10. Operations and Maintenance Program

This chapter summarizes the programs and procedures used to ensure safe and reliable supply of potable water to the District’s customers. It includes a description of water system management and personnel, system operations and control, the comprehensive monitoring plan, the emergency response program, safety procedures, and the cross-connection control program.

10.1. Water System Management and Personnel

Maintenance and operations responsibilities have been clearly defined in order to support efficient and effective operation of the District’s water system. The management structure of both the Maintenance and Operations Department and the Engineering Department are shown in Figure 2-1 (see Chapter 2).

10.2. Operator Certification

Chapter 70.119 RCW requires that Group "A" public water systems have a certified operator on staff. Responsibilities of the certified operator may include supervising the technical direction of a water system’s operation, supervising an operating shift of such a system, or a major segment of a system necessary for monitoring or improving the quality of water. Chapter 246-292 WAC provides the requirements for certification of the water works operator. The District supports and encourages in-house training and external training opportunities for operators, for continuing education. Table 10-1 lists the District’s engineers and lead operations staff, as well as their certifications.

<table>
<thead>
<tr>
<th>Position</th>
<th>Staff Member</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Manager</td>
<td>Arden Blackledge</td>
<td>WDM IV</td>
</tr>
<tr>
<td>District Engineer</td>
<td>Nancy Davidson</td>
<td>WDM IV</td>
</tr>
<tr>
<td>Senior Project Engineer</td>
<td>Brigitte McCarty</td>
<td>WDM IV, CCS</td>
</tr>
<tr>
<td>Project Engineer</td>
<td>Chris Schumacher</td>
<td>WDM IV</td>
</tr>
<tr>
<td>Engineering Services Manager</td>
<td>Dan Scheil</td>
<td>WDM III, CCS</td>
</tr>
<tr>
<td>Construction Inspection Supervisor</td>
<td>Catherine Forrest</td>
<td>WDM III</td>
</tr>
<tr>
<td>M&amp;O Director</td>
<td>Joe Bolam</td>
<td>WDM III, CSS  III</td>
</tr>
<tr>
<td>M&amp;O Superintendent</td>
<td>Mike Johnson</td>
<td>WDM III, CSS  I</td>
</tr>
<tr>
<td>Field Operations Manager</td>
<td>Brett Gehrke</td>
<td>WDM II, CCS, BAT</td>
</tr>
<tr>
<td>Water Quality Supervisor</td>
<td>Darren Demontes</td>
<td>WDM II, CCS</td>
</tr>
<tr>
<td>Field Operations Manager</td>
<td>Mike Oleson</td>
<td>WDM III, CCS, CSS  I</td>
</tr>
</tbody>
</table>

BAT = backflow assembly tester
CCS = cross connection control specialist
CSS = collection system specialist (for wastewater system)
WDM = water distribution manager
WDS = water distribution specialist
10.3. System Operations and Control

Chapter 2 of this Water Comprehensive Plan provides information on the District’s facilities. Facility locations are shown in Figures 2-2 and 2-3. The routine operation and maintenance of the major elements of these facilities are summarized below. The operation of each major facility is described as well as redundancy that exists if a facility shuts down or fails.

10.3.1. SCADA and Telemetry System

A Supervisory Control and Data Acquisition (SCADA) system became fully operational in 2008. The day-to-day operation of the water system is visually monitored and controlled from SCADA computers. This includes pump station status, reservoir and tank levels, flows into the system, and flows through the wholesale master meters. A SCADA system allows for modifications of automatic control setpoints, pump sequence logic, and the Nike and Canyon Park Tanks inlet flow control settings. The continuous monitoring of system operational status is provided through the data acquisition portion of the SCADA system. The SCADA system is also used to generate reports that are used to review operations and identify where changes can be made to improve operational efficiency.

10.3.2. Storage Tanks

Reservoir maintenance includes periodic inspection and cleaning of interior and exterior surfaces, inspection of cathodic protection systems, and interior and exterior painting as required. The District has a regular tank and reservoir maintenance and inspection schedule. The tanks are drained and cleaned every five years. Inspection of cathodic protection systems are completed annually.

A complete description of each of the reservoirs is presented in Chapter 2.

Reservoir Nos. 1, 2, and 3

These three reservoirs are located within less than one-half mile of each other and have a total volume of 68 MG serving the 635 Zone. The pipeline connections and valving between the reservoirs and the distribution system piping is such that any one of the reservoirs may easily be removed from the system for routine maintenance while the other two remain in service.

