Operation and Maintenance Program

6

WATER SYSTEM MANAGEMENT AND PERSONNEL

The water system operator is responsible for normal day to day operations, preventative maintenance and water quality monitoring. Budgeting and accounting is currently handled by the District Secretary. A billing system is not in place at this time; however, one will be developed and implemented as described in the financial section of this Water System Plan (WSP).

Operator Certification

Chapter 70.119 RCW and Chapter 246-292 WAC require operator certification for Group A public water systems. The two operators for the Lake Wenatchee Users (Mr. Cleve Borth and Mr. Mike Sawyer) are not currently certified. The Whispering Pines water system operator, Mr. Charles Cruickshank, is a certified Water Distribution Manager Two, a Water Treatment Plant Operator One and a Cross-Connection Control Specialist. Mr. Cruickshank is also the water system operator for the Brown Road Water Users Association. The water system operator for the Lake Wenatchee Water District (District) will meet the requirements of Chapter 70.119 RCW and Chapter 246-292 WAC for Group A public water systems.

SYSTEM OPERATION AND CONTROL

A water system is comprised of a series of individual components, each requiring some level of routine maintenance and/or observation. Major system components are shown on **Figures 1-2** and **1-3**. Some of the tasks are related to the physical assets of the system such as valves, water mains, air/vacuum and blowoff valves, and fire hydrants. Other tasks are service related and driven by customer or external requests.

Periodically, emergency equipment and spare parts inventory necessary for distribution system repair, spare parts for pumps, and repair items for pumps, valves and pipelines should be checked. A master list of minimum inventory should be developed.

The major activities comprising the operation of the District's water system are summarized below.

Water Main Activities

Task 1 – Connect New Mains to the Distribution System – All newly installed water main is connected to the existing distribution system by contract service or maintenance crews.

Task 2 – Repair Main Breaks - Maintenance personnel are on call 24 hours a day to respond to and repair main breaks. The broken or leaking section must first be isolated from the rest of the system, repaired and then disinfected prior to being put back in service. Repairs of a

minor nature can be repaired under pressure by use of a clamping device, such as a full circle repair clamp. All parts used in the repair (pipes, clamps, fittings and gaskets) that come into contact with the potable water shall be disinfected with a strong solution (20 to 25 parts per million (ppm)) of hypochlorite.

Task 3 – Flush Mains – Water mains are flushed annually to remove accumulated particulates and stagnant water. Flow tests are also conducted on selected mains to evaluate fire flows and distribution system hydraulics.

Valve Activities

Task 1 – Valve Maintenance, Repair and Installation – Each valve is operated once per year in both directions (fully closed and fully opened), and the turns to do so are noted on the valve record card. Valves that operate in the opposite direction than is standard for the system are identified, as are valves in need of repair. Repair also includes maintenance of valve boxes and adjusting boxes to grade. Valve installation includes excavation, removal of the old valve and connection of a new valve.

Task 2 – Blowoff Maintenance, Repair and Installation – Blowoffs are inspected and operated twice per year as part of the main flushing program.

Task 3 – Air and Vacuum Release Valves – Air and vacuum release valves are inspected for proper operation annually.

Service Related Activities

Task 1 – New Services – New services are installed as required. Installation includes the connection to the water main and service line placement up to the property line.

Task 2 – Service Exchanges – Substandard water services that have been identified are exchanged for new services. This includes a regular effort to exchange galvanized piping services when found.

Task 3 – Service Repair – Repairs are usually for leaking services. Water services are also damaged by contractors and customers, requiring immediate repair. This task includes repair of curb stops and meter boxes. About 10 percent of the system's meter boxes are inspected each year; this occurs as part of water turn on, shut off and leak detection activities.

Task 4 – Abandoned Services – Water services that are considered abandoned and not reusable are disconnected and removed from the distribution system.

Meter Related Activities

Task 1 – New Meter Installation – Meters for new services will be installed as required. Installation includes a meter box.

Task 2 – Meter Exchange, Repair, Replacement and Relocation – During meter testing and meter reading activities, damaged, leaking or inaccurate meters are identified for repair or replacement.

Task 3 – Meter Testing – Meters are not routinely tested. Meters are spot tested and replaced at a frequency that depends on the make and model of the meter.

Task 4 – Meter Reading – Meters are read on a routine basis. Large consumption accounts are generally read and billed on a monthly basis, and all other account meters are read once every two months.

Hydrant Related Activities

Task 1 – Hydrant Maintenance, Repair and Installation – Hydrants are painted approximately every five years. A portion of the hydrants require annual cleaning (vegetation removal) to keep them accessible. All hydrants and hydrant valves are operated and inspected annually as part of the main flushing program. Repairs are generally minor with the exception of those that result from vehicle accidents. Hydrants that cannot be repaired or have been determined to be substandard are replaced. This can also include new hydrant installation as part of the maintenance program.

Citizen Services

Task 1 – Complaint Investigation and Resolution – The most common complaints are for "dirty" water, low or no pressure, and evidence of a broken or leaking main or service line. The complaint is investigated and the customer is notified of the action to be taken. A Customer Service Report (CSR) is filled out for each complaint.

Task 2 – Shut Offs (S/O) and Turn Ons (T/O) – This task includes S/O requests for delinquent, abandoned and vacant accounts. These tasks are also conducted so that maintenance can be done on private plumbing per customer request. This task includes T/O requests upon installation of water service lines.

Task 3 – Utility Locates – In the future, the District plans on participating in the Utility Underground Location Center ("call before you dig") service. Water main and water service lines are marked to prevent damage during excavation activities.

Task 4 – Delinquents/Vacants/Pending – Pending and vacant lists are checked to ensure that water services are not being illegally used. Pending checks are done quarterly and vacant checks are done semi-annually.

Other Activities

Task 1 – Account Billing and Invoicing – Water bills are routinely sent to customers and the payments received and credited to the account.

Task 2 – Source of Supply Inspection – Visit and perform a visual inspection of each water source in the system. Lubrication and maintenance instructions specified by the manufacturer should be followed closely, if applicable. The water source site is required to have detailed startup, shutdown and safety procedures posted. Control systems equipment and unexplained changes in reservoir or well water levels are checked.

Task 3 – Booster Pump Station Inspection – Visit and perform a visual inspection of each booster pump station site in the system. Lubrication and maintenance instructions specified by the manufacturer should be followed closely. Each booster pump station site needs to have detailed startup, shutdown and safety procedures posted. Check control systems equipment.

Task 4 – Reservoir/Site Inspection – Visit and perform a visual inspection of each reservoir in the system. Check control system equipment.

Task 5 – Water Quality Testing – Collect and deliver samples to the laboratory for the required water quality tests as necessary.

Task 6 – Backflow Device Inspection and Testing – Ensure that all backflow devices in the water system are inspected and tested on an annual basis by a certified tester.

Task 7 – Leak Detection – Special listening devices are used to locate leaks in water main and services. Older services and sections of pipe are particularly susceptible to leaks.

Task 8 – Flow Tests – These are set up by request to check the condition of certain sections of water main and fire hydrant capacity.

Task 9 – Records and Files – This task includes updating and managing the maintenance management information, map files and other records.

Task 10 – Education/Training – State certification as a Water Distribution Specialist with Cross-Connection Control training, is required for the operator of the water system. Three continuing education units (CEUs) are required every three years (this is equivalent to 30 hours of instruction every 3 years) to maintain State certification. Monthly safety meetings are also conducted. About 40 hours per employee per year is currently planned for education and training needs.

Task 11 – Equipment Maintenance – This task includes minor maintenance to vehicles, tools and shop equipment.

Task 12 – Other General Maintenance – These are miscellaneous tasks that do not fall under any of the listed tasks.

STAFFING

A water system is a complex assortment of equipment and parts that require operation and maintenance. The available hours of a person during a year are not the total hours worked. There are hours spent on training, non-work status and other activities that deduct from the 2,080 hours in pay status during the year. The total available hours are typically reduced to 1,540, as shown in **Table 6-1**.

Table 6-1
Annual Available Hours per Person

Time Available Per Year Per Person	
Beginning Hours Available	2,080
Less average vacation of 3 weeks per year	-120
Less average sick leave of 2 weeks per year	-80
Less holidays of 10 days per year	-80
Less average training of 40 hours per year	-40
Less average small tasks other than above of 1 hour per day	-220
Net Total Available Hours Per Year Per Person	1,540

Table 6-2 summarizes the maintenance and operation staffing needs for the District.

Table 6-2
Operation and Maintenance Plan

	Inventory	Units	Frequency	Time (man hours)	Subtotal (man hours)	Total(man hours)
Main Activities						**89**
Connect New Mains	1	ea	2	24	48	
Repair Main Breaks	2	ea	1	8	16	
Flush Mains	5	miles	1	5	25	
Valve Activities						**43**
Valve Maintenance, Repair and Installation	82	ea	1	0.5	41	
Blowoff Maintenance, Repair and Installation	2	ea	1	0.5	1	
Air and Vacuum Release Valves	1	ea	1	0.5	0.5	
Service Activities						**18**
New Service Installation	1	ea	1	8	8	
Service Exchanges	1	ea	1	6	6	
Service Repair	1	ea	1	2	2	
Abandoned Services	1	ea	1	2	2	
Meter Activities						**210**
New Meter Installation	1	ea	1	4	4	
Meter Exchange, Repair, Replacement and Relocatio	2	ea	1	1	2	
Meter Testing	10	ea	1	1	10	
Meter Reading	129	ea	6	0.25	194	
Hydrant Activities						**216**
Hydrant Maintenance, Repair and Installation	27	hydrant	1	8	216	
Citizen Service						**10**
Complaint Investigation and Resolution	1	inquiries	1	1	1	
Shut Off/Turn On	2	requests	1	0.5	1	
Utility Locates	2	locates	1	1	2	
Delinquents/Vacants/Pending	4	checks	6	0.25	6	
Other Activities						**1,819**
Account Billing and Invoicing	129	ea	1	2	258	
Source of Supply Inspection	5	ea	100	1	500	
Booster Pump Station Inspection	2	ea	30	1	60	
Reservoir/Site Inspection	5	ea	60	1	300	
Water Quality Testing	5	test	12	2	120	
Backflow Device Inspection and Testing	2	inspections	1	2	4	
Leak Detection	24	hrs	1	1	24	
Flow Tests	4	ea	0.25	0.5	0.5	
Records/Files	8	hrs	12	1	96	
Education/Training	40	hrs	1	1	40	
Equipment Maintenance	4	hrs	1	52	208	
General Maintenance	4	hrs	1	52	208	
				Total Estimated Hours		**2,404**
				Total Full Time Staff Required (based on 1,540 hours per year per person)		**1.6**

WATER QUALITY AND COLIFORM MONITORING PLAN

The Water Quality Monitoring Plan contains the requirements for both source and distribution system water quality monitoring in accordance with the drinking water regulations contained in WAC 246-290-300. This plan also provides a summary of the existing water system facilities and operation based on incorporation of the separate water systems. This Plan is located in **Appendix H.**

EMERGENCY RESPONSE

All water systems are subject to damage, contamination or interruption from unusual emergency events. The degree of damage and capacity to respond to that damage or interruption is determined by the vulnerability to or contamination of the system.

Many emergency plans call for notification of the public, Department of Health (DOH) and emergency response agencies regarding the emergency condition and required demand curtailment measures.

