

Cross Connection Control

Public Works – Water Resources Program

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Chapter 1 – Introduction

PURPOSE AND SCOPE

This document contains a cross connection control plan for the City of Tumwater and is one element of the City's 2001 Comprehensive Water System Plan update. The purpose of the cross connection control plan is to meet the requirement of WAC 246-290-490, provide a clear definition of regulated existing and potential cross connections, provide procedures and design criteria for backflow prevention, and summarize current city, state, and federal policies and regulations regarding cross connections. The importance of having an approved cross connection control plan in place can be further understood by the following AWWA policy statement on cross connections.

AWWA recognizes water purveyors have the responsibility to supply potable water to their customers. In the exercise of this responsibility, water purveyors must implement, administer, and maintain ongoing backflow prevention and cross-connection control programs to protect public water systems from the hazards originating on the premises of their customers that may impair or alter the water in the public water systems. The return of any water to the public water system after the water has been used for any purpose on the customer's premises or within the customer's piping system is unacceptable and opposed by AWWA.

The water purveyor shall evaluate and regularly re-evaluate each water service to identify any actual or potential situation or connection that may allow backflow into the public water system. The water purveyor shall assure that effective backflow prevention measures, commensurate with the degree of hazard, are implemented to ensure continual protection of the water in the public water distribution system. Inspections of the customer's plumbing system beyond the point of service are generally the responsibility of state or local regulatory agencies having jurisdiction through rules, regulations, and recommendations (e.g., health official, building official). Most plumbing codes are only enforced on officially permitted new construction and renovation. The water purveyor's cross connection control program does not absolve the customer of the responsibility to prevent contamination of the private plumbing system under its control and of the public water system.

If appropriate backflow-prevention measures commensurate with the degree of hazard have not been taken, or the water purveyor has not been provided with reasonable assurance of protection and continual enforcement, the water purveyor shall take necessary measures to ensure that the public water distribution system is protected from any actual or potential backflow hazard. Such action would include the testing, installation, and continual assurance of proper operation and installation of backflow-prevention assemblies and methods commensurate with the degree of hazard at the service connection or at the point of cross connection or both. If these actions are not taken, water service shall ultimately be eliminated.

To reduce the risk private plumbing systems pose to the public water distribution system, the water purveyor's cross connection control program should include public education regarding the hazards backflow presents to the safety of drinking water and should include coordination with the cross connection efforts of local authorities, particularly health and plumbing officials. In areas lacking a health or plumbing enforcement agency, the water purveyor should additionally promote the health and safety of private plumbing systems to protect its customers from the hazards of backflow.

The protection and preservation of the public potable water supply is one of the highest priorities of a water purveyor. Once drinking water has been produced, provisions must be made to ensure that it will not be contaminated with tainted water or substances from other sources.

The purpose of the Tumwater cross connection control program is to establish recommended procedures to be used to protect the public potable water supply from the possibility of contamination or pollution due to existing or potential cross connections, as defined under WAC 246-290-010. This protection of the water consumers' health is maintained by ensuring the proper installation and surveillance of backflow prevention assemblies when actual or potential cross connections exists and cannot be eliminated.

DEFINITIONS

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

Cross Connection	Any actual or potential connection between a potable water line and any pipe, vessel, or machine containing a non-potable fluid, such that it is possible for the non-potable fluid to enter the potable water system by backflow.
Actual Cross Connection	A cross connection that currently exists.
Potential Cross Connection	A cross connection that does not exist at the time of inspection, but which may occur at any time. Examples of potential cross connections include: bypass arrangements, jumper connections, unattached hose connections, intricate piping, existing wells onsite, etc.
Potable Water	Water suitable for human ingestion, free from harmful or objectionable materials.
Non-Potable Water	All liquids and gases that are not potable water. A list of non-potable fluids is virtually infinite, but includes used water, fuel, liquid chemicals, gases, etc. Used water is any potable water that is no longer in the purveyors distribution system. In most cases, this includes any water downstream of the water meter and/or property line. Reclaimed water ¹ is another example of "used water", but is still within the purveyor's distribution system for irrigation or other non-potable purposes.
Backflow	Reverse of the normal flow direction of water in a plumbing system or public water distribution system. It occurs due to a differential pressure existing between two different points within a continuous fluid system; a fluid of higher pressure

¹ Reclaimed water is not currently offered by the City of Tumwater, but it is under consideration as the LOTT Wastewater Alliance, in cooperation with the regional utilities, develops processes and timelines for availability.

flowing to a fluid of lower pressure. Backflow is caused by either backpressure or back-siphonage.

Back Pressure Results when the pressure (caused by a pump, elevated tank, or piping, boiler, or other means) on the consumer's side of the service connection that is greater than the pressure provided by the public water system and which may cause backflow.

Premise Isolation A means of protecting the City owned and controlled water system through the installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the City to isolate the consumer's water system from the City's distribution system.

Back-Siphonage Results from a partial vacuum (negative pressure) within the piping system. Some common causes are (1) high velocities in pipe lines, (2) line repair or break that is lower than a service point, (3) lowered main pressure due to high water withdrawal rate such as fire fighting or water main flushing, and (4) reduced supply pressure on the suction side of the booster pump.

Appendix A contains examples that clearly illustrate typical cross connection situations.

BACKFLOW PREVENTION ASSEMBLIES

A wide choice of assemblies exists that can be used to prevent potential cross connections within the water system. Generally, the selection of the proper assembly to use is based upon the degree of hazard posed by the cross connection. Additional considerations are based upon piping size, location, and the potential need to periodically test the assembly to ensure proper operation. There are six basic types of assemblies/configurations that can be used to prevent potential cross connections:

1. Reduced Pressure Principle Backflow Assembly (RPBA)
2. Double Check Valve Assembly (DCVA)
3. Pressure Vacuum Breaker Assembly (PVBA)
4. Spill-Resistant Vacuum Breakers (SRVB)
5. Air Gaps²
6. Barometric Loops²

² Air Gaps and Barometric Loops 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 Development Services prior to installation to determine if your site is acceptable for either a barometric loop or air gap configuration.