The reservoirs are supplied by the District’s Pump Station Nos. 1 and 2, and the transmission mains through south Everett. The water surface level for all three reservoirs is monitored in the District’s SCADA system. The reservoir levels are also monitored with the SCADA system, and when Pump Station Nos. 1 and 2 are operating in automatic mode, the low level set point will transmit a signal to the pump stations for pump start up.

High Tank Nos. 1 and 2

High Tank Nos. 1 and 2 serve the 724 Zone service area and provide redundancy for each other. Under emergency conditions, the 724 Zone Booster Pump Station can be operated to by-pass the High Tanks should it be necessary to remove both of the High Tanks from service. Tank levels are monitored with the SCADA system.
Canyon Park Tank

The Canyon Park Tank serves the 520 Zone, and may be taken out of service for maintenance or emergency shut-down without disruption of supply. If it is necessary to remove the Canyon Park Tank from service, the Nike Tanks 1 and/or 2 can provide service for the 520 Zone. Historically, the 520 Zone has also been supplied from the 635 Zone through two PRVs located at 196th Street SE and SR 527; and at 49th Avenue SE and 224th Street SE.

If needed, during peak demand times, isolation valves are closed and the Canyon Park tank can be aligned to the residential area on the east side of the 520 pressure zone to optimize storage if one of the Nike Tanks were removed from service.

Nike Tank Nos. 1 and 2

Nike Tank Nos. 1 and 2 also serve the 520 Zone, providing additional storage for that zone. Nike Tank 2 was placed into service in 2003. The site also includes a retention pond and a disinfection facility. Each tank can be taken out of service for maintenance without disruption of the water supply in the 520 Zone as long as the Canyon Park Tank and one other Nike Tank are in service. When draining either tank for maintenance, the stored water can be pumped into the remaining Nike Tank.

Clearview Reservoir 1

The Clearview Reservoir No. 1 was constructed and placed in service in 2003. The reservoir has a total capacity of 11.93 MG and serves the eastern portion of the 635 Zone.

The Clearview reservoir has an overflow elevation of 660 feet. Initially the reservoirs will be operated at a maximum elevation of 640 feet to reduce high service pressures within the eastern portion of the District’s service area. The reservoir can be drawn down to 625 feet and still maintain service pressures of 30 psi or higher.

10.3.3. Pump Stations

The District has three pump stations. Pump Stations No. 1 and No. 2 supply the District from Everett’s Reservoir No. 3. The High Zone Booster Pump Station pumps water to the 724 Zone tanks.

Start-up and shut-down procedures are posted in the pump station buildings. The safety procedures for operating the pump stations are also included in the Lock-Out Tag-Out Manual. The Lock-Out Tag-Out Manual also provides technical data for the pump station facilities including:

- Inspection routines
- Operating characteristics
- Equipment manufacturers and model numbers.

Each pump station receives an on-site check daily and a daily log is kept documenting the inspection. The inspection includes the following elements:

- Flow rate
- Pump motor temperature
- Bearing oil levels
- Seal leakage
- Power draws.

The following service is completed annually at each pump station and:

- Pump motor servicing
- Infrared testing of the electrical components
- Vibration analysis.

**Pump Station Nos. 1 and 2**

Pump Station No. 1 was constructed in 1964. Pump Nos. 1 and 2 were replaced in 1986. At that time variable frequency drives (VFDs) were installed and the original motors are stored as spares. Pump Nos. 3, 4, and 5 were rebuilt in 1986.

Pump Station No. 2 was built in 1991. The station has four identical pumps that are equipped with pneumatic operated ball valves. Pump starts and stops for both stations are controlled by the water level in the District's Reservoir Nos. 1, 2, and 3.

In automatic mode, the pump-start is triggered by the low level set-point maintained in the District's SCADA system. Occasionally, pump start and stops are controlled manually, on-site to maximize power usage efficiency and to minimize peak flows taken from the City of Everett. The new SCADA system has a pump control feature where starts and stops are triggered on reservoir level and time of day setpoints.

An interconnect pipeline connects the City of Everett's Evergreen Way Pump Station to the District's Pump Station discharge allowing Everett to pump directly to the District. The District may also pump to Everett on a limited basis through a 24-inch diameter interconnect between Everett and the District pump station discharge pipelines. In addition, an emergency intertie exists between the City of Everett's 650 Zone and the District's transmission pipelines at the intersection of Casino Road and 7th Avenue West.

