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CHAPTER 6 - RECLAIMED WATER PROGRAM

Reclaimed water is highly treated wastewater that can be used for a variety of beneficial purposes. Use of reclaimed water supports conservation and can extend available water resources by offsetting the demand on potable water. By using reclaimed water for non-potable purposes, higher quality water can be saved for drinking water supplies. For these reasons, reclaimed water is an important element of the City’s overall water portfolio.

Both the Water Conservation Program and the Reclaimed Water Program aim to achieve the Drinking Water Utility’s Goal 3:

**Olympia’s water supplies are used efficiently to meet the present and future needs of the community and natural environment.**

For the Reclaimed Water Program, this goal is consistent with and is a refinement of the City’s Comprehensive Plan Goal GU4 and Policy PU4.6 which is to “advance the use of reclaimed water as defined in Council-adopted policies.”

While the Water Conservation Program achieves greater efficiency by reducing use of potable water, the Reclaimed Water Program supports efficiency by reusing and recycling potable water. Potable water has been used once in homes and businesses and then treated at the LOTT Clean Water Alliance (LOTT) wastewater treatment plants. Rather than being discharged to Puget Sound, the treated wastewater is reused for irrigation, toilet flushing, heating/cooling, industrial and commercial processes, and educational and interactive water features. It is also recycled by using it to recharge groundwater rather than discharging it into Puget Sound.

Since 2014, the City has shifted from emphasizing reclaimed water as a conservation strategy, which has not proven to be cost-effective, to prioritizing reclaimed water for groundwater recharge and enhanced stream flow.

Three objectives have been identified for 2015-2020:

- Meet the needs of current and future City reclaimed water customers.
- Direct reclaimed water towards meeting the regional wastewater management goal of reducing the amount of treated wastewater discharged into Puget Sound.
- Enhance Reclaimed Water Program efficiency and effectiveness.

6.1 Reclaimed Water Regulations

During the 2009-2014 planning period, revisions to state reclaimed water regulations were initiated, and updates were made to Thurston County and City of Olympia reclaimed water-related ordinances.
Legislation

State law, initially developed in 1995 (Chapter 90.46 RCW), encourages the use of reclaimed water to help meet growing water requirements and directs the Washington State Department of Ecology (Ecology) and Department of Health (DOH) to encourage the development of water reclamation facilities.

A 2006 legislative amendment, Engrossed Substitute House Bill (ESHB) 2884, directed Ecology to develop and adopt rules on all aspects of reclaimed water use by December 31, 2010. It also directed Ecology to coordinate with DOH and form a rule-making advisory committee with a broad range of interested individuals. Reclaimed Water Program staff has participated in this advisory committee since its inception in 2007.

A 2007 legislative amendment, Engrossed Second Substitute Senate Bill (E2SSB) 6117, reaffirmed the State’s commitment to reclaimed water and recognized the importance of the benefits of reclaimed water use, including:

- Consistent, reliable water supply as Washington faces climate change challenges.
- Reduced discharge of treated wastewater into Puget Sound.
- More water in rivers and streams for salmon recovery.

The Municipal Water Law (70.119A.180 RCW), a 2003 amendment to Washington water law, clarifies the nature of water rights issued for municipal supply purposes and provides flexibility for municipal water suppliers in exercising their water rights. Ecology and DOH share responsibilities under the law, bringing to it elements of water resources and watershed management, as well as public health and safety. Collaboration between these agencies resulted in a requirement for utilities to evaluate potential uses of reclaimed water in their water system plans (see Chapter 5, Table 5.1).

State Regulations

In 1997, DOH and Ecology developed the Water Reclamation and Reuse Standards to specify general requirements for the use of reclaimed water, which is categorized into four Classes: A, B, C and D. Class A is the highest quality and is considered safe for public contact and virtually all uses except human consumption. The Standards include requirements for treatment and plant design, engineering and operations.

In 2008, Ecology's Water Quality Program developed the Criteria for Sewage Works Design (also known as the Orange Book) which contains a Water Reclamation and Reuse chapter covering the use of sewage treatment plant effluent (reclaimed water) for beneficial purposes. The Orange Book is intended to supplement the Standards.

A new State Reclaimed Water Rule, in the making as Chapter 173-219 Washington Administrative Code (WAC), will replace the 1997 Standards. The purpose of the new rule is to establish an efficient, effective, and consistent statewide implementation framework for reclaimed water,
including standards and permit requirements. The rule-making process initiated in 2006 was suspended by the Governor under two consecutive Executive Orders from 2010 through 2012. Ecology reactivated the rule-making process in June 2014 and expects the rule will be adopted and implemented by late 2016. The new state rule is currently proposing to regulate only two categories of reclaimed water: Class A and Class B. The current Classes B and D will be eliminated because they have not been in demand by reclaimed water users; the current Class C will become the new Class B.

**Thurston County Critical Areas Ordinance**

In 2012, Thurston County Commissioners revised Thurston County Code Title 24 Critical Areas Ordinance (CAO). The revision changed Chapter 24.10 Critical Aquifer Recharge Areas (CARA), which includes Section 24.10.190 Reclaimed Water. This regulation allows irrigation with Class A reclaimed water at agronomic rates, but prohibits infiltration of reclaimed water by application to the land’s surface above agronomic rates. Table 24.10-1 of the CARA (in Section 24.10.020 Standards and Restricted and Prohibited Uses) indicates infiltration of reclaimed water is prohibited in all County aquifer recharge area categories. This prohibition will stand until more information is available to the County from LOTT’s Regional Reclaimed Water Infiltration Study and other studies and information about reclaimed water. LOTT’s study is scheduled to be completed in 2017, after which the County is expected to revisit the Critical Areas Ordinance to reevaluate the prohibition on infiltrating reclaimed water.