An up-to-date listing of all approved backflow prevention assemblies is available for download through the USC website at: <http://www.usc.edu/dept/fccchr/list/springer.html>.

HOW TO USE THIS MANUAL

The intention of this manual is to aid users in implementing an effective cross control program. Using this manual in conjunction with the *Cross Connection Control Manual, Sixth Edition*. Published by the American Water Works Association, Pacific Northwest Section, this manual will provide the information necessary to ensure that the proper steps are taken towards reviewing new and existing developments for potential cross connections. The use of this information will also ensure that the proper procedures are followed during the installation and inspection of backflow prevention assemblies. This plan is arranged into five sections.

Chapter 2 explains the procedures for program implementation and administration. This section also discusses program policies and associated City actions.

Chapter 3 documents procedures for conducting facility surveys and service types, testing backflow assemblies, and record keeping.

Chapter 4 illustrates the current City ordinance for cross connections and provides an example of a new or modified ordinance.

Chapter 5 describes each of the backflow prevention assemblies and contains illustrations of each. The appendices contain other pertinent information regarding cross connections.

Chapter 2 – Program Implementation, Administration, and Policies

PROGRAM RESPONSIBILITY

Federal and state regulations place the responsibility for cross connection control on the City of Tumwater Public Works Operations as the water purveyor and/or on Development Services as the local authority for in-premise cross-connection prevention. When implementing a cross connection control program, the City needs to follow an organized plan that considers the enforcement authority, administration, personnel, certification, facility surveys, assembly testing, and public education.

In accordance with the Washington Administrative Code (WAC) 246-290-490 (1)(d), the City's responsibility for maintaining cross connection control shall begin at the water supply source, prior to treatment and distribution points. The purveyor's responsibility ends at the point of delivery to the customer's service location. The customer's service location begins at the downstream end of the service connection or water meter located in the public right-of-way or City-held easement. Any issues within the customer's service location after the point of delivery falls under the jurisdiction of the City's Development Services Department. Under Chapter 19.27 of the Revised Code of Washington (RCW), the responsibility for cross connection control within the consumer's service location, i.e., within the property lines of the consumer's premises, falls under the jurisdiction of Tumwater's Development Services as the local administrative authority.

ENFORCEMENT AUTHORITY

Tumwater Municipal Code (TMC) details City policy of cross connection control for the purpose of protecting the health of customers receiving water from the City by protecting the public water system from contamination under Chapters 13.04.430 – 13.04.490. As of the date of this publication, TMC revisions are underway to reflect the new regulations on purveyor responsibility and other issues.

ADMINISTRATION

The City's Public Works Department will carry out the functions of the water purveyor's cross connection control program, including survey, enforcement, and record keeping. The Superintendent of Public Works will oversee and manage program administration and designate an employee to carry out daily procedures. This designee will meet the requirements outlined in the section below labeled "Certification".

As with any successful program, the City of Tumwater has developed working relationships with multiple agencies on the federal, state, and local level. **Figure 2.1**, below, illustrates the relationship between the regulatory agencies and the program standards. **Figure 2.2** demonstrates the working relationship between Tumwater's Water Public Works Department and Tumwater's administrative agency, for in-premise cross connection control, Development Services, for the administration of the city's cross connection control program. **Figure 2.3** illustrates the flow of the plan review process for cross connection control.

Table 2.4 is a complete list of all certified cross connection control specialists employed with the City of Tumwater. Updates to this list will continue as necessary and recorded in the City's current edition of the cross connection control plan.

In the execution of this program, the Operations & Maintenance Division, in conjunction with the Engineering Division of the Public Works Department, and Development Services will have regular open communication. Each department is responsible to maintain and survey facilities as stated above under Program Responsibility. **By agreement between Development Services and Public Works, Public Works Operations will have authority, including survey and enforcement, over residential and fire protection service connections beyond the meter, up to and including the backflow protection assembly.** Responsibility for survey and enforcement of in-premise assemblies shall remain with the Development Service Department. In the event of a discrepancy of jurisdictional responsibility, the WAC and RCW directives take precedence. To resolve any conflicts, department directors will discuss appropriate measures to mitigate the current and similar future issues.

CITY POLICIES

The City has enacted varied policies to ensure the safety and quality of drinking water for all its customers. In accordance with the policies adopted in the Comprehensive Plan, the Public Works staff will operate to:

“Provide the highest quality water in sufficient quantity to meet the needs of the City”

The City of Tumwater Public Works Water Department accepts the responsibility to supply safe drinking water throughout the City. Part of this responsibility includes ensuring that the water is not contaminated prior to reaching the consumer due to backflow of contaminated water into the distribution system. To ensure backflow contamination does not occur and to maintain our high quality water supply, the City will enforce the policies outlined below.

Policy: As the Purveyor, the City Public Works Department will know the complete water distribution system in detail.

Action(s): Public Works operators will maintain a complete database of the complex infrastructure of the water system in detail. Operators will identify the type of connection required by each application or land use. Operators will know the various types of customers in the area and the amount of protection that currently exists. Operators will identify the need for greater protection in the event of new development or revisions on the property use.

Policy: Minimize the potential hazards of new cross connections.

Action(s): Review plans for new construction to identify potential cross connections.

Initiate procedures that will route all requests for new service or enlargement of existing services to the Plan Review Section of Development Services for identification of any cross connections.

Continue requiring the submission of plumbing plans with the construction plans for approval before issuance of a building permit.