The following is a sample emergency announcement: *The water system has experienced a major loss of its water production capacity (booster pump failure, power outage or major main break). Customers are directed to stop all non-essential water use and make every effort to conserve for sanitary and potable use only. Everything is being done to restore the water system to normal operation. You will be notified of any changes in the situation.*

A list of organizations that may be contacted in an emergency is provided in **Table 6-3**. Following this table is a summary of the procedures for notification during an emergency event.

Table 6-3
System Emergency Reference List

Emergency Contact	Phone Numbers	Emergency Contact	Phone Numbers
Fire/Police/Medical	911	Electrician	(509) 763-4344
County Emergency Services	911	DOH Regional Engineer	(509) 329-2117
County Environmental Health Contact	(509) 886-6450	DOH Emergency Contact After Hours	1 (877) 481-4901
Department of Ecology Spill Response (must call both numbers)	1 (800) 258-5990 1 (800) 424-8802	System Owner	(509) 682-5968 (509) 470-1746
Engineering Consultant (RH2)	1 (509) 886-6766 1 (509) 679-4001	System Owner	(509) 682-5968 (509) 670-1864
Electrical Utility (Chelan County PUD)	(509) 682-2581 1 (877) 783-8123 (after hours)	Media Contact (KPQ)	(509) 665-6565
Pump Service (Tumwater Drilling)	(509) 548-5361	"Call Before You Dig"	1 (800) 424-5555
Pipe Services (HD Fowler)	(509) 568-8400		

Customers

Customers and the general public will be notified in the event of an emergency situation that affects either the quantity or quality of water supply. Customers will be notified through door to door direct contact of the emergency situation and how it affects them. If the emergency situation affects water quality, customers may be asked to boil water prior to drinking or cooking. If the emergency situation affects water quantity, customers may be asked to conserve water to prevent depletion of a potentially limited quantity of emergency supply.

Priority Customers

Priority customers that require uninterrupted water service will be notified directly. These customers could include home care kidney dialysis patients, medical facilities and commercial customers who are especially vulnerable to loss of water service. At this time, the water system does not have any customers who require an uninterrupted supply of water.

Health Departments

The local health department, the Chelan-Douglas Health District and the Washington State Department of Health will be contacted directly if there are water quality problems, water shortage concerns or any other emergency situations in which public health is threatened.

Police and Fire

Police or fire personnel will be notified in the event of a fire or human safety emergency situation. The emergency phone number for these types of emergency situations is 911.

Contingency Operation Plan

The following section contains contingency operation plans for responding to potential emergency conditions for each of the major system components.

Wells

Emergency Condition: Aquifer Contamination

Impact on System: Potentially major impact. The water is not suitable for potable water use – major loss of supply.

Emergency Response

1. Shut down the well(s).
2. Notify DOH of the aquifer contamination.
3. Notify all customers of the problem and instruct them to boil all water to be used for consumption and cooking.
4. Analyze the water quality within reservoirs and dispose of properly if contaminated.
5. Disinfect reservoirs and water mains as necessary to remove contaminated residuals.
6. Adjust control of system facilities as necessary to provide supply from storage facilities if water within them is not contaminated.

7. Monitor water quality at the source and investigate the cause of contamination.
8. Implement water use reduction measures as necessary to ensure an adequate supply of water.

Emergency Condition: Power Outage

Impact on System: Moderate impact depending on length of outage, the area affected by the outage and the level of system demand.

Emergency Response

1. Contact the power company to restore power.
2. If necessary, bring portable generator to affected site and connect to facility.
3. Supply water demand from reservoirs.
4. Implement water use reduction measures as necessary to ensure an adequate supply of water.

Reservoirs

Emergency Condition: Structural Damage

Impact on System: Potentially major impact depending on reservoir (or reservoirs) damaged. Impacts could include loss of storage capacity and reduced fire flow.

Emergency Response

1. Isolate reservoir(s) from water system.
2. Notify police and nearby residents of potential danger.
3. Notify local fire departments of reduced firefighting capabilities in areas served by the reservoir(s).
4. Drain reservoir(s), as necessary to reduce level of damage and threat to local residents.
5. Determine the extent of damage.
6. Adjust control of other system facilities to operate system without the damaged reservoir(s).
7. Implement water use reduction measures as necessary to ensure an adequate supply of water.

Emergency Condition: Power Outage

Impact on System: None.

Emergency Response: Contact the power company to restore power.

Transmission and Distribution Mains

Emergency Condition: Water Main Break

Impact on System: Depending on the size and location of water main and size of the break, impacts range from minor to major. Loss of water from reservoirs, reduction or loss of fire protection capability, disruption of water service to customers and potential damage to adjacent property are all possible impacts.

Emergency Response

1. Notify affected customers.
2. Isolate, shut down and repair damaged water main.
3. If one of the major transmission mains must be shut down, adjustments to the control and operation of other facilities may be necessary.

Emergency Condition: Water System Contamination Due to a Backflow Incident

Impact on System: Potentially major impact. Water not suitable for potable use means a loss of supply.

Emergency Response

1. Notify the Cross-Connection Control Specialist of the incident.
2. Shut down the affected mains, if possible, to contain the affected contaminants.
3. Notify DOH of the backflow incident.
4. Notify all customers of the problem and instruct them to boil all water to be used for consumption and cooking and/or issue a no drinking warning.
5. Flush affected water mains to remove contaminants.
6. Disinfect reservoirs and water mains as necessary to remove contaminated residuals.
7. Analyze water quality in other parts of the distribution system to ensure that all contaminants were contained.

Control System

Emergency Condition: Control Equipment Failure

Impact on System: Probably minor to moderate impact depending the extent of loss to control equipment at the affected facilities. If the control equipment fails, the supply pump will have no automatic control. This would result in non-stop pump operation and reservoir overflow if the control equipment failed during pump operation. If the control equipment failed while the pump was in the "off" mode, the results would be failure to activate the pump and excessive drawdown in tanks.

Emergency Response

1. Shut down and/or hand operate the supply pump as needed to maintain reservoir levels.
2. Make necessary adjustments to or manually operate the facility with the failed control

equipment.

3. Call necessary personnel to repair or replace the failed equipment.

Comprehensive Monitoring

Copies of the most recent water quality monitoring reports, Coliform Monitoring Plan, Consumer Confidence Report and related water test results are provided in **Appendices G** and **H**.

Vulnerable Facilities

The water system consists of vulnerable facilities; malfunction or contamination would impact the system's capability to provide domestic demand or fire flows, as shown in **Table 6-4.**

Table 6-4
Impact of Malfunction of Vulnerable Facilities

Malfunctioning Component	Impact
Well	Well is the only water supply source. System is limited to water stored in the reservoir.
Reservoir	If reservoir was to be taken offline, the system would not have stored fire protection. The pump would have enough capacity to meet the peak day demand, but there would be no standby storage.
Supply Pump	Supply pumps are the primary supply sources. In an emergency, a fire pump could be utilized. System is limited to water stored in the reservoir.
Fire Pump	Fire pumps provide critical flow and pressure to meet requirements for fire protection. Fire flow rate, pressure and duration would be greatly reduced.

SAFETY PROCEDURES AND EQUIPMENT

Safety is the concern and responsibility of all water operations and maintenance staff. The American Water Works Association publishes a manual entitled*, Safety Practices for Water Utilities (M3)* that describes safety programs and provides guidelines for safe work practices and techniques for a variety of water utility work situations.

The following identifies procedures to be followed for operations and maintenance tasks that involve the most common potential work place hazards in the water system.

Use of Chlorine or Chlorine Products

Standard Procedure **–** Handle with care, provide adequate ventilation, wear safety glasses and rubber gloves.

Working in Confined Spaces

Standard Procedure – Follow state requirements for confined space entry.

Working around Heavy Equipment

Standard Procedure – Obtain proper training and follow all safety procedures. Use noise protection equipment.

Working in Traffic Areas

Standard Procedure – Wear proper clothing and provide adequate signage and flagging for work area.

Working on or around Water Reservoirs

Standard Procedure – Follow proper safety harness procedures for working on tall structures.

Working in or around Pump Stations

Standard Procedure – Obtain proper training and follow all safety procedures for working on pumps and electrical equipment. Use noise protection equipment.

CROSS-CONNECTION CONTROL

Requirements for Program

The District has the responsibility to protect the public water system from contamination due to cross connections. A cross connection may be defined as

> Any actual or potential physical connection between a potable water line and any pipe, vessel, or machine that contains or has a probability of containing a non-potable gas or liquid, such that it is possible for a non-potable gas or liquid to enter the potable water system by backflow.

All public water systems are required to develop and implement cross-connection control (CCC) programs. The requirements are contained in WAC 246-290-490 of the Drinking Water Regulations. The elements of a CCC program are as follows.

1. Establishment of legal authority and program policies.
2. Evaluation of premises for cross connection hazards.
3. Elimination and/or control of cross-connections.
4. Provision of qualified personnel.
5. Inspection and testing of backflow preventers.
6. Quality control of testing process.
7. Response to backflow incidents.
8. Public education for consumers.
9. Recordkeeping for CCC program.

10. Special requirements for reclaimed water use.

Other requirements of a CCC program include:

1. Coordination with the Local Administrative Authority (local building or plumbing official) regarding CCC activities;
2. Prohibition of the return of used water into the distribution system; and
3. Inclusion of a written CCC program in a WSP or a Small Water System Management Program (SWSMP).

Program Objectives

The objectives of the cross-connection control program are to:

1. Reasonably reduce the risk of contamination of the public water distribution system;
2. Reasonably reduce the District's exposure to legal liability arising from the backflow of any contaminant originating from the customer's plumbing system and then supplied to other customers; and
3. Cooperate with the local plumbing authority by exchanging information.

Summary of Program Decisions

Table 6-5 summarizes the major policy and program decisions that will be adopted for the water system. The items in the table represent CCC program areas that have more than one acceptable approach or option.

Table 6-5
Cross-Connection Control Program Decisions

Decision Item	Decision
1. Type of Program [General, WAC 246-290-490(2)(e)]	
a. Premises Isolation Only	
b. Premises Isolation and In-premises Protection (Combination Program)	X
2. Extent of Coordination with Local Administrative Authority [WAC 246- 290-490(2)(d)]	
a. Information Exchange	X
b. Interaction	
c. Joint Program	
3. Relationship with Customer [Element 1]	
a. Signed Service Agreement or Contract	X
b. Ordinance/Resolution; Implied Service Agreement	
4. Enforcement of Corrective Action [Element 1]	
a. Rely upon Shut Off of Water Service	X
b. Rely upon District Installed Premises Isolation	
5. Assessment and Re-Assessment of Hazard [Element 2]	
a. By District's Staff or Equivalent	
b. By Cross Connection Specialist (CCS) Employed by Customer, Report Reviewed by District's CCS	X
6. Location and Ownership of Premises Isolation Assembly [Element 3]	
a. On District's Service Line	
b. On Customer's Service Line	X
7. CCS Option – District's Program Management [Element 4]	
a. District's Staff Member Certified	X
b. Inter-Agency Agreement of Use Other Agency's CCS	
c. Contract with consultant CCS	
8. Testing of Assemblies [Element 5]	
a. By District Staff or District employed BAT	
b. By Customer Employed (contractor) BAT	X
9. Cost Recovery [WAC 246-290-100(4)(h) and -105(4)(p)]	
a. Borne by all Customers (general water rates)	
b. Assessed to Specific Class (commercial meters)	
c. Each Customer Directly Bears Cost	X

Elements of Program

The Washington State Department of Health (DOH) requires that a Cross-Connection Control Program include certain elements. The elements are listed in WAC 246-290-490(3). These elements are summarized in this section with a description of how the District intends to comply with the program element.

