

CHAPTER 2. ALTERNATIVES

2.1 Level of Service Alternatives

Given anticipated changes in future regulatory requirements for effluent quality, the advent of new technologies, and the numerous ways in which Plant expansion can be accomplished on the Site, the Facilities Plan groups several different potential treatment levels, performance standards, and site development standards. These different treatment levels and standards are referred to as “levels of service.”

Levels of service may be applied to various aspects of the Plant, including liquids treatment, solids treatment, odor and noise control, site development, and non-process facilities (e.g., administration and maintenance buildings).

- The **liquids treatment** level of service is related to the quality of the Plant effluent being discharged to Puget Sound or upland locations.
- The **solids treatment** level of service is related to the quality of biosolids.
- The **odor and noise** level of service is related to the type of processes (sources) that receive odor treatment and the extent of noise control.
- The **site development** level of service refers to how the expanded facilities are screened from surrounding public uses, which relates to the extent of site landscaping and perimeter screening. This element also addresses stormwater treatment and facilities.
- The **non-process** level of service relates to how staffing needs are met and incorporates features such as safety, security, ergonomics, and efficiency. This element also addresses customer needs and overall satisfaction.

Level of service is also used to describe options for increasing benefits for multiple stakeholders. These stakeholders represent multiple interests including, but not limited to, policy interests, ratepayers, sustainability, energy consumption, resource conservation, and regulatory interests.

For this document, level of service describes the types of actions needed to replace or rehabilitate units or systems, to improve treatment performance, or to expand capacity. For example, in-kind replacement assumes that the existing level of service is appropriate. A decision to upgrade units or systems based on maintenance requirements, efficiency, or other values assumes an augmented level of service is appropriate.

Using this level of service approach, a set of five holistic alternatives (level of service alternatives [LOS]) have been developed, ranging from maintaining the status quo in terms of treatment, available facilities area, and capacity (LOS 0 – No Action) to providing the highest possible level of service (LOS 4 – Best Practice – Full Recycling). Each alternative presents a different vision for the future of the Plant.

The following sections describe how the levels of service would change in terms of liquids treatment and effluent discharge, solids treatment, odor and noise control, and non-process facilities. The alternatives differ in the intensity of development within the 180-acre Site, in

accordance with the adopted Sewerage General Plan (2001 Unified Sewer Plan) and the adopted 2005 Chambers Creek Properties Master Site Plan Update (Pierce County, 2007).

2.1.1 No Action Alternative (LOS 0)

The No Action Alternative was developed as a means to describe the environmental conditions if expansion occurs only to the extent already approved by the City of University Place. Under this alternative, no additional land use approvals would be obtained. Although this alternative does not reflect the County's probable or anticipated action, it does describe the actions currently allowable based on existing land use approvals. Under the No Action Alternative, no new Facilities Plan would be adopted by the County, and the current level of wastewater treatment could not be sustained as flows to the Plant increase over the next 5 years.

The No Action Alternative allows continued expansion within the previously approved 49.75-acre Plant. Plant capacity would continue to be expanded to keep pace with increased flows and loadings up to a maximum of 48 mgd as allowed under existing land use permits. When this capacity is met, however, no additional measures would be undertaken to increase the Plant's capacity. At that time, no additional wastewater flows could be accommodated at this Plant.

The No Action Alternative provides a baseline against which to compare the effects of the project alternatives. The No Action Alternative preserves the status quo in terms of treatment, the available site campus, and capacity currently approved for the Plant. This alternative does not accommodate increased future flows under the approved 2001 Unified Sewer Plan. Future flows that exceed the Plant's capacity would need to be accommodated elsewhere, or a moratorium on sewer connections would need to be established. This alternative would not provide any flexibility to meet future NPDES permit requirements.

Perimeter improvements would be implemented in accordance with the Chambers Creek Properties Master Site Plan. Under LOS 0, no additional stormwater treatment would be provided and stormwater not currently collected in the process area of the Plant would continue to drain to Chambers Creek. If LOS 0 were selected, some or all of the odor control measures indicated for the other Facilities Plan alternatives would be implemented if appropriate, but they are not a part of the No Action Alternative.

The potential Plant footprint and configuration under LOS 0 is illustrated in Figure 2-1. The specific facility components that would be allowed under current approvals are listed in Appendix A and shown in Figure A-1, Appendix A.