FIGURE 2.1 - REGULATORY STANDARDS FOR CROSS CONNECTION CONTROL

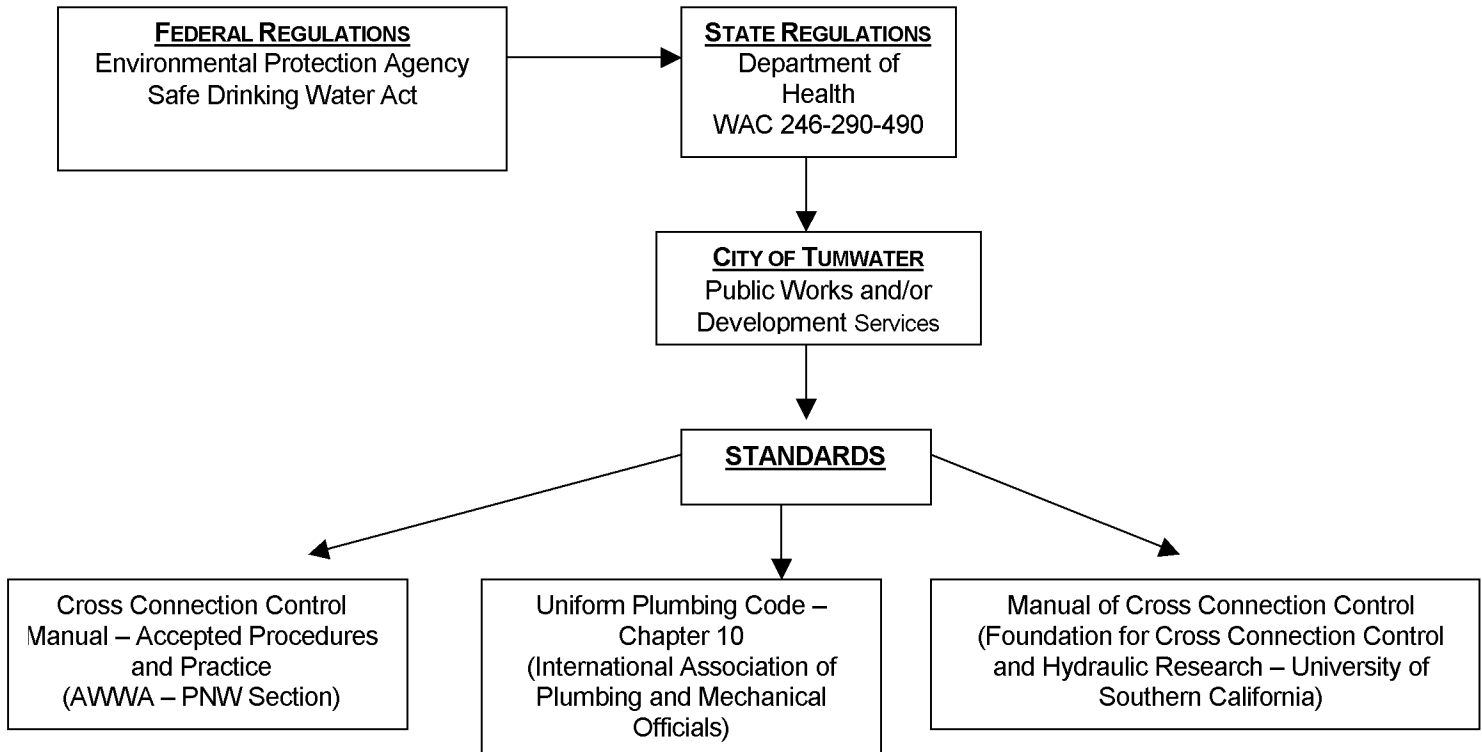


FIGURE 2.2 – DEPARTMENTAL RESPONSIBILITIES FOR CROSS CONNECTION CONTROL

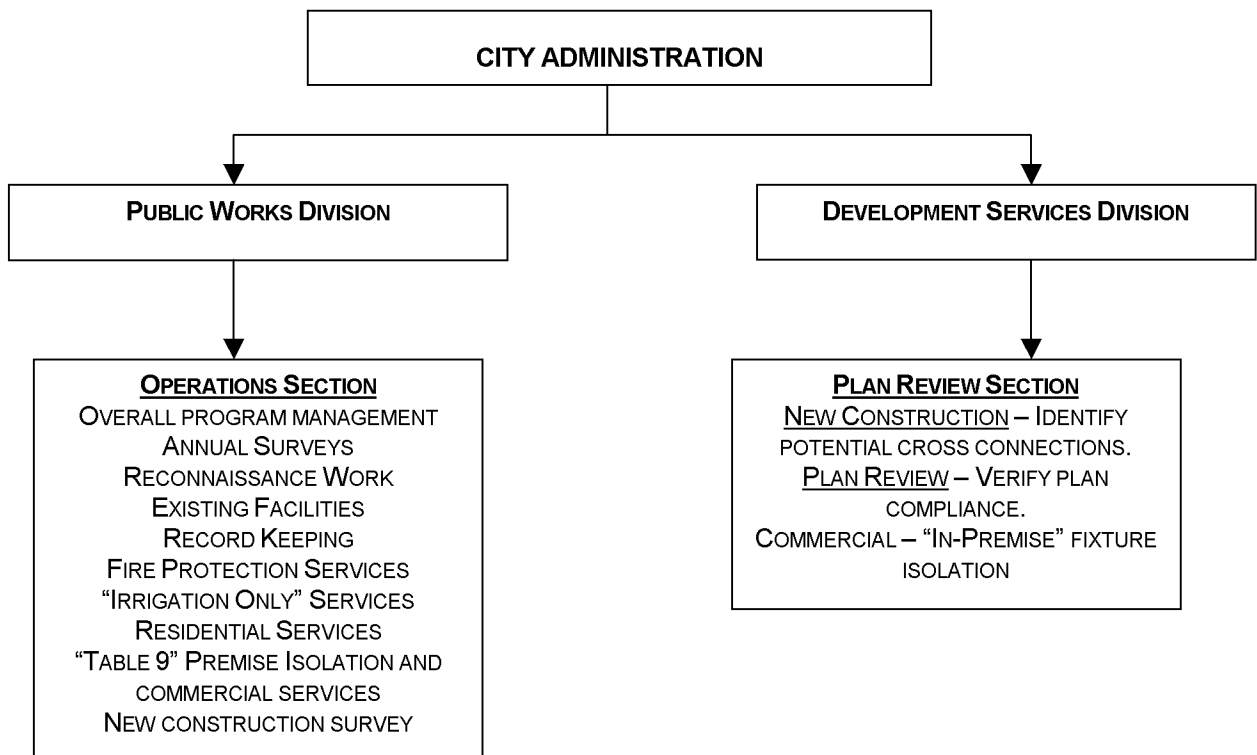


FIGURE 2.3 – PLAN REVIEW PROCESS FOR CROSS CONNECTION CONTROL

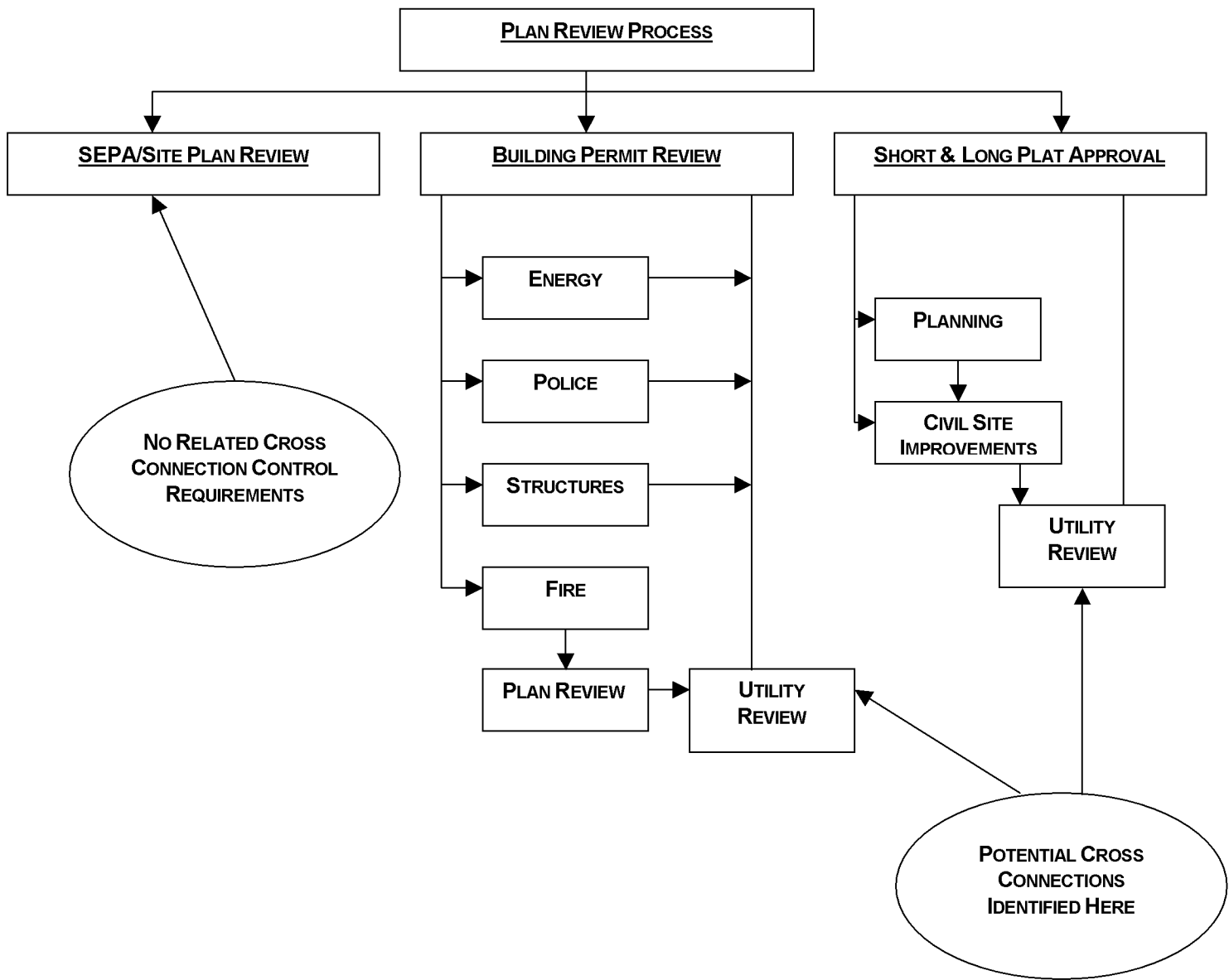


TABLE 2.4 – CITY OF TUMWATER CROSS CONNECTION CONTROL SPECIALISTS

<u>NAME & TITLE</u>	<u>DEPARTMENT</u>	<u>CERTIFICATION NUMBER</u>
Dave Barclift, CCS ³	Operations & Maintenance	4153
Tiffany Ihly, CCS, BAT ⁴	Operations & Maintenance	7488 – CCS, B2350 – BAT
Wayne Lobaugh, BAT	Facilities	B2984

³ Cross-Connection Specialist

⁴ Backflow Assembly Tester

City Policies, Continued.

Policy: Minimize the potential hazards of existing cross connections.

Action(s): Update and maintain a list of all existing cross connections and all backflow prevention assemblies throughout the City's service area.