Element 1: Authorizing a Cross-Connection Control (CCC) Program

The District will adopt a policy or resolution that authorizes the water system to implement a CCC program within 30 days of assumption of the first water system (**Appendix M**). The policy will authorize the system to terminate water service to consumers who do not comply with the policy or resolution. However, the primary method for protection of the distribution system shall be the installation of a backflow prevention device by the water system customer; and the cost thereof will be paid by the customer.

Element 2: Procedures and Schedules for Evaluating New and Existing Service Connections to Assess the Degree of Hazard

The District will survey all customers' premises within one year of the assumption of the first water system. A survey will be completed commensurate with the District's assessment of the degree of hazard by a representative of the District or through the evaluation of a questionnaire completed by the customer for the sole purpose of establishing the District's minimum requirements for the protection of the public water supply system. New residential services will be surveyed at the time of beginning service. Commercial services will be surveyed annually to ensure the required backflow assembly device has been tested by a certified backflow assembly tester (BAT). The District will inform the customer or any regulatory agencies of the District's requirements for the installation of backflow prevention assemblies. Existing services will be monitored for new hazards and continued use of approved backflow devices during meter reading cycles.

Element 3: Procedures and Schedules for Elimination and/or Control of Cross Connections

Backflow Preventer Requirements – The following service policy shall apply to all new and existing customers.

The District will require that water service to all non-residential customers be isolated at the service isolation valve, corporation stop or meter by a District-approved double check valve assembly (DCVA) or reduced pressure backflow prevention assembly (RPBPA). This will occur within 60 days of assessment for existing customers. Water service to all residential customers will be isolated at the service line isolation valve or meter by a District installed meter check valve (single or dual), except where the customer has special plumbing that increases the risk to the District's distribution system. "Special plumbing" includes, but is not limited to, the following.

1. Lawn irrigation systems.
2. Solar heating systems.
3. An auxiliary source of supply, e.g., a well or creek.
4. Piping for livestock watering, hobby farming, etc.
5. Residential fire sprinkler system.
6. Property containing a small boat moorage.

For all District customers, the premises isolation DCVA or RPBPA required above shall be:

1. Purchased and installed by the customer (at the customer's expense) immediately downstream of the water meter in accordance with the District's standards described hereinafter; and
2. Maintained, tested at least annually, and inspected in accordance with the District's standards described hereinafter.

For new customers, the District will not turn on water (except for testing purposes) at the meter until the customer complies with the above requirements.

Failure of the customer to comply with the above installation and maintenance requirements shall be cause for the discontinuation of water service.

Approved Backflow Preventers and Installation

All backflow preventers relied upon by the District to protect the public water system shall meet the definition of "approved backflow preventer" as contained in WAC 246-290-010. The District will obtain and maintain a current list of assemblies approved for installation in Washington State by DOH.

All backflow preventers must be installed:

1. In the orientation for which they are approved;
2. In a manner and location that facilitates their proper operation, maintenance, and testing or inspection (Installation standards contained in the Pacific Northwest Section-American Water Works Association Manual or the *Manual of Cross-Connection Control* published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California (USC Manual) shall be followed unless the manufacturer's requirements are more stringent); and
3. In a manner that will protect them from weather-related conditions such as flooding and freezing; and
4. In compliance with applicable safety regulations.

The District has no regulatory responsibility or authority over the installation and operation of the customer's plumbing system. The customer is solely responsible for compliance with all applicable regulations and for prevention of contamination of their plumbing system from sources within their premises. Any action taken by the District to survey plumbing, inspect or test backflow prevention assemblies, or to require premises isolation (installation of DCVA or RPBPA on service) is solely for the purposes of reducing the risk of contamination of the District's distribution system.

The District will inform the customer that any action taken shall not be construed by the customer to provide guidance on the safety or reliability of the plumbing system. The District will not provide advice to the customer on the design and installation of plumbing other than the general public education program discussed in Element 8.

Except for easements containing the District's distribution system, the District will not undertake work on the customer's premises.

Element 4: Personnel

Program Administration

1. The responsibility for administration rests with the District, either as a body, or to an individual manager or employee, hereinafter referred to as the Manager.
2. The District will employ or have on staff at least one person certified by DOH as a CCS to implement the CCC program. As an alternative, or when no staff or employees are properly qualified, the District may retain a properly certified CCS on contract to provide the necessary expertise and services.

3. The following cross-connection related tasks will be performed by or under the direction of the certified CCS.
   a. Preparation and recommendation of changes to the CCC program.
   b. Performance of and/or review of CCC hazard evaluations.
   c. Recommendation of the type backflow preventer to be installed.
   d. Recommendation of schedules for retrofitting backflow preventers.
   e. Inspection of backflow preventers for proper application and installation.
   f. Review of backflow preventer inspection and test reports.
   g. Review of backflow testing quality control information.
   h. Recommendation and/or the granting of exceptions to mandatory premises isolation.
   i. Participation in or cooperation with other water utility staff in the investigation of backflow incidents and other water quality problems.
   j. Completion of CCC Activity and Program Summary Reports when required by DOH.
4. Other CCC program activities may be delegated, as necessary, to other personnel, including clerical support staff. These activities include:
   a. Administration of paperwork associated with service agreements;
   b. Mailing, collecting and screening of hazard evaluation questionnaires;
   c. Mailing of assembly testing notices;
   d. Receiving and screening of assembly test reports;
   e. Database administration and recordkeeping of CCC program information;
   f. Disseminating public education material; and
   g. Assisting in tasks associated with coordinating with the local administrative authority.
5. The District will retain on contract a current CCS.

Element 5: Backflow Preventer Inspection and Testing

1. Inspection and Testing of Backflow Preventers
   a. All backflow preventers that the District relies upon for protection of the water system will be subject to inspection and, if applicable, testing.
   b. Inspection of backflow preventers for proper application will be performed by the District's CCS.
   c. Inspection of backflow preventers for correct installation will be performed by either a CCS or a DOH certified BAT.
   d. Testing of assemblies will be performed by a DOH certified BAT.
2. Frequency of Inspection and Testing

a. Inspection and testing of backflow preventers will be conducted:

- At the time of installation;
- Annually, after installation;
- After a backflow incident; and
- After a repair, reinstallation, relocation or replumbing.

b. The District may require a backflow preventer to be inspected or tested more frequently than once a year when it protects against a high health hazard or repeatedly fails tests or inspections.

3. Responsibility for Inspection and Testing

a. The District will be responsible for inspecting and testing all District-owned backflow preventers.

b. The District requires the customer to be responsible for inspection and testing of backflow preventers owned by the customer. The customer shall employ, at customer expense, a DOH certified BAT to conduct the inspection and test within the time period specified in a testing notice sent by the District. The test report shall be completed and signed by the BAT, then countersigned and returned by the customer to the District before the due date specified by the District.

4. Approved Test Procedures

The District requires that all assemblies relied upon to protect the water system be tested in accordance with DOH approved test procedures as specified in WAC 246-290-490(7)(d). Any proposal to use alternate test procedures must be approved by the District's CCS.

5. Notification of Testing

The District will notify all customers who own backflow preventers that are relied upon to protect the water system to have their backflow preventer(s) inspected and/or tested.

6. Enforcement

A customer who fails to send in the inspection/test report by the due date specified may be subject to water discontinuation.

Element 6: Backflow Device Testing Quality Control Assurance Program

The District will maintain a list of pre-approved local certified CCSs and BATs.

Element 7: Backflow Incident Response

1. Backflow Incident Response Plan

The District's CCS will participate in developing a backflow incident response plan that will be part of the water system's emergency response program as required by WAC 246-290-415(2). The incident response plan will include, but will not be limited to:

a. Notification of affected population;

b. Notification and coordination with other agencies, such as DOH, the local administrative authority and the local health jurisdiction;

c. Identification of the source of contamination;

d. Isolation of the source of contamination and the affected area(s);

e. Cleaning, flushing and other measures to mitigate and correct the problem; and

f. Application of corrective action to prevent future backflow occurrences.

2. Technical Resource

The District will use the manual *Backflow Incident Investigation Procedures*, First Edition, 1996, published by the PNWS-AWWA as a supplement.

Element 8: Public Education Program

The District will educate customers about cross connections through newsletters or brochures regarding the following possible subjects.

- Cross-connection hazards in general.
- Irrigation system hazards and corrective actions.
- Fire sprinkler cross-connection hazards.
- Importance of annual inspection or testing of backflow preventers.
- Thermal expansion in hot water systems when backflow preventers are installed.

The District shall distribute informational brochures to all customers every two to three years.

Element 9: Cross-Connection Control Records

Types of Records and Data to be Maintained

1.) Service connections/customer premises information, including assessed degree of hazard and required backflow preventer to protect the public water system.

2.) Backflow preventer inventory and information, including:

a) Air gap location, installation and inspection dates, inspection results and person conducting the inspection;

b) Backflow assembly location, assembly description (type, manufacturer, make, model, size and serial number), installation, inspection and test dates, test results and person performing the test; and

c) Information on Atmospheric Vacuum Breakers (AVBs) used for irrigation system applications, including manufacturer, make, model, size, dates of installation, and inspections and person performing inspections.

Reports to be Prepared and Submitted

1.) The District will prepare the following reports as required by DOH. The District's CCS will prepare or review the report for correctness.

- Cross-connection control program activities for the calendar year to be sent to DOH when requested.
- Cross-connection control program summary information, when required, or when there are significant policy changes.
- Backflow incident reports to DOH.
- Documentation when exceptions to mandatory premises isolation are granted.

Element 10: Reclaimed Water

At this time the District does not receive or distribute reclaimed water. In the event that reclaimed water use is proposed within the system service area, all cross-connection control requirements mandated by the permitting authority in accordance with Chapter 90.46 RCW will be compiled with and made part of the CCC program.

Other Provisions

Coordination with Local Administrative Authority

A copy of the District's CCC program is provided to the Chelan County Building Official (plumbing authority) via a copy of the WSP or in a separate document. The District will inform the plumbing authority of any changes in policy or procedure that may impact the plumbing authority.

Unapproved Auxiliary Supplies

All water supplies other than those owned by the District are considered unapproved auxiliary supplies as defined in WAC 246-290-010. The District will require the installation of an RPBPA for premises isolation at the service connection of any customer having an unapproved auxiliary supply on the premises, whether or not there is a physical connection between the auxiliary supply and the District's system.

Tanker Trucks

The District may allow tanker trucks to obtain water from the water system under the following conditions.

- The tanker truck is equipped with an approved Air Gap or an approved RPBPA with a current satisfactory inspection or test report.
- The tanker truck shall obtain water from District designated watering points only through a metered connection.

Temporary Water Connections

The District will not supply water through temporary connections, such as those used for construction projects or main disinfection, except through a backflow preventer arrangement approved by the District. The applicant for the temporary connection shall document that the backflow preventer is of an approved model and has passed an inspection or test within the past 12 months.