2.1.2 Alternative 1: Maintain Existing Level of Service – Marine Discharge (LOS 1)

Under LOS 1, the existing level of service would be maintained. The Plant would be expanded to provide needed capacity using existing treatment processes. This level of service preserves the status quo in terms of treatment, while accommodating increased future flows under the approved 2001 Unified Sewer Plan. This alternative does not provide flexibility to address future regulatory requirements.

Existing treatment processes would be improved to meet current water quality standards, but no new technologies or processes would be introduced. Non-process facilities would be expanded to keep pace with capacity demands, but would not be upgraded. Treated effluent of similar quality to the existing effluent would continue to be discharged into Puget Sound. Existing measures to control odor from facilities with the highest intensity odor sources (most odorous sources) would be expanded as those facilities are expanded.

Figure 2-2 illustrates the potential Plant footprint and configuration on the Site with full build-out under LOS 1.

2.1.2.1 Liquids Treatment– LOS 1

Biological processes would be designed for removal of biological oxygen demand (BOD) and total suspended solids (TSS). Continued expansion as allowed under current permits would include additional primary sedimentation basins, primary clarifiers, aeration basins, and secondary clarifiers to meet increased flows and loads. The design and configuration of these units would be similar to the existing units. Disinfection capacity would be expanded through the installation of ultraviolet (UV) technology.

This alternative would involve increasing the volume of treated effluent discharged to Puget Sound from an existing or modified outfall system. The existing effluent quality would be maintained and the total loading would increase. Expanded treatment and discharge capacity, a revised NPDES discharge permit, and land use approvals would be required to meet projected capacity requirements for the year 2040 as approved under the 2001 Unified Sewage Plan. In 2040, this capacity is projected to be 56 mgd at peak monthly conditions. Future outfall improvements to meet NPDES permit requirements may include extending the outfall by approximately 200 feet and adding additional ports in the outfall diffuser.

2.1.2.2 Solids Treatment – LOS 1

Commercial grade fertilizer would continue to be the end product of the solids stream. Existing processes for solids thickening, digestion, dewatering, and drying would be expanded to keep pace with increased loadings. The Plant would maintain its policy of using Class B solids disposal as a fall-back for periods when Class A production facilities (solids dryer) are off-line. Existing levels of redundancy would be maintained throughout the system. Redundant dryer capacity and digester storage would not be implemented.

2.1.2.3 Odor and Noise Control – LOS 1

Existing odor control systems treat the facilities and processes with the highest intensity odor sources. These facilities include headworks, grit removal, solids thickening, digestion, dewatering, and drying. This level of odor control would be extended as these processes are expanded. Odor control would not be applied to any systems not currently receiving odor control. Odor levels in the vicinity of the Plant would remain similar to existing levels.

Noise control would be provided by continuing to place most mechanical equipment in the existing and expanded underground utility corridors as capacity is added.

2.1.2.4 Site Development – LOS 1

Currently, landscaping is provided only in the area immediately surrounding Plant buildings and process tanks. The remainder of the Site is maintained only to the degree to which roads are kept clear and security fencing intact. As the surrounding Chambers Creek Properties become more public with the establishment of the golf course, public meadows, and surrounding paths, the need for full site and perimeter landscaping will become more important. Under LOS 1, a security fence and natural screening (landscaping) would be provided around the full Site perimeter in accordance with the Chambers Creek Properties Master Site Plan (2007).

Stormwater collection and conveyance would be redesigned, incorporating low impact design standards such as bioswales and phytoremediation. A system of landscaped detention ponds at the northern border of the Site would provide both surface water retention and improved visual screening

2.1.2.5 Non-Process Facilities – LOS 1

The existing non-process facilities would be expanded to keep pace with expanded staffing, storage, or workspace needs. Existing ratios of staff space would be maintained, along with existing staff amenities. Electrical and other ancillary systems (process air, process water) would be renovated and replaced when needed. New systems would largely replicate existing ones. Site utilities such as potable water and natural gas would be expanded to keep pace with demand. Existing levels of energy use, relative carbon footprint, and ergonomics would be maintained. New and expanded facilities would be constructed to all code standards applicable at the time of construction.

2.1.3 Alternative 2: Augment Existing Level of Service – Marine Discharge (LOS 2)

Under LOS 2, the Plant would be expanded to keep pace with increased flows and loadings from the sewer service area. In addition to increased capacity, the Plant would be modified to enhance nitrogen removal from the liquid stream. Non-process facilities would be expanded or upgraded to keep pace with state regulations and NPDES permit requirements, industry norms, and applicable building codes.