Establish a reconnaissance program that inspects existing facilities for actual or potential cross connections within the City water system. This is an on-going endeavor that concentrates on all facilities under the authoritative jurisdiction of the City.

Inform all owners of fire sprinkler systems, both commercial and residential, of the new State requirements regarding these systems and require all owners to upgrade to current standards.

Policy: Public Works Operations will take corrective action if an existing cross connection is brought to the City's attention that is not controlled commensurate to the assessed degree of hazard.

Action(s): The City will make every effort to bring the consumer into compliance. Consumer retrofits will be required. The City may offer financial assistance to those who can prove hardship per Tumwater's Finance Department guidelines.

Ultimately, if the consumer does not abide by the regulations set forth by the City, the City may deny or discontinue water service to a customer's premise until the cross-connection hazard is eliminated or controlled to the satisfaction of program staff. As an alternative, the City may opt to install an assembly at the owner's expense to eliminate the potential for cross connection. In this event, the Program staff will notify Development Services in all cases prior to the action, to determine if a permit is needed, except in the event of an emergency.

Policy: Public Works Operations will be responsible for implementing Tumwater's Cross Connection Control Program for the protection of the City's drinking water distribution system.

Action(s): This section will ensure that annual testing is performed, that records of all actions for each assembly are kept on file, and that an on-going search for existing, uncontrolled, or unmonitored cross connections are performed.

Policy: Development Services will be responsible for reviewing all in-coming plans and requests for new construction. It will also be responsible for identifying potential cross connections, and ensuring that development plans meet the cross connection standards and criteria of the City. Other arrangements may be made by agreement between the Public Works Director and the Development Services director, on a case-by-case basis.

Action(s): All requests for new service, repair, or enlargement of existing services requiring a permit will route through the Development Services Department.

All new construction plans shall be reviewed and assessed for cross connections, and backflow prevention assemblies shall be installed correctly and concurrent with that facility.

Policy: The City will make every reasonable effort to ensure that all existing or potential cross connections, including in-premise cross connections, that cannot be eliminated are protected with an approved backflow prevention assembly. Ensure that all existing cross connection assemblies comply with the City's program.

Action(s): The City will make every reasonable effort to eliminate the potential hazard, add protection to the existing system, or disconnect water service at the owner's expense, to any premise where the customer fails to cooperate in the installation, maintenance, testing, inspection, or replacement of any backflow prevention assembly.

Notify the customer of all responsibilities and options required by the City's Cross Connection Control Program.

Make available to the general public, especially those affected by the Cross Connection Control Ordinance, all information necessary to assist them in complying with the City's cross connection control program.

When cross connections cannot be eliminated, the potential hazard will be controlled by the installation of an approved backflow assembly commensurate with the degree of hazard.

Policy: The City will conduct an annual inspection program and maintain testing results with the goal that all existing backflow prevention assemblies maintain proper operating condition compliant with the State regulations.

Action(s): Maintain a testing program wherein the City informs all backflow prevention assembly owners of their responsibility to have their assembly tested annually by a certified tester.

Keep records on all existing assemblies and verify that each passes an annual test.

Provide random spot inspections of existing assemblies to verify that they are properly installed and in working order.

Replace existing assemblies that are no longer on the most current Washington State approved list. However, these assemblies may remain in service until maintenance is required, at which point the owner will be notified that the assembly must be replaced.

PERSONNEL AND CERTIFICATION

The Superintendent of Public Works, as Operator of the water system, or his/her designee, will be responsible for organizing and implementing the Cross Connection Control Program. Any staff member involved in the administration of this program will receive training through recognized courses and seminars to become a certified cross connection control specialist. The staff member name and certification number will be updated and entered into **Table 2.4** of this manual.

To effectively manage the program, a staff member, as designated by the Public Works Superintendent, will provide assistance in surveying facilities, to provide additional information about potential cross connections in other areas of the Public Works duties, to provide educational outreach efforts, and to provide continuity in the program for personnel changes. This skilled staff member will also receive certifiable training in cross connection control (CCS) and backflow assembly testing (BAT). Individuals obtaining either CCS or BAT certification will be added to the **Table 2.4** list of City approved Cross Connection Specialists.

Currently, the City needs no additional employees to accomplish the goals of the Cross Connection Control Program. Public Works Operations will review the staffing needs annually to determine if the goals outlined in the program can be met given current staffing levels.

PUBLIC EDUCATION

The City will develop a procedure to provide cross connection control information and educate consumers about the operation of their water system. Such a program may include periodic bill inserts, public service announcements, pamphlet distribution, notification of new consumers, speeches to local civic groups or organizations, displays at local shopping outlets, and consumer confidence reports.

FINANCIAL IMPACTS

The costs to administer this Cross Connection Control Program arise primarily from personnel needs to review and identify cross connection hazards and to cover assembly testing and inspection in the Public Works Department. Funding for the program will be provided from the Utility Operating Fund for Public Works responsibilities.

Chapter 3 – Facility Surveys, Assembly Testing, & Record Keeping

The City of Tumwater Public Works Water Department has identified five types of services covered under the Cross Connection Control Program for drinking water. Due to the inherent potential cross connection hazards that exist with these services, the City requires premise isolation under most conditions. Under WAC 246-290-490 (4)(b)(iii) Table 9, the Department of Health identifies services of high health risk and requires premise isolation (see **Table 3.1** for those identified hazards). The City of Tumwater has opted for higher, proactive protection than Table 9, requiring premise isolation for *all* development except residential. Residential development will be considered on a case-by-case basis according to the assessed degree of hazard that exists.

COMMERCIAL/INDUSTRIAL SERVICE

Under existing City standards, all new development is required to install and maintain an approved, premise isolation cross connection control assembly that is commensurate to the assessed degree of hazard.