Interties and Wholesale Water Customers

The District will require that interties with other public water systems be isolated at the point of delivery by:

- A minimum of a DCVA; or
- A minimum of an RPBPA if the District considers the customer to be a high health hazard.

The District may waive or reduce the level of protection if the customer:

- Is a Group A public water system not exempt from DOH regulation as per WAC 246-290-020(2);
- Has a CCC program that complies with WAC 246-290-490 and has been approved by DOH; and
- Implements the CCC program at a level satisfactory to the District.

Relationship to Other Programs

The District will consider the requirements and consequences of the cross-connection control program upon the planning and operations requirements of the water utility. Such considerations include, but are not limited to:

- Ensuring and promoting adequate communication between CCC program personnel and other water utility staff;
- Ensuring that adequate training is provided to all staff to recognize potential cross-connection control problems;
- Ensuring that cross-connection issues are considered in water quality investigations;
- Ensuring that the design of the water distribution system makes adequate provisions for expected head losses experienced by backflow assemblies;
- Ensuring that the CCC program personnel be consulted in the design of water and wastewater treatment facilities and when proposals are made to receive or distribute reclaimed water;
- Ensuring that operations under normal and abnormal conditions do not result in excessive pressure losses; and
- Providing for adequate financial and administrative resources to carry out the CCC program.

Operations and Maintenance Improvements

Other proposed improvements not mentioned above are addressed in **Chapter 8** and included in the District's Capital Improvement Program.

Distribution of Facilities Design and Construction Standards

7

GENERAL WATER SYSTEM STANDARDS AND DETAILS

Design standards to be used for replacement or extensions to the water system are:

- Chelan County PUD No. 1 Water Standard Details (See Appendix D)
- Applicable County ordinance(s) or standards;
- "Standard Specification for Road, Bridge, and Municipal Construction," Washington State Department of Transportation, latest update;
- Standards of the American Water Works Association (AWWA), latest revision;
- "Water System Design Manual," Washington State Department of Health, latest revision; and

All future improvements to the water system must be designed by a professional engineer licensed in the State of Washington. Lake Wenatchee Water District would like to be eligible for the submittal exception process for distribution system improvements. Water system improvement plans for booster pumps and reservoirs must be submitted to DOH for review and approval prior to making any improvements. Upon completion of improvements, a construction report for Public Water Systems Projects (DOH Form), per WAC 246-290-040 shall be provided to the District.

DESIGN STANDARDS

Purpose

The purpose of this document is to provide information regarding the standards for design and construction of water system improvements to the Lake Wenatchee Water District's domestic water system. Information in this document is partially obtained from the following sources.

- 2010 Lake Wenatchee Water District Comprehensive Water System Plan
- 2010 Washington State Dept. of Transportation Standard Specifications
- American Water Works Association (AWWA) Standards
- Washington State Dept. of Health, Water System Design Manual

Where any signed agreement exists between the District and the party providing the infrastructure, any such standards or requirements outlined in said agreement shall take precedence over this document.

The following standards are to be followed in the design of extensions to the water system of the District and in the preparation of plans and specifications for the construction of these extensions. These standards are to be followed except where specific deviations are approved by the District. A copy of the District's standard construction details is located in **Appendix D**.

Construction Drawing Format

Sheet size: 24-inch x 36-inch.
Plat Map: The final plat map shall be to the scale of 1-inch = 100 feet. The contour map shall have a standard engineering scale and contour intervals of five (5) feet or less. The remaining sheets may be to any suitable scale as selected by the DEVELOPER.

The District desires to maintain a consistent format to its construction drawings and, therefore, requires that all construction drawings conform to the following format unless exceptions are approved in advance by the District and/or District's Engineer.

The following format and requirements are a minimum for typical system extensions. Unusual or special facilities or construction requirements may dictate additional drawings and drawing requirements.

Water Plan: a separate construction plan is required at a scale of **1"=20', 30' or 40'**, showing all existing or proposed utilities, existing or proposed street surfacing and improvements, street centerline and stationing, street right-of-way margins, street names, legal identifications of properties such as lot number or tax lot number, section subdivision lines, all property lines and all water or other utility easements and rights-of-way.

All Water Plans shall show the following information:

- Size, material, location and length of each water main. Length measured between fittings or appurtenances.
- Station and offset to all fittings and valves and listing of each fitting and the type of connection, i.e., flanges (FL), mechanical joint (MJ), etc.
- Station and offset to all appurtenances such as fire hydrants, blow off and air vacuum release assemblies.
- Details showing how the connection to the existing water system is to be made and how the new mains are to be tested and sampled for bacteriological analysis prior to connection.
- Location and size of all water services and whether the service is a double or single.
- Lot numbers and phasing, if applicable.

Water Profile: A drawing showing the vertical profile will be required for water lines. The scale of these drawings shall be a standard engineering scale with an appropriate vertical exaggeration. Other utilities (sanitary sewer, storm drain, etc.) shall also be shown on the profile.

As Built: After construction, the Owner shall submit to the District a revised Plan showing all field changes in both Mylar and an electronic file of the CAD drawing. Water service will not be provided until an as-built record has been received.

Water System Design

The design of water extensions shall be consistent with the District's approved Comprehensive Plan, Standard Details, the regulations and standards of the Department of Ecology, Department of Health, Department of Social and Health Services, Chelan County Fire Marshall and all other applicable State, County, and Local agency standard regulations. Specific standards established by the District are as follows:

Transmission and Distribution Mains

1. Minimum size for all water mains shall be 6-inches except at the discretion of the District.
2. Any existing steel and/or undersized pipes that are adjacent to properties under development shall be replaced to current standards by the Developer to the farthest property boundary in all directions. Any existing water services along the existing main(s) shall be reconnected to the new main(s).
3. Water lines shall be extended to the boundaries of the property being served providing access to all adjacent properties for looping and/or that may require future service.
4. Water mains shall be located at a uniform 6 to 9 feet north and east of centerline, roughly centered in the driving lane, unless otherwise approved by the District. Fittings shall be used when necessary to maintain, as closely as possible, the uniform offset from centerline.
5. Water mains shall not be located under permanent concrete structures unless cased.
6. All new water mains shall be PVC or ductile iron pipe. The ductile iron pipe shall be class 50 except where trench, backfill and loading dictate a stronger class pipe. PVC pipe shall be C-900. Tracing wire and locating tape shall be installed on all PVC pipe and service lines.
7. In areas of corrosive soils, polyethylene tubing wrap shall be used or the District may review the use of C900 PVC as an option.
8. Water lines shall be looped and dead-end lines avoided if possible.
9. Waterlines shall be located in Public Right-of-Ways whenever possible.
10. The bury for all waterlines shall be 48-inches minimum and 54 inches maximum as measured from the top of the pipe to top of the subgrade. Whenever excavation or fill changes the cover over an existing waterline then, at the discretion of the District, the water main may be required to be replaced to the specified grade.
11. Water and sanitary sewer mains separation shall conform to Department of Ecology Standards. For all other utilities, the water main shall have a minimum separation of 36-inches, unless waived by the District.
12. Vertical separation from utilities other than sanitary sewer shall be 6 inches minimum. If this is not possible, the District may allow closer separation with the addition of "blueboard" insulation to prevent utilities from bearing directly on each other.

13. A blow-off or fire hydrant shall be installed at all dead-end cul-de-sacs to improve water quality and facilitate testing.

Valves and Hydrants

1. Valves shall be clustered at the tee or crosses of connecting intersecting water lines. Full valve clusters are required.
2. All buried valves and valve clusters shall be pressure tested outside the trench prior to installation.
3. Zone valves shall be located at all pressure zone interfaces to allow future pressure zone re-alignment without the need for additional pipe construction.
4. Isolation valves shall be located wherever necessary to allow individual pipelines to be shut down for repair or installing services. In general, four valves shall be provided per cross and three valves per tee.
5. Typically, valves shall be placed at a maximum of 1,000 foot intervals.
6. Combination air/vacuum release valves shall be placed at all high points or "crowns" in all pipelines.
7. Hydrants shall be located where required by County or State Code.

Water Services

1. Service lines shall only be connected to public distribution mains. Connection to hydrant runs, private mains, or dedicated supply mains will not be allowed. The District may reconsider this standard at their discretion if there is public health benefit.
2. All water service lines shall be 1" or larger. Dual services are allowed.
3. All water service lines are to be located along the street-side of the lot and installed perpendicular to the water main and street centerline.
4. Meter boxes shall be located within right of way whenever possible. Where sidewalks do not exist, the boxes shall be adjacent to the right of way line whenever possible.
5. If water service line lengths greater than 250 feet are required, the customer shall sign a special water service agreement with the District.
6. Standard District practice is to serve properties no more than two deep from the water main.
7. Meter boxes shall be installed with sufficient clearance from side sewers, transformers, pedestals and other utility service equipment to provide for safe maintenance access and maintain water quality. Generally clearance required is 10 feet from side sewers and 3 feet clear from dry utilities.
8. Where existing mains are being replaced, all existing water services shall be connected to the new main. For newer services with full size meter boxes and poly service lines, the service lines need only be reconnected at the main. For older small meter chambers, the chambers shall be rebuilt to current standards and located as close to the right of way as

possible. For any existing services with a copper or steel service pipe, the pipe shall be replaced with poly. Service reconstructions shall be reconnected to the customer side line.

9. For a site served by a master meter and/or private on-site domestic distribution, a cross-connection device, commensurate with the degree of hazard shall be installed. See WAC 46-0-010. Installation will be at the point of delivery which is the downstream side of the water service (Premises Isolation) unless In-Premises backflow preventers are providing a level of protection commensurate with the District's assessment. The Owner's Engineer shall size the device to pass all anticipated flows which may include domestic, irrigation and fire sprinkler demands. Per WAC 246-290-490(1)e, 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, falls under the jurisdiction of the local administrative authority (Local Building Department). Owner's engineer/architect shall to verify if premise isolation will be required at each structure.

Pressure Reducing Stations

1. District Standard Detail for PRV stations shall be used for design. Prepackaged stations may be allowed at the discretion of the District.
2. Vaults are to be sized to provide adequate working space including clear head room and sufficient clearance to service and remove all equipment.
3. Vaults shall include drywell drains, daylight drains or sump pumps.
4. Pressure relief valves shall be considered for closed pressure zones to prevent over-pressurization if a PRV fails in the open position.
5. Stations shall include a large valve for emergency flow and small bypass valve for domestic flows.
6. Hydraulic control valves 2-inch and larger shall be manufactured by Cla-Val, no substitutions.

Easements

Whenever water lines are located outside of public streets, the right-of-way or easement shall be of sufficient width to allow for future replacement of the facility without damage to permanent adjacent improvements. In general, the minimum easement width shall be 20 feet. Special circumstances may require additional easement widths. A graveled vehicular access road shall be provided over the easement, unless waived by the District. Easements must be shown on the water plan and recorded on the plat.

Water System Improvements 8

INTRODUCTION

This chapter presents proposed improvements to the Lake Wenatchee Water District's (District) water system that are necessary to resolve existing system deficiencies, improve reliability and accommodate the projected growth of water customers. The water system improvements were identified from an evaluation of the results of the water system analyses presented in **Chapter 3**. The water system improvements were sized to meet both the existing and future demand conditions of the system.