The District is in the process of evaluating both pump stations. Improvements under consideration are as follows:

- A back-up generator to provide limited emergency pumping needs at Pump Station Nos. 1 and 2, in the event that the regular power supply is lost.
- New VFDs for increased energy efficiency and improved maintenance / operation.
- Rehabilitation of Pump Station 1 to ensure reliability.

**724 Zone Booster Pump Station**

The 724 Zone Booster Pump Station was completely rebuilt in 2001. The station contains three vertical turbine pumps, two duty and one standby. The lead pump is automatically rotated among the three pumps so that total run hours are kept approximately the same. The station is also equipped with a backup generator, which also provides power to the disinfection facility located on-site. The backup generator can provide enough power to run two duty pumps, providing regular supply to the 724 Zone if necessary.
The booster pumps may be operated either in manual or automatic mode. Pump start and stops are controlled by the water level in the High Tanks. In automatic mode the low level set point for the High Tanks will trigger a pump start.

The booster station draws water from the Reservoir No. 1 inlet piping and discharges into the 724 High Tank inlet piping. The booster station can also pump directly into the 724 Zone distribution system.

10.3.4. Disinfection Facilities

The District’s disinfection facilities re-chlorinate to provide adequate chlorine residual throughout the distribution system and out to the master meters of the District’s wholesale customers. A sodium hypochlorite facility is located at each of the four tank sites and chlorination is provided by the outlet of each tank. Due to the disinfection/disinfection byproduct (D/DBP) requirements, the District is maintaining a more comprehensive program of monitoring chlorine residuals with on-line chlorine residual analyzers that report a continuous reading to the SCADA system.

Water supplied from the City of Everett has a chlorine residual of approximately 0.7 to 1.0 ppm. The District has significantly reduced the amount of re-chlorination, due to the high chlorine residual present in the Everett supply entering the District’s system. Currently the District is operating one of its four disinfection facilities (at Reservoir No. 1) at the lowest possible rate. The typical downstream residual is approximately 0.5 to 0.7 ppm. On the occasion when a high chlorine residual spikes at the District’s master meters to its wholesale customers then the District will temporarily shut down the associated disinfection facility to reduce the risk of disinfection by-products.

All preventive maintenance is performed per the manufacturer’s recommendations. Chlorine Residual Analyzers are calibrated monthly.

Reservoir 1, 2, 3, and High Tanks

The chlorination system is a Chlortec, on-site generation system capable of feeding up to 50 pounds of equivalent chlorine per day. The new facility at the Reservoir No. 1 site is also used to disinfect water for High Tank Nos. 1 and 2.

Nike Site

The chlorination system is a Chlortec, T-6/V-2 on-site generation system capable of feeding up to six pounds per day of equivalent chlorine. The system operates at a constant rate based on the flow out of the Nike Tanks.

Canyon Park

The chlorination system is a Chlortec, T-6/V-2 on-site generation system capable of feeding up to six pounds per day of equivalent chlorine. The system operates at a constant rate based on the flow out of the Canyon Park Tanks.

10.3.5. Pressure Reducing Valves

The District maintains four pressure reducing valve stations which regulate pressure between the 635 Zone and the lower 520 and 285 Zones. The District also maintains flow control valves
at the 520 Zone, Canyon Park Tank, and Nike Tank Nos. 1 and 2. Downstream pressure at each PRV is monitored continuously and alarm setpoints (high and low) are incorporated in the District-wide SCADA system. A summary of the District’s PRVs is presented in Chapter 2 - Table 2-6.

The pressure reducing valves (PRVs) are checked periodically with scheduled maintenance as required.

10.3.6. Transmission Pipelines

Two separate transmission pipelines supply water to the District from the District’s Pump Station Nos. 1 and 2. The transmission pipelines are capable of interconnection at the pump station site and at approximately Casino Road and 7th Avenue West. From the Casino Road interconnect location; the transmission lines continue to the 635 Zone Reservoir Nos. 1, 2, and 3 along independent alignments; one along Beverly Park Boulevard and the other along 3rd Avenue East.

A new transmission pipeline was constructed in 2003 to deliver water from Everett’s No. 5 Transmission Line through the Clearview pump station, pipeline, and the Clearview reservoirs to the District. It connects directly to the distribution system at two locations along 180th Avenue SE and a third location at the Canyon Park Tank.

