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CHAPTER 12 - OPERATIONS AND MAINTENANCE PROGRAM

The primary role of the Utility’s Operations and Maintenance (O&M) Program is to operate and maintain the infrastructure that extracts water from groundwater sources, stores it for future use, and transports the water through the distribution and delivery system to the City’s water customers. The O&M Program is also responsible for the maintenance of all reclaimed water lines inside the City.

The O&M Program helps meet the Drinking Water Utility’s Goal 6:

**Infrastructure is prudently financed, and sustainably constructed, maintained and operated to ensure reliable delivery of high quality water to a growing community.**

The program also implements Comprehensive Plan Goal GU7.

Objectives for improving the infrastructure are discussed in Chapter 8 (Source Infrastructure), Chapter 9 (Storage), and Chapter 10 (Transmission/Distribution Infrastructure). Water quality strategies are in Chapter 11, and Chapter 6 addresses the Reclaimed Water Program. O&M Program objectives for 2015-2020 are to:

- Continue to improve the maintenance management program, including preventive maintenance, repairs and replacements.
- Continue to improve the emergency response program and maintain facility security.
- Continue to improve program management, including safety and asset management.

Priorities for 2015-2020 include more fully developing the asset management program, completing Automatic Meter Reader (AMR) implementation, bringing leak detection in-house and continuing to meet Level of Service Standards (LOS).

12.1 Operations and Maintenance Regulations

The O&M Program is guided by a number of state regulations. Details on the Utility’s compliance with operator certification requirements and other applicable regulations are presented below.

**Operator Certification**

The Washington State Department of Health (DOH) requires all public water systems with more than 100 service connections to have a certified operator. Certifications are mandatory for staff members who are in direct charge of a public water system or major segments of the system, and who are responsible for monitoring or improving water quality. (See Chapter 70.119 RCW and Chapter 246-292 WAC.)

DOH requires mandatory certification for six types of positions, as shown in Table 12.1.
Table 12.1 Mandatory Certifications

<table>
<thead>
<tr>
<th>Position</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Operations Supervisor</td>
<td>Water Distribution Manager (WDM) 4</td>
</tr>
<tr>
<td>Pump Stations Supervisor</td>
<td>WDM 4, Water Treatment Plant Operator (WTPO) 1</td>
</tr>
<tr>
<td>Water Operations Lead Worker</td>
<td>WDM 3</td>
</tr>
<tr>
<td>Water Quality Supervisor</td>
<td>WTPO 1</td>
</tr>
<tr>
<td>Water Quality Specialist</td>
<td>WTPO 1</td>
</tr>
<tr>
<td>Water Monitoring Assistant</td>
<td>WTPO 1</td>
</tr>
</tbody>
</table>

A WTPO 2 certification will be required should the Utility install iron or manganese treatment (Chapter 11, Section 11.2).

Certification is also available on a voluntary basis to individuals interested in the Water Distribution Manager (WDM), Cross Connection Specialist (CCS) and Backflow Assembly Tester (BAT) classifications. These voluntary certifications demonstrate staff incentive and competence and are an index of the professionalism and expertise available to efficiently operate the City’s water system. Table 12.2 lists Utility staff and their certification status.