A Capital Improvement Program (CIP) number has been assigned to each improvement. Numbers assigned to the improvements start at the north end of the system and generally increase incrementally to the south, as shown in **Figure 8-1** and **Figure 8-1A.** The improvements are also illustrated in the hydraulic profile of the future water system, shown in **Figure 8-2**. The improvements are organized and presented in this Chapter according to the following categories.

- Water system conversion improvements
- Water main improvements
- Facility improvements
- Miscellaneous improvements
- Future expansion improvements

The remainder of this Chapter presents a brief description of each group of improvements, an overview of the deficiencies they will resolve, the prioritization criteria, the basis for the cost estimates and the implementation schedule.

For planning purposes, the improvement projects described herein are based on one alternative or conventional concept for providing the necessary improvement. Other methods of achieving the same result should be considered during predesign to ensure the best and lowest cost alternative design is selected.

Water System Conversion Improvements

The following projects represent the minimum improvements necessary to consolidate the District's water systems, and should be completed prior to the implementation of other water main or facility improvements. The Goal of these projects is the bring each of the separate systems up to an equivalent standard of service, with the addition of service meters, replacement of substandard mains along with improvements to supply and storage facilities. These projects along with the water system replacement projects identified for the first six years of the plan to replace leaking 2-inch diameter steel mains will result in all five systems to a minimum level of service for the water system.

CIP C1 – Lester Connection

Deficiency: The existing Lester water system relies completely on the Lester Intake, has no storage and has a low water quality. Conversion of the system into the Lake Wenatchee Water Users 2128 Zone is necessary to improve reliability and level of service to customers.

Improvement: Install 498 lineal feet of 6-inch water main from the Lake Wenatchee Water Users 2128 Zone main in North Shore Drive to connect to the Lester water system in Fir Drive. Individual pressure reducing valves may be required along with the new meters on existing services in the Lester system to protect customers from the increased pressure associated with the pressure zone conversion. As part of the conversion, the existing Lester Intake main will need to be abandoned at the crossing of the Lake Wenatchee Highway in order to isolate the source from the distribution system.

CIP C2 – Brown Road Connection Phase 1

Deficiency: The existing Brown Road water system relies completely on the Brown Road Well and has inadequate storage capacity. Conversion of the system into the Lake Wenatchee Water Users 2128 Zone is necessary to improve reliability and level of service to customers. Associated with this project is the replacement of the existing Brown Road Well pump as will likely not be capable of serving the 2128 Zone.

Improvement: Install 654 lineal feet of 6-inch diameter water main along Brown Road from the 2128 Zone in North Shore Drive to connect to the end of the Brown Road water system on the north side of the Lake Wenatchee Highway. Evaluate the existing Brown Road Well pump to determine its ability to pump to the 2128 Zone. Replace the well pump and install other improvements as necessary to enable the pump to meet the new duty point following the pressure zone conversion. Install telemetry for automated control of both the Brown Road Well and the Lake Wenatchee Users Well off of the Lake Wenatchee Water Users Reservoir. As part of the telemetry improvements, include a HMI unit for remote monitoring and control. Abandon the Brown Road Reservoir and the associated 2-inch diameter PVC reservoir supply main.

CIP C3 – Brown Road Connection Phase 2

Deficiency: The existing 2-inch diameter water main in Brown Road water system is substandard and the steel sections of this main are over 50 years in age and leak. Replacement of this main is necessary to improve reliability and level of service to customers.

Improvement: Replace 2,550 lineal feet of the existing 2-inch steel water main along Brown Road from the Brown Road Well to Lake Wenatchee Highway with new 6-inch water main. Individual pressure reducing valves should be installed on existing services in the Brown Road water system to protect customers from the increased pressure associated with the pressure zone conversion.

CIP C4 – Whispering Pines Connection Phase 1

Deficiency: The existing Whispering Pines water system relies completely on the Whispering Pines Spring and has areas of inadequate service pressures. During Phase 1, customers along Brown Road, Maple Drive and the lower part of Fir Drive would be converted fto the 2128 pressure zone to improve reliability and level of service to customers.

Improvement: Following the completion of CIP C1, install 303 lineal feet of 6-inch water main along Fir Drive from the Lester water system to the 2085 Zone of the Whispering Pines system at Lake Wenatchee Highway. Install a pressure reducing valve in the existing 2085 Zone adjacent to 16847 Fir Drive to convert the southerly portion of the zone to the 2128 Zone.

Convert the northerly portion of the existing 2085 Zone to the Whispering Pines 2272 Zone by disconnecting the Whispering Pines Lower Reservoirs from the 2085 Zone at Fir Drive and Lakeview Drive and connecting the northerly portion of the 2085 Zone to the discharge side of the Whispering Pines Mid Booster Pump Station. Install telemetry for automated control of the Whispering Pines Mid Booster Pump Station based on levels in the Whispering Pines Mid Reservoirs.

CIP C5 – Whispering Pines Connection Phase 2

Deficiency: The existing Whispering Pines water system relies completely on the Whispering Pines Spring and has areas of inadequate service pressures. Conversion of the system to operate with the other water systems is necessary to improve reliability and level of service to customers.

Improvement: Install a 2380 Zone Booster Pump Station at the Brown Road Reservoir site. For planning purposes, the capacity of the station will be approximately 50 gallons per minute (gpm). The final capacity and configuration of the booster pump station will be determined during the preliminary design phase of the project. An engine generator set for emergency power supply is proposed to provide water supply during power outages. The booster pump station will operate to supply the 2335 Zone Whispering Pines Upper Reservoirs until the 2380 Reservoir is constructed. Install telemetry for automated control of the 2380 Zone Booster Pump Station based on reservoir levels.

Install 1,561 lineal feet of new 8-inch water main along the abandoned 2-inch PVC water main alignment from the Brown Road well site to the 2380 Zone Booster Pump Station, north to Lakeview Drive and west in Lakeview Drive, Past the existing 2335 Zone 4-inch PVC water main. Install a new pressure reducing valve station in Lakeview Drive to connect the westerly end of the new 8-inch 2380 Zone water main to the 2272 Zone. The station should include a pressure relief valve that will be sized during design to relieve pressures in the 2272 Zone in the event of a failure one of the pressure reducing valves.

CIP C6 – Mountain Park Well Improvements

Deficiency: The existing Mountain Park water system has no storage. Limited data on the existing facilities is known. Until such time as this water system can be connected to the 2128 Zone, Upgrading of the well and hydropneumatic tanks and building is proposed to improve operations and reliability. Some capacity to expand the water system in this area should be considered during the design of the recommended improvements.

Improvement: Evaluate the Mountain Park Well to identify improvements necessary to supply existing and new customers in this area under the future dynamic head conditions for the 2128 Zone. Install necessary improvements to meet the needs of supply facility. The cost estimate for this CIP item assumes that the well pump, well casing including the building will need to be replaced.

Water Main Improvements

Annual Water Main Replacement CIP

Deficiency: Most of the water main improvements shown in **Figure 8-1** are required to resolve existing system fire flow deficiencies due to undersized water mains. Some of the identified projects are to replace older steel mains known to have a high occurrence of water main leaks.

Improvement: Replace existing water main with new DI or PVC water main in accordance with the District's construction standards. The selection of specific projects will be accomplished annually during the District's budget development process and will be guided by the District's prioritization. This will provide the District with the flexibility to coordinate these improvements with other projects that may occur within the same area. Annual water main replacements are shown in **Table 8-1**.

The projects identified for replacement within the first six years are to replace known leaking and older steel 2-inch mains. These projects should be completed as soon as possible to reduce the loss of water within the water system. Project 4 is intended to improve potential low pressure observed at the end of this deadend line during peak day demands. Project 6 is to improve capacity and circulation between the existing water systems.

The projects identified for replacement after 2016 are primarily upgrading the existing water system with larger mains for meeting the Chelan County fire code to meet minimum's fireflow requirement within the existing service area.

Table 8-1
Annual Water Main Replacement Projects

No.	Estimated Construction Cost	Diameter			Description	Estimated Project Cost	
		Length (ft)	Ex (in)	Prop (in)	Location	2011 - 2016	2017 - 2030
1	$216,750	2,550	4	8	Lakeview Drive - From Fir Dr. Intx to end of pavement		$310,000
2	$46,750	550	4	8	Fir Drive - Intx w/Lakeview Dr. to 550 ft SE of Intx		$67,000
3	$70,550	830	4	8	Fir Drive - From Brown Rd to 830 ft NW of Brown Rd Intx (PRV #2)		$101,000
4	$38,250	450	4	8	Maple Drive - Fr Brown Rd intx to end of Cul-de-Sac	$55,000	
5	$37,400	440	4	8	Pipeline Easement - From LWWU Well Bldg to N Shore Dr		$54,000
6	$97,750	1,150		8	New Extension - From west end of Brown Rd to LWWU Well Bldg		$140,000
7	$158,950	1,870	4	8	Brown Road - Replacement of ex. 4" Main		$227,000
8	$76,500	900		8	Brown Rd. new extension - from east end of CIP 7 to Brown Rd Well		$109,000
9	$46,970	610	2	6	Fir Drive - From Brown Rd to end of existing 2" Main	$67,000	
10	$129,360	1,680	4	6	North Shore Drive - from Falls Cr culvert to west end of CIP 12		$185,000
11	$19,250	250	2	6	Pipeline Easement - From N Shore Dr to south end of C1	$28,000	
12	$87,010	1,130	2	6	North Shore Dr - Replace 2" Steel main from CIP 10 to CIP 14	$125,000	
13	$40,810	530	2	6	Watermain Replacement: Fir Road - Lk Wenatchee Hwy to Cul-de-Sa	$58,000	
14	$111,650	1,450	2	6	North Shore Drive - Replace 4" Main from CIP 12 to Brown Rd Intx	$160,000	
15	$46,750	550	2	8	North Shore Drive - Replace 4" Main from Brown Rd Intx to end	$67,000	
16	$62,050	730	2	8	Mt. Park 2" Steel Main Replacement	$89,000	
Total	**$1,286,750**					**$649,000**	**$1,193,000**

Facility Improvements

CIP F1 – Whispering Pines Spring Collection Box Temporary Improvements

Deficiency: The collection box for the Whispering Pines Spring is not watertight. The source may be susceptible to contaminants from surface water flow entering the collection box. A

temporary solution is required for the public safety and health of the customers until CIP F4 is completed.

Improvement: Construct watertight seals for the Whispering Pines Spring collection box.

CIP F2 – Whispering Pines and Lester Supply Improvements Study

Deficiency: The Whispering Pines Water Association obtains it water supply from a spring that is a tributary to Barnard Creek. The source was designated as a groundwater supply in hydraulic connection to surface water. The source is currently chlorinated and provides a flow rate of approximately 50 gpm.

The spring collector is constructed of a plastic bottle that is 24 inches deep by 18 inches in diameter. The shallow depth indicates that the spring source is not protected. In 2008, a sanitary survey was completed for the system by Washington State Department of Health (DOH). The inspector noted surface water adjacent to the collector box. It appeared that, at least seasonally, surface water infiltrates or could infiltrate through the first few feet of soil. Since the spring is likely derived from a veneer of shallow soil and rock rubble, the source is susceptible to the pathogens associated with surface water. Chlorine is ineffective against these pathogens. The existing spring source and collector box poses a risk from a health and safety standpoint. The existing collector box and associated piping would be difficult to effectively rehabilitate due to its location. The spring source is located on forest property, and can only be accessed on foot since there is no access road to the site.

