

## **Appendix G**

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### Public Meeting Minutes

- Water Use Efficiency Program Public Notice
- Water System Plan Approval Public Notice
- Council Approval of Water Use Efficiency Program
- Council Approval of Water System Plan

Note: Waiting for Appendix G documents as of 3/6/2013.

## **Appendix H**

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### Cross Connection Control Program

- Department of Health Cross Connection Control Requirements
- Cross Connection Control Program, See Kelso Municipal Code Chapter 13.04.060 (Appendix F)
- Annual Cross Connection Summary Report



# Cross-connection control rules and definitions

**Extracts from Group A Public Water Supplies, chapter 246-290 WAC**  
The full rule is online at <http://www.doh.wa.gov/ehp/dw/publications/331-010.pdf>

## WAC 246-290-010 Definitions.

"**Approved air gap**" means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel. To be an air gap approved by the department, the separation must be at least:

- Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch, when unaffected by vertical surfaces (sidewalls); and:
- Three times the diameter of the supply piping, if the horizontal distance between the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe, or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and in no case less than one and one-half inches.

## Acronyms

<b>AG</b>	air gap
<b>AVB</b>	atmospheric vacuum breaker
<b>AWWA</b>	American Water Works Association
<b>BAT</b>	backflow assembly tester
<b>CCS</b>	cross-connection control specialist
<b>DCDA</b>	double check detector assembly
<b>DCVA</b>	double check valve assembly
<b>EPA</b>	U.S. Environmental Protection Agency
<b>IAPMO</b>	International Association of Plumbing and Mechanical Officials
<b>PVBA</b>	pressure vacuum breaker assembly
<b>RPBA</b>	reduced pressure backflow assembly
<b>RPDA</b>	reduced pressure detector assembly
<b>SVBA</b>	spill resistant vacuum breaker assembly
<b>UPC</b>	Uniform Plumbing Code
<b>WAC</b>	Washington Administrative Code

"**Approved atmospheric vacuum breaker (AVB)**" means an AVB of make, model, and size that is approved by the department. AVBs that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or that are listed or approved by other nationally recognized testing agencies (such as IAPMO, ANSI, or UL) acceptable to the authority having jurisdiction are considered approved by the department.

"**Approved backflow preventer**" means an approved air gap, an approved backflow prevention assembly, or an approved AVB. The terms "approved backflow preventer," "approved air gap," or "approved backflow prevention assembly" refer only to those approved backflow preventers relied upon by the purveyor for the protection of the public water system. The requirements of WAC 246-290-490 do not apply to backflow preventers installed for other purposes.



**"Approved backflow prevention assembly"** means an RPBA, RPDA, DCVA, DCDA, PVBA, or SVBA of make, model, and size that is approved by the department. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or other entity acceptable to the department are considered approved by the department.

**"Authority having jurisdiction"** (formerly known as local administrative authority) means the local official, board, department, or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code as adopted under chapter 19.27 RCW.

**"Backflow"** means the undesirable reversal of flow of water or other substances through a cross-connection into the public water system or consumer's potable water system.

**"Backflow assembly tester"** means a person holding a valid BAT certificate issued under chapter 246-292 WAC.

**"Backpressure"** means a 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.

**"Backsiphonage"** means backflow due to a reduction in system pressure in the purveyor's distribution system and/or consumer's water system.

**"Combination fire protection system"** means a fire sprinkler system that:

- Is supplied only by the purveyor's water;
- Does not have a fire department pumper connection; and
- Is constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer's potable water system.

**"Consumer"** means any person receiving water from a public water system from either the meter, or the point where the service line connects with the distribution system if no meter is present. For purposes of cross-connection control, "consumer" means the owner or operator of a water system connected to a public water system through a service connection.

**"Consumer's water system"** as used in WAC 246-290-490, means any potable or industrial water system that begins at the point of delivery from the public water system and is located on the consumer's premises. The consumer's water system includes all auxiliary sources of supply, storage, treatment, and distribution facilities, piping, plumbing, and fixtures under the control of the consumer.

**"Contaminant"** means a substance present in drinking water that may adversely affect the health of the consumer or the aesthetic qualities of the water.

**"Council"** means the Washington state building code council under WAC 51-04-015(2).

**"Cross-connection"** means any actual or potential physical connection between a public water system or the consumer's water system and any source of nonpotable liquid, solid, or gas that could contaminate the potable water supply by backflow.

**"Cross-connection control program"** means the administrative and technical procedures the purveyor implements to protect the public water system from contamination via cross-connections as required in WAC 246-290-490.

**"Cross-connection control specialist"** means a person holding a valid CCS certificate issued under chapter 246-292 WAC.

**"Cross-connection control summary report"** means the annual report that describes the status of the purveyor's cross-connection control program.

**"Department"** means the Washington state department of health or health officer as identified in a joint plan of operation under WAC 246-290-030(1).

**"Distribution system"** means all piping components of a public water system that serve to convey water from transmission mains linked to source, storage and treatment facilities to the consumer excluding individual services.

**"Emergency"** means an unforeseen event that causes damage or disrupts normal operations and requires immediate action to protect public health and safety.

**"Flow-through fire protection system"** means a fire sprinkler system that:

- Is supplied only by the purveyor's water;
- Does not have a fire department pumper connection;
- Is constructed of approved potable water piping and materials to which sprinkler heads are attached; and
- Terminates at a connection to a toilet or other plumbing fixture to prevent stagnant water.

**"High health cross-connection hazard"** means a cross-connection involving any substance that could impair the quality of potable water and create an actual public health hazard through injury, poisoning, or spread of disease.

**"In-premises protection"** means a method of protecting the health of consumers served by the consumer's potable water system, located within the property lines of the consumer's premises by the installation of an approved air gap or backflow prevention assembly at the point of hazard, which is generally a plumbing fixture.

**"Low cross-connection hazard"** means a cross-connection that could impair the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of potable waters for domestic use.

**"Potable"** means water suitable for drinking by the public.

**"Premises isolation"** means a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the purveyor to isolate the consumer's water system from the purveyor's distribution system.

**"Public water system"** is defined and referenced under WAC 246-290-020.

**"Purveyor"** means an agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or person or other entity owning or operating a public water system. Purveyor also means the authorized agents of these entities.

**"Reclaimed water"** means effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for beneficial use or a controlled use that would not otherwise occur, and it is no longer considered wastewater.

**"Severe health cross-connection hazard"** means a cross-connection which could impair the quality of potable water and create an immediate, severe public health hazard through poisoning or spread of disease by contaminants from radioactive material processing plants, nuclear reactors, or wastewater treatment plants.

**"State building code"** means the codes adopted by and referenced in chapter 19.27 RCW; the state energy code; and any other codes so designated by the Washington state legislature as adopted and amended by the council.

**"Unapproved auxiliary water supply"** means a water supply (other than the purveyor's water supply) on or available to the consumer's premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

**"Uniform Plumbing Code (UPC)"** means the code adopted under RCW 19.27.031(4) and implemented under chapter 51-56 WAC. This code establishes statewide minimum plumbing standards applicable within the property lines of the consumer's premises.

**"Used water"** means water which has left the control of the purveyor.

## **WAC 246-290-490 Cross-connection control.**

### **(1) Applicability, purpose, and responsibility.**

- (a) All community water systems shall comply with the cross-connection control requirements specified in this section.
- (b) All non-community water systems shall apply the principles and provisions of this section, including subsection (4)(b) of this section, as applicable to protect the public water system from contamination via cross-connections. Noncommunity systems that comply with subsection (4)(b) of this section and the provisions of WAC 51-56-0600 of the UPC (which addresses the installation of backflow preventers at points of water use within the potable water system) shall be considered in compliance with the requirements of this section.
- (c) The purpose of the purveyor's cross-connection control program shall be to protect the public water system, as defined in WAC 246-290-010, from contamination via cross-connections.
- (d) The purveyor's responsibility for cross-connection control shall begin at the water supply source, include all the public water treatment, storage, and distribution facilities, and end at the point of delivery to the consumer's water system, which begins at the downstream end of the service connection or water meter located on the public right of way or utility-held easement.
- (e) Under this section, purveyors are not responsible for eliminating or controlling cross-connections within the consumer's water system. Under chapter 19.27 RCW, the responsibility for cross-connection control within the consumer's water system, i.e., within the property lines of the consumer's premises, lies with the authority having jurisdiction.

## (2) General program requirements.

- (a) The purveyor shall develop and implement a cross-connection control program that meets the requirements of this section, but may establish a more stringent program through local ordinances, resolutions, codes, bylaws, or operating rules.
- (b) Purveyors shall ensure that good engineering and public health protection practices are used in the development and implementation of cross-connection control programs. Department publications and the most recently published editions of references, such as, but not limited to, those listed below, may be used as guidance for cross-connection program development and implementation:
  - (i) *Manual of Cross-Connection Control* published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California (USC Manual);
  - (ii) *Cross-Connection Control Manual, Accepted Procedure and Practice* published by the Pacific Northwest Section of the American Water Works Association (PNWS-AWWA Manual); or
  - (iii) Guidance document: *Cross-Connection Control for Small Water Systems* published by the department.
- (c) The purveyor may implement the cross-connection control program, or any portion thereof, directly or by means of a contract with another agency or party acceptable to the department.
- (d) The purveyor shall coordinate with the authority having jurisdiction in all matters concerning cross-connection control. The purveyor shall document and describe the coordination, including delineation of responsibilities, in the written cross-connection control program required in (e) of this subsection.
- (e) The purveyor shall include a written description of the cross-connection control program in the water system plan required under WAC 246-290-100 or the small water system management program required under WAC 246-290-105. The cross-connection control program shall include the minimum program elements described in subsection (3) of this section.
- (f) The purveyor shall ensure that cross-connections between the distribution system and a consumer's water system are eliminated or controlled by the installation of an approved backflow preventer commensurate with the degree of hazard. This can be accomplished by implementation of a cross-connection program that relies on:
  - (i) Premises isolation as defined in WAC 246-290-010; or
  - (ii) Premises isolation and in-premises protection as defined in WAC 246-290-010.
- (g) Purveyors with cross-connection control programs that rely both on premises isolation and in-premises protection:
  - (i) Shall comply with the premises isolation requirements specified in subsection (4)(b) of this section; and
  - (ii) May reduce premises isolation requirements and rely on in-premises protection for premises other than the type addressed in subsection (4)(b) of this section, only if the following conditions are met:
    - (A) The in-premises backflow preventers provide a level of protection commensurate with the purveyor's assessed degree of hazard;
    - (B) Backflow preventers which provide the in-premises backflow protection meet the definition of approved backflow preventers as described in WAC 246-290-010;

- (C) The approved backflow preventers are installed, inspected, tested (if applicable), maintained, and repaired in accordance with subsections (6) and (7) of this section;
  - (D) Records of the backflow preventers are maintained in accordance with subsections (3)(j) and (8) of this section; and
  - (E) The purveyor has reasonable access to the consumer's premises to conduct an initial hazard evaluation and periodic reevaluations to determine whether the in-premises protection is adequate to protect the purveyor's distribution system.
- (h) The purveyor shall take appropriate corrective action as authorized by the legal instrument required by subsection (3)(b) of this section, when:
    - (i) A cross-connection exists that is not controlled commensurate to the degree of hazard assessed by the purveyor; or
    - (ii) A consumer fails to comply with the purveyor's requirements regarding the installation, inspection, testing, maintenance or repair of approved backflow preventers required by this chapter.
  - (i) The purveyor's corrective action may include, but is not limited to:
    - (i) Denying or discontinuing water service to a consumer's premises until the cross-connection hazard is eliminated or controlled to the satisfaction of the purveyor;
    - (ii) Requiring the consumer to install an approved backflow preventer for premises isolation commensurate with the degree of hazard; or
    - (iii) The purveyor installing an approved backflow preventer for premises isolation commensurate with the degree of hazard.
  - (j) Except in the event of an emergency, purveyors shall notify the authority having jurisdiction prior to denying or discontinuing water service to a consumer's premises for one or more of the reasons listed in (h) of this subsection.
  - (k) The purveyor shall prohibit the intentional return of used water to the purveyor's distribution system. Used water includes, but is not limited to, water used for heating, cooling, or other purposes within the consumer's water system.