Additional improvements would be made to address regulated odor sources. This level of service keeps current with the demands of increased influent flows. Treated effluent would continue to be discharged into Puget Sound.

Figure 2-3 illustrates the potential Plant footprint and configuration on the Site with full build-out under LOS 2.

2.1.3.1 Liquids Treatment – LOS 2

This level of service would expand the Plant to keep pace with wastewater flow and loadings and to provide for nutrient removal. Nutrients targeted for removal would include nitrogen and potentially phosphorus. Processes required for nutrient removal would also provide improved removal of organics and microconstituents. To accomplish this level of treatment, aeration basins would be expanded between two and four times the volume required under LOS 1. The number of secondary clarifiers would need to be increased by approximately 50 percent above those required under LOS 1. Disinfection replacement and expansion would be similar to that proposed under LOS 1.

The existing marine discharge would be maintained. As with LOS 1, this alternative would also involve increasing the volume of treated effluent discharged to Puget Sound from an existing or modified outfall system. Effluent quality would be increased and total loadings reduced, with reduced levels of nutrients, BOD, and suspended solids.

2.1.3.2 Solids Treatment – LOS 2

The Plant currently produces a commercial grade fertilizer, which already represents an augmented level of service when compared to other facilities in the region. Under this alternative, the Plant would continue to produce commercial grade fertilizer, but the process used to generate the product would be improved. Process improvement could include enhanced energy recovery, or improved processes requiring fewer units and less energy. Dewatering and drying processes would be expanded with improved system redundancy.

2.1.3.3 Non-Process Facilities – LOS 2

Non-process facilities would be expanded to keep pace with expanded staffing, storage, or workspace needs. Where existing ratios of staff space or staff amenities fall below the industry norm, they would be expanded or upgraded. Upgrades to existing facilities would be targeted toward reduced energy use, improved carbon footprint, and improved ergonomics. Replacement and expansion of electrical and ancillary systems would be of a larger scale to reflect the larger scale of the processes required to achieve an augmented level of service.

2.1.3.4 Odor and Noise Control – LOS 2

Odor control will be expanded beyond that provided under LOS 1 to include moderate intensity odor sources, which includes all areas in direct contact with raw sewage (primary influent channels and primary sedimentation basins). Noise control would likely be similar to that proposed for LOS 1, as the underground utility corridor buffers most noise generated at the Plant.

2.1.3.5 Site Development – LOS 2

As with LOS 1, site landscaping would be expanded to provide the full perimeter of the facility with natural screening to reflect the landscape design of the Chambers Creek Properties. Stormwater collection and conveyance would also be the same as described for LOS 1.

2.1.4 Alternative 3: Augment Existing Level of Service – Partial Recycling (LOS 3)

LOS 3 includes expansions and upgrades similar to LOS 2 with the addition of facilities that begin to divert a portion of the treated effluent away from Puget Sound. While a majority of the treated effluent would continue to be discharged to Puget Sound during wet weather periods, a portion of the treated wastewater would be diverted for reclaimed water production and upland application. Reclaimed water could be used in multiple ways, including but not limited to Plant process water, Chambers Creek Properties irrigation (during drier weather seasons), groundwater recharge on the Site, or similar off-site uses.

Figure 2-4 illustrates the potential Plant footprint and configuration on the Site with full build-out under LOS 3.

2.1.4.1 Liquids Treatment – LOS 3

As with LOS 2, the Plant would be designed to produce effluent with reduced nutrients. LOS 3 differs from LOS 2 mostly in the provision of tertiary (advanced) treatment to a portion of the flow for reclaimed water production. Effluent from the tertiary treatment process would meet Washington State Class A reclaimed water standards. Class A water could be used for irrigation, landscaping, groundwater recharge through surface percolation, and a variety of industrial processes. When used for irrigation, reclaimed water is applied according to the moisture and nutrient uptake rate of the vegetation. Irrigation demands for golf course and landscaping, for example, vary greatly between wet and dry weather seasons. Consequently, reclaimed water for irrigation would likely be used during summer months only. Industrial demands (e.g., Plant process water) may be less seasonal and could be supplied with reclaimed water year-round. The reclaimed water could also be recharged into the groundwater through infiltration basins year-round.