Table 12.2 Water Operations and Water Quality Staff Water Certifications

<table>
<thead>
<tr>
<th>Name</th>
<th>Certification Number</th>
<th>State Certification</th>
<th>Mandatory Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonsall, Mark</td>
<td>11167</td>
<td>CCS, WDM 2</td>
<td></td>
</tr>
<tr>
<td>Coke, Steve</td>
<td>6185</td>
<td>CCS, BAT, WDM 4</td>
<td></td>
</tr>
<tr>
<td>Cole, Jeremy</td>
<td>10219</td>
<td>WDM 3, CCS, WTPO 1</td>
<td>x</td>
</tr>
<tr>
<td>Curley, Daisy</td>
<td>11502</td>
<td>WTPO 1, CCS</td>
<td>x</td>
</tr>
<tr>
<td>Daniels, Curt</td>
<td>6329</td>
<td>WDM 2, CCS, WTPO 1</td>
<td>x</td>
</tr>
<tr>
<td>Davis, Bill</td>
<td>12850</td>
<td>WDM 2</td>
<td></td>
</tr>
<tr>
<td>Davis, Steve</td>
<td>12409</td>
<td>WDM 1</td>
<td></td>
</tr>
<tr>
<td>Gallagher, Mike</td>
<td>7939</td>
<td>WDM 3, CCS</td>
<td></td>
</tr>
<tr>
<td>Main, Ed</td>
<td>10739</td>
<td>WDM, WTPO 1</td>
<td>x</td>
</tr>
<tr>
<td>Maxfield, Meliss</td>
<td>11529</td>
<td>WDM 1, WTPO 1, CCS</td>
<td>x</td>
</tr>
<tr>
<td>Michael, Tim</td>
<td>12881</td>
<td>WTPO 1</td>
<td>x</td>
</tr>
<tr>
<td>Miller, Cara</td>
<td>12303</td>
<td>WDM 1</td>
<td></td>
</tr>
<tr>
<td>Norton, Dave</td>
<td>7875</td>
<td>WDM 3, CCS</td>
<td>x</td>
</tr>
<tr>
<td>Klimek, Ernie</td>
<td>7402</td>
<td>WDM 4, WTPO 4, CCS</td>
<td>x</td>
</tr>
<tr>
<td>Reimers, Cheri</td>
<td>9485</td>
<td>WDM 4, CCS, WTPO 1</td>
<td>x</td>
</tr>
<tr>
<td>Black, Ronnie</td>
<td>11952</td>
<td>WDM 2</td>
<td></td>
</tr>
<tr>
<td>Sloan, Dustin</td>
<td>10880</td>
<td>WDM 2, CCS</td>
<td></td>
</tr>
<tr>
<td>Vessey, Mike</td>
<td>7809</td>
<td>WDM 4, CCS, WTPO 1</td>
<td>x</td>
</tr>
<tr>
<td>Witt, Ken</td>
<td>10319</td>
<td>WDM 2, CCS, BAT</td>
<td></td>
</tr>
<tr>
<td>Woods, Eric</td>
<td>10802</td>
<td>WDM, WTPO 1</td>
<td>x</td>
</tr>
</tbody>
</table>

Acronyms: WTPO=Water Treatment Plant Operator, WDM=Water Distribution Manager, BAT=Backflow Assembly Tester, and CCS=Cross Connection Specialist.
Other Regulations

Chapter 246-290 WAC, Part 5 contains detailed regulations covering operations and maintenance, system reliability, emergency response, and metering. Olympia’s compliance with these regulations is described in the following section.

As required by Chapter 246-294 WAC, the City maintains a Drinking Water Operating Permit for the water system.

Olympia’s municipal code (OMC 13.04) gives the City the legal authority to implement and enforce a Cross Connection Control program. Specific requirements are in the City’s Engineering and Development Standards.

12.2  O&M Program Activities

The O&M Program is the most publicly visible component of the Drinking Water Utility, with staff in the field operating and maintaining water storage facilities, pumping equipment, valves, pipes, hydrants and meters.

O&M staff visually inspects or uses telemetry to remotely monitor critical system components; provide routine maintenance, repair and replacement services; maintain accurate system maps and records; and develop and test the Utility’s Emergency Response Plan. In addition, O&M staff makes sure there is adequate water volume to meet fire protection and peak flow needs, thereby maintaining system reliability, performance and water quality.

The Program manages:

- Seven water supply sources (McAllister Wellfield and six wells)
- Five booster pump stations
- 11 storage tanks
- Over 360 miles of transmission and distribution pipe
- Approximately 2,500 fire hydrants
- Approximately 8,400 valves
- 19,646 service connections (as of 2013)

In addition to maintenance management, activities include reclaimed water system management, cross connection control, emergency response, and program management to address safety issues, asset management, and upgrading and replacing service meters.

Maintenance Management

The O&M Program currently uses a straightforward, subjective assessment of service levels related to the program’s core functions, such as hydrant maintenance, valve exercise, pipe flushing, new service installations; and maintenance of pump stations, source facilities and water meters. The staff is organized into two crews: one responsible for supply, storage, and pump station maintenance; and one responsible for the transmission and distribution system piping.
Supply, Storage and Pump Station Maintenance

The pump station staff is responsible for all pump stations and other mechanical equipment and facilities at the supply sources and storage tanks (Chapter 8 and Chapter 9). The following activities are described in this section:

- General building and grounds maintenance.
- Electrical repair and maintenance.
- Exercise, flushing and inspection of equipment.
- Scheduling of equipment maintenance.
- General maintenance, repair or replacement of parts or equipment.
- Interior tank cleaning (supported by contractors).
- Inspection, scheduling and repair of treatment equipment (that is, chlorine pumps, injector, analyzers and pressure regulators) and changing out chlorine tanks.
- Telemetry alarm checks, repairs, loading programs, re-calibration, upgrades.