**(3) Minimum elements of a cross-connection control program.**

- (a) To be acceptable to the department, the purveyor's cross-connection control program shall include the minimum elements identified in this subsection.
- (b) **Element 1:** The purveyor shall adopt a local ordinance, resolution, code, bylaw, or other written legal instrument that:
  - (i) Establishes the purveyor's legal authority to implement a cross-connection control program;
  - (ii) Describes the operating policies and technical provisions of the purveyor's cross-connection control program; and
  - (iii) Describes the corrective actions used to ensure that consumers comply with the purveyor's cross-connection control requirements.
- (c) **Element 2:** The purveyor shall develop and implement procedures and schedules for evaluating new and existing service connections to assess the degree of hazard posed by the consumer's premises to the purveyor's distribution system and notifying the consumer within a reasonable time frame of the hazard evaluation results. At a minimum, the program shall meet the following:

- (i) For connections made on or after April 9, 1999, procedures shall ensure that an initial evaluation is conducted before water service is provided;
  - (ii) For all other connections, procedures shall ensure that an initial evaluation is conducted in accordance with a schedule acceptable to the department; and
  - (iii) For all service connections, once an initial evaluation has been conducted, procedures shall ensure that periodic reevaluations are conducted in accordance with a schedule acceptable to the department and whenever there is a change in the use of the premises.
- (d) **Element 3:** The purveyor shall develop and implement procedures and schedules for ensuring that:
- (i) Cross-connections are eliminated whenever possible;
  - (ii) When cross-connections cannot be eliminated, they are controlled by installation of approved backflow preventers commensurate with the degree of hazard; and
  - (iii) Approved backflow preventers are installed in accordance with the requirements of subsection (6) of this section.
- (e) **Element 4:** The purveyor shall ensure that personnel, including at least one person certified as a CCS, are provided to develop and implement the cross-connection control program.
- (f) **Element 5:** The purveyor shall develop and implement procedures to ensure that approved backflow preventers relied upon to protect the public water system are inspected and/or tested (as applicable) under subsection (7) of this section.
- (g) **Element 6:** The purveyor shall develop and implement a backflow prevention assembly testing quality control assurance program, including, but not limited to, documentation of BAT certification and test kit calibration, test report contents, and time frames for submitting completed test reports.
- (h) **Element 7:** The purveyor shall develop and implement (when appropriate) procedures for responding to backflow incidents.
- (i) **Element 8:** The purveyor shall include information on cross-connection control in the purveyor's existing program for educating consumers about water system operation. The public education program may include periodic bill inserts, public service announcements, pamphlet distribution, notification of new consumers and consumer confidence reports.
- (j) **Element 9:** The purveyor shall develop and maintain cross-connection control records including, but not limited to, the following:
- (i) A master list of service connections and/or consumer's premises where the purveyor relies upon approved backflow preventers to protect the public water system from contamination, the assessed hazard level of each, and the required backflow preventer(s);
  - (ii) Inventory information on backflow preventers that protect the public water system including:
    - (A) 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;
    - (B) Approved backflow assemblies including exact assembly location, 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 tests; and

- (C) Approved AVBs used for irrigation system applications including location, description (manufacturer, model and size), installation date, history of inspection(s), and person performing inspection(s).
  - (iii) Cross-connection program summary reports and backflow incident reports required under subsection (8) of this section.
- (k) Element 10:** Purveyors who distribute and/or have facilities that receive reclaimed water within their water service area shall meet any additional cross-connection control requirements imposed by the department in a permit issued under chapter 90.46 RCW.

**(4) Approved backflow preventer selection.**

- (a) The purveyor shall ensure that a CCS:
  - (i) Assesses the degree of hazard posed by the consumer's water system upon the purveyor's distribution system; and
  - (ii) Determines the appropriate method of backflow protection for premises isolation as described in Table 8.

**TABLE 8**

**APPROPRIATE METHODS OF BACKFLOW PROTECTION FOR PREMISES ISOLATION**

<b>Degree of Hazard</b>	<b>Application Condition</b>	<b>Appropriate Approved Backflow Preventer</b>
High health cross-connection hazard	Backsiphonage or backpressure backflow	AG, RPBA, or RPDA
Low cross-connection hazard	Backsiphonage or backpressure backflow	AG, RPBA, RPDA, DCVA, or DCDA

- (b) Premises isolation requirements.
  - (i) The purveyor shall ensure that an approved air gap, RPBA, or RPDA is installed for premises isolation for service connections to premises posing a high health cross-connection hazard including, but not limited to, those premises listed in Table 9, except those premises identified as severe in (b)(ii) of this subsection.
  - (ii) For service connections to premises posing a severe health cross-connection hazard including wastewater treatment plants, radioactive material processing plants, and nuclear reactors, the purveyor shall ensure that either an:
    - (A) Approved air gap is installed for premises isolation; or
    - (B) Approved RPBA or RPDA is installed for premises isolation in combination with an in-plant approved air gap.
  - (iii) If the purveyor's CCS determines that no hazard exists for a connection serving premises of the type listed in Table 9, the purveyor may grant an exception to the premises isolation requirements of (b)(i) of this subsection.
  - (iv) The purveyor shall document, on a case-by-case basis, the reasons for granting an exception under (b)(i) of this subsection and include the documentation in the cross-connection control program annual summary report required in subsection (8) of this section.

**TABLE 9**

**SEVERE\* AND HIGH HEALTH CROSS-CONNECTION HAZARD PREMISES  
REQUIRING PREMISES ISOLATION BY AG OR RPBA**

Agricultural (farms and dairies)

Beverage bottling plants

Car washes

Chemical plants

Commercial laundries and dry cleaners

Premises where both reclaimed water and potable water are provided

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 purveyor's water supply and with chemical addition<sup>+</sup>

Laboratories

Metal plating industries

Mortuaries

Petroleum processing or storage plants

Piers and docks

Radioactive material processing plants or nuclear reactors<sup>\*</sup>

Survey access denied or restricted

Wastewater lift stations and pumping stations

Wastewater treatment plants<sup>\*</sup>

Premises with an unapproved auxiliary water supply interconnected with the potable water supply

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<sup>+</sup> For example, parks, playgrounds, golf courses, cemeteries, estates, etc.

<sup>\*</sup> RPBA's for connections serving these premises are acceptable only when used in combination with an in-plant approved air gap; otherwise, the purveyor shall require an approved air gap at the service connection.

(c) Backflow protection for single-family residences.

- (i) For single-family residential service connections, the purveyor shall comply with the premises isolation requirements of (b) of this subsection when applicable.
- (ii) If the requirements of (b) of this subsection do not apply and the requirements specified in subsection (2) (g)(ii) of this section are met, the purveyor may rely on backflow protection provided at the point of hazard in accordance with WAC 51-56-0600 of the UPC for hazards such as, but not limited to:
  - (A) Irrigation systems;
  - (B) Swimming pools or spas;
  - (C) Ponds; and
  - (D) Boilers.

For example, the purveyor may accept an approved AVB on a residential irrigation system, if the AVB is properly installed under the UPC.

(d) Backflow protection for fire protection systems.

- (i) Backflow protection is not required for residential flow-through or combination fire protection systems constructed of potable water piping and materials.
- (ii) For service connections with fire protection systems other than flow-through or combination systems, the purveyor shall ensure that backflow protection consistent with WAC 51-56-0600 of the UPC is installed. The UPC requires minimum protection as follows:
  - (A) An RPBA or RPDA for fire protection systems with chemical addition or using unapproved auxiliary water supply; and
  - (B) A DCVA or DCDA for all other fire protection systems.
- (iii) For connections made on or after April 9, 1999, the purveyor shall ensure that backflow protection is installed before water service is provided.
- (iv) For existing fire protection systems:
  - (A) With chemical addition or using unapproved auxiliary supplies, the purveyor shall ensure that backflow protection is installed within ninety days of the purveyor notifying the consumer of the high health cross-connection hazard or in accordance with an alternate schedule acceptable to the purveyor.
  - (B) Without chemical addition, without on-site storage, and using only the purveyor's water (i.e., no unapproved auxiliary supplies on or available to the premises), the purveyor shall ensure that backflow protection is installed in accordance with a schedule acceptable to the purveyor or at an earlier date if required by the code official administering the State Building Code as defined in chapter 51-04 WAC.
  - (C) When establishing backflow protection retrofitting schedules for fire protection systems that have the characteristics listed in (d)(iv)(B) of this subsection, the purveyor may consider factors such as, but not limited to, impacts of assembly installation on sprinkler performance, costs of retrofitting, and difficulty of assembly installation.

- (e) Purveyors may require approved backflow preventers commensurate with the degree of hazard as determined by the purveyor to be installed for premises isolation for connections serving premises that have characteristics such as, but not limited to, the following:
  - (i) Complex plumbing arrangements or plumbing potentially subject to frequent changes that make it impracticable to assess whether cross-connection hazards exist;
  - (ii) A repeated history of cross-connections being established or reestablished; or
  - (iii) Cross-connection hazards are unavoidable or not correctable, such as, but not limited to, tall buildings.

**(5) Approved backflow preventers.**

- (a) The purveyor shall ensure that all backflow prevention assemblies relied upon by the purveyor are models included on the current list of backflow prevention assemblies approved for use in Washington state. The current approved assemblies list is available from the department upon request.
- (b) The purveyor may rely on testable backflow prevention assemblies that are not currently approved by the department, if the assemblies:
  - (i) Were included on the department and/or USC list of approved backflow prevention assemblies at the time of installation;
  - (ii) Have been properly maintained;
  - (iii) Are commensurate with the purveyor's assessed degree of hazard; and
  - (iv) Have been inspected and tested at least annually and have successfully passed the annual tests.
- (c) The purveyor shall ensure that an unlisted backflow prevention assembly is replaced by an approved assembly commensurate with the degree of hazard, when the unlisted assembly:
  - (i) Does not meet the conditions specified in (b)(i) through (iv) of this subsection;
  - (ii) Is moved; or
  - (iii) Cannot be repaired using spare parts from the original manufacturer.
- (d) The purveyor shall ensure that AVBs meet the definition of approved atmospheric vacuum breakers as described in WAC 246-290-010.

**(6) Approved backflow preventer installation.**

- (a) The purveyor shall ensure that approved backflow preventers are installed in the orientation for which they are approved (if applicable).
- (b) The purveyor shall ensure that approved backflow preventers are installed in a manner that:
  - (i) Facilitates their proper operation, maintenance, inspection, in-line testing (as applicable), and repair using standard installation procedures acceptable to the department such as those in the USC Manual or PNWS-AWWA Manual;
  - (ii) Ensures that the assembly will not become submerged due to weather-related conditions such as flooding; and
  - (iii) Ensures compliance with all applicable safety regulations.