MULTI-FAMILY SERVICE

Any residential development having one or more metered connections serving more than 2 living units per meter will be treated as a commercial service for the purposes of this program.

FIRE SERVICE

Backflow protection is not required by the state for residential flow-through or combination fire protection systems constructed of potable water piping and materials. For service connections with fire protection systems other than flow-through or combination, the City program will, where such a case exists, ensure that premise isolation is installed in accordance with WAC 51-56-0600 of the Universal Plumbing Code (UPC).

The City will inspect and survey fire services annually, coordinating with the City Fire Department to acquire records indicating sites with fire service connections.

RESIDENTIAL SERVICE

For single-family residential homes, premise isolation is not mandatory unless the premise is regulated under the provisions of **Table 3.1**. If the premise is not regulated under Table 3.1, the City will rely upon backflow prevention at the point of hazard, in accordance with WAC 51-56-0600 of the UPC. Residential hazards, such as irrigation systems, swimming pools, spas, ponds, or boilers, will require the installation of an

approved backflow assembly by the consumer as specified by Program staff if a potential for cross connection exists.

IRRIGATION-ONLY SERVICE

The City will ensure that all irrigation-only services will receive protection that matches the assessed degree of hazard. Generally, the City will require premise isolation for all premises in need of protection.

TABLE 3.1 – DOH “TABLE 9” – HIGH HEALTH CROSS CONNECTION HAZARD PREMISES REQUIRING PREMISE ISOLATION BY AIR GAP (AG) OR REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA)⁵

Agricultural (farms and dairies)
Beverage bottling plants
Car washes
Chemical plants
Commercial laundries and dry cleaners
Premises providing both reclaimed and potable water
Film processing facilities
Food processing plants
Hospitals, medical centers, nursing homes, veterinary, medical, and dental clinics, and blood plasma centers.
Premises with separate irrigation systems using the utilities water supply and with chemical addition⁶
Laboratories
Metal plating industries
Mortuaries
Petroleum processing or storage plants
Piers and docks
Radioactive material processing plants or nuclear reactors⁷
Survey access denied or restricted
Wastewater lift and pumping stations
Wastewater treatment plants⁷
Premises with an auxiliary water supply⁸

NEW CONSTRUCTION

All applications for new services and enlargement of existing services will route through the Development Services department for the initial review of the plans to determine if any actual and/or potential cross connection hazard exists. The plot plan, mechanical plan, and plumbing fixture schedule will be submitted for review. Reviewers will make use of this plan and other applicable publications, such as the Plumbing Code, when assessing the cross connections.

As developers seek final approval for their plans, Development Services will require that backflow prevention assemblies are listed on the final plans before issuance of any approval. Experience shows that if the assemblies are shown on the plans, they are

⁵ This table is subject to amendment. Please refer to WAC 246-290-490(4)(b)(iii) for current table.

⁶ For example, parks, playgrounds, golf courses, cemeteries, estates, etc.

⁷ RPBA's for connections serving these premises are acceptable only when used in combination with an in-plant approved air gap; otherwise, Turnwater will require an approved air gap at the service connection.

⁸ Portion of text amended that differs from DOH “Table 9”.

normally installed. Approval of the cross connection plan will not relieve the consumer of the responsibility to comply with the requirements of the other agencies having jurisdiction or future requirements to meet a higher standard for the protection of the public health and safety. The City, or other agencies, may still require the customer to install additional backflow assemblies or other modifications determined necessary in the final survey of the facilities prior to providing water service, or at a future date should changes in the customer's water use or plumbing increase the degree of risk to the City's water distribution system.

As part of the plan approval process, Development Services will provide the customer with the City's installation standards for assemblies and the assembly test requirements.

Upon completion of construction, the City will follow up with a facility survey to address compliance issues. After the survey, the City will notify the customer in writing, via survey report or letter, requesting changes, if needed, to bring the customer into compliance with the City's cross connection control program. Water service will not be connected until the customer has complied with all of the cross connection control requirements imposed by the City. These requirements must include the satisfactory completion of the assembly test by a certified tester.

The City will confirm with each non-residential customer verbally and in writing after successful completion of the cross connection control requirements and request that the customer notify the City when any changes are made to the customer's plumbing or in the customer's water use (if the water is to be utilized in any way other than for domestic consumption or if domestic use includes any use on Table 9 (e.g. reclaimed water use).

EXISTING FACILITIES

The City Public Works Department will develop a list and survey schedule of all existing facilities, based on the typical risk assessment of the various categories of facilities. The list will start with the highest risk categories, i.e., those with the highest health hazard. Table 3.1 is a valuable resource to prioritize existing facilities. Once established, this list and schedule will outline the initial survey and periodic repeat survey of facilities. Staff will utilize this list in order, except in circumstances that require a special survey of a facility, such as a response to a water quality complaint.

The City currently shows 1,014 backflow prevention assemblies in its database. Of these, it is Public Works' responsibility to track 719 assemblies to meet the requirements of the Department of Health program. Sixty-one (61) of these assemblies have been installed that meet the "Table 9" (see Table 3.1) definition of high-risk premises. An additional 135 fire sprinkler services have had backflow prevention assemblies installed and Public Works currently tracks their status.

The remaining 199 identified assemblies in the database are considered "in-premise". These assemblies fall under the jurisdiction of Development Services. The City of Tumwater owns the most assemblies, 64, and the Miller Brewery and Columbia Beverage are the largest private assembly owners with 22 and 14 assemblies respectively.

During 2002, Public Works Operations staff logged 1,026 hours in carrying out the requirements of the cross connection control program. Time requirements are attributed

primarily to testing and maintenance of the identified assemblies. Staff time is also dedicated to sending letters to homeowners and business owners/operators and making contacts to set up survey appointments.