**Olympia Reclaimed Water Ordinance**

As a requirement of LOTT’s Reclaimed Water Permit, Olympia was required to adopt a reclaimed water ordinance. The ordinance was adopted in 2005 as Chapter 13.24 Reclaimed Water of the Olympia Municipal Code. It includes policies and procedures for the distribution and use of reclaimed water. The initial ordinance established a rate for reclaimed water at 70 percent of the equivalent potable rate to encourage its use, and placed the Reclaimed Water Program within the Drinking Water Utility. (Reclaimed water could not not be a stand-alone utility since rates would not be sufficient to cover the costs of the needed infrastructure.)

In 2007, the City Council directed staff to revise the ordinance requiring use of reclaimed water in some locations in order to increase conservation of potable water. Council’s directive was to require customers fronting reclaimed water mains (and meeting other criteria) to connect to the City’s reclaimed water system; customers were to bear the connection costs with some rebate assistance from the City. Council direction was also to require developers of projects (meeting certain criteria on use and proximity to existing pipeline) to install reclaimed water mains.

In 2011, Utility staff initiated the process of adopting into ordinance the direction of the 2007 Council. However, upon considering the cost of the rebate program and an excessive-cost exemption from the connection requirement, the cost of infrastructure and anticipated revenue, Utility management decided to pursue a less assertive strategy for advancing reclaimed water use.
Instead of revising the ordinance to require the use of reclaimed water, staff focused on updating the ordinance to address regulatory gaps and achieve consistency with other updated utility ordinances. Also added were fees, rates, and charges not included in the original reclaimed water ordinance; these changes in revenue base aligned the reclaimed water financial structure with that of the drinking water, storm and surface water, and wastewater utilities. The amended ordinance was adopted by Council in late 2013 and became effective January 1, 2014.

The City’s Engineering Design and Development Standards (EDDS), an ordinance typically updated and adopted annually, contains Chapter 10 for reclaimed water systems. The EDDS specifies standards for infrastructure and accessories (for example, valves and meters), service interruptions, testing and inspections, submittals, and other technical specifications. It parallels the Drinking Water Utility’s EDDS Chapter 6, given the similarities in the two water systems.

**Reclaimed Water End User Agreements**

Reclaimed Water End User Agreements are required between the City and each reclaimed water customer prior to actual use of reclaimed water. A model End User Agreement was developed by the LOTT partner jurisdictions when establishing the various initial General Interlocal, Distribution, and Supply Agreements (described in Section 6.2). The model was approved by DOH and Ecology as part of the Agreement review process. The End User Agreement is tailored to each customer regarding the type, location and period of intended reclaimed water use, and quantity and price. The End User Agreement also specifies restrictions and other conditions for compliance.

As of 2014, Olympia has End User Agreements with four customers: the Washington State Department of Enterprise Services (DES, formerly General Administration or GA), the Port of Olympia, Weyerhaeuser Company, and the Hands On Children’s Museum. The Olympia Parks, Arts and Recreation Department also uses reclaimed water, but an End User Agreement is not required because distribution by the City to City departments is regulated directly under LOTT’s permit.

### 6.2 Regional Implementation and Infrastructure

Olympia’s Reclaimed Water Program has been developed as part of a regional system through its partnership with LOTT. As a reclaimed water purveyor, Olympia is an active participant in LOTT-related activities. LOTT regional and Olympia local reclaimed water distribution lines as of 2014 are shown in Map 6.1

**LOTT Clean Water Alliance**

LOTT is a nonprofit corporation formed by the cities of Lacey, Olympia and Tumwater, and Thurston County to provide wastewater treatment and reclaimed water production services for the urban area.

**LOTT Treatment Facilities**

LOTT operates a large central treatment facility, the Budd Inlet Treatment Plant, in downtown Olympia. Wastewater is piped to the plant from Lacey, Olympia and Tumwater residential and
commercial customers. Each day about 11.5 to 15 million gallons of wastewater receives advanced secondary treatment, the highest level of treatment on Puget Sound. Most of the final treated effluent is discharged into Budd Inlet; however, some is diverted to the Budd Inlet Reclaimed Water Plant for further treatment to Class A reclaimed water standards.

**Satellite Reclaimed Water Facilities**

As part of its 1998 Wastewater Resource Management Plan, LOTT identified construction of satellite reclaimed water facilities throughout its service area as a cost-efficient way to manage the need for future treatment capacity as the area continues to grow. Generation of Class A reclaimed water is one of LOTT’s key strategies to meet regulatory restrictions on the volume and quality of treated wastewater that can be discharged into Budd Inlet.

In addition to the Budd Inlet Reclaimed Water Plant, LOTT has constructed the Martin Way Reclaimed Water Plant in the City of Lacey. In the long term, LOTT plans to construct other reclaimed water plants and infiltration basins in Thurston County.

**Permits**

Ecology and DOH issued permits to LOTT for each of its reclaimed water facilities. Because it discharges to surface water, the Budd Inlet facility was issued a combined National Pollutant Discharge Elimination System/Waste Discharge and Reclaimed Water Permit, specifying regulation of monitoring, reporting and recordkeeping, as well as distribution and use of reclaimed water. The Martin Way facility, which discharges to groundwater only, was issued a Reclaimed Water Permit, covering monitoring, reporting, recordkeeping, reclaimed water distribution and use, and plant operation and maintenance.

**Olympia’s Reclaimed Water Allocation**

LOTT does not sell reclaimed water as a commodity, but provides it to the partner utilities for distribution and beneficial use. LOTT allocates Olympia a portion of the reclaimed water from the Budd Inlet Reclaimed Water Plant to distribute within city limits for direct beneficial use. Olympia is also allotted a portion of reclaimed water generated at the Martin Way Reclaimed Water Plant. (See Distribution Agreement for the allotted quantities.)

As a distributor of LOTT’s reclaimed water, Olympia is required to uphold the permit requirements and ensure that the City and its customers abide by these requirements.

Olympia uses reclaimed water from the Budd Inlet plant for irrigation, toilet flushing, heating/cooling, industrial processes, commercial processes (such as dust suppression and washdown water), and educational and interactive water features. Olympia’s reclaimed water from the Martin Way plant is being infiltrated at the Woodland Creek Groundwater Recharge Facility in Lacey’s Woodland Creek Community Park to enhance groundwater recharge and stream flow as part of the cities’ water rights mitigation portfolios and as a key element in the broader approach to managing the sustainability of regional water resources.
Reclaimed Water Task Force and Partner Agreements

In 2001, LOTT convened a Reclaimed Water Policy Task Force, composed of staff from LOTT, the three cities and the County. The Task Force resolved numerous policy issues related to the initial distribution and use of reclaimed water, through a series of general interlocal, distribution, supply, and end user agreements. These agreements offer regional resource management structure while preserving each jurisdiction’s operating autonomy.

General Interlocal Agreement. Specifies policies, distribution methodology, negotiation protocols, and roles and responsibilities. It is required by the state reclaimed water permit and was approved by Ecology and DOH.

Supply Agreement. Defines how much water LOTT will make available to Olympia from specific plants, and includes the general operating and technical Distribution Agreement and the model End User Agreement.

Distribution Agreement. Exhibit A of the Supply Agreement, the Distribution Agreement details the volume of reclaimed water available to the City from the Budd Inlet and Martin Way plants. The City was allotted 460,000 gallons per day from the Budd Inlet plant beginning in 2005, when it came on-line. The City was also allotted 300,000 gallons per day from the Martin Way plant beginning in 2007, when it started producing reclaimed water. The Distribution Agreement also includes a future facility in the Chambers Prairie (Mullen Road) area, with an allotment of 300,000 gallons per day for the City when it is built (post-2030); however, it is not certain at this point whether the next facility will be constructed in this area. Thus, under the current Distribution Agreement, the City has been allotted a total of 1,060,000 gallons per day. As LOTT increases reclaimed water production or finalizes new facility locations and production, the LOTT partners will revisit the Distribution Agreement.

A model End User Agreement was also developed by LOTT and the partners; it was approved by Ecology and DOH as Exhibit B of the Supply Agreement.

In 2005, as required by LOTT’s permit, Olympia and Lacey adopted uniform reclaimed water ordinances to ensure permit requirements were met (Section 6.1). In 2014, Olympia adopted amendments to the City’s municipal code, OMC 13.24 Reclaimed Water, to fill regulatory gaps, achieve consistency with other updated City utility ordinances, and to add fees, rates, and charges in alignment with other City utilities.
Recent and Future Regional Expansion

LOTT’s 2009-2025 Capital Improvements Plan resulted in the construction of a pipeline to carry reclaimed water to groundwater recharge sites, beginning with one planned for the Tumwater area. As shown in Map 6.1, the first leg of this pipeline (installation completed in 2010) extends from Marathon Park, south on Deschutes Parkway to the Tumwater Valley Municipal Golf Course, and includes an extension of reclaimed water pipe up Lakeridge Drive leading to Olympia’s west side.

LOTT’s 2014 Budget and Capital Improvements Plan highlights three strategies for future management of wastewater directly associated with use of reclaimed water:

- A multi-year Reclaimed Water Infiltration Study to inform decisions about the use of reclaimed water for groundwater recharge. The study includes a scientific portion to gather local data about potential environmental, ecological and human health risks, and a public engagement portion to encourage community conversations about what can be done to reduce those risks. The study is expected to be completed in 2017.

- Development of new reclaimed water treatment facilities on 45 acres of LOTT-owned land on the former brewery property in the Tumwater valley. Three kinds of facilities could be built at this location: a satellite plant similar to the Martin Way Reclaimed Water Plant; a plant to provide further treatment of treated wastewater piped from the Budd Inlet Treatment Plant; or a plant using advanced treatment such as reverse osmosis. This site also offers opportunity for riparian corridor restoration along the Deschutes River and improved public access to the riverfront. A master plan with the City of Tumwater is needed to help guide future development of the property.

- Construction of a reclaimed water storage tank, also in the Tumwater valley area, to provide equalizing storage to meet peak use demands that currently exceed the Budd Inlet Reclaimed Water Plant, as well as standby storage and operational storage for future planned recharge basins. This storage tank could benefit Olympia by increasing pressure for reclaimed water service to higher elevation areas in the City.

6.3 Reclaimed Water Activities

Olympia uses reclaimed water in two ways: for direct beneficial use by agencies and businesses and for groundwater recharge.

Direct Beneficial Use

As shown in Map 6.1, LOTT has constructed a reclaimed water distribution main that runs south from the Budd Inlet plant to Heritage Park, under the pedestrian bridge across Capitol Lake and through Marathon Park to LOTT’s Capitol Lake Pump Station. The south line provides reclaimed water to DES for irrigation of state park grounds. (This line continues south along Deschutes Parkway to the Tumwater Valley Golf Course area.)
In a cost-share arrangement with the City, the Port of Olympia installed a reclaimed water distribution line that runs north from the Budd Inlet plant to the end of the Port peninsula. The north line provides reclaimed water to the Port, Hands On Children’s Museum and Anthony’s Hearthfire Grill Restaurant, and is available for use by Weyerhaeuser and other Port tenants. Olympia has approximately 4.85 miles of reclaimed water pipeline within city limits.

Current Customers and Uses

LOTT’s Budd Inlet Reclaimed Water Plant began generating Class A reclaimed water in 2005. The following year, Olympia began distributing reclaimed water in the downtown area. By 2014, Olympia had Reclaimed Water End User Agreements with four reclaimed water customers in downtown Olympia (shown in Map 6.1):

- Washington State Department of Enterprise Services (DES, formerly General Administration) – For irrigation at Heritage and Marathon Parks.
- Port of Olympia – For irrigation along Marine Drive and at the Anthony’s Hearthfire Grill Restaurant at the north end of the Port peninsula, and for equipment cleaning and wash-down in the Swantown Marina area. The Port also has a filling station with three meters to supply reclaimed water to Port and Port tenant tank trucks for dust suppression at the log yard. Use of the filling station was suspended in 2012 until the Port improved the stormwater treatment system in the log handling area.
- Weyerhaeuser Company – To use reclaimed water from the Port’s filling station for dust suppression in the log yard area.
- Hands On Children’s Museum – For irrigation and toilet flushing in the City-owned building to the east of the LOTT Administration Building.

In addition, Olympia Parks, Arts and Recreation Department uses reclaimed water at Percival Landing and Percival Landing Park, for irrigation. (No End User Agreement is needed for City departments.)

Quantity of Reclaimed Water Used in Olympia

As specified in the Distribution Agreement (Section 6.2), Olympia has been allotted 460,000 gallons per day (equivalent to about 167.9 million gallons per year) from the Budd Inlet plant.

Table 6.1 shows the annual reclaimed water use for Olympia’s reclaimed water customers during the first nine years of program implementation. On average, the City used about 5.5 percent of its allotted reclaimed water from the Budd Inlet plant each year during this period. The average annual use of reclaimed water between 2006 and 2014 was about 9.24 million gallons per year. The year of highest usage, 2012, (11.12 million gallons) represents just over one-half percent (0.55%) of the City’s potable water usage for that year (2,010 million gallons; Table 5.6).
### Table 6.1  Annual Reclaimed Water Use, 2006-2014 (million gallons)

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### Groundwater Recharge - McAllister Wellfield Mitigation

The City began using reclaimed water from LOTT’s Martin Way Reclaimed Water Plant in 2014 as part of its mitigation plan for the McAllister Wellfield (Chapter 4, Section 4.3).

### Mitigation Plans

The McAllister Wellfield mitigation planning process concluded that predicted impacts in the Deschutes River basin from wellfield pumping could be effectively mitigated by infiltrating reclaimed water to enhance in-stream flows in the Woodland Creek sub-basin as part of the City’s portfolio of in-kind mitigation actions. In 2008, the Cities of Lacey and Olympia submitted to Ecology separate but coordinated mitigation plans proposing to jointly mitigate predicted impacts to Hicks Lake, Pattison Lake and Long Lake (the “Tri-Lakes”) in the Woodland Creek sub-basin resulting from the new and additional water sources (Olympia’s McAllister Wellfield and Lacey’s groundwater wells).

The City of Olympia and the Nisqually Indian Tribe jointly developed the McAllister Wellfield Mitigation Plan and submitted a final version to Ecology in December 2010. The mitigation plan acknowledges the potential for reclaimed water to benefit the lower reach of the Deschutes River as was determined during the mitigation planning process.

### Infiltration Facility

In October 2008, Lacey and Olympia signed an Interlocal Agreement to mitigate the predicted impacts to the Tri-Lakes by infiltrating Class A reclaimed water downstream from the outlet of Long Lake and upstream of where Woodland Creek passes beneath Martin Way. The cities have applied their respective shares of reclaimed water from the Martin Way Reclaimed Water Plant to share the cost and ownership of a mitigation facility at Lacey’s Woodland Creek Community Park.

As specified in the Interlocal Agreement, based on the predicted impact by McAllister Wellfield pumping, Olympia’s share is 21.7 percent of the cost to construct, operate and maintain the
Woodland Creek Community Park Groundwater Recharge Facility. This effort is an important component of Olympia’s McAllister Wellfield water rights mitigation portfolio.

During the water rights mitigation planning period (2000-2013), a hydrogeological (infiltration) feasibility study was conducted (2009-2010), followed by facility design (2011-2012) and construction (2013). A pilot test, infiltrating potable water at the new facility, was conducted in early 2014. Lacey began operating the facility in mid-2014. The cities have collaborative reporting requirements to Ecology, due annually in January. The feasibility study indicates between 0.3 and 0.8 million gallons per day of reclaimed water will need to be infiltrated to mitigate for the predicted impacts from the cities’ new and transferred water rights. The facility may be able to infiltrate up to 1.3 million gallons per day depending on seasonal groundwater levels at the site. Olympia has been allotted up to 0.3 million gallons per day from the Martin Way plant, while Lacey’s allotment is up to 1.46 million gpd.

Potential Future Customers and Uses

The City’s 2005 Business Plan and 2010 Reclaimed Water System Expansion Plan (Section 6.4) identify potential future users of reclaimed water at approximate volumes and peak demands. The Business Plan focused on potential users located close to existing reclaimed water mains, while the Expansion Plan proposed extending reclaimed water infrastructure to new areas east and south and within the downtown Olympia core; it also included existing irrigation meters. The largest potential future user identified in both plans is the State Capitol Campus, which used an average of about 8.4 million gallons of potable water annually (in 2012, 2013 and 2014) for irrigation and other outdoor uses. Directed through Section 11 of E2SSB 6117, DES (then the Department of General Administration) worked with the City to provide a report to the Legislature in December 2007 regarding the potential use of reclaimed water on the Capitol Campus. The report identified needed infrastructure, implementation costs and potential funding sources for irrigation and related outdoor applications using reclaimed water. The recommended approach would cost approximately $2.32 million in 2007 dollars, with the City contributing approximately $750,000 in 2009 dollars. The City and DES periodically revisit their mutual interest in extending reclaimed water to the Capitol Campus; however, given the cost of infrastructure, the project has not yet been pursued. Completion of LOTT’s reclaimed water storage tank in the Tumwater valley area could enhance the potential for reclaimed water use on the Capitol Campus by helping to address pressure needs at the higher elevation of the campus.

A relatively new potential benefit of reclaimed water use involves the extraction of thermal energy from the water as it is used for heating and cooling. The feasibility of this use could be explored further to determine whether it boosts the economic viability of reclaimed water use, particularly in cases where this energy could be extracted prior to other downstream uses such as irrigation or toilet flushing. During 2015-2020, the Reclaimed Water Program plans to evaluate amending the Reclaimed Water Ordinance (OMC 13.24) to require developers to individually assess different types of reclaimed water uses for economic feasibility. The use of reclaimed water for thermal energy extraction could be included in such an analysis (see Performance Measures, Section 6.6).
6.4 Reclaimed Water Program Development (2005-2014)

In launching the Reclaimed Water Program in 2005, the Utility envisioned reclaimed water would significantly reduce potable water use. By 2008, much had been accomplished to establish reclaimed water as a new water resource: generation by LOTT, installation of infrastructure by LOTT and the City, development of local regulations and partnership agreements, first customers, billing processes, new signs and educational materials, and initial program staffing and implementation.

The 2009 Water System Plan described the status of the Reclaimed Water Program through about 2008, and projected the strategy of advancing the direct beneficial use of reclaimed water in a fairly assertive manner through that planning period. The initial Business Plan for Reclaimed Water Distribution in 2005 captured the Program’s early developmental efforts, and the 2011 Reclaimed Water System Expansion Plan laid out an ambitious plan to extend reclaimed water infrastructure throughout the City’s core east side.

Also in 2011, the Reclaimed Water Procedures Manual was approved, spelling out specific program implementation procedures and summarizing the history and legal basis of the Program.

In 2014, the City revisited the financial structure of the Reclaimed Water Program, with an analysis that showed that direct beneficial use of reclaimed water was not cost effective enough to fully implement as initially envisioned.

These major developmental documents are summarized in this section, as a prelude to the shift in program focus planned for 2015-2020.


The Drinking Water Utility contracted with HDR, Inc. to develop the initial Business Plan for Reclaimed Water Distribution. Completed in June 2005, the plan presents a long-range vision for the City’s Reclaimed Water Program and discusses policy issues that would affect development and financing in the program’s early years. The plan estimated $40 million (in 2005 dollars) would be needed to construct the infrastructure necessary to deliver 2.8 million gallons a day of reclaimed water from LOTT reclaimed water plants to the potential customers that had been identified. (This 2.8 million gallons a day is about six times the current allotment from the Budd Inlet plant.)

Procedures Manual (2011)

In April 2011, a Reclaimed Water Procedures Manual, written by staff for internal use, was approved by the then-Acting Director of the Public Works Department. The manual documents programmatic roles and responsibilities, and implementation and operating procedures. Included are sections on program history and partnerships; regulations, guidance and plans; record keeping and reporting; and funding, rates and billing, and enforcement. The manual highlights incident response procedures for cases of reclaimed water spillage or cross-connection control violations. The Procedures Manual will be reviewed and updated during the 2015-2020 planning period.
System Expansion Plan (2011)

In November 2011, the Drinking Water Utility contracted with the engineering firm Skillings Connolly, Inc. to develop a Reclaimed Water System Expansion Plan. The Expansion Plan, completed as a Technical Memorandum, is intended to provide guidance to the City ahead of any development-driven expansion of the reclaimed water system.

The Expansion Plan builds on previous evaluations and predictions of reclaimed water use in the City by identifying geographic service areas and pipeline alternatives to serve current and future potential users. Potential new users previously identified in the 2005 Business Plan, and new customers added since then, were included in the analysis, as well as over 100 existing potable-water irrigation meters (that could be retrofitted to deliver reclaimed water). Potential user demand was quantified and peak instantaneous demand was calculated to determine any storage needs. Locations of users were considered to create a basic pressure zone map that has been helpful in evaluating delivery of reclaimed water to the higher-elevation Capitol Campus and areas further south from the Budd Inlet plant. Therefore, planning-level cost estimates provided in the plan include both a storage tank and pump station.

Build-out of the new service areas was proposed in eight phases. The total cost of build-out was more than $11.1 million, not including any railroad crossings/permitting, property acquisition for storage tank(s) and booster pump station(s), and possible re-chlorination facilities. LOTT’s planned storage tank in the Tumwater valley area could alleviate the need for storage and pumping.

Financial Considerations (2014)

In recent years, the community – notably represented by the LOTT Reclaimed Water Infiltration Study Community Advisory Group and the City’s Utility Advisory Committee – has posed questions regarding the cost effectiveness of using reclaimed water for various purposes.

In 2014, Reclaimed Water Program staff worked with HDR Engineering, Inc. to explore basic financial considerations relating to the costs of using reclaimed water for direct beneficial use (instead of potable water for non-potable uses) and for groundwater recharge and enhancing in-stream flows.

The City and HDR distilled the community’s broader cost-related questions into two specific questions:

1. Is reclaimed water use for non-potable purposes an economical means of reducing potable water use?
2. How does the cost of using reclaimed water for non-potable purposes compare to the cost of using it for groundwater recharge?

To answer these questions, HDR conducted a general cost-benefit analysis. To estimate costs, the firm reviewed existing information, plans and analyses. These included the Reclaimed Water System Expansion Plan, the Woodland Creek Groundwater Recharge Facility Engineering Report, a City demand forecast analysis, the capital improvement program and irrigation water rates. HDR’s

**Present Value Analysis**

HDR conducted a 20-year present value analysis to capture “life cycle” capital and operational/maintenance costs, and benefits. Present value cost totals were divided by the volumes of water considered to arrive at present value unit costs ($/gallon) to enable a relative cost-effectiveness comparison of the various options considered. An important assumption made for this analysis acknowledges that LOTT has developed reclaimed water as a new water resource and plans to continue expansion of its reclaimed water program, regardless of the extent to which the City uses reclaimed water for its particular purposes. Therefore, reclaimed water production costs by LOTT are not included.

**Reducing Potable Water Use**

“*Is reclaimed water use for non-potable purposes an economical means of reducing potable water use?*”

HDR addressed this first question by calculating the cost of delivering reclaimed water through a separate “purple pipe” distribution network dedicated for direct beneficial use purposes. This cost was compared with the cost of delivering potable water from the City’s potable water system, which is supplied by groundwater wells, for the same volume of non-potable use.

An estimate of the total volume of reclaimed water usage for irrigation in downtown Olympia and the Capitol Campus/Stevens Field area (obtained from the *Reclaimed Water System Expansion Plan*) correlated to a total annual volume of reclaimed water usage of approximately 49,820,000 gallons. Delivery costs indicated in the plan amounted to about $12,000,000 (in 2014 dollars). Operation and maintenance costs, primarily for energy and labor, were estimated at $50,000 per year. Because the City’s reclaimed water rate is 70 percent of the potable water rate, revenue is lost when potable irrigation demand is replaced with reclaimed water. This lost revenue was estimated to be about $125,000 per year.

A benefit of using reclaimed water can be realized by deferring capital investments in future water supply projects, such as the planned Briggs well (Chapter 4, Section 4.2) used in this analysis. A potential deferment, calculated to be four years, resulted in an estimated cost savings of $270,000, which offsets a portion of the costs of using reclaimed water.

To fully answer this first question, the analysis also estimated the cost of delivering potable water, for the same use as estimated for reclaimed water, using the City’s 2014 summer irrigation water rate ($6.19 per hundred cubic feet) and the same volume of reclaimed water delivered. Thus, the total potable water costs could be compared with the total reclaimed water delivery costs.

The result of this analysis gives a unit cost of approximately $0.0141 per gallon of reclaimed water used for non-potable purposes. By comparison, the unit cost of delivering potable water supplied by City wells for such uses is approximately one-third of the reclaimed water cost, or $0.0055 per gallon of potable water used. The City recognizes that specific, targeted uses of reclaimed water
for non-potable purposes may make economic sense in some applications. However, it does not appear cost effective at this time for the City to focus on expanding this element of its reclaimed water program extensively. Other factors may be considered that could make direct beneficial uses of reclaimed water more economically feasible, but such factors were not explored in this general level analysis.

**Comparing Uses: Non-Potable Water vs Groundwater Recharge**

“How does the cost of using reclaimed water for non-potable purposes compare to the cost of using it for groundwater recharge?”

HDR addressed this second question by comparing the cost of delivering reclaimed water for non-potable purposes (as estimated above) with the cost of constructing and operating groundwater recharge facilities. Information on the Cities of Lacey and Olympia Woodland Creek Groundwater Recharge Facility (Section 6.3) was used for this analysis. This facility, constructed in 2013 and placed online in July 2014, has a total project cost of $4.3 million and annual operation and maintenance costs of about $36,000. The hydrogeological analysis for infiltration feasibility estimates this site can accept about 179,200,000 gallons of reclaimed water per year.

With cost and rate escalation factors, and a discount factor assumed over a 20-year “life-cycle” time frame, the unit cost is approximately $0.0014 per gallon for reclaimed water used for groundwater recharge. Therefore, it appears more cost-effective, in terms of a general strategy, to use reclaimed water for groundwater recharge as opposed to using it for non-potable purposes. This result was not unexpected, as groundwater recharge facilities require infrastructure that is typically less extensive than a “purple pipe” distribution system network, and can make beneficial use of reclaimed water on a larger scale and over the course of the entire year, as compared to the limited seasonality of use in most non-potable applications, like irrigation.

**Summary of Results**

The results of this general cost-benefit analysis indicate the unit cost per gallon of using reclaimed water for direct beneficial use ($0.0141) is about 2.5 times the cost of using potable water ($0.0055) and 10 times the cost of reclaimed water use in groundwater recharge facilities ($0.0014).

Based on this analysis, the 2015-2020 Plan shifts the City’s focus to using reclaimed water for groundwater recharge. However, the City remains fully committed to extending reclaimed water for direct beneficial use where it best suits a specific application or area or meets a particular customer’s preference.

**6.5 2015-2020 Priorities and Direction**

The 2007 Council policies (Section 6.1) and 2009 Water System Plan emphasized using reclaimed water by direct beneficial use – such as irrigation and toilet flushing, and heating and cooling, dust suppression, wash-down, and other commercial and industrial uses. Infiltrating reclaimed water for groundwater recharge or stream-flow enhancement was not considered in the previous plan.
The City’s shift away from emphasizing direct beneficial use to focusing on infiltration of reclaimed water to enhance groundwater recharge and stream flow has roots in a desire to exercise regional partnerships and goals, and achieve financial economies of scale.

Therefore, the 2015-2020 Water System Plan emphasizes using reclaimed water in support of regional wastewater management priorities:

- **Reduce the use of drinking water for non-potable uses.** This priority aligns with the City’s water conservation goals (Chapter 5). For example, reclaimed water used for outdoor irrigation reduces the use of potable water for this purpose. The City has been manifesting this priority through its existing customers who use reclaimed water for irrigation and a variety of other applications.

- **Reduce wastewater going to LOTT.** This priority supports regional wastewater management efforts by helping to avoid increasing capacity at existing treatment facilities or building new treatment facilities. Any use of reclaimed water that reduces wastewater to LOTT supports this priority, including using reclaimed water to replace potable water.

- **Reduce treated wastewater discharge into Budd Inlet.** This priority provides environmental benefits to Puget Sound by complying with LOTT’s wastewater discharge limits, and contributing to a reduction in wastewater discharge to Puget Sound. Recently, Olympia has been supporting this priority by using reclaimed water for groundwater recharge to mitigate the impacts of the McAllister Wellfield (Section 6.3). With other LOTT partners, Olympia is exploring the further use of reclaimed water for groundwater recharge in LOTT’s Reclaimed Water Infiltration Study (Section 6.2).

### 6.6 2015-2020 Reclaimed Water Program

The purpose of the Reclaimed Water Program is to support and advance the use of reclaimed water as defined in Council-adopted policies. These policies are primarily captured in Olympia’s municipal codes for reclaimed water (OMC 13.24) and the EDDS (Chapter 10) (Section 6.1).

In 2015-2020, the Reclaimed Water Program will maintain existing procedures and support for direct beneficial use reclaimed water customers. However, the emphasis will be on taking advantage of economies of scale by seeking opportunities to increase the local use and regional applications of reclaimed water for groundwater recharge and stream-flow enhancement.

The Reclaimed Water Program objectives and strategies help meet the Drinking Water Utility’s Goal 3:

> Olympia’s water supplies are used efficiently to meet the present and future needs of the community and natural environment.

The objectives and strategies listed below are derived from the priorities in Section 6.5, which are supported by the financial considerations described in Section 6.4. Performance measures will be used to evaluate program effectiveness.
Given the two programs’ shared Goal 3, the objectives of the Reclaimed Water Program follow those of the Water Conservation Program (Chapter 5; Objectives 3A, 3B, and 3C).

**Objective 3D**  
*Meet the needs of current and future City reclaimed water customers.*

This objective aims to help reduce the use of drinking water for non-potable uses, and ensure customer satisfaction with the City’s reclaimed water service.

**Strategy 3D1** -- Continue to respond to inquiries about reclaimed water use, regulations, availability, capacity, opportunities and requests for assistance with existing infrastructure.

**Strategy 3D2** -- Continue to support development-driven advancement of reclaimed water for direct beneficial use, using the *Reclaimed Water System Expansion Plan* to guide placement of infrastructure.

**Strategy 3D3** -- Continue to implement and enforce the City’s reclaimed water ordinance, engineering design and development standards, and End User Agreements to ensure compliance.

**Performance Measures**

1. Respond to a request for assistance and/or information within one week of receiving the inquiry, either directly to an individual or entity, through the City’s Community Planning and Development Department process, or other appropriate means, including assistance from the Public Works Department.

2. Respond to a complaint or report of reclaimed water misuse (such as over-application of irrigation) before the end of the next business day. Ensure reclaimed water is available for seasonal irrigation by March 15 of each year. Inform customers of the target shut-down date (typically mid-October) within one week of being informed by LOTT of the shut-down schedule.

3. Continue to monitor for detectable chlorine residual on a monthly basis during the irrigation season at the reclaimed water sampling station near the Anthony’s Hearthfire Grill Restaurant at the north end of the Port peninsula. Monitoring for detectable residual (rather than a specified concentration) is allowed by DOH and Ecology as captured in April 2008 correspondence to LOTT from each of these regulating state agencies.

4. Complete initial and routine cross-connection control inspections within two weeks of request. Complete an emergency-precipitated cross-connection control inspection before the end of the next business day.

5. Evaluate Reclaimed Water End User Agreements and update as needed within six months of when a change occurs in a customer’s use of reclaimed water.
6. Evaluate whether to develop Levels of Service for the Reclaimed Water Program, potentially modeled after those determined for the Water Quality and Operations and Maintenance Programs.

**Objective 3E** Direct reclaimed water towards meeting the regional wastewater management goal of reducing the amount of treated wastewater discharged into Puget Sound.

**Strategy 3E1** -- Seek opportunities to increase infiltration of reclaimed water to recharge groundwater and enhance in-stream flows.

**Strategy 3E2** -- Participate as a LOTT partner in state and local reclaimed water regulation development activities, including presence on technical and advisory groups.

**Strategy 3E3** -- Support efforts to expand infrastructure for partnered or regional uses.

**Performance Measures**

1. Provide staffing to actively engage with the LOTT Reclaimed Water Policy Task Force and the LOTT Reclaimed Water Infiltration Study Science Task Force meetings and implementation activities.

2. Provide staffing to participate as a LOTT partner in Ecology’s Reclaimed Water Rule Advisory Committee activities through completion of the state rule-making effort anticipated in 2016.

3. Meet all obligations and deadlines specified in the *Interlocal Agreement between the City of Lacey and the City of Olympia for Water Rights Mitigation* (October 10, 2008) regarding the Woodland Creek Community Park Groundwater Recharge Facility.

4. Provide staffing and resources through the 2015-2020 planning period to coordinate with reclaimed water partners on regional projects, including those involving areas outside City limits or the urban growth area.

**Objective 3F** Enhance Reclaimed Water Program efficiency and effectiveness.

**Strategy 3F1** -- Engage in a reclaimed water project or effort involving direct beneficial use when it:

- Benefits implementation of the City’s Reclaimed Water Program.
- Results in the use of significant volumes of reclaimed water.
- Involves a high-profile or model use or user.
- Aligns with implementing the *Reclaimed Water System Expansion Plan*.

**Strategy 3F2** -- Research and pursue grants and other funding sources that support the Reclaimed Water Program’s objectives and strategies.
**Performance Measures**

1. Evaluate by the end of 2016 whether to amend the Reclaimed Water Ordinance, OMC 13.24, to clarify that development applications involving reclaimed water use include analysis of potential use types individually rather than collectively (to see whether one type of use would be more feasible than others).
2. Review the *Reclaimed Water Procedures Manual* annually and update as needed.
3. Pursue connecting the north end of Olympia’s reclaimed water line to the Port’s gravity sewer system to provide reclaimed water year-round at the Port peninsula by 2018.
4. Stay apprised of legislative activity associated with opportunities to advance reclaimed water to the State Capitol Campus.
5. Monitor on a quarterly basis, websites and other information sources about reclaimed water funding opportunities, including the Ecology Reclaimed Water Grants Program, the WateReuse Association, the Water Environment Research Foundation, US Environmental Protection Agency federal programs, and others.

**6.7 Implementation and Staffing**

This Plan guides staff in implementing projects and activities that are intended to accomplish Reclaimed Water Program objectives. Although the program direction has shifted from an emphasis on direct beneficial use to groundwater recharge, no net increase in staffing or resource needs has resulted.

**Staffing**

The Program’s activities will be conducted at the current staffing level of ~0.5 FTE Senior Program Specialist. (Reclaimed Water Program staffing is shared with the Groundwater Protection Program to equal one FTE. (Staff responsibilities in support of reclaimed water customers include:

- Implementing the Reclaimed Water Ordinance and EDDS, and developing program tools (such as procedures manuals).
- Maintaining End User Agreements.
- Coordinating the City’s Community Planning and Development Department on development-related inquiries about reclaimed water availability and requirements.
- Preparing analyses and reports on consumption to LOTT for annual state reporting and monthly use (at the Hands On Children’s Museum and East Bay Public Plaza).
- Providing signage and other educational materials.

Staff works with regional partners in support of state and local efforts to regulate and advance the development of reclaimed water primarily by actively participating as a LOTT partner, with the LOTT inter-jurisdictional team as well as with individual jurisdictions.
No increases in Reclaimed Water Program financial or staffing needs have been identified for the 2015-2020 planning period, despite the shift in program strategy and priorities (Section 6.6). Therefore, program activities will be accomplished with current staffing.

**Reclaimed Water Revenue**

Revenue from reclaimed water sales supports about two-thirds of the program staffing and operating budget, with the remaining third subsidized by drinking water rate payers. Prior to 2014, reclaimed water customers were charged 70 percent of the drinking water rates for seasonal irrigation. With the 2014 amendments to the Reclaimed Water Ordinance, reclaimed water is sold at the discounted rate of 70 percent of drinking water rates for both seasonal irrigation and indoor use (that is, “consumption”). No discount is provided for the ready-to-serve meter fee. Also, engineering, building code and land use fees, as well as fines for violations, are charged the same as for other utilities. No general facility charge (GFC) is incurred for reclaimed water.

LOTT ultimately subsidizes reclaimed water as a new water resource by generating reclaimed water and installing reclaimed water infrastructure. LOTT has a written agreement with the City Public Works Department for Drinking Water Utility staff to maintain reclaimed water infrastructure and respond to emergencies solely or in coordination with LOTT staff or contractors.

**Reclaimed Water Projects**

Although capital funds have been appropriated for the Reclaimed Water Program during this planning period (and beyond), the 2015-2020 Capital Improvement Program (Chapter 13, Table 13.2) identifies reclaimed water infrastructure projects as low priority. Therefore, expansion of the reclaimed water system will occur as opportunities arise and funding allows.

For the 2015-2020 planning period, the City’s Capital Improvement Program includes $50,000 in 2017 for:

- Additional water piping to provide looping and eliminate the northern dead end in the reclaimed water system serving the Port of Olympia.

Projects planned after 2020 include $350,000 for:

- Reclaimed water filling stations for construction-related purposes.
- Reclaimed water infrastructure system development as needed to support efforts meeting regional wastewater management goals.

This total of $400,000 represents a decrease from a total of $1,000,000 allotted for 2013 and 2014 in the 2009 Water System Plan Capital Improvement Plan.