- (c) The purveyor shall ensure that approved backflow assemblies for premises isolation are installed at a location adjacent to the meter or property line or an alternate location acceptable to the purveyor.
- (d) When premises isolation assemblies are installed at an alternate location acceptable to the purveyor, the purveyor shall ensure that there are no connections between the point of delivery from the public water system and the approved backflow assembly, unless the installation of the connection meets the purveyor's cross-connection control requirements and is specifically approved by the purveyor.
- (e) The purveyor shall ensure that approved backflow preventers are installed in accordance with the following time frames:
  - (i) For connections made on or after April 9, 1999, the following conditions shall be met before service is provided:
    - (A) The provisions of subsection (3)(d)(ii) of this section; and
    - (B) Satisfactory completion of the requirements of subsection (7) of this section.
  - (ii) For existing connections where the purveyor identifies a high health cross-connection hazard, the provisions of (3)(d)(ii) of this section shall be met:
    - (A) Within ninety days of the purveyor notifying the consumer of the high health cross-connection hazard; or
    - (B) In accordance with an alternate schedule acceptable to the purveyor.
  - (iii) For existing connections where the purveyor identifies a low cross-connection hazard, the provisions of subsection (3)(d)(ii) of this section shall be met in accordance with a schedule acceptable to the purveyor.
- (f) The purveyor shall ensure that bypass piping installed around any approved backflow preventer is equipped with an approved backflow preventer that:
  - (i) Affords at least the same level of protection as the approved backflow preventer that is being bypassed; and
  - (ii) Complies with all applicable requirements of this section.

**(7) Approved backflow preventer inspection and testing.**

- (a) For backflow preventers that protect the public water system, the purveyor shall ensure that:
  - (i) A CCS inspects backflow preventer installations to ensure that protection is provided commensurate with the assessed degree of hazard;
  - (ii) Either a BAT or CCS inspects:
    - (A) Air gaps installed in lieu of approved backflow prevention assemblies for compliance with the approved air gap definition; and
    - (B) Backflow prevention assemblies for correct installation and approval status.
  - (iii) A BAT tests approved backflow prevention assemblies for proper operation.

- (b) The purveyor shall ensure that inspections and/or tests of approved air gaps and approved backflow assemblies that protect the public water system are conducted:
  - (i) When any of the following occur:
    - (A) Upon installation, repair, reinstallation, or relocation of an assembly;
    - (B) Upon installation or replumbing of an air gap;
    - (C) After a backflow incident involving the assembly or air gap; and
  - (ii) Annually thereafter, unless the purveyor requires more frequent testing for high hazard premises or for assemblies that repeatedly fail.
- (c) The purveyor shall ensure that inspections of AVBs installed on irrigation systems are conducted:
  - (i) At the time of installation;
  - (ii) After a backflow incident; and
  - (iii) After repair, reinstallation, or relocation.
- (d) The purveyor shall ensure that approved backflow prevention assemblies are tested using procedures acceptable to the department, such as those specified in the most recently published edition of the USC Manual. When circumstances, such as, but not limited to, configuration or location of the assembly, preclude the use of USC test procedures, the purveyor may allow, on a case-by-case basis, the use of alternate (non-USC) test procedures acceptable to the department.
- (e) The purveyor shall ensure that results of backflow prevention assembly inspections and tests are documented and reported in a manner acceptable to the purveyor.
- (f) The purveyor shall ensure that an approved backflow prevention assembly or AVB, whenever found to be improperly installed, defective, not commensurate with the degree of hazard, or failing a test (if applicable) is properly reinstalled, repaired, overhauled, or replaced.
- (g) The purveyor shall ensure that an approved air gap, whenever found to be altered or improperly installed, is properly replumbed or, if commensurate with the degree of hazard, is replaced by an approved RPBA.

**(8) Recordkeeping and reporting.**

- (a) Purveyors shall keep cross-connection control records for the following time frames:
  - (i) Records pertaining to the master list of service connections and/or consumer's premises required in subsection (3)(j)(i) of this section shall be kept as long as the premises pose a cross-connection hazard to the purveyor's distribution system;
  - (ii) Records regarding inventory information required in subsection (3)(j)(ii) of this section shall be kept for five years or for the life of the approved backflow preventer whichever is shorter; and
  - (iii) Records regarding backflow incidents and annual summary reports required in subsection (3)(j)(iii) of this section shall be kept for five years.
- (b) Purveyors may maintain cross-connection control records in original form or transfer data to tabular summaries.
- (c) Purveyors may maintain records or data in any media, such as paper, film, or electronic format.

- (d) The purveyor shall complete the cross-connection control program summary report annually. Report forms and guidance on completing the report are available from the department.
  - (e) The purveyor shall make all records and reports required in subsection (3)(j) of this section available to the department or its representative upon request.
  - (f) The purveyor shall notify the department, authority having jurisdiction, and local health jurisdiction as soon as possible, but no later than the end of the next business day, when a backflow incident is known by the purveyor to have:
    - (i) Contaminated the public water system; or
    - (ii) Occurred within the premises of a consumer served by the purveyor.
  - (g) The purveyor shall:
    - (i) Document details of backflow incidents contaminating the public water system on a backflow incident report form available from the department; and
    - (ii) Include all backflow incident report(s) in the annual cross-connection program summary report referenced in (d) of this subsection, unless otherwise requested by the department.
- 

## For more information

Our publications are online at <https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm>

Call the Office of Drinking Water Cross-Connection Control Program staff at (360) 236-3133 or toll-free (800) 521-0323.



If you need this publication in alternate format, call (800) 525-0127. For TTY/TDD, call (800) 833-6388.



Office of Drinking Water

**Public Water System Cross-Connection Control Activities  
Annual Summary Report for Year 2011**

**Part 1: Public Water System (PWS) and Cross-Connection Control Specialist (CCS) Information**

PWS ID: 38000	PWS Name: KELSO, CITY OF	County: COWLITZ
Provide name and Cert No. of CCS who develops and implements your CCC program		
CCS Name (last, first & mi): Yates, Garrett		CCS Phone: (503) 255-1619
CCS Cert No.: 9662	BAT Cert. No. (if applicable): B4798	
CCS is (check one): PWS owner or employee <input type="checkbox"/> On contract to PWS <input checked="" type="checkbox"/> Volunteer or other <input type="checkbox"/>		

**Part 2: Status of Cross-Connection Control (CCC) Program at end of 2011**

PWS has (check one box in each column below):					
A written CCC program plan	Y <input checked="" type="checkbox"/>	N <input type="checkbox"/>	CCC implementation activities	Y <input checked="" type="checkbox"/>	N <input type="checkbox"/>

(Written program may be a separate document, or part of water system plan or small water system management program).

Provide information regarding PWS's specific CCC Program Elements

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is Currently:	
		Included in Written Program	Being Implemented or Is Completed
1	Legal Authority Established	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
2	Hazard Evaluation Procedures and Schedules	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
3	CCC Procedures and Schedules	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
4	Certified CCS Provided	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
5	Backflow Preventer Inspection and Testing	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
6	Testing Quality Control Assurance Program	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
7	Backflow Incident Response Procedures	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
8	Public Education Program	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
9	CCC Records	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
10	Reclaimed Water Permit	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

**Part 3A: System Characteristics at End of 2011**

Indicate the number of connections of each type that the PWS serves (whether or not they are protected by backflow preventers). Estimate if necessary.

Type of Service Connection	Number
Residential (As defined by PWS)	4261
All Other (Include dedicated fire sprinkler and irrigation lines and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers and docks.)	861
<b>Total Number of Connections</b>	<b>5122</b>

**Part 3B: Cross-Connection Control for High-Hazard Premises or Systems Served by the PWS**

If PWS does not serve any high-hazard premises or systems, check here  and go to Part 4A.

- Complete all cells. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 12/31/2011			
	A. Being Served Water by PWS <sup>1</sup>	B. With Premises Isolation by AG/RP	C. With Column B AG Inspected or RP Tested <sup>2</sup>	D. Granted Exception from Mandatory Premises Isolation
Agricultural (farms and dairies)	0	0	0	0
Beverage bottling plants (including breweries)	0	0	0	0
Car washes	0	0	0	0
Chemical plants	0	0	0	0
Commercial laundries and dry cleaners	2	1	1	0
Both reclaimed water and potable water provided	0	0	0	0
Film processing facilities	0	0	0	0
Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies	1	0	0	0
Food processing plants (including canneries, slaughter houses, rendering plants)	1	1	1	0
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers	7	5	5	0
Separate irrigation systems using purveyor's water supply and chemical addition <sup>4</sup>	0	0	0	0
Laboratories	1	0	0	0
Metal plating industries	0	0	0	0
Petroleum processing or storage plants	0	0	0	0
Piers and docks	0	0	0	0
Radioactive material processing plants or nuclear reactors	0	0	0	0
Survey access denied or restricted	0	0	0	0
Wastewater lift/pump stations (non-residential only)	6	6	6	0
Wastewater treatment plants	0	0	0	0
Unapproved auxiliary water supply interconnected with potable water supply	0	0	0	0
	0	0	0	0
<b>Totals</b>	<b>18</b>	<b>13</b>	<b>13</b>	<b>0</b>

<sup>1</sup>Count multiple connections or parallel installations as *separate* connections.

<sup>2</sup>Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVA/DCDAs installed for premises isolation.

<sup>3</sup>Count only those connections whose premises isolation preventers were inspected (AG) or tested (RPBA) during 2011.

<sup>4</sup>For example, dedicated lines to irrigation systems in parks, playgrounds, golf courses, cemeteries, estates, etc.

<sup>5</sup>Premises with hazardous materials or processes (requiring isolation by AG or RPBA) such as: aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, e.g.: other manufacturing or other commercial. If needed, attach additional sheet giving same information as requested in table.

**Part 3C: Cross-Connection Control for Medical Category High-Hazard Premises Served by the PWS**

If PWS does not serve any medical type premises, check here  and go to Part 4A.

- Complete all cells. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 12/31/2011			
	A. Being Served Water by PWS <sup>1</sup>	B. With Premises Isolation by AG/RP	C. With Column B AG Inspected or RP Tested <sup>2</sup>	D. Granted Exception from Mandatory Premises Isolation
<b>Hospitals</b>				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)	0	0	0	0
<b>Facilities for Treatment and Care of Patients Not Located in Hospitals Counted Above</b>				
Same day surgery centers	0	0	0	0
Out-patient clinics and offices	0	0	0	0
Alternative health out-patient clinics and offices	0	0	0	0
Psychiatric out-patient clinics and offices	0	0	0	0
Chiropractors	1	0	0	0
Hospice care centers	0	0	0	0
Childbirth centers	0	0	0	0
Kidney dialysis centers	0	0	0	0
Blood centers	0	0	0	0
Dental clinics and offices	3	3	3	0
<b>Facilities for Housing Patients</b>				
Nursing homes	0	0	0	0
Boarding homes	0	0	0	0
Residential treatment centers	0	0	0	0
<b>Other Medical-Related Facilities</b>				
Mortuaries	1	1	1	0
Morgues and autopsy facilities (not in hospitals)	0	0	0	0
Veterinarian offices, clinics and hospitals	2	1	1	0
All other (describe in Part 6: Comments on page 6)	0	0	0	0
<b>Totals</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>0</b>

<sup>1</sup>Count multiple connections or parallel installations as *separate* connections.

<sup>2</sup>Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVA/DCDAs installed for premises isolation.

<sup>3</sup>Count only those connections whose premises isolation preventers were inspected (AG) or tested (RPBA) during 2011.

**Part 4A: Backflow Preventer Inventory and Testing Data During Year 2011**

- Complete all cells. Enter zero (0) if there are no backflow preventers in that category.
- Count only the backflow preventers that the PWS relies upon for protection of the distribution system. If your records do not distinguish between premises isolation and in-premises protection preventers, enter all data in Premises Isolation section and check the box.
- Count AVBs on irrigation systems only. **If you do not track AVBs, enter "UNK"**.
- Count multiple tests or failures for any particular backflow preventer as one test or failure for that backflow preventer.
- Multiple Service or Parallel Connections: Count each assembly separately.
- Assemblies on Dedicated Fire or Irrigation Lines: Count as Premises Isolation Assemblies.