Preventive maintenance is scheduled. Breaks are fixed immediately. Equipment is replaced when it becomes unreliable.

Transmission and Distribution System

The distribution system staff is responsible for maintaining the pipes that make up the transmission and distribution systems (Chapter 10). The Utility currently contracts leak detection activities, but is considering purchase of its own detecting and assessing equipment for the system. Detection efforts indicate the occurrence of very few leaks. Most leaks are associated with hydrant bleeders and valve packing, all of which have been repaired. The O&M Program will evaluate the frequency of future leak detection efforts. See Chapter 3, Section 3.2 for an explanation of how the Utility accounts for leakage in forecasting future demand. See Chapter 5, Section 5.2 for the role of controlling leakage in the conservation program.

Maintenance activities are described below for:

- Valves
- Service lines
- Hydrants
- Water meters

Preventive maintenance is done on a schedule. Breaks and other problems are immediately fixed. Replacements occur on a limited basis.
Valve Maintenance

Distribution system staff exercise and flush the system’s approximately 8,400 valves on a three-year cycle. The staff is also responsible for installing new valves, and handling general maintenance and replacement activities.

Preventive maintenance is based on a rotating schedule by zone. Breaks and other problems are immediately fixed.

Service Line Maintenance

Water distribution staff is responsible for abandoning, installing, replacing, repairing and relocating service lines. Service line maintenance is a low priority and only becomes a high priority when breaks and other service losses occur; these issues are immediately addressed. This group also installs new sampling stations and replaces old ones when requested by Water Quality Program staff.

Hydrant Maintenance

The water distribution staff is responsible for flushing, exercising, installing, raising/adjusting, replacing or relocating the system’s approximately 2,500 hydrants. The flushing schedule is once every three years. Preventive maintenance is a high priority to avoid leaks and breaks, and to make sure the hydrants are functional for firefighting.

Water Meter Maintenance

At the end of 2013, the Utility was reorganized to reassign meter reading activities from the Water Quality Section to the Water Operations Section. Meter readers, with assistance from the distribution crew as needed, are responsible for installing and replacing most meters. Water distribution crews also respond to after-hours customer service calls for turning meters on and off. Preventive meter maintenance is rarely done. Breaks and other problems are immediately fixed when reported. The Meter Reading system was upgraded in 2014 to an Itron AMR system where 90 percent of meters are read via a fixed network and the remaining 10 percent are read via a mobile system. This capital improvement project replaced approximately 75 percent of the meters and retrofitted the rest with new registers that allow for automated reading.

Reclaimed Water System

The water distribution staff is responsible for initial flushing of all reclaimed water lines at the beginning of the irrigation season, re-painting valve box covers, and making any needed line repairs. See Chapter 6 for additional information regarding the City’s reclaimed water system and program.
Cross Connection Control

Cross connection control is needed to ensure the potable drinking water system is protected from potential backsiphonage at the customers’ point of service. In 2013, this responsibility was reassigned to Water Operations and staff continued with efforts outlined in the 2009 Water System Plan to improve enforcement and annual testing. An evaluation of remaining unprotected Table 9 High Health Hazard Premises identified 75 facilities needing premises isolation. Three key steps were implemented:

- Assigning dedicated administrative support staff.
- Replacing backflow management software.

By the end of 2014, all known Table 9 facilities had achieved premises isolation, and annual testing reached 98 percent.

OMC 13.04 gives the City the legal authority to implement and enforce a Cross Connection Control Program. This authority now includes requiring regular inspections and testing on all backflow assemblies within the City’s jurisdiction. Any device found not functioning properly must be promptly repaired or replaced; otherwise, the City may deny or discontinue water service to the premises.

The Engineering Design and Development Standards outline the specific requirements for cross connection controls for new construction and remodels.

Utility’s Cross Connection Control Procedures Manual (Appendix 12-1) provides details on how the program is implemented, including hazard evaluations, notification activities, inspections, testing and repairs.

Emergency Response

A variety of emergencies may threaten the Utility’s ability to deliver safe and reliable drinking water. The purpose of emergency response planning is to identify specific response actions to be taken during an emergency that will maintain quantity and quality of water, protect employees, minimize disruption to the public and preserve property.