SURVEY PROCEDURE

To initiate a survey, staff will set an appointment to meet with the owner or authorized representative of the facility to be surveyed. Staff will explain, in writing and verbally, that the purpose of the survey is to ensure the protection of the water distribution system from contamination, and that the survey is not for the purpose of identifying and isolating all cross connections *within* the customer's premise. Staff will explain the customer's responsibility to protect the public water supply, the Public Works Department's conditions for service, and other applicable regulations either at the time of the contact or at the survey appointment. Staff may request that the customer or a maintenance person familiar with the plumbing system accompany staff at the time of the survey for accurate assessment of the system.

During the survey, staff will identify cross connections and explain to the customer the City's concern about potential health risks to the public. Staff will take pictures and fully document all high hazard cross connections in order to locate them during future tests and/or surveys. Once the survey is complete, staff will mail a copy of the report to the customer. The survey report will state the backflow assemblies required by the City at the meter for premise isolation to protect the water distribution system, and the assessment of the hazard or reason for the protection requirements. Staff will also include a copy of the City's installation standards and a list of approved assemblies with the customer's survey report. After identification of a cross connection hazard, the consumer will be notified in writing that he/she must comply with the City requirements within ninety days.

ASSEMBLY TESTING

To maintain compliance under state regulations, staff will require all backflow prevention assemblies to be tested using procedures specified in the most current edition of the University of Southern California (USC) Cross Connection Control Manual as required to protect the City's water distribution system. A certified Backflow Assembly Tester (BAT) will test these assemblies upon installation, after repair or relocation, after a backflow incident, and at a minimum of annually. Either a BAT or Cross Connection Specialist (CCS) will inspect all City-approved air gaps annually. The City requires that inspections and testing of all assemblies installed on irrigation systems are conducted at the time of installation, after a backflow incident, and after repair, reinstallation, or relocation. After testing and inspection, staff will report to the Cross Connection Control program administrator for review, determination of follow-up action (if necessary), and comparison to previous results for the specific assembly.

When the field test report shows that an assembly has failed its test, the City will require the customer to repair the assembly and return it to proper working condition in an amount of time to be determined on a case-by-case basis depending on the hazard.

If a certified private contractor completes the assembly testing, staff will periodically review and audit, via re-tests, testing results to ensure accuracy and limit City liability. Testers on staff at the City will submit verification of the calibration of their test kit annually. The City will specify the agency and acceptable methods for the verification of

test equipment calibration accuracy and test equipment calibration (e.g., USC FCCCHR procedures). The City will report any testing discrepancies to DOH for further action.

RECORDS AND REPORTING

An adequate record system is essential to the successful operation of a cross connection control program. Required by the Washington State Department of Health (DOH), these records will form the basis of any enforcement action or legal defense by the City. The DOH requires that the City have all records and reports available to the department or its representative(s) upon request. The Cross Connection Program staff will develop and maintain cross connection control records that will contain the following:

- A master list of service connections and/or consumer's premises where the City relies upon approved backflow preventers to protect the public water system from contamination, the assessed hazard level of each, and the required backflow preventer.
- Inventory information on:
 - i. Approved air gaps installed in lieu of approved assemblies including exact air gap location, assessed degree of hazard, installation date, history of inspections, inspection results, and person conducting inspections.
 - ii. Approved backflow assemblies including exact assembly locations, assembly description (type, manufacturer, model, size, and serial number), assessed degree of hazard, installation date, history of inspections, tests and repairs, test results, and person performing the inspection(s).
 - iii. Existing approved AVBs used for irrigation system applications including location, description, (manufacturer, model, and size), installation date, history of inspections, and person performing inspections. AVBs will not be approved for new installation.
- Program staff will complete cross connection program summary reports and backflow incident reports annually and retained for five years.

In accordance with WAC 246-290-490(8)(a), the City will retain records pertaining to the master list of service connections and/or consumer's premises for as long as the premises pose a cross connection hazard. Once the hazard or connection is removed from the system, the City will retain the records for a minimum of five years.

In the event of a cross connection incident that has contaminated the public water system or occurred within a premise of a consumer served by the City, the City will notify DOH, Development Services, and the Thurston County Health Department as soon as possible after the incident, but no later than the end of the next business day, in accordance with WAC 246-290-490(8)(f). The City will document the details of the backflow incident using the *Backflow Incident Report Form* found in Appendix C. The City will include all backflow incident report(s) and the annual cross connection control program summary.

Chapter 4 – Cross-Connection Ordinance Information

INTRODUCTION

Appendix B contains the current City and State ordinances for cross connections. The Washington State DOH and the American Water Works Association (AWWA) have separately established criteria for the substantive requirements of City ordinances concerning cross connection control. The following is an example of ordinance language in compliance with these criteria.

ORDINANCE BACKGROUND

Purpose

Under the provisions of the Safe Drinking Water Act of 1986, the federal government has established, through the EPA, national standards for safe drinking water. These standards, as they apply to cross connections, are enforced by the State of Washington through the DOH under WAC 246-290-490. The City of Tumwater, as the water purveyor, has the primary responsibility for preventing water from unapproved sources from entering the public potable water system.

This ordinance, in conjunction with Chapter 10 of the UPC, WAC 246-290-490, and the current edition of the Cross Connection Control Manual Accepted Procedure and Practice, AWWA – PNW section, is to protect the health of the water consumer and the potability of the water in the distribution system. This is accomplished by eliminating or controlling all actual (direct) and potential (indirect) cross connection between potable and non-potable systems through the use of approved backflow prevention assemblies. The City of Tumwater is required to ensure that such assemblies are installed properly, receive annual inspection and tests, and that all new and existing plumbing systems are reviewed for identification of cross connections.