If PWS does not track AVBs Check here:

Backflow Preventer Category and Testing/Inspection Information		Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Premises Isolation, including preventers isolating PWS-owned facilities. <i>If In-Premises Protection preventers are also included, check here.</i> <input checked="" type="checkbox"/>									
<b>Rows 1-3 pertain ONLY to Premises Isolation preventers in service at beginning of 2011</b>									
1	In service on 1/1/2011	0	87	0	93	39	0	0	unk
2	Inspected and/or Tested in 2011 <sup>1</sup>	0	87	0	91	39	0	0	unk
3	Failed Inspection or Test in 2011	0	21	0	3	1	0	0	unk
<b>Rows 4 - 6 pertain ONLY to NEW Premises Isolation preventers installed during 2011</b>									
4	New preventers installed in 2011 <sup>2</sup>	0	10	0	5	0	0	0	unk
5	Inspected and/or Tested in 2011 <sup>1</sup>	0	10	0	5	0	0	0	unk
6	Failed inspection or test in 2011 <sup>3</sup>	0	0	0	0	0	0	0	unk
7	Preventers taken out of service in 2011 <sup>3</sup>	0	0	0	0	0	0	0	0
<b>Premises Isolation Total at end of 2011<sup>4</sup></b>		0	97	0	98	39	0	0	unk
<b>In-Premises Protection (Fixture Protection or Area Isolation), including preventers within PWS-owned facilities.</b>									
<b>Rows 8 - 10 pertain ONLY to In-Premises Protection Preventers in service at beginning of 2011</b>									
8	In service on 1/1/2011	0	0	0	0	0	0	0	unk
9	Inspected and/or Tested in 2011 <sup>1</sup>	0	0	0	0	0	0	0	unk
10	Failed Inspection or Test in 2011	0	0	0	0	0	0	0	unk
<b>Rows 11 - 13 pertain ONLY to NEW In-Premises Protection Preventers installed during 2011</b>									
11	New preventers installed in 2011 <sup>2</sup>	0	0	0	0	0	0	0	unk
12	Inspected and/or Tested in 2011 <sup>1</sup>	0	0	0	0	0	0	0	unk
13	Failed inspection or test in 2011	0	0	0	0	0	0	0	unk
14	Preventers taken out of service in 2011 <sup>3</sup>	0	0	0	0	0	0	0	0
<b>In-Premises Protection Total at end of 2011<sup>4</sup></b>		0	0	0	0	0	0	0	unk
<b>Grand Total at end of 2011</b>		0	97	0	98	39	0	0	unk

<sup>1</sup>Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only using DOH/USC test procedures). Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at beginning of 2011. Replacement preventers may be of a different type than the original.

<sup>2</sup>Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at the beginning of 2011. Replacement preventers may be of a different type than the original.

<sup>3</sup>New or existing preventers taken out of service, whether or not they were replaced by the same type or different type of preventer.

<sup>4</sup>Total at end of 2011 should be equal to the number of preventers in service at beginning of 2011 plus those installed during 2011 minus the number of preventers taken out of service during 2011.

**Part 4B: Other Implementation Activities in 2011**

Complete all cells. Enter zero (0) if not applicable.

Activity or Condition	Number
New service connections evaluated for cross-connection hazards to PWS in 2011.	0
New service connections requiring backflow protection to protect PWS. <sup>1</sup>	0
Existing service connections evaluated for cross-connection hazards to PWS in 2011.	0
Existing service connections requiring backflow protection to protect PWS. <sup>1,2</sup>	0
Exceptions granted to high-hazard premises per WAC 246-290-490(4)(b) in 2011. <sup>3</sup>	0
CCC enforcement actions taken by PWS during 2011. <sup>4</sup>	0

<sup>1</sup>Include services where either premises isolation or in-premises preventers were required to protect the PWS.<sup>2</sup>Include existing services that need new, additional or higher level backflow prevention.<sup>3</sup>A DOH Exceptions to Hazard Premises Form *must* be attached for each exception granted during the year.<sup>4</sup>"Enforcement actions" mean actions taken by the PWS (such as water shut-off, PWS installation of backflow preventer) when the customer fails to comply with PWS's CCC requirements.**Part 5: Backflow Incidents and "Off-Normal" Events in 2011**

Backflow Incidents, Risk Factors and Indicators during 2011	Number (Enter 0 if none)	Check if Data Not Available
<b>Backflow Incidents during 2011</b>		
1 Backflow incidents that contaminated the PWS <sup>5</sup> .	0	<input type="checkbox"/>
2 Backflow incidents that contaminated the customer's drinking water system <i>only</i> <sup>5</sup> .	0	<input type="checkbox"/>
<b>Risk Factors for Backflow during 2011</b>		
3 Distribution main breaks per 100 miles of pipe.	9.00	<input type="checkbox"/>
4 Low pressure events (<20 psi in PWS distribution system).	10	<input type="checkbox"/>
5 Water outage events.	1	<input type="checkbox"/>
<b>Indicators of Possible Backflow during 2011</b>		
6 Total health-related complaints received by PWS. <sup>6</sup>	0	<input type="checkbox"/>
7 Received during BWA or PN events. <sup>7</sup>	0	<input type="checkbox"/>
8 Received during low pressure or water outage events.	0	<input type="checkbox"/>
9 Total aesthetic complaints (color, taste, odor, air in lines, etc.).	0	<input type="checkbox"/>
10 Received during BWA or PN events. <sup>7</sup>	0	<input type="checkbox"/>
11 Number of these complaints received during low pressure or water outages events.	0	<input type="checkbox"/>

<sup>5</sup>Complete and submit a Backflow Incident Report form for each known backflow incident.<sup>6</sup>Such as stomach ache, headache, vomiting, diarrhea, skin rashes, etc.<sup>7</sup>"BWA" means *Boil Water Advisory* and "PN" means *Public Notification* for water quality reasons.

**Part 6: Comments and Clarifications**

Enter comments or clarifications to any of the information included in this report. Note for on-screen completion: Comments will not "word wrap" from one line to the next. Press to continue on new line. Maximum length of each comment is 255 characters, including spaces.

Part No.	Date Added	Comment
Pt 3B	4/9/07	The City is in the process of requiring all table 9 facilities to comply with the mandatory premises isolation requirement. Backflow Management has began assisting the City with the management of their CCC program in the last quarter of 2006, and is in the process of updating assembly inventory information. etc.

**Part 7: Report Completion Information**

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name <sup>1</sup> : Garrett Yates		Title: Cross Connection Specialist
Signature:		Date: 05/17/2012
Phone: (503) 255-1619	E-mail: gyates@bmibackflow.com	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
PWS Mgr./Owner Name <sup>2</sup> : DAVID M. SYPHER		Title: PUBLIC WORKS DIRECTOR
Signature:	Op. Cert. No.:	Date: 05/17/2012

<sup>1</sup> CCC Program Manager is generally the CCS who is responsible for development and implementation of the PWS's CCC Program.

<sup>2</sup> The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program.



Office of Drinking Water

**Cross-Connection Control Program Summary Report For 2011**

Describe the characteristics of the PWS's CCC Program at the end of 2011. Complete this form only if PWS had written CCC program plan, policies or procedures at end of 2011.

**Part 1: Public Water System (PWS) Identification**

PWS ID: 38000	PWS Name: KELSO, CITY OF	County: COWLITZ
---------------	--------------------------	-----------------

**Part 2: Cross-Connection Control (CCC) Program Characteristics**

**A. Type of Program Currently Implemented**

Type of Program	Check One
Premises isolation only.	<input type="checkbox"/>
Combination program: reliance on both premises isolation and in-premises protection.	<input checked="" type="checkbox"/>
In transition from a combination program to a premises isolation only program.	<input type="checkbox"/>

**B. Coordination with Authority Having Jurisdiction (AHJ) on Cross-Connection Issues**

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code. *Check one box in each of last 3 columns for each AHJ in your service area.*

AHJ No.	Name of AHJ (e.g., the City or County Building Department)	PWS Currently:		AHJ Declined to Coordinate
		Coordinates with AHJ	Has Written Agreement with AHJ	
1	KELSO COMMUNITY DEVELOPMENT	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>
2	COWLITZ 2 FIRE & RESCUE	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>
3	COWLITZ COUNTY DEPARTMENT OF HEALTH	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>
4		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
5		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>

<sup>1</sup> If more than 5 AHJs, attach separate sheet giving the above information.

**C. Corrective or Enforcement Actions Available to the Purveyor**

Type of Corrective Action	Indicate Whether Available	Most Often Used (Check One)
Denial or discontinuance of water service.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	<input checked="" type="checkbox"/>
Purveyor installs backflow preventer and bills customer.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>
Assessment of fines (in addition to elimination or control of cross-connection).	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>
Other corrective actions (describe):	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	<input type="checkbox"/>

**D. CCC Program Responsibilities**

*Do not include enforcement action related procedures or circumstances.*

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Backflow preventer (BP) ownership	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP installation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP <i>initial</i> inspection (for proper installation - all BPs)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BP <i>initial</i> test (for testable assemblies)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP <i>annual</i> inspection (Air Gaps and AVBs)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP <i>annual</i> test (for testable assemblies)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP maintenance and repair	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**E. Backflow Protection for Fire Protection Systems**

*Please remember to enter number of days allowed if you require retrofitting.*

PWS coordinates with <i>AHJ</i> on CCC issues for fire protection systems(FPS).	Y <input checked="" type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/>
PWS coordinates with <i>local Fire Marshal</i> on CCC issues for FPS.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/>
PWS ensures backflow prevention is installed before serving <i>new</i> connections with FPS.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
PWS requires retrofits to <i>high</i> -hazard FPS.	Y <input checked="" type="checkbox"/> No. of days allowed: 90 N <input type="checkbox"/> N/A <input type="checkbox"/>
PWS requires retrofits to <i>low</i> -hazard FPS.	Y <input checked="" type="checkbox"/> No. of days allowed: 365 N <input type="checkbox"/> N/A <input type="checkbox"/>

**F. Backflow Protection for Irrigation Systems**

Minimum level of backflow prevention required on irrigation systems <i>without</i> chemical addition.	Not Addressed <input type="checkbox"/> AVB <input type="checkbox"/> PV/SVBA <input type="checkbox"/> DCVA <input checked="" type="checkbox"/> RPBA <input type="checkbox"/>
PWS currently inspects AVBs upon <i>initial</i> installation.	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

**G. Used Water**

PWS prohibits, by ordinance, rules, policy or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
If not prohibited at present, date plan to prohibit use.	N/A <input checked="" type="checkbox"/>
Current number of service connections returning used water to distribution system.	0

**H. Backflow Protection for Auxiliary Water Supplies<sup>1</sup> NOT Interconnected with PWS**

Indicate the minimum backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies when they are NOT interconnected to the PWS. Check one box per row.

Existing service connections.	None <input checked="" type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/> AG <input type="checkbox"/>
Type of protection required.	None <input checked="" type="checkbox"/> In-premises protection <input type="checkbox"/> Premises isolation <input type="checkbox"/>
New service connections.	None <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input checked="" type="checkbox"/> AG <input type="checkbox"/>
Type of protection required.	