To improve the security of critical facilities, the Utility hired the consulting firm EES in 2004 to conduct a Vulnerability Assessment, and began installing several security enhancements in 2007. The assessment addressed specific physical technologies and Utility policies and operational procedures relevant to securing critical potable water facilities.
Emergency Response Plan

The Utility’s Emergency Response Plan (ERP), updated concurrently with this Water System Plan, follows an “all hazards” approach to emergency planning. This means that whatever the emergency might be, the same formula, outlined in the ERP, is used to respond. The ERP was developed using the Incident Command (IC) structure to ensure smooth communication between the Utility and the City’s Emergency Operations Center. The ERP also provides details on the Utility’s internal and external communication procedures, threat evaluation, replacement equipment, chemical supplies, employee safety protocols and returning to normal operations. For a complete list of ERP components, see the ERP Table of Contents (Appendix 12-2). The ERP itself contains 14 appendices, including a priority customer list, emergency contact list, equipment inventory, hazard analysis, water quality reporting forms, and critical facility schematics and operational specifics. Also contained in ERP appendices are:

- **Spill Response Plan** for responding to immediate or short-term threats.
- **Contingency Plan** to supply water from other sources if a water supply needs to be abandoned or temporarily shut down.
- **Water Shortage Response Plan** if water supplies become limited due to a contamination event (Chapter 5, Section 5.2).

In addition to the ERP, a field guide was developed to provide quick and practical direction to field staff on how to respond to a variety of emergency situations. Because of its sensitive nature, the field guide and several sections of the ERP are not publicly available. The Utility’s Water Quality Supervisor maintains these documents.

In addition to maintaining planning documents, the Utility has prepared in the following specific ways for an immediate, short-term or long-term event that might impact a City water supply:

- Drinking Water Utility ERP and IC system in place, including the ability to communicate with first responders during spill events.
- Trained staff ready to respond, with clear understanding for the ERP, the IC system, and their roles during emergencies.
- Working relationships with first responders within DWPAs and participation on the Local Emergency Planning Committee (Table 12.3).
- Mutual Aid Agreement in place with Fort Lewis for spill response, and mutual aid and inter-tie agreements in place with the Cities of Lacey and Tumwater to receive emergency water if needed (Chapter 4).
- Protocols in place for isolating the potentially contaminated source, sampling the source to determine levels of contamination, and modeling and evaluating a contaminant plume.
- Arrangements for environmental monitoring support from all potential first responders.
- System in place to communicate with customers about the event, risks and actions the Utility is taking.
Contingency Plan

The City successfully secured approval from the Washington Department of Ecology (Ecology) to transfer McAllister Springs and Abbott Springs water rights to the new McAllister Wellfield, which went on line in 2014. This action greatly reduced the vulnerability of the City’s main water source, since the Wellfield is more protected than the Springs.

The ERP outlines details of the Contingency, Spill Response and Water Shortage Plans, so staff can be prepared to maintain water supply to customers if one or more supply sources should be lost or some other major infrastructure failure occurs. The Utility’s LOS standard for system reliability is to maintain capacity to meet winter demand (inside water use only) with loss of the largest water source. Currently the winter demand is approximately 6.0 million gallons a day. Meeting this demand would require complete curtailment of all outside and non-essential water use. This standard is within the Utility’s current and planned capacity (Chapter 3). See Section 12.3 for more on Levels of Service.

Potential for Loss of Supply

A water supply could be lost due to contamination of a water source or damage to a source or transmission line due to natural events like an earthquake or human-caused threats. To prevent contaminants from reaching a supply source, it may be necessary to stop pumping operations until corrective actions can be completed. Under extreme circumstances, the City may need to permanently abandon or temporarily shut down a source because of source contamination.

Contamination risks are described in Chapter 7. Hazardous material spills or discharges can result in contamination of a single well or an entire wellfield. Loss of supply at McAllister Wellfield through a source or transmission failure would have a significant impact on system reliability. Loss of one or more of the other supply wells would not have as dramatic an impact. However, if loss occurred during peak season, some curtailment would be needed.

Standby (or emergency) storage in each pressure zone provides some system reliability (Chapter 9). The Utility’s reliability LOS standard requires supply capacity in addition to this storage capacity. Also, interties with the cities of Lacey and Tumwater can provide water during an emergency under certain conditions.

Contingency Measures

If necessary in the event of loss of water supply, the Utility could implement the Water Shortage Response Plan (Appendix 5-2) for complete curtailment of all outside and non-essential water use, a strategy that would still allow customers to meet basic needs for consumption, sanitation and general commerce. The restriction on outdoor water use would need to be strictly enforced to ensure that indoor uses are not affected.