10.3.7. Distribution Pipes

The District maintains an ongoing pipe replacement program, where older pipes known to be degraded or have high repair requirements are scheduled for replacement. The District has replaced all of the asbestos cement pipe that was present in prior decades. The District is also developing a program to replace its cast iron pipe over time. The District’s aggressive replacement program has resulted in a distribution system having low leakage (unaccounted-for water) and minimal pipe breaks.

10.3.8. Preventative Maintenance Program

The District’s computerized maintenance management system will be fully operational in 2009. Prior to the maintenance management system, the District was not equipped with the means to track and record regular and long-term maintenance schedules and reports on major system facilities. Tank inspections and cleaning was completed as required by state regulations and as needed. Maintenance of most of the other facilities was done as it was necessary.

In 2001 the District began a unidirectional flushing program to improve water quality and maintain optimal operational capabilities of the distribution system. The District is working its way through the distribution system beginning at the supply sources and moving out to the extremities of the system. Approximately three to five years is needed to complete flushing of the entire system. Once District staff has gone all the way through the system, they will begin again. As part of this flushing program all of the hydrants and blow-off valves are being serviced prior to flushing in any given area.

Once the new maintenance system is installed, the District will begin a regular preventative maintenance program on all of its major system facilities.
Regular servicing of pumps, motors, flow meters, and related mechanical and electrical equipment receives highest priority.

### 10.3.9. Equipment, Supplies, and Chemical Listing

The operations division maintains a detailed inventory of equipment, supplies, and materials. The District maintains an inventory of necessary supplies and spare parts for routine operations and emergency operations. Spare parts, such as valves, pipes, fittings, and electrical and electronic parts are kept current in the inventory. The District also maintains a detailed inventory of its vehicle fleet and large equipment.

### 10.4. Comprehensive Monitoring Plan

The District routinely monitors water quality parameters in accordance with State and Federal drinking water regulations. Details of the monitoring program are contained in Chapter 9 – Water Quality.

### 10.5. Emergency Response Program

Emergencies that could impede the supply of water on a short term basis include such occurrences as pipe breakage, hydrant damage, and short-term power outages. These emergencies are normally anticipated and handled by the District staff without significant difficulty.

Less frequently, water utilities must deal with natural and man-made disasters of greater proportions. These include earthquakes, volcanoes, hazardous material spills, vandalism, extended periods of unusually cold conditions, extended droughts, flooding, major power outages, and windstorms. Less extensive emergencies could include landslides, labor force strikes, and major mechanical failures.

Back-up facilities and safety procedures for the major elements of the water system were previously identified under the System Operation and Control portion of this section. A comprehensive emergency response plan (emergency plan) was prepared in connection with the District’s last Water System Plan update. This emergency plan is updated as needed.

The following elements are included in the emergency plan:

- Vulnerability analysis of major facilities
- Emergency operations procedures
- Notification procedures
- Emergency contacts and phone numbers
- Interagency cooperation and responsibilities
- Water Shortage Response Plan, including coordination with Everett as the water supply source agency.

Each of the above points is discussed in detail in the emergency plan. The full emergency response plan is available from the District’s offices.
10.6. Safety Procedures and Programs

The District is committed to the safety of its maintenance and operations staff and ensuring the safe operation of all facilities. District personnel follow the safety procedures and training programs shown below:

- District Accident Prevention Program
- State Labor & Industries, Division of Occupational Safety and Health (DOSH) standards outlined in applicable sections of the WAC Chapters 296-24, 296-27, 296-45, 296-62, 296-155, and 296-800 including but not limited to:
  - Trenching and Shoring Safety, Confined Spaces Safety, and Flagger Certification
  - District Lock-Out Tag-Out Training
  - First Aid/AED/CPR Training based on current American Heart Association and DOSH guidelines
- Water and Sewer Risk Management Pool – endorsed programs
- Washington Environmental Training Center Certification Workshops
- Certification Upgrades

The District Accident Prevention Program is adopted by resolution and updated as needed by the District Safety Office, the Safety Committee, and the Management Team. District personnel are routinely and regularly trained on all aspects of the safety programs to include the standards, best practices, and safe work procedures. Safety training is provided in house and by subject matter experts that are contracted on a regular basis.

10.7. Cross-Connection Control Program

There are approximately 2,218 privately-owned backflow prevention assemblies in the District’s service area. These assemblies are tested by private, DOH-certified, backflow assembly testers. The District has a computerized backflow prevention device tracking system (XC2) that is used to generate reminder letters to inform owners when their device is due for its annual inspection and testing. The District also owns more than 30 backflow prevention assemblies which are tested and inspected by DOH certified District personnel.