None  In-premises protection  Premises isolation

<sup>1</sup> An auxiliary water supply is any water supply on or available to customer's premises in addition to the purveyor's potable water supply.  
Page 2

**I. Backflow Protection for Tanker Trucks and Temporary Water Connections**

Minimum level of backflow protection (installed on or associated with the truck) required for tanker trucks taking water from PWS.	AG <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input checked="" type="checkbox"/> Not Specified <input type="checkbox"/> Tanker trucks not allowed <input type="checkbox"/>
PWS requires tanker trucks to obtain water at designated filling sites each equipped with permanently installed backflow preventer(s).	Y <input type="checkbox"/> (Min. protection: DCVA <input type="checkbox"/> RPBA <input type="checkbox"/> ) N <input checked="" type="checkbox"/> N/A <input type="checkbox"/> No sites provided <input type="checkbox"/>
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/>
Minimum level of backflow protection required for temporary water connections (e.g. for construction sites).	AG <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/> Not specified <input checked="" type="checkbox"/> Temp. connections not allowed <input type="checkbox"/>
PWS requires testing each time the temporary connection backflow preventer is relocated.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A <input type="checkbox"/> (Temp. connections not allowed)
PWS provides approved backflow preventer for temporary connections.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A <input type="checkbox"/> (Temp. connections not allowed)

**J. Backflow Protection for Non-Residential Connections**

For each category shown, indicate whether PWS has non-residential connections of that type and the minimum level of *premises isolation* backflow protection required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Protection Required
Commercial	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Not Required <input checked="" type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
Industrial	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Not Required <input checked="" type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
Institutional	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Not Required <input checked="" type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>

**K. Backflow Protection for Wholesale Customers**

Indicate whether the PWS requires backflow protection at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has (plans to have) Customers of this Type	Backflow Protection Required
Existing	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Not specified / Not required <input checked="" type="checkbox"/> Always required <input type="checkbox"/> Required only if purchaser's CCC program is inadequate <input type="checkbox"/> Minimum required (if applicable): DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
New	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Not specified / Not required <input checked="" type="checkbox"/> Always Required <input type="checkbox"/> Required only if purchaser's CCC program is inadequate <input type="checkbox"/> Minimum required (if applicable): DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>

**L. Exceptions to Mandatory Premises Isolation**

PWS's written CCC Program Plan <i>allows</i> system to grant Exceptions to mandatory premises isolation per WAC 246-290-490(4)(b)(iii).	Y <input checked="" type="checkbox"/> N <input type="checkbox"/> Doesn't Address <input type="checkbox"/>
PWS currently grants new Exceptions.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
PWS granted Exceptions in previous reporting years.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>

**Part 3: CCC Program Record-Keeping and Inventory**

Indicate the type or name of computer software used by the PWS to track CCC records.

Cross-Track (BMI)  BPMS  XC2 (Engsoft)  Tokay  Other commercial CCC software (specify)   
 Custom developed for or by PWS<sup>1</sup>  Other non-CCC software (e.g. Excel)  None Used

<sup>1</sup> Do not include commercial CCC software customized for PWS. If PWS uses customized commercial software, check the box for the appropriate commercial software name.

**Part 4: Comments and Clarifications**

Enter comments or clarifications to any of the information provided in this report.

Part No.	Date Added	Comment

**Part 5: CCC Program Summary Completion Information**

I certify that the information provided in this CCC Program Summary is complete and accurate to the best of my knowledge.

CCC Program Mgr. Name <sup>1</sup> : Garrett Yates	Title: Cross Connection Specialist
Signature:	Date: 05/17/2012
Phone: (503) 255-1619	E-mail*: gyates@bmibackflow.com

I certify that the information provided in this report accurately represents the status and description of this water system's CCC Program.

PWS Mgr/Owner Name <sup>2</sup> : DAVID M. SYPHER	Title: PUBLIC WORKS DIRECTOR
Signature:	Op. Cert. No.:      Date: 05/17/2012

\*Required Field. For security reasons, an e-mail address must be provided. DOH will e-mail you to confirm any changes made to your data

- <sup>1</sup> The CCC Program Manager is generally the CCS responsible for developing and implementing the PWS's CCC program.
- <sup>2</sup> The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program. This person doesn't need to be in charge of the entire water system.

# **Appendix I**

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## Hydraulic Modeling

- Hydraulic Model Assumptions
- Hydraulic Model Results – Map
  - 2011 ADD, MDD + FF, and PHD
  - 2018 ADD, MDD + FF, and PHD
  - 2032 ADD, MDD + FF, and PHD
- Minor Road Reservoir, Flow Test Locations – Map, Table, and Protocols

**City of Kelso Water System Plan**  
 Hydraulic Model Assumptions

Total System Demand		
	2018	2032
ADD (MGD)	2.47	2.83
MDD (MGD)	3.8	4.35
PHD (MGD)	6.2	7.0
Fire Flow	Used Available Flow	Used Available Flow

Tanks	Model Identifier	Diameter	Bottom of Overflow	Bottom of Operational	Bottom of Equalizing	Bottom of Fire Flow	Base
Beshel Heights 1	BESHEL-HEIGHTS-RESERVOIR-1	59	443	Not Used	434	432	413
Beshel Heights 2	BESHEL-HEIGHTS-RESERVOIR-2	42	443	Not Used	434	432	413
Carrols Road	CARROLRD-1	48	517	Not Used	509	495	472
Minor Road 1	MINOR-ROAD-RESERVOIR-1	125	188	Not Used	184	180	173
Minor Road 2	MINOR-ROAD-RESERVOIR-2	125	188	Not Used	184	180	173
Paxton Road 1	PAXTON-ROAD-RESERVOIR-1	60	188	Not Used	184	180	164
Paxton Road 2	PAXTON-ROAD-RESERVOIR-2	120	188	Not Used	184	180	164
Rocky Point	ROCKYPOINT-1	60	188	Not Used	184	180	158
Tybre Heights 1	TYBREN-HEIGHTS-RESERVOIR-1	42	544	Not Used	540	529	525
Tybre Heights 2	TYBREN-HEIGHTS-RESERVOIR-2	42	544	Not Used	540	529	525
Williams Finney	WILLIAMS-FINNEY-RESERVOIR	60	322	Not Used	314	307	290

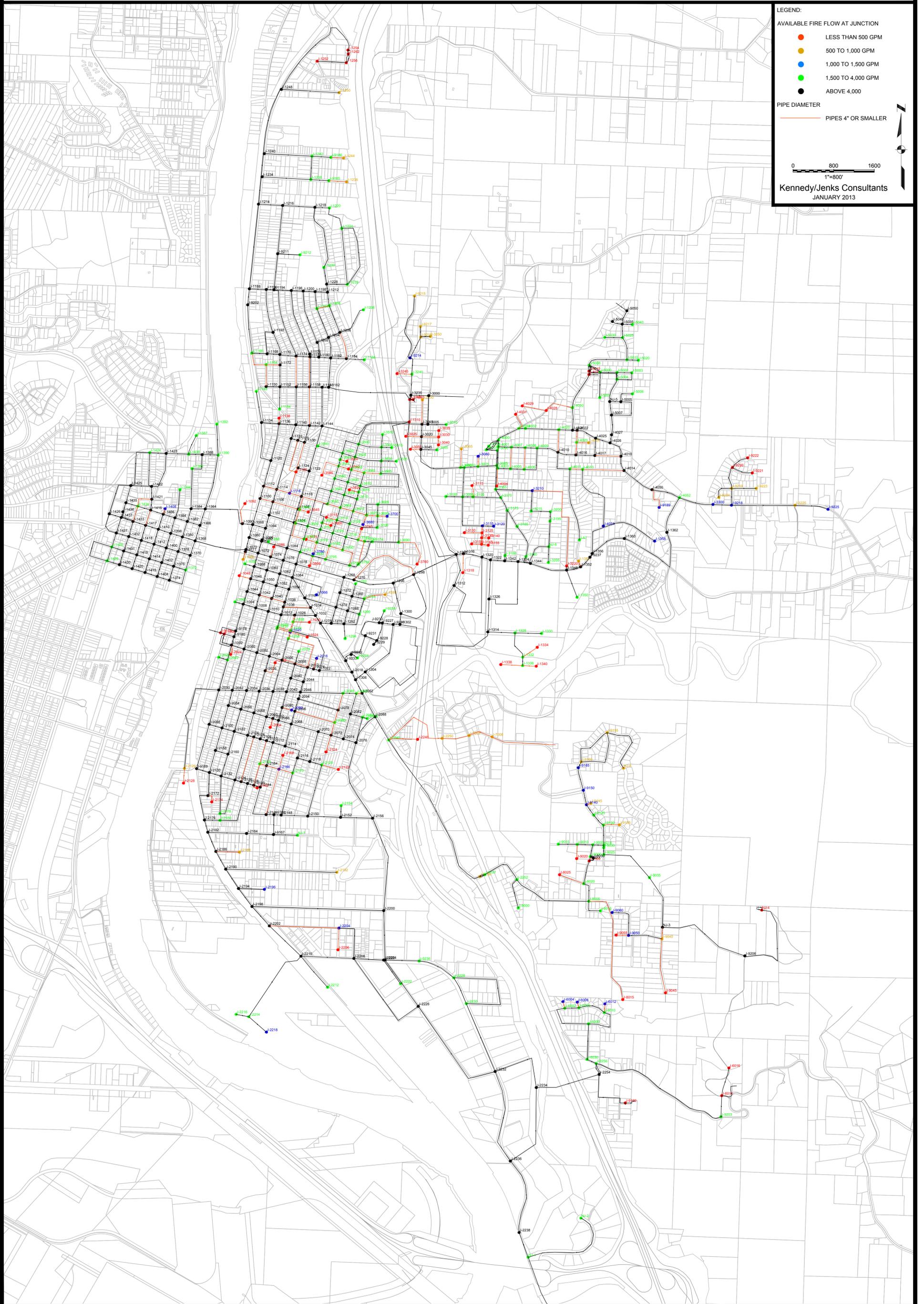
Reservoirs	Model Identifier	Elevation	Design Flow (gpm)	TDH at Design Flow (ft)	HP	Aquifer Elevation	Controlled By
Longview Intertie	SR-5000	520	Scenario Demand	Intertie Pressure	NA	NA	Scenario Demand
WTP	SR-1	32	Scenario Demand	WTP Pumps	NA	NA	Scenario Demand
	HIGHLAND-PARK-EQUALIZATION-TANK	416	Scenario Demand	NA	NA	NA	Scenario Demand
Longview Intertie	SR-7000	304	Scenario Demand	Intertie Pressure	NA	NA	Scenario Demand

Booster Pump Stations	Model Identifier	Elevation	Design Flow (gpm)	TDH at Design Flow (ft)	HP	Zone from and to	Controlled By
18th Ave	PMP-18 AVE 1	195	600	Not Used	50	322 to 443	Behshel Heights Reservoir Level
18th Ave	PMP-18 AVE 2	195	600	Not Used	50	322 to 443	Behshel Heights Reservoir Level
Behshel Heights	PMP-BESHSEL HEIGHTS 1	400	100	Not Used	5	443 to 552	Mt. Brynion Estates Demand
Behshel Heights	PMP-BESHSEL HEIGHTS 2	400	400	Not Used	15	443 to 552	Mt. Brynion Estates Demand
Behshel Heights	PMP-BESHSEL HEIGHTS 3	400	1120	Not Used	40	443 to 552	Mt. Brynion Estates Demand
Carroll Road	PMP-CARROLS 1	97.5	130	Not Used	25	188 to 517	Carroll Road Reservoir Level
Carroll Road	PMP-CARROLS 2	97.5	130	Not Used	25	188 to 517	Carroll Road Reservoir Level
Davis Terrace	PMP-DAVIS TERRACE	48	85	Not Used			Davis Terrace Demand
Highland Park	PMP-HIGHLAND PARK 1	318	175	Not Used	15	410 to 544	Tybre Heights Reservoir Level
Highland Park	PMP-HIGHLAND PARK 2	318	175	Not Used	15	410 to 544	Tybre Heights Reservoir Level
Highland Park	PMP-HIGHLAND PARK 3	318	175	Not Used	15	410 to 544	Tybre Heights Reservoir Level
Lower Haussler Pump House	PMP-LOWER HAUSSLER 1	72.5	150	Not Used	15	188 to 410	Highland Park Pump Station Demand
Lower Haussler Pump House	PMP-LOWER HAUSSLER 2	72.5	150	Not Used	15	188 to 410	Highland Park Pump Station Demand
Minor Road	PMP-MINOR 1	177.5	800	Not Used	50	188 to 322	Williams-Finney Reservoir Level
Minor Road	PMP-MINOR 2	177.5	800	Not Used	50	188 to 322	Williams-Finney Reservoir Level
Rocky Point	PMP-ROCKYPOINT 1	152	75	Not Used	5	188 to 301	Rocky Point Demand
Rocky Point	PMP-ROCKYPOINT 2	152	75	Not Used	5	188 to 301	Rocky Point Demand
WTP	PMP-TREATMENT PLANT 1	22	2000	Not Used		Cowlitz River to 188	188 Zone Reservoir Level
WTP	PMP-TREATMENT PLANT 2	22	2000	Not Used		Cowlitz River to 188	188 Zone Reservoir Level