The Water Shortage Response Plan establishes procedures to follow if curtailment is required and outlines four progressive levels of curtailment: advisory, voluntary, mandatory and emergency.
**Emergency Incident and Spill Response**

Although contingency planning is designed to address longer-term impacts from water supply contaminating events, by default it also provides tools for responding to immediate or short-term threats. Thus, through the ERP, the Utility has companion emergency incident and spill response procedures in place to minimize impact to the City’s water supplies. A critical component of emergency response is solid relationships and effective communication with neighboring and regional partners, particularly with respect to the City’s DWPAs, since some DWPAs extend beyond city limits (Chapter 7, Section 7.3).

The existing mutual aid agreements, multi-jurisdictional response planning coordination, and multi-agency response capabilities are important tools in planning for and responding to emergency incident and spill events.

**Incident Response Example - Transportation Spills**

As an example of implementing incident response, transportation spills of hazardous materials are rated as “high” in the hazard analysis conducted by the Utility as part of its Vulnerability Assessment and contaminant source inventories (Chapter 7, Section 7.4, Appendix 7-1 and Appendix 7-2). Risk from transportation spills is most threatening to the Allison Springs Well 13 (S09) and Well 19 (S11), Indian Summer Well 20 (S12), McAllister Wellfield (S16), and the planned Briggs Well (Table 7.2).

First response to spills that occur along transportation corridors is the responsibility of the Washington State Patrol, in coordination with local fire districts and Ecology. The Washington State Patrol acts as IC for all jurisdictions when a spill occurs on a transportation route. Because Olympia’s DWPAs are located both within and outside the City limits, local response to spills may be under the jurisdiction of the Olympia Fire Department and other fire department(s) or fire district(s). For example, Thurston County Fire District 3 (Lacey), District 6 (East Olympia), District 9 (McLane) and the Tumwater Fire Department all have a potential role in local emergency management planning and spill response in DWPAs outside the City’s boundaries. The address or location of the incident reported to Thurston County’s 911 Emergency Dispatch Center usually determines the jurisdictional authority.

**First Responder Jurisdictions**

Table 12.3 indicates the jurisdictions that could potentially be designated as the “first responder” for each of the City’s DWPAs located within and outside of the City.
Table 12.3 Spill Response First Responder Jurisdictions

<table>
<thead>
<tr>
<th>Olympia Supply Source</th>
<th>First Responder Jurisdictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>McAllister Wellfield (S16)</td>
<td>Washington State Patrol – Incident Command (IC)</td>
</tr>
<tr>
<td></td>
<td>Fire District No. 3 – Lacey</td>
</tr>
<tr>
<td>Shana Park Well 11 (S10)</td>
<td>Washington State Patrol (IC)</td>
</tr>
<tr>
<td></td>
<td>Fire District No. 3 – Lacey</td>
</tr>
<tr>
<td></td>
<td>Fire District No. 6 – East Olympia</td>
</tr>
<tr>
<td>Indian Summer Well 20 (S12)</td>
<td>Washington State Patrol (IC)</td>
</tr>
<tr>
<td></td>
<td>Fire District No. 3 – Lacey</td>
</tr>
<tr>
<td></td>
<td>Fire District No. 6 – East Olympia</td>
</tr>
<tr>
<td>Hoffman Well 3 (S08)</td>
<td>Washington State Patrol (IC)</td>
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<tr>
<td></td>
<td>Olympia Fire Department</td>
</tr>
<tr>
<td></td>
<td>Fire District No. 3 – Lacey</td>
</tr>
<tr>
<td>Briggs Well (planned)</td>
<td>Washington State Patrol (IC)</td>
</tr>
<tr>
<td></td>
<td>Olympia Fire Department</td>
</tr>
<tr>
<td></td>
<td>Tumwater Fire Department</td>
</tr>
<tr>
<td>Allison Springs Well 13 (S09)</td>
<td>Washington State Patrol (IC)</td>
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<tr>
<td></td>
<td>Olympia Fire Department</td>
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<td></td>
<td>Fire District No. 9 – McLane</td>
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<tr>
<td>Allison Springs Well 19 (S11)</td>
<td>Washington State Patrol (IC)</td>
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<tr>
<td></td>
<td>Olympia Fire Department</td>
</tr>
<tr>
<td></td>
<td>Fire District No. 9 – McLane</td>
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<tr>
<td>Kaiser Well 1 (S03)</td>
<td>Washington State Patrol (IC)</td>
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<td>Olympia Fire Department</td>
</tr>
<tr>
<td></td>
<td>Fire District No. 9 – McLane</td>
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<tr>
<td>State and Federal Highways and</td>
<td>Washington State Patrol (IC)</td>
</tr>
<tr>
<td>Railroads</td>
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</tr>
</tbody>
</table>

Operations and Maintenance Program Management

Program management activities include developing and implementing Standard Operating Procedures (SOPs), conducting an employee safety program, developing an asset management program, and planning to upgrade and replace service meters.