The District is required to develop and implement a Cross-Connection Control (CCC) Program in accordance with WAC 246-290-490. The water quality supervisor at the District is responsible for implementing and managing this program.

District Resolution No. 2385-2000 establishes a cross-connection control program within the District’s service area and gives the District the authority to implement and enforce the program. This resolution adopts the Washington State regulations and the American Water Works Association guidelines regarding cross-connection control. A copy of the resolution and the written Cross-Connection Control Program is contained in Appendix M, and is briefly summarized according to the ten minimum elements required by WAC 246-290-490 as follows:
Element 1 – Legal Authority for Cross-Connection Control Program

This element requires that a water purveyor adopt a local ordinance, resolution, code, bylaw, or other written instrument that:

1. Establishes the purveyor’s legal authority to implement a CCP;
2. Describes the operating policies and technical provisions of the CCP; and
3. Presents the corrective actions that can be used to ensure customers’ compliance with the CCP.

Alderwood Water District, Snohomish County Resolution No. 2385-2000 fulfills this requirement.

Element 2 – Evaluation of New and Existing Service Connections

This element requires each purveyor to develop and implement procedures and schedules for evaluating new and existing service connections. The District continues to inspect all new construction as required by the CCC Program. Potentially high hazard existing construction is identified and prioritized for inspection. The high hazard existing locations that have been identified are being inspected in conjunction with new construction as the necessary staff is available. Once an initial evaluation has been conducted, service connections must be re-evaluated periodically according to a schedule acceptable to DOH and whenever there is a change in use of the premises.

The District evaluates premises for degree of hazard in accordance with the following:

1. Table 9 of WAC 246-290-490
2. Subsections (4) (d, e, and f) of WAC 246-290-490

The District reviews the following for evidence of potential cross-connection issues:

- Water service applications
- Construction plans
- Requests for water/sewer estimates
- Applications for business licenses
- Other documents which may indicate that a requirement for cross-connection control exists.

Consultations with customers are conducted to help assure that all City and State requirements are met. If, upon review, it is determined that any hazard exists or a requirement is not met, the Water Quality Supervisor will advise the property owner in writing and as a courtesy offer technical guidance.
Element 3 - Cross-Connection Elimination, Control, and Prevention

This element requires that cross connections be eliminated whenever possible or, where they cannot be eliminated, that approved backflow assemblies commensurate with the degree of hazard be properly installed.

The District requires elimination wherever practical. The type of assembly required is based on degree-of-hazard, and proper installation is required. These activities are based on the following:

- Table 8 of WAC 246-290-490
- Subsection 6 of WAC 246-290-490
- The Cross Connection Control, Accepted Procedure and Practice Manual (most current edition), published by the Pacific Northwest Section of the American Water Works Association

Element 4 - Cross Connection Control Personnel

This element requires the purveyor to ensure that personnel are provided to develop and implement the backflow prevention program. At least one must be a certified cross connection control specialist (CCS).

The District requires the person filling the position of Water Quality Supervisor position be a certified cross-connection control specialist (CCS). At this time, several District staff besides the Water Quality Supervisor also hold a CCS certification (see Table 10-1).

Element 5 – Backflow Preventer Inspection and Testing

The water purveyor must ensure that approved backflow preventers are inspected and tested for proper operation in accordance with subsection (7) of WAC 246-290-490.

The District manages inspection and testing activities in accordance with subsection (7) as required. The Water Quality Supervisor oversees mailing notices generated from the XC2 system to customers that own backflow preventers after initial installation and then annually. Customers are responsible for hiring a certified (private) backflow assembly tester (BAT) and to maintain their own assemblies.

Element 6 – Quality Control Assurance Program

The water purveyor is required to develop and implement a quality-control assurance program for the testing of backflow-prevention assemblies. Certified BATs are required to take steps to control the quality and reliability of their work, and the District is required to verify that inspections meet standards. The program must include, at a minimum, documentation of tester certification and test kit calibration, standard requirements for the contents of test reports, and requirements for submitting completed test reports in a timely manner.

The District manages quality assurance of testing activities in accordance with subsection (7) of WAC 246-290-490.
The Water Quality Supervisor conducts an annual query of backflow assembly testers (BATs) for copies of their certification cards before they are placed on the Districts’ approved list. The CCS further ensures that all test reports contain the required information, such as test-kit calibration dates, line pressure readings, and the presence of a pressure-regulating valve upstream of the backflow preventer.

**Element 7 – Backflow Incident Response**

The water purveyor is required to develop and implement procedures for responding to backflow incidents.