Control Valves	Model Identifier	Elevation	Control Setting (psi)	Zone from and to
West Vista Way	PRV-1	335	108	544 to 410
Apple Ln & Haussler Rd (Tybre Hts)	PRV-2	240	80	410 to 297
Sunrise & Starburst	PRV-4038	102	150	443 to 320
North Crescent Dr (Behshel Hts)	PRV-4050	98	150	443 to 264
Carrols Road	PRV-6030	149	155	517 to 311
Barr Dr & Allen St	PRV-3220	32	OFF	322 to --
19th Ave & Allen	PRV-3180	29	OFF	322 to --
Highland	PRV-HIGHLANDPARK	335	108	544 to 297



CITY OF KELSO  
KELSO, WASHINGTON  
KELSO WATER MODEL UPDATE  
2011 MAXIMUM DAY DEMAND WITH FIRE FLOWS



LEGEND:

AVAILABLE FIRE FLOW AT JUNCTION

- LESS THAN 500 GPM
- 500 TO 1,000 GPM
- 1,000 TO 1,500 GPM
- 1,500 TO 4,000 GPM
- ABOVE 4,000

PIPE DIAMETER

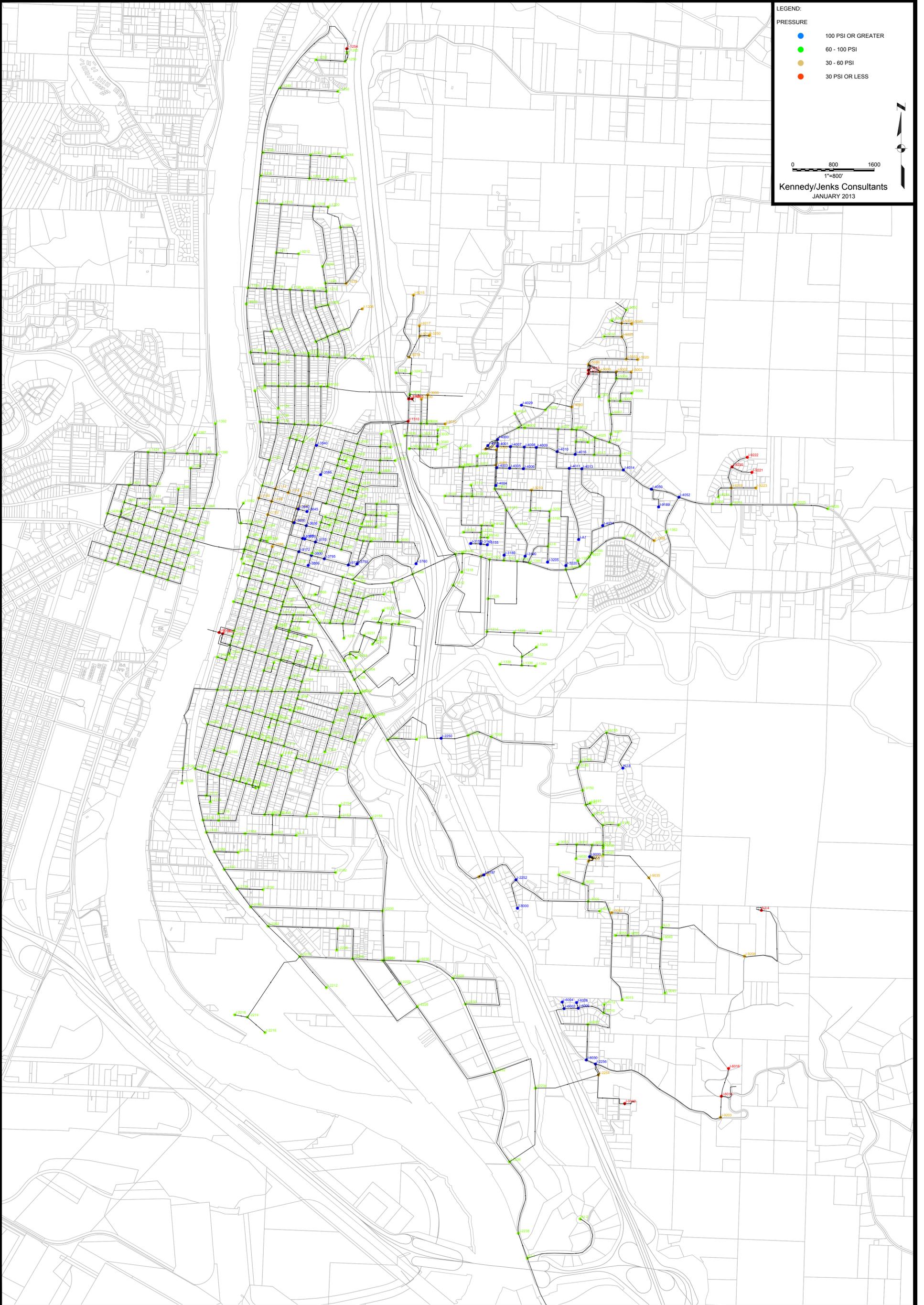
- PIPES 4" OR SMALLER

0 800 1600  
1"=800'

Kennedy/Jenks Consultants  
JANUARY 2013



CITY OF KELSO  
KELSO, WASHINGTON  
KELSO WATER MODEL UPDATE  
2018 AVERAGE DAY DEMAND



LEGEND:  
PRESSURE

- 100 PSI OR GREATER
- 60 - 100 PSI
- 30 - 60 PSI
- 30 PSI OR LESS

0 800 1600  
1"=800'

Kennedy/Jenks Consultants  
JANUARY 2013

CITY OF KELSO  
KELSO, WASHINGTON  
KELSO WATER MODEL UPDATE  
2018 MAXIMUM DAY DEMAND WITH FIRE FLOWS

LEGEND:

AVAILABLE FIRE FLOW AT JUNCTION

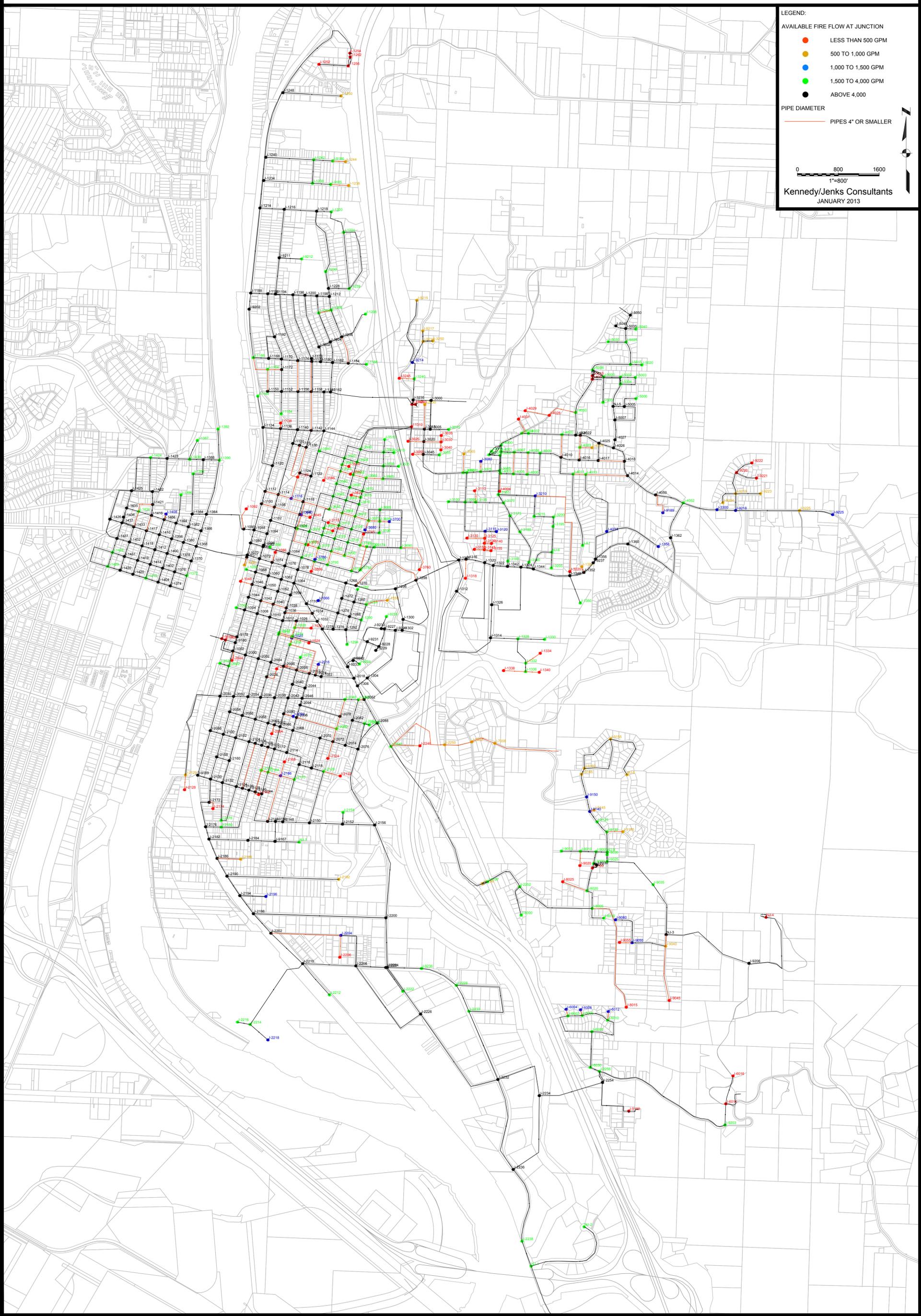
- LESS THAN 500 GPM
- 500 TO 1,000 GPM
- 1,000 TO 1,500 GPM
- 1,500 TO 4,000 GPM
- ABOVE 4,000