Applicability

The provisions of this chapter apply throughout the water service area of the City of Tumwater. They apply to all systems installed prior to or after its enactment. Therefore, any customers using water from the City of Tumwater are responsible for compliance with these regulations and shall be strictly liable for all damage incurred as a result of failure to comply with the express terms and provisions contained herein.

Enforcement

The Superintendent of Public Works will administer the provisions of this chapter. The Superintendent will designate cross connection specialists and establish all necessary rules and regulations to enforce these provisions. The City's Public Works Department will be responsible for monitoring, inspecting, and maintaining records for all existing cross connection assemblies except commercial in-premise fixture protection. Development Services will be responsible for reviewing all new and improvement plans

for cross connections. Development Services will also be responsible for ensuring the installation, testing, and maintenance of cross connection control assemblies for all commercial and industrial “in-premise” locations as deemed appropriate by Development Services and maintaining the associated records. Public Works staff will be responsible for ensuring the installation of all residential in premise assemblies as deemed appropriate.

Installation of Backflow Prevention Assemblies

Backflow prevention assemblies required by this chapter must be installed so as to be readily accessible for maintenance and testing. All assemblies shall be connected at the meter, the property line when meters are not used, or within any premise for which, in judgment of the City of Tumwater Cross Connection Control Specialist, the nature and extent of activity on the premises, or the materials used or stored, could present a health hazard, should a cross connection occur. This category includes:

1. Premises having an auxiliary water supply.
2. Premises having internal cross connections that are not correctable, or intricate plumbing arrangements which make it impractical to ascertain whether cross connections exist.
3. Premises where entry is restricted so that inspections for cross connections cannot be made with sufficient frequency or at sufficient short notice to ensure that cross connections do not exist.
4. Premises having a repeated history of cross connections being established or re-established.
5. Premises on which any substance is handled under pressure so as to permit entry into the public water system, or where a cross connection could reasonably be expected to occur. This includes the handling of process waters and cooling waters.
6. Premises where materials of a toxic or hazardous nature are handled such that if a back-siphonage should occur, a health hazard may result.
7. Any premise found on Table 3.1 (also known as DOH Table 9 -- WAC 246-290-490).
8. Fire sprinkler systems.
9. Irrigation systems.
10. Others as specified by the Superintendent and/or Director of Development Services.

Types of Backflow Prevention Assemblies Required

Specific types of backflow prevention assemblies are required in the following conditions:

1. An air gap separation or reduced principle backflow prevention assembly shall be installed where the water supply may be contaminated by industrial materials or waste of a toxic nature or any other contamination which would cause a health or system hazard.

2. An air gap must be used between a potable water supply and sewer-connected wastes.
3. Lawn sprinkler or irrigation systems, which are supplied by City water only as opposed to well-irrigated systems, shall be required to have a backflow prevention assembly as specified by program staff. If such systems contain an auxiliary pump or are subject to chemical additives, air gap separation or a reduced pressure principle backflow prevention assembly will be required.

Requirements

Public Works and Development Services

1. Public Works will perform evaluations and inspections of all existing facilities and inform the owner by letter of any corrective action deemed necessary, the method of achieving the correction, and the time allowed to make the correction. Development Services maintains authority over any "in-premise" assemblies.
2. Public Works shall ensure that all backflow prevention assemblies that are the responsibility of the water purveyor are tested annually to ensure satisfactory operation. Development Services maintains authority over any "in-premise" assemblies.
3. The City's Public Works Department shall inform the owner by letter, of any failure to comply with cross connection control requirements, preceding the first re-test and re-inspection. Once notified, the customer will be allowed fifteen (15) days to take corrective action, as specified by Public Works. In the event the Owner fails to comply with the necessary correction by the time of the second re-test and re-inspection, Public Works will inform the Owner, by letter, that the water service to the Owner's premises may be terminated within a period not to exceed five (5) days.
4. If Public Works determines at any time that a serious threat to the public health exists, water service may be terminated immediately and without notice.
5. For new developments, Public Works Operations will provide an on-site evaluation to determine if cross connections exist and what type of backflow preventer, if any, will be required before a water meter permit can be issued. All new commercial/industrial developments, multi-family, and fire protection services will be required to have "premise isolation" regardless of business application.

Owner

1. The Owner shall be responsible for the elimination or protection of all cross connections on his/her premises.
2. The Owner, whether notified by the City or not, shall, at the expense of the Owner, install, maintain, and have tested by a certified tester any and all backflow prevention assemblies on the premises.
3. The Owner shall return the assembly test reports to the City of Tumwater within thirty (30) days after receipt of the yearly test notification.
4. The Owner shall notify the City of any proposed or modified cross connections.

5. Owners who cannot shut down for operation for testing of assemblies must provide bypass piping with an additional backflow assembly at their expense.
6. The Owner shall only install backflow prevention assemblies that are approved by the Washington State DOH (WAC 246-290-490(4) & (5)).
7. The Owner shall only install backflow prevention assemblies in a manner that is approved by the Washington State DOH (WAC 246-290-490(6)(b)).
8. The Owner will be required to install a backflow prevention assembly at the service entrance if a private water source is maintained on his/her premise, even if it is not connected to the City's system.
9. Failure of the Owner to cooperate in the installation, maintenance, repair, inspection and testing of backflow prevention assemblies required by this ordinance may be grounds for the termination of water service, or the City will install an assembly at the expense of the owner.

Annual Inspection and Testing Requirements

All reduced pressure principle backflow assemblies, double check valve assemblies, spill-resistant vacuum breaker assemblies, pressure vacuum breaker assemblies, and air gaps installed in lieu of a backflow preventer, shall be inspected and tested annually or more often when successive inspections indicate failure. All inspections and testing will be done by a certified tester. The test reports shall be returned to the City of Tumwater within thirty (30) days after the receipt of the yearly test notification.