The Lester water source is diverted from Barnard creek. In early 2010, a debris slide partially filled the diversion with wood and other debris. The diversion was cleaned but significant rain events cause muddy water in the distribution system. In addition, this source is a surface water source that requires filtration and potentially additional water treatment to comply with the Surface Water Treatment Rule and the Long Term 1 Enhanced Surface Water Treatment Rule. It is recommended that this supply source be replaced by either a new well source or combined with the Whispering Pines source.

Improvement: Conduct an alternative analysis study to identify the preferred alternative for the Whispering Pines Spring and Lester Intake sources. The study assumes that the surface water rights may be transferred to a new groundwater point of withdrawal, which is in hydraulic continuity with Lake Wenatchee (the same body of water). This study would compare the alternatives of using existing wells in the District, the drilling of one or two new wells in the District's retail water service area or a combination of new and existing or retaining the existing Springs source. Existing wells within the District would be evaluated for their capacity to sustain additional groundwater withdrawal, their vulnerability to surface contamination, and the physical condition and useful life as well as the feasibility of improvements required to the springs to insure their continued use as a supply source.

CIP F3 – Whispering Pines Spring Water Right Transfer

Deficiency: Depending on the results of Whispering Pines Supply Study, the Whispering Pines Spring source may be replaced for an existing or new source depending on the recommendation resulting from CIP F2. While the District may decide to will be abandoning the source, they have no intent to abandon or relinquish the associated water right. In order to protect the water right, the District can apply to change the point of diversion/withdrawal of the water right to an existing or new water source. Alternatively, an

application may be made to Washington State Department of Ecology (Ecology) to place the water right into the temporary Trust Water Rights Program for the benefit of instream flows until a suitable new source can be identified. The number of years and terms of the transfer will be established by the District at the time the water rights are transferred temporarily to the Trust Water Rights Program.

Improvement: Based on the recommendations from CIP F2, coordinate with Ecology to transfer the 49.4 gpm of the Whispering Pines Spring water right to an existing or new well or into the temporary Trust Water Rights Program. The cost estimate for this CIP item assumes that the Whispering Pines water right will be transferred to an existing or new well. CIP C5 should be completed before this project is implemented.

CIP F4 – Whispering Pines Water New Source Improvements

Deficiency: The Whispering Pines Spring requires additional treatment for the protection of the public health and safety. Depending on the results of CIP F2, either this source will be replaced or additional treatment system will be installed at the location of the existing lower reservoirs

Improvement: Based on the results of CIP F2, install a new supply well or increase the supply capacity of an existing well or wells. For planning purposes, it is assumed that the use of an existing well or wells to replace the 50 gpm supply of the Whispering Pines Spring is the recommended alternative. This improvement alternative would consist of upgrading an existing well to meet source approval requirements, if it is capable of sustaining additional withdrawal. Alternatively, a new well or wells may be installed if existing wells cannot meet source approval requirements. To be conservative, the more expensive alternative of drilling, development and equipping two new wells is assumed for the cost estimate. Following completion of the new well or upgrade of existing wells, abandon the Whispering Pines Spring source, as well as the Whispering Pines Mid Booster Pump Station, Whispering Pines Lower Reservoirs and the 1,900 feet of 2-inch PVC transmission main connecting the spring to the reservoirs. CIP C5 should be completed before this project is implemented.

CIP F5 – 2380 Zone Reservoir and Transmission Main

Deficiency: The storage analysis in **Chapter 3** indicates the system has insufficient capacity to meet existing and projected storage requirements of the system.

Improvement: Construct a reservoir with an overflow elevation of 2,380 feet and a minimum useful storage capacity of 180,000 gallons to meet the projected needs of the system through the 20-year planning period. During the predesign effort, conduct an evaluation of the hydraulic operation of the system based on the actual tank site to identify any additional improvements necessary to support the proposed reservoir. Install water main as necessary to convey water between the reservoir site and the distribution system. CIP C5 should be completed before this project is implemented.

CIP F6 – Abandon Whispering Pines Upper Reservoirs, Booster Pump Station and Water Main

Deficiency: The Whispering Pines Upper Reservoirs have insufficient capacity to serve their supply area. In addition, the 2335 Zone is being converted to a 2380 Zone to increase the service pressure. The existing 4-inch PVC Whispering Pines Upper Reservoir transmission

main and the Whispering Pines Upper Zone Booster Pump Station will no longer be necessary after the removal of the reservoirs.

Improvement: Demolish the Whispering Pines Upper Reservoirs, Whispering Pines Upper Zone Booster Pump Station and abandon the 4-inch PVC reservoir transmission main following the completion of CIP F5.

CIP F7 – Abandon Whispering Pines Mid Reservoirs

Deficiency: The Whispering Pines Mid Reservoirs have insufficient storage capacity and are not needed once the proposed 2380 Zone Reservoir is constructed.

Improvement: Following the completion of CIP F5, demolish the Whispering Pines Mid Reservoirs and abandon the reservoir transmission main.

CIP F8 – Lester Water Right Transfer and Source Abandonment

Deficiency: The Lester Intake will be abandoned for an existing or new source based on the results of the study completed under CIP F2. While the District will be abandoning the diversion facility, they have no intent to abandon or relinquish the associated water right. In order to protect the water right, the District can apply to change the point of diversion/withdrawal of the water right to an existing or new water source. Alternatively, an application may be made to Ecology to donate the water right into the temporary Trust Water Rights Program for the benefit of instream flows until a suitable new source can be identified. The number of years and terms of the transfer will be established by the District at the time the water rights are transferred temporarily to the Trust Water Rights Program. After the water rights for Lester Intake have been transferred to another source, the Lester Intake and 2-inch steel transmission main connecting it to the Lester system will no longer be necessary.

Improvement: Coordinate with Ecology to transfer the 44.9 gpm of the Lester water right to an existing or new well or into the temporary Trust Water Rights Program through a donation. To be conservative, the cost estimate for this item assumes that the Lester water right will be transferred into the temporary Trust Water Rights Program. The Lester Intake source shall be abandoned after the water rights have been successfully transferred to the Trust Water Rights Program. In addition, the 2,000 feet of 2-inch steel transmission main connecting the intake to the system will be abandoned. CIP F8 should be done in coordination with CIP WM1 and CIP PZ3.

CIP F9 – Lake Wenatchee Users Miscellaneous Improvements

Deficiency: A few deficiencies were noted by DOH in the Lake Wenatchee Users 2009 Sanitary Survey. These deficiencies have been addressed according to the Department of Health.

Improvement: None

CIP F10 – Lake Wenatchee Users Chlorination System

Deficiency: The Lake Wenatchee Users system is currently unchlorinated. The system has recently experienced coliform exceedances in the distribution system. It is recommended

that a chlorination system be installed at the well source for the health and safety of the water system customers.

Improvement: Install a chlorination system to provide a disinfection residual in the distribution system.

CIP F11 – Mountain Park Connection (USFS)

Deficiency: Conversion of this System into the Lake Wenatchee Water Users 2128 Zone is necessary to improve the long-term reliability and expand water service into currently un-served areas along the North Shore Road west of the existing Lake Wenatchee Water Users System. This Project could also provide an additional source of water to the USFS Facilities located in the SW quarter of Section 13 and assumption of this Group A water system. It is assumed that this project would be initiated by either the currently un-served residences along the North Shore Road or the Forest Service. Following the connection of the Mountain Park system to the 2128 Zone, it is proposed that the existing well pump would be used as a secondary supply to the 2128 pressure zone.

Improvement: Connect the Mountain Park water system to the 2128 Zone by installing 5,500 feet of 12-inch DI water main along North Shore Drive from the west end of the 2128 Zone to the Mountain Park system.

Miscellaneous Improvements

CIP M1 – Water Use Efficiency Program

Deficiency: The existing water system is aged and consequently has leaks. The water use efficiency measures contained in **Chapter 4** must be carried out on an ongoing basis to comply with state requirements.

Improvement: Implement the Water Use Efficiency Program and perform public education measures as outlined in **Chapter 4**.

CIP M2 – Water Service Meters Installation

Deficiency: Water meters are not currently installed on Brown Road, Lake Wenatchee Users, Lester and Mountain Park's existing water service connections. Water meters are needed so that the District can track water usage for customer billing and to comply with the water use efficiency rule.

Improvement: Install and maintain water service meters on all existing and future water service connections.

CIP M3 – Cross-Connection Control Program

Deficiency: The District does not have an ordinance or cross-connection control program.

Improvement: Adopt a cross-connection control resolution similar to the resolution that is included in **Appendix M**. Carry out other cross-connection control program requirements as outlined in **Chapter 6**.

CIP M4 – Wellhead Protection Program

Deficiency: The District does not have a wellhead protection ordinance and program that meets current state requirements.

Improvement: Develop and adopt a wellhead protection ordinance that addresses permitted uses and performance standards for properties located within designated wellhead protection areas. Conduct a detailed inventory of potential sources of groundwater contamination. In addition, perform a more detailed delineation of the wellhead protection area boundaries utilizing analytical models, hydrogeologic mapping and computer flow models. Carry out other wellhead protection program requirements as outlined in **Chapter 5**.

CIP M5 – Water System Plan Update

Deficiency: WAC 246-290-100 requires that the District's Water System Plan be updated every six years and be submitted to the DOH for review and approval.

Improvement: Update and submit a Water System Plan every six years to comply with state requirements.

CIP M6 – Water Rate Study

Deficiency: The District's water rates should be evaluated to establish costs for providing water service to customers. Currently, a flat rate structure is utilized because meters have not yet been installed system-wide to enable the District to charge customers on their individual water use.

Improvement: Conduct a water rate study. The study should consider an increasing block rate structure to encourage efficient use of the District's water supply.

CIP M7 – Telemetry System Improvements

Deficiency: The water system does not currently have a telemetry system for the monitoring and control of the supply sources, booster pump stations or reservoirs.

Improvement: Install telemetry systems at each facility to provide the capability of monitoring and controlling the entire water system. The costs for the installation of the telemetry system have been included into the specific individual projects.

Future Water Main Expansion Projects

Four general water main expansion projects have been identified in order to provide future service within the District's retail service area. These projects are identified to assist the District regarding future service requests for currently unserved areas. The alignments of the proposed extensions are conceptual and it is assumed that a detail analysis of possible alignment options will be undertaken to determine the least cost alternative for providing water service within these areas. It is assumed that the cost for the design and extension of water service into these areas will be borne by the land owners benefited by these projects.

A summary of the proposed water system expansion improvements along with the estimated project costs are shown in **Table 8-2**. The project cost listed in this table are based on historical construction costs for the Chelan County area and include indirect costs of 35

percent which covers State Sales tax (8.1%), engineering and surveying (15%), contingencies (15%) and administration (5%).