The District has developed such procedures. Activities include but are not limited to the following:

- The Water Quality Supervisor organizes an in-field investigation and determines, cause, extent, need for isolation, need for public notification, method of resolution.
- Notification of management, related City departments, and regulators including the Snohomish County Health District and the Washington State Department of Health.
- Restoration of service protocols.
- Copies of all reports or correspondence pertaining to backflow incidents

**Element 8 – Consumer Education**

This element requires a water purveyor to educate consumers about cross-connections. The Code recognizes that purveyors must have a broader public-education program and requires that the information on cross-connections be a part of it. Examples of educational materials include bill inserts, pamphlet distribution, and consumer confidence reports.

Alderwood Water and Wastewater District disseminates information on cross-connection control through consumer confidence reports and public service announcements, and, generally, as part of its larger public-education program. The following is used as a guideline:

- Cross-connection Control Program Administration, first edition, 1988 (Chapter 14); by the Cross-connection control committee of the Pacific Northwest Section of the American Water Works Association.

**Element 9 – Record-keeping**

This element requires purveyors to keep up-to-date records documenting cross connection efforts and information, including:

- A master list of service connections where backflow preventers are installed, as well as the assessed hazard level for the premises and the type (category) of backflow preventer(s) required for each.
- Detailed information on each individual air gap, back-flow assembly, and atmospheric vacuum breaker, including (as applicable):
  - Location
  - Date of installation
The District prepares a written report of initial evaluations to the file system that includes:

- A list of all cross connections found, their location, and alternatives for elimination or control
- Any applicable drawings, sketches, blueprints, or photos
- Summary of finding, recommendations and requirements for corrective actions.

The District produces an annual cross-connection control program annual report that includes the content and forms required by the DOH. Backflow incident reports are completed for every backflow incident known to have contaminated the public water system or the potable water system within the customer’s premises. Incident reports are included as part of the annual report.

**Element 10: Reclaimed Water**

Under this element, purveyors that distribute and/or have facilities that receive reclaimed water within their service area must abide by additional cross connection control requirements that are imposed by the DOH under a permit issued in accordance with Chapter 90.46 RCW (reclaimed water use permits).

Reclaimed water is not currently distributed for use with the Districts service area.

**10.8. Record Keeping and Reporting**

When customer complaints occur repeatedly in the same area, this indicates a need for potential operations or maintenance attention. For example, these may indicate localized pressure or water quality problems. Complaints from the District’s customers are usually received by the Finance Department and M&O Water Quality Department and are entered into a database.

Complaints that are pertinent to water quality are routed to Water Quality Department staff for action. The complaint or problem and the action taken are kept in a written log. The District’s new maintenance management program will allow Maintenance and Operations to keep more detailed records of complaints and report what action was needed and taken.

**10.9. Recommended Maintenance and Operation Improvements**

Refer to Chapter 11 for detailed project discussions and priorities.

The District maintains and replaces equipment, parts, and supplies as needed as part of its normal operations. The costs associated with these are met by the M & O annual operating budget. Capital Improvement Projects may increase M&O operating budgets. M&O has identified the following projects for funding during this planning period:
• Water Storage Projects
  o Recoat the interior and exterior of Reservoir 2 and 3 in 2008/2009 starting a 20-year interval. (ST-2,3,4&5)
  o Installation of fall protection devices and exterior ladder modifications at Reservoirs 2 and 3. (ST-,3,4,5)

• Water Pump Stations
  o Conduct evaluation of Pump Station 1 and 2 in 2007 (PS1A &PS2A)
  o Backup Power Supply for PS 1 and PS 2. (S-4)
  o Electrical and mechanical upgrades to Pump Stations in 2012 (PS-1 and PS-2)
  Mechanical and Electrical evaluation of the 724 Booster Pump Station. (WM-C)

• Water Distribution System
  o Assortment of pipeline replacement projects throughout the system. (D10 and D11)
  o Replacement of Substandard Fire Hydrants (WM-1)
  o Metered Water Fill Stations (WM-B)
  o Replacement of valve vaults on lines 24” or larger on transmission line 21A. (WM-I)
  o Main Looping and Water Quality Improvements.
  o Upgrade Air Vacuum / Blow valves on transmission line 21A. (WM-J)
  o Meter replacement program.
  o DCDA (Double Check Detector Assembly) Replacement Program (WM-H).

At the time this Plan was written, a new maintenance management system was being installed and is expected to be operational by 2009.