PIPE DIAMETER

- PIPES 4" OR SMALLER

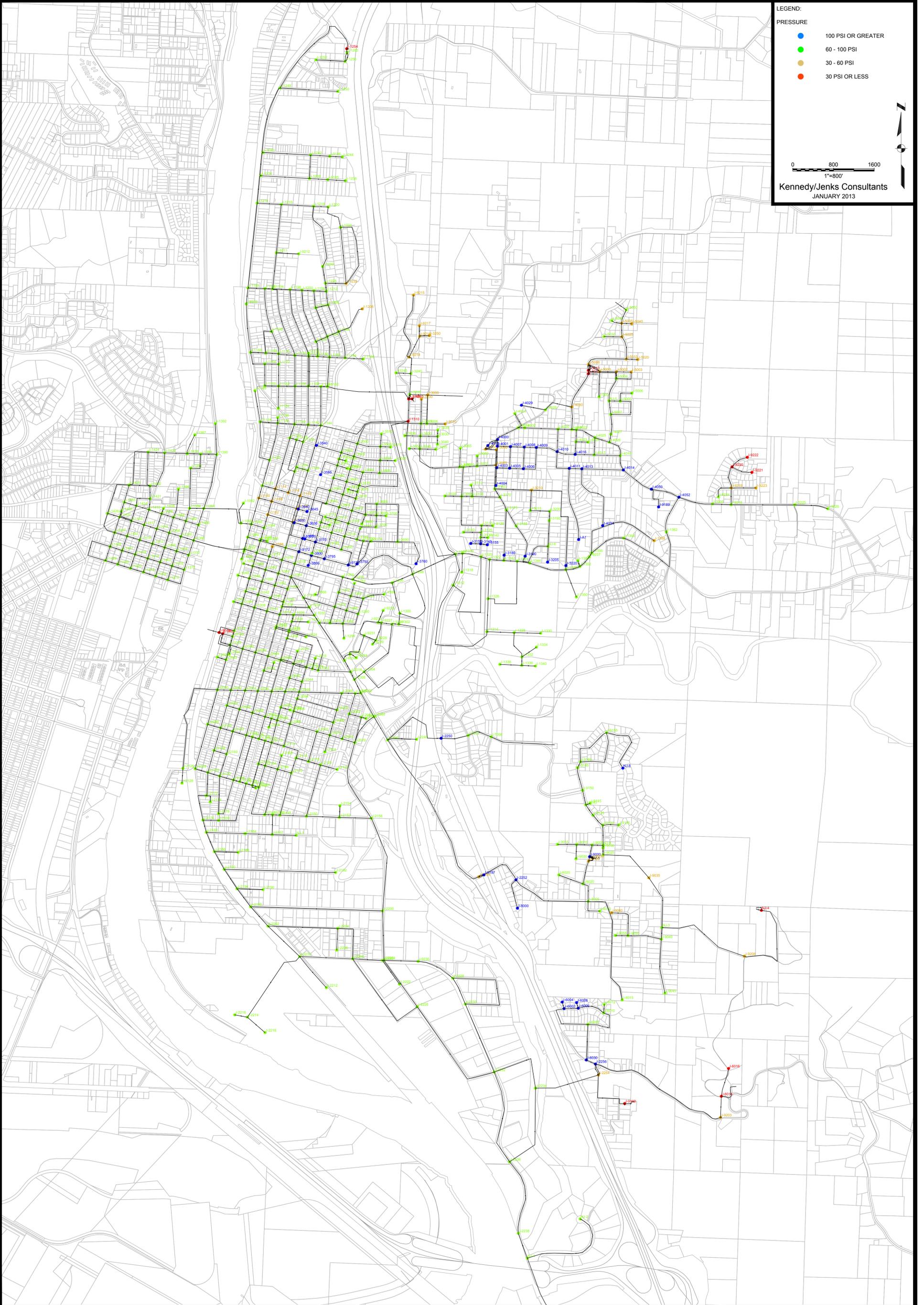
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Kennedy/Jenks Consultants  
JANUARY 2013





CITY OF KELSO  
KELSO, WASHINGTON  
KELSO WATER MODEL UPDATE  
2032 AVERAGE DAY DEMAND



LEGEND:

PRESSURE

- 100 PSI OR GREATER
- 60 - 100 PSI
- 30 - 60 PSI
- 30 PSI OR LESS

0 800 1600  
1"=800'

Kennedy/Jenks Consultants  
JANUARY 2013

CITY OF KELSO  
KELSO, WASHINGTON  
KELSO WATER MODEL UPDATE  
2032 MA $\square$ IMUM DAY DEMAND WITH FIRE FLOWS

LEGEND:

AVAILABLE FIRE FLOW AT JUNCTION

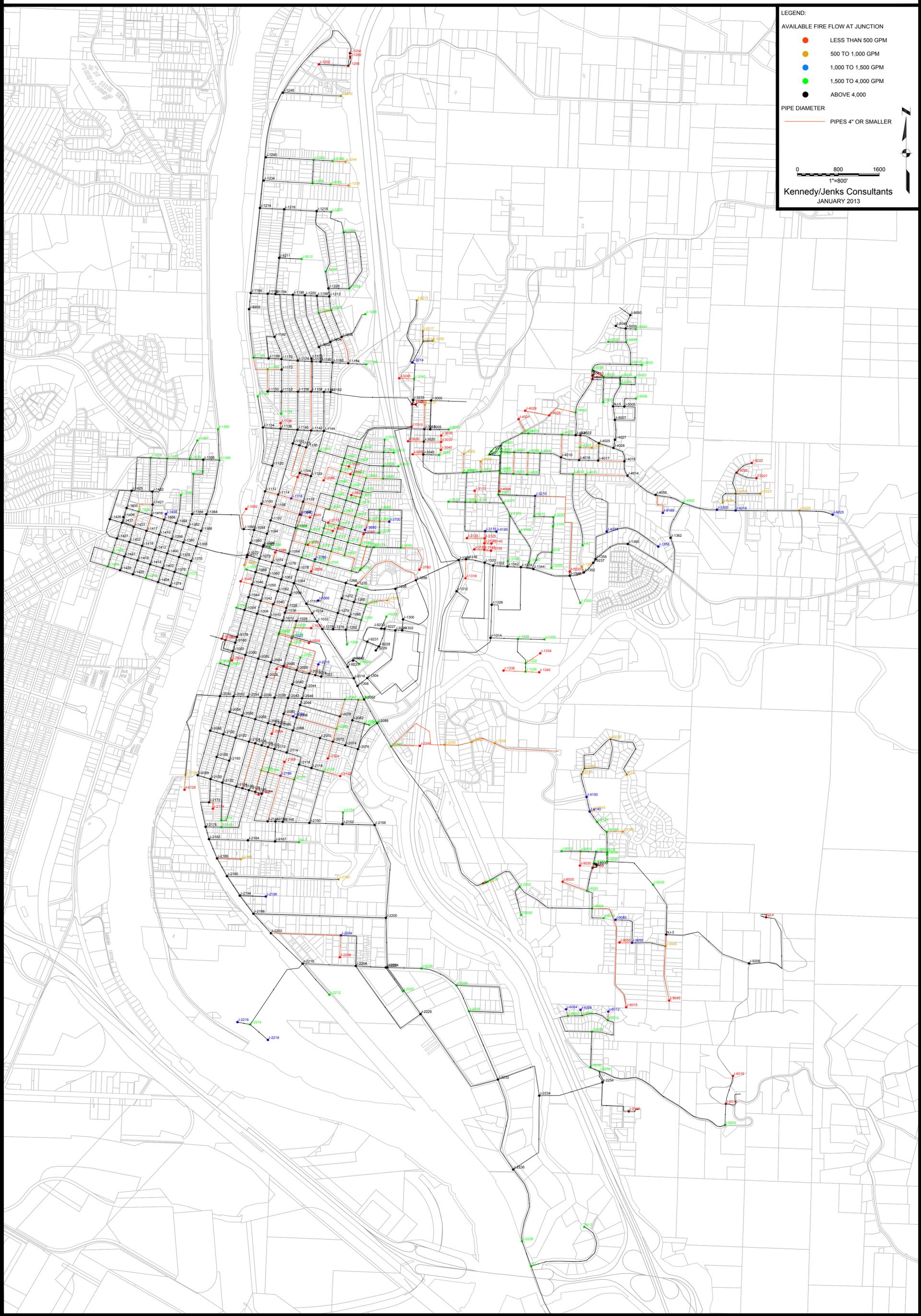
- LESS THAN 500 GPM
- 500 TO 1,000 GPM
- 1,000 TO 1,500 GPM
- 1,500 TO 4,000 GPM
- ABOVE 4,000

PIPE DIAMETER

- PIPES 4" OR SMALLER

0 800 1600  
1"=800'

Kennedy/Jenks Consultants  
JANUARY 2013





14 February 2013

## Flow Testing Memorandum

To: Mr. Michael Kardas, PE; City of Kelso

From: Janet Snedecor, PE; Kennedy/Jenks Consultants

Subject: City of Kelso Hydraulic Model Field Verification  
Flow Testing Protocol  
K/J 1197012\*00

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Kennedy/Jenks Consultants is in the process of updating the City of Kelso's (City's) Water System Plan and WaterCAD hydraulic model. As part of this process, Kennedy/Jenks was asked to model a scenario in which the City's Minor Road Reservoirs were removed from service to determine the potential service impacts. The City's water system model, WaterCAD version 8i, was utilized to determine the potential system impacts during the highest demand situation, maximum day demand plus fire flow. It should be noted the analysis performed was for the static condition and does not reflect cyclical demand patterns.

Two scenarios were compared for this analysis; Scenario 1 – Minor Road Reservoirs in service, maximum day plus fire flow conditions, and Scenario 2 – Minor Road Reservoirs out of service, maximum day plus fire flow. Both scenarios assume that the Minor Road pump station will remain in service. The results from Scenario 1 were then compared to Scenario 2. Model results indicate there are minimal negative impacts on the distribution system associated with removing the Minor Road Reservoirs from service. Prior to removing the Minor Road Reservoirs from service, the City plans to field-validate the Scenario 2 model results by conducting flow testing at various locations throughout the distribution system. Flow testing locations were selected based on variations between the two scenarios and City staff's knowledge of the distribution system.

This memorandum describes the recommended locations for flow testing, as well as the procedures that should be followed while performing the tests. The attached map and Table 1 describe the recommended flow test locations. As the WaterCAD model does not include fire hydrant locations, the final flow test locations and hydrants utilized will be determined in conjunction with City staff. It is expected that each flow test will take approximately 1 to 1.5 hours to complete. Based on the expected flow test duration, the City should anticipate 3 days to complete the recommended flow testing.

### **Recordkeeping**

Before starting each flow test, the locations of all hydrants used during the testing and any changes to the original flow testing plan should be recorded on the Hydrant Testing Data Recording forms so that Kennedy/Jenks can compare field conditions to the modeled conditions. Information about the water distribution system should be noted at the time of each

## Flow Testing Memorandum

Mr. Michael Kardas, PE; City of Kelso

11 February 2013

1197012\*00

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flow testing event. Additional information collected will include time of day, weather conditions, water levels in test zone reservoir, the operational status of all pumps, and control valves (for example, pressure reducing valves for both static and test conditions) and the system demand the day of the test. Any other unusual information about the existing conditions of the water system on that day should also be recorded.

Each of the flow tests will require two hydrants. The first hydrant of each test will be used as the flowing hydrant (FH), where flow and static pressure will be measured. The second hydrant will be identified as a Residual Hydrant (RH). Both static and residual pressures are measured at the RH, during the flow test. If a flow or pressure hydrant noted is unavailable or inoperable, use the nearest hydrant to the specified location and note the new hydrant location on the appropriate Flow-Test Figure on the attached form.

### Procedures

The recommended field-testing procedures for fire hydrant flow testing are as follows:

1. Prior to testing:
  - a. Notify City customers that flow testing will occur. Verify that the proposed hydrant discharge flows can be safely accommodated.
2. At all hydrants (flow and residual):
  - a. Flush the hydrant to remove sediment by opening the hydrant pumper outlet. Sediment could damage the pressure gage if not flushed.
  - b. Shut the flow off and install a pressure gage with the appropriate adaptor on the hydrant pumper or hose outlet.
  - c. Slowly open the valve fully and read and record the static pressure at each hydrant.
  - d. Use the hydrant spanner wrench to operate the hydrant nuts.
3. At the FH:
  - a. Install flowmeter per the manufacturer's instructions.
  - b. Locate nearby storm drains or drainage ditches. Make accommodations to direct discharge water to the most appropriate acceptance point. Follow standard dechlorination procedures for the discharge water, as required.
  - c. Slowly open the flow hydrant until it is fully open. Always open hydrants slowly to avoid pressure surges in the distribution system.