Table 8-2
Future Water Main Expansion Projects

No.	Estimated Project Cost	Size		Description		
		Length (ft)	Diam (in)	In	From	To
DF1	$600,000	5,000	8	West North Shore Drive	Mt Park Water System	West end of District
DF2	$372,000	3,100	8	East North Shore Drive	550 ft east of Brown Rd	East end of District
DF3	$163,000	1,500	6	Plat of Mountain Park	North Shore Drive, Lake Wenatchee Highway and along easements	
DF4	$312,000	2,600	8	East end of District	future service to parcels north of Lake Wenatchee Highway	
Total	**$1,447,000**					

Summary of Capital Improvement Projects

A summary of the consolidation, watermain, facility and miscellaneous capital improvement projects are listed in **Table 8-3.** The project cost listed in this table are based on historical construction costs for the Chelan County area and include indirect costs of 35 percent which covers State Sales tax (8.1%), engineering and surveying (15%), contingencies (15%) and administration (5%). The Projects identified as necessary to meet the District's goal to provide a minimum level of service to all customers within the District are shown for completion within the first six years of the Plan. Projects beyond 2016 include a new storage facility to provide fire flow capacity for the entire service area and a new source well as an alternative for the Whispering Pine springs source that meets State and Federal requirements. Both of these projects are dependent on funding and could be accelerated by the District should funding become available for the projects. The identified water main projects after 2016 are primarily for upgrading the water system to provide minimum levels of fire protection throughout the District's service area.

A detailed list of the capital improvement projects showing the various components included in each project is shown in **Table 8-4**. This Table lists the main and service meter projects identified for each of the existing distribution systems as well as the source and storage projects that would have common benefit all five existing systems.

Table 8-3
CIP Summary

CIP Item	Project Description	Timing and Project Cost (2010 $)	
		2011-2016	2017-2030
Water System Consolidation Improvements			
C1	Lester Connection - Watermain Extension	$55,000	
C2	Brown Road Connection Phase 1	$159,000	
C3	Brown Road Connection Phase 2	$277,000	
C4	Whispering Pines Connection Phase 1	$104,000	
C5	Whispering Pines Connection Phase 2	$361,000	
C6	Mountain Park Well Improvements	$50,000	
	Consolidation Improvements Subtotal	**$1,006,000**	**$0**
Water Main Improvements			
	Annual Water Main Replacements (see Table 8-1)	$649,000	$1,193,000
F11	Mountain Park Connection (USFS)		$876,000
	Water Main Improvements Subtotal	**$649,000**	**$2,069,000**
Water System Facility Improvements			
F1	Whispering Pines Spring Collection Box Temporary Improvements	$7,000	
F2	Whispering Pines and Lester Source Improvements Evaluation	$15,000	
F3	Whispering Pines Spring Water Right Transfer		$15,000
F4	Whispering New Pines Water Source Improvements		$100,000
F5	2380 Zone Reservoir and Transmission Main		$288,000
F6	Abandon Whispering Pines Upper Reservoirs, BPS and Water Main		$6,000
F7	Abandon Whispering Pines Mid Reservoirs		$9,000
F8	Lester Water Right Transfer and Source Abandonment	$15,000	
F10	Lake Wenatchee Users Chlorination System	$15,000	
	Facility Improvements Subtotal	**$52,000**	**$418,000**
Miscellaneous Improvements			
M1	Water Use Efficiency Program	$5,000	$7,000
M2	Water Service Meters Installation	$100,000	
M3	Cross-Connection Control Program	$7,000	$10,000
M4	Wellhead Protection Program	$4,000	
M5	Water System Plan Update		$120,000
M6	Water Rate Study	$15,000	
	Miscellaneous Improvements Subotal	**$131,000**	**$137,000**
	Total All Improvement Projects	**$1,838,000**	**$2,624,000**

1 = Total costs include construction and indirect costs. Indirect costs assume 8.1 % tax, 15% design, 15% contingency and 5% administration.

Table 8-4
Detailed Capital Improvements Project List
Distribution and Meter Projects

CIP	Description	2011-16	2017-30
Lester Water Improvements			
C1	**Lester Connection** - Watermain Extension	$55,000	
13	**Watermain Replacement: Fir Road - Lk Wenatchee Hwy to Cul-de-Sac**	$58,000	
M2d	**Water Service Meter Installation**	$15,000	
	Subtotal:	$128,000	$0
Brown Rd Water Improvements			
C3	**Brown Road Connection Phase 2** - Water Main Replacement	$277,000	
M2c	**Water Service Meter Installation**	$21,000	
	Subtotal:	$298,000	$0
Whispering Pines Improvements			
F1	**Whispering Pines Spring Collection Box Temporary Improvements**	$7,000	
	Watermain Replacements		
4	**Maple Drive - Fr Brown Rd intx to end of Cul-de-Sac**	$55,000	
9	**Fir Drive - From Brown Rd to end of existing 2" Main**	$67,000	
	Subtotal:	$129,000	$0
Lake Wenatchee Water Improvements			
M2b	**Water Service Meter Installation**	$52,000	
	Watermain Replacements		
11	**Pipeline Easement - From N Shore Dr to south end of C1**	$28,000	
12	**North Shore Dr - Replace 2" Steel main from CIP 10 to CIP 14**	$125,000	
14	**North Shore Drive - Replace 4" Main from CIP 12 to Brown Rd Intx**	$160,000	
15	**North Shore Drive - Replace 4" Main from Brown Rd Intx to end**	$67,000	
	Subtotal:	$432,000	$0
Mountain Park Water Improvements			
M2a	**Water Service Meter Installation**	$12,000	
16	**Mt. Park 2" Steel Main Replacement**	$89,000	
	Subtotal:	$101,000	$0

Table 8-4 - Continued
Detailed Capital Improvements Project List
Common Projects

CIP	Description	2011-16	2017-30
Common Water System Improvements			
C2	**Brown Road Connection Phase 1**		
C2a	*Brown Road Connection - Phase 1, Install new pump*	$7,000	
C2b	*Install telemetry system for Brown & LWWU wells & HMI unit*	$64,000	
C2c	*Install new water main from Lk Wen Hwy to No. Shore Dr.*	$84,000	
C2d	*Abandon Brown Road Reservoir*	$4,000	
C4	**Whispering Pines Connection Phase 1**		
C4a	Fir Dr Water Main Extension to Lk Wen Hwy	$33,000	
C4b	Pressure Reducing Station	$21,000	
C4c	*Reconfigure WP Lower Reservoir connection & add telemetry*	$50,000	
C5	**Whispering Pines Connection Phase 2**		
C5a	*2380 Zone Booster Pump Station*	$150,000	
C5b	*Water Main*	$190,000	
C5c	*Pressure Reducing Station*	$21,000	
C6	**Mountain Park Well Improvements**		
C6a	*Rehab/Replace Well Building*	$26,000	
C6b	*Install new pump, new pressure tanks, electrical*	$17,000	
C6c	*Install new 12" well casing 100 ft in length*	$7,000	
F4	**Whispering New Pines Water Source Improvements**		$100,000
F5	**2380 Zone Reservoir and Transmission Main**		
F5a	*2380 Zone Reservoir*		$215,000
F5b	*Transmission Main*		$73,000
F6	**Abandon Whispering Pines Upper Reservoirs, BPS and Water Main**		
F6a	*Abandon Whispering Pines Upper Reservoirs*		$3,000
F6b	*Abandon Whispering Pines Upper BPS*		$2,000
F6c	*Abandon main to Whispering Pines Upper Reservoirs*		$1,000
F7	**Abandon Whispering Pines Mid Reservoirs**		$9,000
F10	**Lake Wenatchee Users Chlorination System**	$15,000	
	Subtotal:	$689,000	$403,000
	Water Main Extensions (2017 to 2030)		
1	**Lakeview Drive - From Fir Dr. Intx to end of pavement**		$310,000
2	**Fir Drive - Intx w/Lakeview Dr. to 550 ft SE of Intx**		$67,000
3	**Fir Drive - From Brown Rd to 830 ft NW of Brown Rd Intx (PRV #2)**		$101,000
5	**Pipeline Easement - From LWWU Well Bldg to N Shore Dr**		$54,000
6	**New Extension - From west end of Brown Rd to LWWU Well Bldg**		$140,000
7	**Brown Road - Replacement of ex. 4" Main**		$227,000
8	**Brown Rd. new extension - from east end of CIP 7 to Brown Rd Well**		$109,000
10	**North Shore Drive - from Falls Cr culvert to west end of CIP 12**		$185,000
F11	**Mountain Park Connection**		$876,000
	Subtotal:	$0	$2,069,000
	Programs, Planning and Water Rights		
F2	**Whispering Pines and Lester Source Improvements Evaluation**	$15,000	
F3	**Whispering Pines Spring Water Right Transfer**		$15,000
F8	**Lester Water Right Transfer and Source Abandonment**	$15,000	
M1	**Water Use Efficiency Program**	$5,000	$7,000
M3	***Cross-Connection Control Program***	$7,000	$10,000
M4	***Wellhead Protection Program***	$4,000	
M5	***Water System Plan Update***		$120,000
M6	**Water Rate Study**	$15,000	
	Subtotal:	$61,000	$152,000
	Total Estimated Cost of All Projects:	$1,838,000	$2,624,000

Financial Program

9

INTRODUCTION

The purpose of the financial program is to provide a reasonable assurance that the proposed consolidation of the five separate water systems will have the financial ability to maintain and operate the water systems on an on-going basis and has the capacity to obtain sufficient funds to construct the water system improvements as identified in **Chapter 8**.

WATER RATES AND PAST FINANCIAL RECORDS

Of the five water systems, only Whispering Pines has a water rate based on both a monthly meter charge and a commodity charge based on water use as the water system is fully metered. All of the other Systems charge either an annual, quarterly or bi monthly flat rate charge for water service. The monthly charge for water service for these Systems ranges from a low of $25 to $40 a month.

For 2010, Whispering Pines has enacted a zero base charge of $27.50 a month and an increasing block rate structure for all water consumption. The rate structure is summarized below:

Monthly Base Rate - $27.50	
0 to 4,500 gallons per month	$1.90 per 1,000 gallons
4,501 to 7,500 gallons per month	$2.90 per 1,000 gallons
7,501 and above per month	$5.00 per 1,000 gallons

The goal of this water rate structure is to promote conservation and to limit water consumption with the goal of limiting maximum water use to 350 gallons per customer per day.

Past financial records for the individual water systems were not available. The previous and current customers of the individual Systems have paid all expenses for the water system improvements as well as operation and maintenance costs on a "pay as you go" basis either by specific capital assessments or annual maintenance dues or assessments.

PROPOSED CONSOLIDATION AND CAPITAL IMPROVEMENT FUNDING

Discussions continue between the District and the member owned water systems concerning long-term ownership and operation by the District. The critical issue is how to fund the identified projects necessary to consolidate the separate water systems into a single system and over what time frame it takes to complete the consolidation.

The District has proposed that the majority of the costs associated with the six-year capital improvement plan be borne by the individual systems and that the revenues from the monthly base rate and commodity charge be used to support the operations and maintenance of the water systems. Using this approach, the District will explore other funding sources to complete the improvements in the Capital Improvement Plan from **Chapter 8**. It is assumed that the District could seek grant and loan funding for these improvements from various State and Federal agencies. Possible funding programs include the Public Works Trust Fund, and USDA Rural Development Program. Repayment of loans used to fund the improvements could be accomplished by using creating area specific utility local improvement districts (ULID), area specific base rates or a combination of both options.

It is assumed that the costs associated with consolidation water system improvements (C1-C6) and the water main replacement improvements (4, 9, 11-16) as described in **Chapter 8** will be borne by the existing customers of the five individual systems. Based on **Table 8-3**, the estimated total project cost of the consolidation and small main replacement projects is $1,655,000 or approximately $12,800 per connection. If these improvements were fully funded as area specific ULID's, the average annual cost per connection could range between $850 to $950 annually for principal and interest assuming a bond interest rate between 3.5to 4.5 percent over a twenty year term..

PROPOSED DISTRICT ASSUMPTION AND WATER RATES

As identified in **Chapter 6**, if the Lake Wenatchee Water District was to assume operation and maintenance of the five systems, this could be accomplished with one certified full-time operator with additional part-time assistance during the summer. Consolidation of the water systems with one billing and meter reading system would result in overall reduced costs and greater efficiency in operations. Another area of potential saving is in water quality monitoring and reporting. Other expenses such as labor, legal services, insurance and repairs would have little impact to the District's operating expenses.

The assumption of the individual water association water systems by the District would seem to benefit both the users of the system who could see reduced rates in the future and the District who could see a positive cash flow right away.

The proposed water rates as shown in **Table 9-1** are based on providing operations and maintenance for the consolidated water system. The proposed rates are based on estimates of staffing needs as identified in Chapter 6 and associated operating expenses. Once agreements are in place to begin operations of the water systems, it is the intent of the District implement billing customers at a base rate of $34 per month per ERU for the first 4,500 gallons (average day demand of 150 gallons per day for 30 days) for the first two years and an additional monthly commodity charge of $2.10 per 1,000 gallons over the base amount. For all customers without meters, it is proposed that an additional $10.00 per month be added to the base charge to cover all excess commodity usage. For the purposes of this Plan, it is recommended that rate increases in both the base rate and the excess rate increase by 3 percent per year for planning purposes for the purpose of developing both operating and emergency reserves. It is recommended that the District plan to conduct a water rate study after the first 2 years of operations to review and adjust rates to insure revenues are sufficient to cover the operations and maintenance expenses.

Table 9-1
Proposed Rates and Estimate of Rate Revenue

Description	2011	2012	2013	2014	2015	2016
Number of Service Connections						
Residential	133	136	138	140	142	145
Non-residential	0	0	0	0	0	0
Total	**133**	**136**	**138**	**140**	**142**	**145**
Base Meter Charge per Month						
Residential Meter Charge	$34.00	$34.00	$36.00	$36.00	$38.00	$38.00
Meter Revenue						
Residential	$54,264	$55,488	$59,616	$60,480	$64,752	$66,120
Total Base Meter Revenue	**$54,264**	**$55,488**	**$59,616**	**$60,480**	**$64,752**	**$66,120**
Est. Excess Annual Consumption (1,000's of gallons)	2,400	2,200	2,000	2,000	1,800	1,800
Commodity Chg (per 1,000 gallons)	$2.10	$2.10	$2.40	$2.40	$2.60	$2.60
Non-meter Service Charge	$6,000	$5,400	$4,320	$3,456	$1,728	$864
Commodity Revenue	$5,040	$4,620	$4,800	$4,800	$4,680	$4,680
Total Projected Revenue	**$65,304**	**$65,508**	**$68,736**	**$68,736**	**$71,160**	**$71,664**
Avg. Revenue per Customer/month	$40.92	$40.14	$41.51	$40.91	$41.76	$41.19
Avg. Revenue per Customer/year	$491.01	$481.68	$498.09	$490.97	$501.13	$494.23

Base rate meter charge includes 4,500 gallons a month
Non-meter service charge assumes 50 non-metered connections which are phased out over the 6-yr CIP

FINANCIAL VIABILITY TEST WORKSHEET SUBMITTALS

If outside funding is secured, it is demonstrated by the Financial Viability worksheets that the Lake Wenatchee Water District's water system is viable for the future based upon the anticipated efficiency of a consolidated system. The projected revenues allow for both on-going maintenance, operations and sufficient net revenue to accomplish the projected miscellaneous and non-project capital improvements. Presented in **Table 9-2** is the six year operating budget pro-forma based on consolidation of the water systems.

The Financial Viability Worksheet is included as **Table 9-3** demonstrates the financial strength that is foreseen should the owners of the private water systems agree to move forward with consolidation. During the first six years of operations, it is projected that District operations will run a deficit in 2013 due to the cost of a biannual State audit. However, surpluses from 2011-12 will be used to cover the cost of the additional operations expense.

Non-facility costs projected for years 2013 and 2015 as shown in the Table 9-2 are for completion of CIP projects F2 and F8 associated with the project report and evaluation of the Whispering Pines source alternatives and for and for legal assistance associated with the transfer of water rights associated with the both the Lester and Whispering Pines systems to new groundwater sources.

The financial worksheets presented in this Chapter were developed based on the rates proposed above and planning level estimates of future costs and customer growth rates. Once the proposed financial system is in place and records are available, these sheets should be revised to reflect the actual water usage, revenue generation, system costs and customer growth that occur in assumption and consolidation of the five water systems.

Table 9-2
Six Year Cash Flow operating Budget

Description	2011	2012	2013	2014	2015	2016
REVENUE						
Water Sales	$65,304	$65,508	$68,736	$68,736	$71,160	$71,664
Other Revenue						
TOTAL REVENUE	**$65,304**	**$65,508**	**$68,736**	**$68,736**	**$71,160**	**$71,664**
EXPENSES						
Employee Payroll						
Contract Operator	$40,000	$40,000	$42,000	$42,000	$44,000	$44,000
Contract Billing	$6,000	$6,000	$6,100	$6,100	$6,200	$6,200
Total Payroll	$46,000	$46,000	$48,100	$48,100	$50,200	$50,200
Operation and Maintenance						
Materials and Supplies	$3,500	$3,500	$3,500	$4,000	$4,000	$4,000
Water Testing	$1,500	$1,500	$1,600	$1,600	$1,700	$1,700
Utility Service	$1,000	$1,000	$1,000	$1,100	$1,100	$1,100
Total Operation & Maint.	$6,000	$6,000	$6,100	$6,700	$6,800	$6,800
General and Administrative						
Administrative	$1,000	$1,000	$1,200	$1,200	$1,200	$1,400
Insurance	$1,500	$1,500	$1,600	$1,600	$1,700	$1,700
Legal Services	$3,000	$3,000	$3,500	$3,500	$4,000	$4,000
State Auditor	$3,500	$0	$3,500	$0	$3,500	$0
Other Expenses	$2,000	$2,000	$3,000	$3,000	$3,000	$3,000
Total General & Admin.	$11,000	$7,500	$12,800	$9,300	$13,400	$10,100
State and Local Taxes	$3,265	$3,275	$3,437	$3,437	$3,558	$3,583
TOTAL EXPENSES	**$66,265**	**$62,775**	**$70,437**	**$67,537**	**$73,958**	**$70,683**
Annual Debt Payments						
Loans Principal & Interest	$0	$0	$28,000	$120,000	$120,000	$120,000
LESS Collections from ULID	$0	$0	$35,000	$126,400	$126,400	$126,400
Annual Pmt from Operating Revenue	**$0**	**$0**	**-$7,000**	**-$6,400**	**-$6,400**	**-$6,400**
Capital Improvement Program Expenditures						
Water System Replacement	$0	$0	$0	$0	$0	$0
Capital Improvements	$99,000	$231,000	$1,655,000	$0	$0	$0
Non-Facility Costs	$0	$0	$15,000	$0	$15,000	$0
Total CIP Expenditures	**$99,000**	**$231,000**	**$1,670,000**	**$0**	**$15,000**	**$0**
Capital Sources						
Loans	$0	$0	$1,655,000	$0	$0	$0
Grants	$99,000	$231,000	$0			
Connection Charges	$12,000	$12,000	$8,000	$8,000	$8,000	$12,000
Property Owner Contributions	$0	$0	$0	$0	$0	$0
Withdrawal fr Ex. Reserves	$0	$0	$0	$0	$0	$0
Withdrawal fr Ops Reserves	$0	$0	$7,000	$0	$7,000	$0
Net CIP from Capital Sources	**-$12,000**	**-$12,000**	**$0**	**-$8,000**	**$0**	**-$12,000**
Capital Improvement Fund						
Beginning Balance	$0	$12,000	$24,000	$24,000	$32,000	$32,000
Additions (Withdrawals)	$12,000	$12,000	$0	$8,000	$0	$12,000
Ending Balance	$12,000	$24,000	$24,000	$32,000	$32,000	$44,000
Operating Cash Reserve						
Minimum Balance	$8,283	$7,847	$8,805	$8,442	$9,245	$8,835
Annual Installment	$0	$0	$0	$0	$0	$0
Transfer to Capital Funding	$0	$0	$0	$0	$0	$0
Prior Year Surplus	$0	$9,839	$13,533	$4,099	$14,399	$2,402
Running Balance	$0	$9,839	$23,371	$27,471	$41,870	$44,272
Emergency Reserve						
Minimum Balance	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Annual Installment	$1,200	$1,200	$1,200	$1,200	$1,200	$1,200
Running Balance	$1,200	$2,400	$3,600	$4,800	$6,000	$7,200
Replacement Reserve						
Target Balance	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Annual Installment	$0	$1,500	$0	$1,500	$1,500	$1,500
Running Balance	$0	$1,500	$0	$3,000	$4,500	$6,000
TOTAL REVENUE REQUIREMENT	**$55,465**	**$51,975**	**$64,637**	**$54,337**	**$68,758**	**$53,483**
BUDGET SURPLUS (DEFICIT)	**$9,839**	**$13,533**	**$4,099**	**$14,399**	**$2,402**	**$18,181**

Table 9-3
Financial Viability Test Summary

Test 1 - Do you have a budget and are rates sufficient to cover expenses		
Description	Budget Year 2011	Budget Year 2016
REVENUES		
Water Sales	$65,304	$71,664
Other Revenues	$0	$0
Misc	$0	$0
Connection Charges	$12,000	$12,000
Total Other Revenues	$12,000	$12,000
Total Revenue	$77,304	$83,664
EXPENSES		
Total Operation and Maintenance Expense	$66,265	$70,683
Taxes	$0	$0
Debt Service Payments	$0	($6,400)
Net CIP from Rates	$0	$0
Operating Cash Reserve	$0	$0
Emergency Reserve	$1,200	$1,200
Replacement Reserve	$0	$1,500
TOTAL REVENUE REQUIRED	$67,465	$66,983
Required Water Rate Revenue	$67,465	$66,983
Are Water Rate Revenues Sufficient	YES	YES
Test 2- Is the Operating Cash Reserve = or > than 45 days maintenance and Operating Costs?		
Current Operating Reserve	$0	$44,272
Plus Budget Increase	$9,839	$2,402
Total Operating Cash Reserve	$9,839	$46,674
Required Operating Cash Reserve	$8,170	$8,714
Is Operating Cash Reserve Sufficient	YES	YES
Test 3- Is the Emergency Reserve = or > than cost of the most vulnerable facility?		
Current Emergency Reserve	$1,200	$7,200
Plus Budgeted Increase	$1,200	$1,200
Total Emergency Reserve Funds	$2,400	$8,400
Cost of most vulnerable facility-Well Pump	$6,000	$6,000
Is the emergency Reserve sufficient	NO	YES
Test 4 - Household Index; is 1.5 percent of median household income = or > than cost per ERU		
Median household income	$48,417	$48,417
Median household income X 0.015	$726	$726
Cost per ERU	$491	$494
1.5% of Median Household Income =/> Cost per ERU?	YES	YES
Customer Data		
Estimated Median Household Income	$48,417	$48,417
Number of ERU's (Connections)	133	145