Standard Operating Procedures

The Utility hired a consultant to help develop SOPs. For the most critical activities, these SOPs provide detailed steps on completing the activity, including safety and health considerations.

SOPs were also developed for reclaimed water, dealing with such issues as startup procedures, inspection and testing of backflow devices, and identifying unauthorized connections. Each Operations and Water Quality vehicle contains a binder with up-to-date copies of the SOPs, Emergency Action Plans (EAPs) and Fall Protection Plans. The Water Resources Director and Water Operations, Pump Stations and Water Quality Supervisors also have copies of these documents in their offices.
The SOPs are reviewed annually and updated as necessary. The SOP binder contains:

- Physical address of sources, storage tanks and booster pump stations.
- Day and after-hours phone numbers of Utility emergency staff contacts.
- Distribution system procedures.
- Water quality procedures.
- Emergency procedures.
- Pump station and storage tank procedures.
- Reclaimed water procedures.

Safety Program

The Utility has an active safety program guided by the City’s Safety Coordinator. A safety committee meets monthly to monitor and discuss ways to improve safety. The committee reviews accidents or near misses as well as new training opportunities and regulations. Monthly trainings for staff are given by either the Safety Coordinator or an experienced outside professional. Some of the training topics include:

- Personal protection equipment
- Flagging
- Cranes, hoists and rigging
- Fall protection
- Lock out procedures
- Confined space procedures
- Respiratory protection
- Handling asbestos
- Chlorine systems

The Utility has developed an action plan to ensure implementation of the Public Works Department’s Employee Safety and Health Handbook. The action plan identifies priority elements of the handbook which are routinely discussed at staff meetings. Material Safety Data Sheets for chemicals used are located next to the safety bulletin board, along with safety and first aid equipment. The Standard Operating Procedures include protocols for fall protection and safely dealing with such hazardous tasks as handling asbestos pipe and changing chlorine cylinders.

Asset Management

During the last planning period, the Utility began creating a process for managing its infrastructure assets. The Utility hired the consulting firm HDR Engineering, Inc. to help identify the next steps for the Utility to develop a more comprehensive asset management program (see Appendix 12-3). Also, the City has created an interdepartmental leadership team to steer the overall planning and development of asset management programs.
Asset management provides a structured approach to minimizing asset ownership life cycle costs while meeting required service levels and providing long-term confidence in the condition of system infrastructure. An effective asset management process will enable the Utility to make decisions about when to repair and replace infrastructure based on social, financial and environmental factors rather than simply on age or location of a particular asset. The expected program outcomes are lower ownership costs, assets in better condition with longer lives, and more efficient use of the City’s human and capital resources.

An effective asset management process will help the Utility:

- Determine levels of service, and measures of service levels important to customers (see current LOS standards, Section 12.3).
- Develop measures tying employee work to the desired outcome or customer service level.
- Develop business case evaluations for asset decisions using a triple-bottom line approach (financial, social, environmental) and for selecting the best means to accomplish a desired level of service.
- Map workflows for maintenance, asset replacement and capital facilities planning, and set priorities for workflow improvements. This will ensure that assets are built to standards and maintained to function optimally.
- Make course corrections based on "lessons learned", the advent of new technologies, or changes in LOS standards.

The Utility has completed some fundamental efforts towards implementing an asset management program, such as updating levels of service and implementing the Vueworks computerized maintenance management system (CMMS). The Utility has begun developing the data systems for asset management by incorporating all assets into the City’s GIS mapping system. A complete data system will allow the Utility to:

- Inventory each asset by its location, condition, value and cost to the Utility.
- Prioritize investment decisions based on criticality (both risk of failure and consequence of failure).
- Schedule when to repair, replace and/or expand each asset.
It will take years for the Utility to develop and fine tune a meaningful asset management program. Asset Management Plans are considered “living documents” that require regular updates to remain relevant and useful. Near-term asset management and planning activities will focus on:

- Asset knowledge
- Asset operation and maintenance
- Asset condition monitoring
- Asset management systems

A technical memorandum from HDR Engineering, Inc. (Appendix 12-3) contains more information on asset management plan development and implementation, the current state of the asset management program, and near- and short-term activities needed to close knowledge gaps.

**Meter Program**

Approximately 20,000 service meters were upgraded or replaced as part of the AMR capital project completed in 2014.

The Utility has two full-time staff who read meters and perform other meter related service work. Approximately 98 percent of meters are read and billed bi-monthly, while the remaining two percent (typically larger accounts) are read and billed monthly.

Future needs include a capital plan to replace the 5,000 meters that went through a register change-out only during the AMR transition. These meters warranted that approach, but will be nearing the end of their useful life during the 2015-2020 plan cycle. Also needed are plans to maintain and upgrade hardware and software infrastructure as the new AMR system moves forward.

**Energy Efficiency**

The Utility recently contracted with an Energy Savings Company (ESCO) through the State Department of Enterprise Services Energy Savings Performance Contracting (ESPC) program to perform a preliminary energy audit of our water facilities. Recommendations for energy savings measures included optimization of well and booster pump station operations. Additionally, the Utility will seek to incorporate energy efficiency into future capital improvement projects for both new facility designs, as well as existing station rehabilitation projects.
12.3  2015-2020 O&M Program

The O&M Program helps meet the Drinking Water Utility’s Goal 6:

Infrastructure is prudently financed, and sustainably constructed, maintained and operated to ensure reliable delivery of high quality water to a growing community.

Chapters 8, 9 and 10 describe the infrastructure which is designed to meet Objective 6A: Design and construct infrastructure to ensure reliable delivery of water.

This section presents the 2015-2020 O&M program objectives, and ongoing and new program strategies.

Objective 6B  Continue to improve maintenance management, including preventive maintenance, repairs and replacements.


Strategy 6B2 -- Maintain, clean, and exercise equipment per manufacturer recommendations.

Strategy 6B3 -- Maintain buildings and grounds in a park-like manner.

Objective 6C  Continue to improve the emergency response program and maintain facility security.

Strategy 6C1 -- Plan for the anticipated impacts of sea level rise.

Strategy 6C2 -- Continue to maintain and be prepared to implement the water system emergency response plan.

Strategy 6C3 -- Store emergency supplies at several strategic locations and replenish before expiration dates.

Strategy 6C4 -- Conduct tabletop and/or field exercises periodically.

Strategy 6C5 -- Maintain existing security equipment at critical facilities.

Strategy 6C6 -- Update or replace pump station telemetry system hardware and software as needed.

Objective 6D  Continue to improve (O&M) program management, including safety and asset management.

Strategy 6D1 -- Continue scheduling and documenting all water system maintenance in VueWorks.

Strategy 6D2 -- Continue employee safety program, including safety committee review of accidents, review of new regulations and available training, and monthly staff training sessions.

Strategy 6D3 -- Ensure that all Utility infrastructure is accurately depicted on maps and related databases.

Strategy 6D4 -- Develop and implement an asset management program, in coordination with Public Works and City-wide efforts, to prioritize future capital improvement projects.
12.4 Implementation and Staffing

This section includes current staff and additional staff needed to support the planned program and meet the new LOS standards, as well as operations and maintenance projects scheduled in the Capital Improvement Program (Chapter 13).

Current Staffing Levels

The O&M Program currently is budgeted for 21 employees, divided into two crews. The Water Operations Supervisor oversees distribution system activities and meter operations, and the Pump Stations Supervisor oversees sources, booster pump stations and storage tank facilities. Both supervisors report to the Director of Water Resources. The function of each staff position and its full-time equivalent (FTE) is detailed below.

Drinking Water Operations

- Water Operations Supervisor (1.0 FTE). Directs, plans and organizes operation and maintenance of the potable water and reclaimed water distribution system.
- Water Distribution Lead Worker (1.0 FTE). Oversees and assists with day-to-day distribution and reclaimed water system maintenance and repair activities.
- Water Distribution Maintenance Worker II (11.0 FTEs). Performs day-to-day distribution system maintenance and repair duties.
- Inventory Control Specialist I (0.5 FTE). Responsible for data entry.
- Cross Connection/Meter Reader Lead (1.0 FTE). Oversees meter operations and tests and inspects backflow assemblies.
- Meter Readers (2.0 FTEs). Reads meters and performs meter maintenance.

Pump Stations Operations

- Pump Station Supervisor (0.5 FTE). Directs, plans and organizes operation and maintenance of pump stations and source and storage facilities.
- Pump Stations Remote Systems Technician (1.25 FTE). Ensures that all remote systems necessary to operate the water system are functioning at capacity.

Staffing Needs

A staff position is potentially needed to make the transition from manually read to automatically read meters. The person in this position would work with customer service and also to troubleshoot/repair the radios and the radio network, and review fault reports from the network.

Developing in-house leak detection and pipe analysis may also require the addition of a position to the Drinking Water Operations staff. The person in this position would be responsible for finding
leaks in the system and doing condition analysis of the distribution system at the field level to be entered into the Vueworks condition module. From here, the data will be used to identify capital projects for Drinking Water Operations as part of an Asset Management Plan.

An additional 0.25 FTE will need to be added to the current data control position (currently in Storm/Sewer operations) to help Pump Stations and Water Quality with asset management and with running monthly reports from Vueworks.

A Maintenance Worker II will need to be added to Pump Stations Operations. This position will be jointly funded by the Drinking Water and Wastewater Utilities. The position will be needed to keep up with the facility side of the Pump Stations crew’s responsibilities. Duties will include building maintenance, roof maintenance and grounds maintenance. Adding this position will allow the current Maintenance Technician to complete all necessary preventative maintenance work orders in the required time frame.

Adding staff positions will be considered in developing future Utility budgets.

Projects

The 20-year Capital Improvement Program (Chapter 13) includes a number of Operations and Maintenance projects scheduled for implementation during 2015-2020. Funds for the following ongoing projects are appropriated each year in the Capital Facilities Plan:

- Small diameter main replacement
- Asphalt overlay
- AC/aging pipe replacement
- Distribution main condition assessment
- Asset management program
- Corrosion control (aeration) tower assessment and upgrades

The following additional projects are scheduled for implementation after 2020:

- Storage tank coatings (interior/exterior)
- Booster Station upgrade/rehabilitation
- PRV telemetry (radio-based)
- Cross-country mains replacement/relocation
- On-site generator replacement
- Water meter replacement
- Water meter AMR radio replacement
12.5 Levels of Service

Municipal utilities in the United States and elsewhere commonly use LOS standards to evaluate whether the physical system and operations are functioning to an adequate level. LOS can be defined in terms of the customer’s experience of utility service and/or technical standards based on professional expertise of utility staff.

The Utility complies with all regulatory standards for water quality and system design and operation. In addition to these minimum standards, the LOS standards address issues of concern for customers that influence decisions on infrastructure investments.

LOS standards can help guide investments in maintenance, repair and replacement. For new assets, LOS can be used to establish design criteria and prioritize needs. Using a structured decision process that incorporates LOS can help a utility achieve desired service outcomes while minimizing life-cycle costs.

The Utility has refined its LOS standards using the following criteria:

- Specific goal or expectation identified.
- Focused on customer and community.
- Quantifiable and measurable.
- Relatively simple to understand and apply.
- Constrained by available budgets for maintenance, repair and replacement.

The Utility’s LOS are in these areas:

- System performance (including service interruption due to breakage, pressure, system reliability).
- Sustainability (energy efficiency).
- Customer service (response to water quality and service-related complaints).

LOS standards related to the O&M Program are described below. See Chapter 11 for water quality LOS standards.

System Performance

- **Service interruption due to line breaks.** During a three-year period, no customer will experience more than three service interruptions due to a line break; such service interruptions will average four hours or less.

- **Pressure.** Water will be delivered to new construction at a minimum pressure of 40 psi at the service meter.

- **System reliability with the largest source off-line.** The Utility will meet winter demand (inside water use only) with the loss of the largest water source. This would require complete curtailment of all outside and non-essential water use, particularly during peak use periods.
Sustainability

- **Energy efficiency.** All new pumps are rated 80 percent efficient or higher, unless it is not cost-effective to do so; meaning that the value of energy savings would not “pay back” the cost of the improvement within five years.

Customer Service

LOS standards for responsiveness to water quality and service-related complaints are:

- The Utility responds to main breaks within 15 minutes during work hours and within one hour during non-work hours, with a goal of no customer complaints about loss of service.
- The Utility responds to low pressure and water quality complaints by the end of the following business day.