## Flow Testing Memorandum

Mr. Michael Kardas, PE; City of Kelso

11 February 2013

1197012\*00

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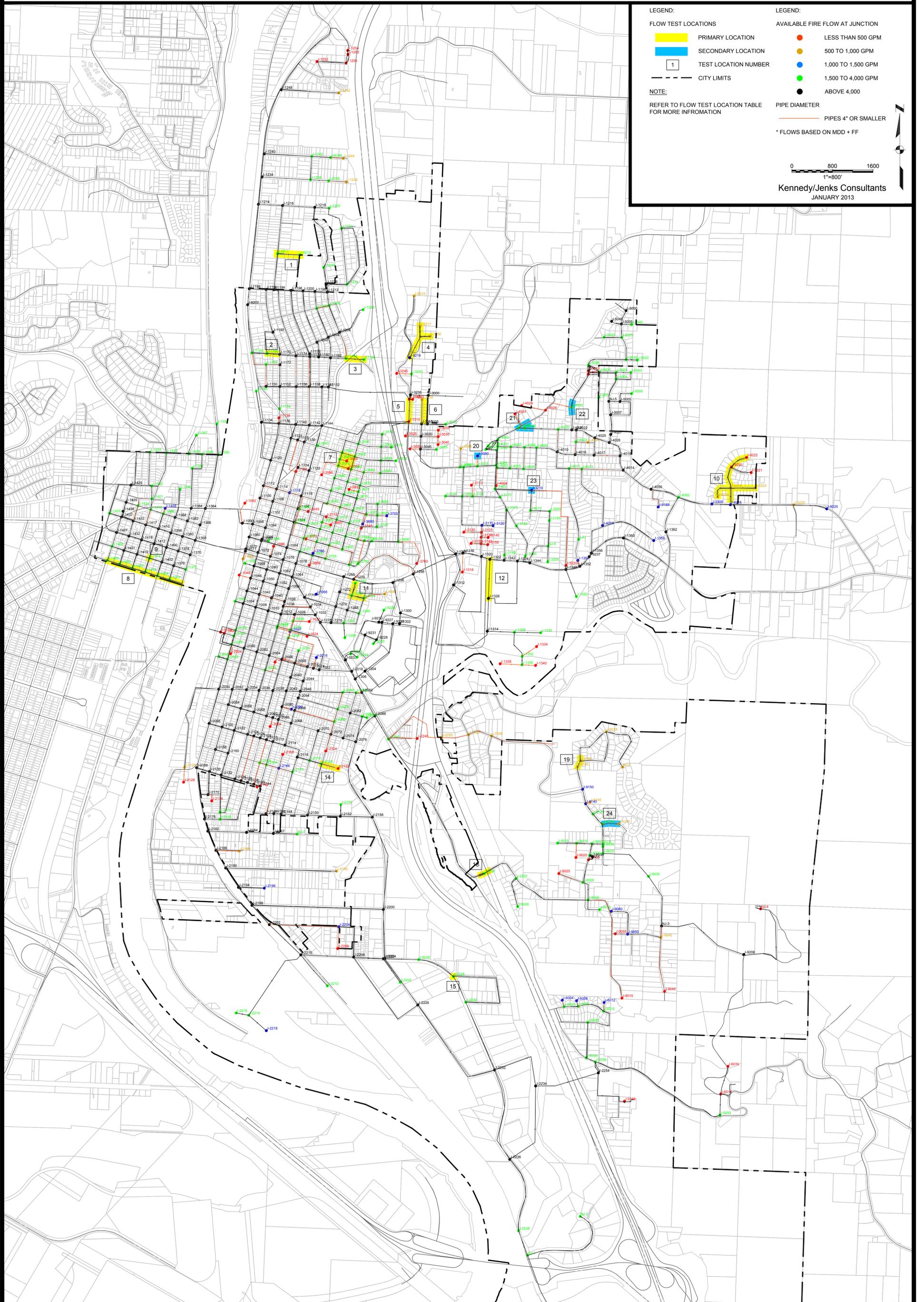
- d. Ensure water is flowing safely. If required, install a hose and energy dissipater to reduce the energy from the flowing water. This should be done only if the energy dissipater does not restrict the flow or pressure at the hydrant.
- e. Allow sufficient time (up to 5 to 10 minutes) to obtain steady-state conditions.
4. Measuring flow (at the FH):
  - a. Read and record hydrant flow per the meter manufacturer's instructions.
  - b. While the FH is flowing, notify personnel at the residual hydrant to record the residual pressure.
5. Completing work at the FH:
  - a. Slowly shut the hydrant off until fully closed. Close hydrant slowly to prevent water hammer or positive surge.
  - b. Shut off all hydrants, remove gages and hydrant diffuser, and close all nozzle caps.
6. Completing work at the RH:
  - a. Shut off all valves, remove gages, and close all nozzle caps.
  - b. Document all test information on the Hydrant Testing Data Recording Form before proceeding to the next hydrant.

Upon completion of all fire hydrant testing, provide the recording forms and marked-up maps to Kennedy/Jenks.

### Enclosures:

Flow Test Location Map  
Flow Test Location Table  
Hydrant Testing Data Recording Form

CITY OF KELSO  
 KELSO, WASHINGTON  
**KELSO WATER MODEL UPDATE**  
**MINOR ROAD RESERVOIR FLOW TEST LOCATIONS**



**LEGEND:**

**FLOW TEST LOCATIONS**

- PRIMARY LOCATION
- SECONDARY LOCATION
- 1 TEST LOCATION NUMBER
- CITY LIMITS

**NOTE:**

REFER TO FLOW TEST LOCATION TABLE FOR MORE INFORMATION

**LEGEND:**

**AVAILABLE FIRE FLOW AT JUNCTION**

- LESS THAN 500 GPM
- 500 TO 1,000 GPM
- 1,000 TO 1,500 GPM
- 1,500 TO 4,000 GPM
- ABOVE 4,000

**PIPE DIAMETER**

- PIPES 4" OR SMALLER

\* FLOWS BASED ON MDD + FF

0      800      1600  
 1"=800'

Kennedy/Jenks Consultants  
 JANUARY 2013

**Primary Recommended Flow Test Locations**

<b>Flow Test Location</b>	<b>Junction No.</b>	<b>Location</b>	<b>Fire Flow With Minor Road Online</b>	<b>Fire Flow Without Minor Road Online</b>	<b>Comments</b>
1	J-9211	2 <sup>nd</sup> & Veys area	Above 4,000 gpm	1,500 to 4,000 gpm	
2	J-1168	Division & Home Ct	Above 4,000 gpm	1,500 to 4,000 gpm	
3	J-1184	Division & Bowmont	Above 4,000 gpm	1,500 to 4,000 gpm	
4	General Area	End of Minor Rd & Teresa Way	500-1,000 gpm		Per Fire code should have 1,000 gpm for fire flow. Verify flow in field.
5		Immediately adjacent Minor Reservoirs (13 <sup>th</sup> Ave N)	<500-1,000 gpm		Flow varies in this area – all low accordingly to model.
6		Discharge side of Minor Rd Pumps			
7		Ayers & 7 <sup>th</sup>			Cluster of 4-inch mains – not all connected.
8	J-1420	W. Kelso - Along street S of Lincoln	Above 4,000 gpm	1,500 to 4,000 gpm	Flow decreased in all nodes along this street.
9	J-1414	Corner of Lincoln & 4 <sup>th</sup>	Above 4,000 gpm	1,500 to 4,000 gpm	
10	J-9222 or J-9220	Tweed Ct area	< 500 to 1,000 gpm		
11	J-1280 or J-1282	Oak & 9 <sup>th</sup> or dead end of 9th	Above 4,000 gpm	1,500 to 4,000 gpm	Verify model results.
12	J-1326 or J-1322	Near High School	Above 4,000 gpm	Above 4,000 gpm	
13	J-2016	Cherry & 4 <sup>th</sup>	Above 4,000 gpm	1,500 to 4,000 gpm	
14	J-2118/2120	Elm & 11 <sup>th</sup>	Above 4,000 gom	1,500 to 4,000 gpm	
15	J-2228	Corner of Talley Way & Baker Way	Above 4,000 gpm	1,500 to 4,000 gpm	
16	J-2234	Before I-5 crossing to Paxton (Talley area)	Above 4,000 gpm	Above 4,000 gpm	
17	J-2238	Talley Way, near Marina Rd (north of Coweeman River)	Above 4,000 gpm	1,500 to 4,000 gpm	
18	J-8197	Near Haussler Pump Station (suction or discharge?)	Above 4,000 gpm	1,500 to 4,000 gpm	
19	J-9165	Corner of Mimosa or Grim	1,000 to 1,500 gpm	500 to 1,000 gpm	

**Secondary Recommended Flow Test Locations**

<b>Flow Test Location</b>	<b>Junction No.</b>	<b>Location</b>	<b>Fire Flow with Minor Rd online</b>	<b>Fire Flow w/out Minor Rd online</b>	<b>Comments</b>
20	J-3080	Butler Acres School	1,000 to 1,500 gpm	1,000 to 1,500 gpm	1,500 gpm required.
21	J-9032	Jones Rd/Sunrise/Carolyn Area	1,500 to 4,000 gpm	1,500 to 4,000 gpm	
22	J-4080	Behshel Heights Rd – midway between reservoir and Sunrise	1,500 to 4,000 gpm	1,500 to 4,000 gpm	Verify flow – 4,000 gpm estimated near intersection of Behshel Heights and Sunrise.
23	J-3210	Harris St & N 20 <sup>th</sup>	1,000 to 1,500 gpm	1,000 to 1,500 gpm	1,000 gpm required. Model shows 1,500 to 4,000 gpm on either side of node.
24	J-9130/9135	Aldercrest – between Grimm and dead-end	1,500 to 4,000 gpm 500 to 1,000 gpm	1,500 to 4,000 gpm 500 to 1,000 gpm	
25	J-6014	Tybren Heights/Carrols Rd	< 500 gpm	< 500 gpm	500 gpm required.

**Note:**

gpm = gallons per minute

# Hydrant Test Form

# City of Kelso Minor Road Reservoir Model Verification

TEST #	DATE	TIME <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	CITY/AREA	PRESSURE ZONE	MAIN SIZE
TESTER NAME(S)					
TEST CONDITIONS/REMARKS					

FLOW HYDRANT NUMBER	LOCATION COORDINATES			STATIC PRESSURE (PSI)	OBSERVED DISCHARGE (GPM)
	Latitude	Gage Elev.	Longitude		
<b>FH-</b>					

REDIDUAL HYDRANT NUMBER	LOCATION COORDINATES			STATIC PRESSURE (PSI)	RESIDUAL PRESSURE (PSI)	REMARKS
	Latitude	Gage Elev.	Longitude			
<b>RH-</b>						

COORDINATE DATUM	
VERTICAL	
HORIZONTAL	

# Hydrant Test Form

# City of Kelso Minor Road Reservoir Model Verification

Page 2 of 2

DATE:

TIME:

SYSTEM WATER DEMAND:  
WHERE MEASURED:

RESERVOIR(S) SERVING ZONE TESTED –	WATER SURFACE ELEVATION (ft)
REMARKS	

PUMP STATION SUPPLYING ZONE TESTED –	PUMP STATUS
	<input type="checkbox"/> ON <input type="checkbox"/> OFF    FLOWRATE: PRESSURE:
	<input type="checkbox"/> ON <input type="checkbox"/> OFF    FLOWRATE: PRESSURE:
REMARKS	

PRV/VALVES –	STATUS
	<input type="checkbox"/> INTO ZONE <input type="checkbox"/> OUT OF ZONE    FLOWRATE: PRESSURE:
	<input type="checkbox"/> INTO ZONE <input type="checkbox"/> OUT OF ZONE    FLOWRATE: PRESSURE:
	<input type="checkbox"/> INTO ZONE <input type="checkbox"/> OUT OF ZONE    FLOWRATE: PRESSURE:
REMARKS	

NOTES: