Section 9 Capital Improvement Plan

This section develops CIPs for the 10- and 20-year planning horizons to address system needs and deficiencies identified in the previous sections of this GSP. The improvements have been prioritized to provide the necessary capacity and reliability requirements described in Sections 3 and 4. In addition to capital improvements, this section also presents O&M improvements and non-facility projects that the City will undertake to improve the performance and reliability of the WRF, reclaimed water system, and sewer collection systems.

As documented throughout this GSP, two different development scenarios have been evaluated: with and without the development of the Thurston Highlands MPC. The City has elected to plan improvements according to the "without MPC" scenario due to uncertainties as to when the Thurston Highlands MPC will begin to develop. Therefore, this section describes a schedule of improvements and individual projects in detail for the "without MPC" scenario. Improvements necessary to provide service to the MPC are described in Section 6.

As stated in Section 4, long-term improvements that will be necessary to increase WRF treatment capacity will be evaluated in a separate Facilities Plan. This Facilities Plan, identified on the CIP list for 2012 and 2013, will identify specific long-term projects and will recommend improvements to provide treatment capacity and continued production of Class A reclaimed water. Potential reclaimed water projects to be developed after the Facilities Plan is completed are summarized in Section 5.

9.1 Project Prioritization

The need for the capital projects that make up the CIP is described in Sections 3 and 4. The primary consideration in prioritizing projects was to ensure that sufficient capacity is available in the system such that projected growth rates are accommodated.

Collection system improvements were prioritized to address projected deficiencies before they became problematic. Because there are no existing deficiencies in the collection system, the first set of collection system improvements are not scheduled to be completed until 2017.

Non-facility and O&M projects were prioritized to address issues that were identified during the development of the CIPs. For example, as the existing WRF and collection system facilities were evaluated, it was determined that the Air Release Valves (ARVs) in the collection system needed to be replaced. An O&M program to replace the ARVs has been included in the CIP, beginning in 2012 and ending in 2017.

9.2 Project Descriptions

This section provides details about the individual projects that make up the 10- and 20-year CIPs. The schedules and cost estimates for the CIPs are summarized in Section 9.4. The financial plan to fund the identified projects is described in the financial analysis section in Section 10.

9.2.1 Collection System Improvements

Collection system improvements are described in Section 3.6. Three projects are planned for completion before 2020, with three more projects planned for the period between 2020 and 2030, as summarized below:

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- Prior to 2020:
 - Longmire Street replacement: Replace approximately 800 LF of 2- and 3-inch-diameter piping with 4-inch-diameter piping on Longmire Street.
 - Yelm Avenue replacement: Replace 120 LF of 3-inch-diameter pipe downstream of 4-inchdiameter pipe on Yelm Avenue, between 93rd Avenue and W Yelm Avenue. Also replace approximately 200 LF of 3-inch-diameter pipe downstream of a 2- and 4-inch-diameter pipe intersection in Yelm Avenue.
 - Mountain View Road replacement: Replace approximately 3,000 LF of 3-inch-diameter pipe with 6inch-diameter pipe on Mountain View Road SE and Yelm Avenue.
- Prior to 2030:
 - Main sewer line replacement: Replace approximately 3,800 LF of 8- and 6-inch-diameter pipe with 10-inch-diameter pipe through the main sewer line in Yelm Avenue, Cullens Street, NW Jefferson Street, NW Solberg Street, and Coates Road. Also replace approximately 525 LF of 4-inch-diameter pipe with 6-inch-diameter pipe on the line across Yelm Creek.
 - Rhoton Road replacement: Replace approximately 1,500 LF of 8-inch-diameter pipe with 10-inchdiameter pipe on the mainline into the WRF.
 - Mill Road replacement: Replace approximately 130 LF of 4-inch-diameter pipe with 6-inchdiameter pipe on Mill Road.

Costs for these improvements total approximately \$490,000 prior to 2020 and approximately \$862,000 between 2020 and 2030.

9.2.2 Facility Plan

Engineering reports and facility plans are defined in WAC 173-240-020(6) as "a document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility." Engineering reports and facility plans must be sufficiently complete so that plans and specifications can be developed from it without substantial changes.

A facility plan is an engineering report that includes additional elements required by the National Environmental Policy Act, other federal statutes, and planning requirements for the State Revolving Fund loan program. To be eligible for funding assistance through Ecology's water quality program for specific project planning, design, or construction, the engineering report for the project must meet the additional requirements for a facility plan.

In addition to the requirements listed in WAC 173-240 for facility plans, the City will complete a re-rating study to evaluate plant capacity with respect to influent solids loading. As summarized in Section 4.6.2, the WRF is projected to reach the apparent design criteria for TSS by the end of 2012. However, because plant performance relative to TSS has been well within effluent permit limits, it is likely that a re-rating study would determine that the WRF has additional capacity beyond the current design criteria. If the re-rating study confirms a higher capacity, the facility plan will evaluate need and timing for additional solids treatment capacity in the future. If the re-rating study reveals that there is no additional capacity, a project to increase the solids treatment capacity will be proposed in the facility plan.

9.2.3 Short-Term Improvements

As described in Section 4.9, improvements at the WRF will be required in the short term in order to improve the reliability of the WRF. These improvements, described in more detail in Section 4.9.2.6, include:

• A new carbon addition system: Construction of a new system to add supplemental carbon will assist with reducing the total nitrogen levels to the limits required by the City's NPDES permit. The City is

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investigating supplemental carbon sources concurrently with the development of the GSP. The project cost estimate assumes that the new system would use MicroCg, a proprietary product, and would be installed in the chemical feed building, and use the existing NaOH piping to route MicroCg to the SBR.

- **Refurbishment of the existing alkalinity system:** Refurbishment of the existing alkalinity system will assist with reducing ammonia levels and also with reclaimed water corrosivity concerns. The planning-level cost estimate includes refurbishment and conversion of existing system to MgOH and the implementation of a new remote telemetry unit (RTU) to replace the existing control cabinet, providing better integration of the system into the WRF SCADA system and control scheme.
- SBR control modifications and instrumentation upgrades: This includes replacement of DO probes in each SBR basin, a new influent ammonia instrument, new effluent ammonia and nitrate instruments at the common effluent of the SBRs, and programming necessary for changes. Other instrumentation that could be added to the I&C system, such as ORP meters, would be evaluated as part of the design of this improvement.

9.2.4 Expansion of RIBs at Cochrane Park

The RIBs at Cochrane Park were designed to receive a maximum flow of 50,000 gpd. However, preliminary analysis completed by Skillings Connolly in 2004 indicates that the RIB facilities have additional capacity beyond the current load of 50,000 gpd. This analysis indicates that the RIBs may have the potential capacity to handle up to 200,000 to 250,000 gpd. In order to increase the flow to the RIBs, the constructed treatment wetlands would need to be bypassed. Currently, the configuration is set up such that flow can bypass the fish pond, wetland cell 2, and wetland cell 3. This alternative would involve piping modifications to bypass all wetlands and the trout pond, as well as placing the underground RIB into service. Bypassing the wetlands would reduce the solids concentrations in the reclaimed water and reduce concerns of the underground RIB clogging. Prior to placing the underground RIB in service, the subsurface piping should be inspected for obstructions. The planning-level cost estimate assumes that the underground RIB would require minimal repair before it is placed back into service. Based on the City's current water rights mitigation strategy, this project is currently planned for 2014.

9.2.5 Complete General Sewer Plan

The CIP includes the costs incurred in 2012 to complete the General Sewer Plan.

9.2.6 WRF Capacity Study

In September, 2012 the City entered into a contract with an engineering consultant to evaluate the capacity of the WRF. The CIP includes the contracted amount of \$70,000 to perform that work.

9.3 O&M and Non-Facility Projects

A number of projects and activities have been identified throughout this GSP to improve the reliability of the water system, update plans and programs required by Health and Ecology, and implement operational improvements. These projects are summarized in Table 9-1, and include the following:

- **STEP tank pump repair and replacement:** STEP tank pumps will be repaired or replaced as needed, based upon scheduled inspections described in the BCE in Section 3.5.2.1.
- Reserve fund for STEP tank replacement: Set up reserve for repair of major STEP tank failure.
- Convert shared STEP tanks to individual STEP tanks: Based upon the results of the BCE presented in Section 3.5.2.2, the five most problematic shared STEP tanks should be converted to separate STEP tanks.
- **Replace ARVs:** As summarized in Section 3.4.1, many of the ARVs in the collection system have become corroded. All 116 existing ARVs in the collection system will be replaced between 2012 and

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2017. Valves replaced in 2012 will be funded with reserves; valves replaced in 2013–17 will require additional O&M funds.

- **SBR handrails:** Handrails around the perimeter of the SBRs will be installed to improve safety (see Section 4.4.2.3). This project is planned for 2013.
- Reclaimed water valve replacement: As summarized in Section 5.1.3.3 replacement of five corroded distribution system valves and installation of a new valve at the WRF is required. The first valve will be replaced in 2012 out of existing 0&M funds. The balance in 2013 and 2014 will require additional 0&M funds.
- **Reclaimed water tank inspection:** As described in Section 5.14, the interior of the reclaimed water storage tank will be inspected every 10 years.
- Radio read meter in Cochrane Park: A radio read reclaimed water meter was installed at Cochrane Park in 2012.
- Utility administration improvements: Expand the City's existing billing system, INCODE, to implement an asset management program. Also, as described in Section 3.4.3, the City will develop and implement a revised pretreatment program and an Operation and Maintenance database.
- **Replace SBR valve actuators:** As described in Section 4.4.2.3, four actuators at the SBRs will be replaced in 2012.
- **Replace influent flow meter:** Section 4.4.2.1 describes the replacement of the influent flow meter at the WRF, scheduled for 2012.
- **PAX system relocation:** The temporary PAX system will be relocated to a fiberglass reinforced plastic (FRP) building, as described in Section 4.4.2.4, in 2012.

9.4 Capital Improvement Plans

The 20-year CIP for the "without MPC" scenario is presented in Table 9-2. A map showing the location of these projects is presented in Figure 9-1, and a schematic showing improvements at the WRF is presented in Figure 4-9. The estimated project cost for the 10-year CIP (in 2012 dollars) is \$2.15 million. This includes projects scheduled for completion between 2012 and 2020. For the period between 2020 and 2030, the total estimated cost is approximately \$860,000. For the entire 20-year planning period, the CIP represents a total capital investment of \$2.05 million.

The 10-year and 20-year CIPs for the "without MPC" scenario are the basis for the capital funding plan presented in Section 10.



Table 9-1. O&M Projects																							
Project No.	Name	Description	Estimated project cost (2012 dollars)	Section in GSP	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
COM-1	STEP Tank Pump Repair and Replacement	Repair/replace as needed based upon scheduled inspections as described in BCE.	\$637,500	Section 3.6.2		\$1,500	\$4,500	\$7,500	\$15,000	\$30,000	\$120,000	\$120,000	\$120,000	\$45,000	\$30,000	\$21,000	\$13,500	\$10,500	\$12,000	\$15,000	\$19,500	\$22,500	\$30,000
COM-2	Reserve fund for STEP tank replacement	Set up reserve for repair of major STEP tank failure.	\$50,000	Section 3.6.1		\$10,000	\$10,000	\$10,000	\$10,000	\$10,000													
COM-3	Convert shared STEP tanks to individual STEP tanks	Convert five most problematic shared STEP tanks to separate STEP tanks (requires six new STEP tanks to be installed).	\$42,000	Section 3.6.2			\$7,000		\$7,000		\$7,000		\$7,000		\$14,000								
COM-4	Replace ARVs	Replace all 116 existing air release valves in collection system. The first 20 valves replaced in 2012 will be funded with Fund 413 reserves. 2013-2017 will require additional O&M funds.	\$71,050	Section 3.4.1	\$12,250 ⁽¹⁾	\$11,760	\$11,760	\$11,760	\$11,760	\$11,760													
WRFOM-3	SBR Handrails ⁽¹⁾	SBRs do not have handrails around the perimeter; installation is recommended as a safety improvement.	\$51,620	Section 4.4.2.1		\$51,620																	
RWOM-1	Reclaimed water valve replacement	Replacement of five corroded distribution system valves and installation of a new valve at the WRF. The first RW valve will be replaced in 2012 out of existing 0&M funds. Balance in 2013 and 2014 will require additional 0&M funds.	\$30,000	Section 5.2.3.4	\$6,000	\$12,000	\$12,000																
RWOM-2	Reclaimed Water Tank Inspection	Inspect interior of Reclaimed Water Storage Tank every 10 years.	\$20,000	Section 5.2.3.2				\$10,000										\$10,000					
RWOM-3	Radio Read Meter at Cochrane Park	Install a radio read meter at the Cochrane Park RIBs.	\$2,000	Section 5.2.3.7	\$2,000																		
ADMIN-1	Utility administration improvements	Institute asset management program; institute O&M program; implement upgraded pretreatment program.	\$30,000			\$7,500	\$7,500	\$7,500	\$7,500														
WRFOM-2	Replace SBR Valve Actuators	Six actuators total at SBRs, one does not need to be replaced and one replacement has already been ordered. Four actuators yet to be replaced.	\$8,520	Section 4.4.2.3	\$8,520																		
WRFOM-1	Replace Influent Flow Meter ⁽¹⁾	Existing 6-include flow meter has failed and needs to be replaced	\$8,000	Section 4.4.2.6	\$8,000(1)																		
WRFOM-4	PAX System Relocation ⁽¹⁾	Relocation to an FRP building to get the system out of an electrical room. Further improvements would be implemented as part of a plant upgrade.	\$8,600	Section 4.4.2.7	\$8,600 ⁽¹⁾																		
	O&M Projects Total		\$959,290		\$45,370	\$94,380	\$52,760	\$46,760	\$51,260	\$51,760	\$127,000	\$120,000	\$127,000	\$45,000	\$44,000	\$21,000	\$13,500	\$20,500	\$12,000	\$15,000	\$19,500	\$22,500	\$30,000

⁽¹⁾ O&M Project funded from Capital Improvement Fund (413). See Section 10.3.2. All other projects identified in table will be funded as O&M expenses from Operations Fund (412).

Note: CIP does not include water rights mitigation projects that do not directly require reclaimed water (such as in-kind contributions, habitat restoration, etc.); these were included on WSP CIP.

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		Table 9-2. 20-Year Capital Improvement Plan																					
Project No.	Name	Description	Estimated project cost (2012 dollars)	Year On-Line	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
C-1	Collection System Upgrades	Collection system upgrades necessary to address anticipated pressure issues, based on hydraulic modeling.	\$1,349,765	2020, 2030						\$162,740	\$162,740	\$162,740								\$287,182	\$287,182	\$287,182	
WRF-1	Short Term Improvements:	Implement short term improvements described in Chapter 4: carbon addition, alkalinity system upgrade, I&C, blower modifications.	\$300,000	2013																			
		Carbon addition system				\$43,000																	
		Alkalinity system upgrade				\$59,000																	
		I&C upgrade (includes replacement of DO probes in each SBR basin, a new influent ammonia instrument, new effluent ammonia and nitrate instruments at the common effluent of the SBRs, and programming necessary for changes)				\$198,000																	
WRF-2	Complete GSP	Costs to complete the General Sewer Plan in 2012	\$221,000	2012	\$221,000																		
WRF-3	WRF Capacity Study	Update process model to reflect most recent plant operations and identify short and long term WRF improvements to provide future capacity.	\$70,000	2012	\$70,000																		
RW-1	Expand Cochrane Park RIBs	Complete improvements to expand the capacity of the RIBs at Cochrane Park, including piping modifications, further investigation to determine capacity of RIBs, and placing the underground RIB into service.	\$661,000	2014			\$661,000																
WRF-4	Facilities Plan	Prepare planning document conforming to WAC 173-240 for upgrades to WRF to increase treatment capacity.	\$400,000	2013	\$50,000	\$350,000																	
	Capital Projects Totals		\$3,001,765		\$341,000	\$650,000	\$661,000	\$0	\$0	\$162,740	\$162,740	\$162,740	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$287,182	\$287,182	\$287,182	\$0

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