Implementation of a tertiary process would require an additional process step beyond what is required for LOS 2, such as an effluent filtration system. In addition to the tertiary process facilities, chlorine contact would be required to meet regulatory residual disinfection requirements. A reclaimed water storage pond and pumping facility would likely be required to meet distribution needs.

As with LOS 1 and 2, future improvements to the existing marine outfall and diffuser are anticipated, although water reclamation and reuse under this alternative may delay or eliminate the need for outfall improvements.

2.1.4.2 Solids Treatment - LOS 3

As with LOS 2, the Plant would continue to produce commercial grade fertilizer, but the process used to generate the product would be improved. Process improvement could include enhanced energy recovery, or optimized solids stream processes requiring fewer units and less energy.

2.1.4.3 Non-Process Facilities – LOS 3

As with LOS 2, non-process facilities would be expanded to keep pace with expanded staffing, storage, or workspace needs.

2.1.4.4 Odor and Noise Control – LOS 3

Moderate odor sources would be treated along with the highest intensity odor sources (same as LOS 2). Noise control would also be the same as LOS 2.

2.1.4.5 Site Development – LOS 3

As under LOS 1 and 2, site landscaping would be expanded to provide the full perimeter of the facility with natural screening to reflect the landscape design of the Chambers Creek Properties. Stormwater collection and conveyance would also be the same as LOS 1 and 2.

2.1.5 Alternative 4: Best Practice Level of Service – Full Recycling (LOS 4)

This alternative would implement the best available practices (Best Practice) throughout the Plant. Best Practice, in this context, refers to the best treatment technology and advanced processes available that, while offering superior results, may not currently have widespread use by wastewater utilities due to cost, resource commitments, or other factors.

LOS 4 would expand the Plant to keep pace with wastewater flow and loadings. It would also improve treatment performance to produce an effluent suitable for water reclamation, up to indirect potable reuse, using best available technologies. Advanced processes and best management practices would be used in all areas (liquids treatment, solids treatment, odor control, site development, and non-process facilities). All Plant effluent would be reclaimed or reused, resulting in zero marine discharge of treated effluent.

Figure 2-5 illustrates the potential Plant footprint and configuration on the Site with full build-out under LOS 4.

2.1.5.1 Liquids Treatment – LOS 4

Marine discharge of treated effluent would be phased out under this alternative, with all Plant effluent being reclaimed or reused. Advanced treatment processes would produce effluent meeting drinking water quality standards. Following secondary clarification, all effluent would be routed to an advanced tertiary water treatment facility. This facility would include such processes as microfiltration, reverse osmosis, and granular activated carbon. The high level of treatment would remove conventional parameters such as solids and BOD, nutrients such as nitrogen and phosphorous, as well as but not limited to dissolved solids, total carbon, and microconstituents. This effluent would be suitable for such practices as direct aquifer injection for potable use, or other uses with less stringent treatment requirements such as stream augmentation, landscape irrigation, and industrial process uses.

This alternative would include storage facilities and pump stations for reclaimed water distribution. Chlorine contact would be added to the disinfection process to provide for a distribution residual. Expansion of conventional processes such as primary sedimentation, aeration basins, and secondary clarifiers would incorporate the most energy-efficient, lowest carbon-footprint technology available.

2.1.5.2 Solids Treatment – LOS 4

The Plant would continue to produce commercial grade fertilizer, but the process used to generate the product would be improved. Additional emphasis would be placed upon energy conservation and recovery, with fully optimized solids stream processing requiring fewer units and less energy.

2.1.5.3 Non-Process Facilities – LOS 4

All facilities would be constructed with Leadership in Energy and Environmental Design (LEED) certification as a goal. Ratios of staff space or staff amenities would be upgraded to match those of the top 10 percent of similarly sized facilities. Laboratory facilities would incorporate state-of-the-art technologies, allowing for in-house analysis of conventional parameters as well as those associated with meeting drinking water standards for effluent. Upgraded facilities would employ best management practices to limit energy use, reduce carbon footprint, and improve ergonomics. Safety features would be maintained beyond the requirements of local codes and standards.

2.1.5.4 Odor and Noise Control – LOS 4

This alternative would provide a superior level of odor control: all process areas of the Plant would be treated, including biological process tanks, aeration basins, secondary clarifiers, and mixed liquor channels. Noise control would be the same as LOS 2 and 3.

2.1.5.5 Site Development – LOS 4

As with LOS 1, 2 and 3, site landscaping would be expanded to provide the full perimeter of the facility with natural screening to reflect the landscape design of the Chambers Creek Properties.

Stormwater collection would incorporate the full range of low impact development designs and technologies, including the use of integrated treatment wetlands.

2.1.6 Summary of Level of Service Alternatives

Table 2-1 summarizes the features of the level of service alternatives.

Table 2-1. Summary of Components Associated with Each Level of Service Alternative

| Programmatic “Level of Service” Alternatives | | | | | |
|--|--|--|--|---|---|
| Elements | No Action Alternative (LOS 0) | Alternative 1: Maintain Existing Level of Service – Marine Discharge (LOS 1) | Alternative 2: Augment Existing Level of Service – Marine Discharge (LOS 2) | Alternative 3: Augment Existing Level of Service – Partial Recycling (LOS 3) | –Alternative 4: Best Practice Level of Service – Full Recycling (LOS 4) |
| Treatment Level (Liquids) | No change to existing secondary treatment (BOD and TSS removal). | No change to existing secondary treatment (BOD and TSS removal). | Augmented treatment would include increased removal of nutrients, particularly nitrogen. | Tertiary treatment added for the production of reclaimed water with off-site groundwater recharge, and the potential for both site-wide and off-site reclaimed water uses. | Advanced tertiary water treatment processes for the production of effluent meeting drinking water quality standards. |
| Treatment Level (Solids) | No change - commercial grade fertilizer (Class A production). | Commercial grade fertilizer (Class A production). | Commercial fertilizer with process optimization (enhanced energy recovery). | Commercial fertilizer with process optimization (best practice). | Commercial fertilizer with process optimization (best practice). |
| Effluent Discharge | Marine discharge. | Marine discharge. | Marine discharge. | Marine discharge and partial reuse/recharge (approximately 5 mgd). Potential reuse and recharge options – irrigation, process water for Plant, onsite and off-site recharge. | All effluent would be recharged or reused. Potential reuse and recharge options – same as LOS 3 plus direct aquifer injection and stream augmentation. |
| Plant Capacity | 48 mgd | 56 ¹ mgd | 56 mgd | 56 mgd | 56 mgd |
| Potential Outfall Requirements | None. | Potential outfall extension and additional diffuser ports. | Same as LOS 1. | Same as LOS 1, though need for outfall improvements could be delayed or eliminated depending on level of reuse. | None. |

| Programmatic “Level of Service” Alternatives | | | | | |
|---|---|---|--|--|---|
| Elements | No Action Alternative (LOS 0) | Alternative 1: Maintain Existing Level of Service – Marine Discharge (LOS 1) | Alternative 2: Augment Existing Level of Service – Marine Discharge (LOS 2) | Alternative 3: Augment Existing Level of Service – Partial Recycling (LOS 3) | –Alternative 4: Best Practice Level of Service – Full Recycling (LOS 4) |
| Potential Reclaimed Water and Reuse Structures | None. | None. | None. | Storage facilities, pump station for distribution of reclaimed water, and up to 13 miles of conveyance pipeline. | Similar to LOS 3, though additional storage, pump stations, and conveyance lines would be needed. |
| Non-process Facility Expansion | No expansion beyond current approved facilities. | Expanded to meet staffing, storage, or workspace needs. Existing ratios of staff maintained. | Expanded and improved to stay above industry mean in all areas. | Same as LOS 2. | Expanded and improved to stay within top 10% of industry standard in all areas. |
| Odor Control | No additional odor control. | Highest intensity odors treated (solids thickening, biosolids drying, headworks, grit tanks, and headbox). | Expanded to treat moderate intensity odor sources (e.g., primary sedimentation tanks). | Same as LOS 2. | Superior level of treatment. Expanded to treat all process areas. |
| Noise Control | No additional noise control. | Continue to place most mechanical equipment in underground utility corridor. | Same as LOS 1. | Same as LOS 1. | Same as LOS 1. |
| Visual Screening | Perimeter security fence and natural screening in accordance with Chambers Creek Properties Master Site Plan. | Perimeter security fence and natural landscape screening in accordance with Chambers Creek Properties Master Site Plan. | Perimeter security fence and natural landscape screening with additional natural landscaping provided around stormwater ponds. | Same as LOS 1. | Same as LOS 1. |
| Stormwater | No additional stormwater treatment provided. Stormwater not currently collected and diverted to the Plant process will continue to drain to Chambers Creek. | Retention ponds to be provided to capture runoff from impervious areas of the Site. Existing conveyance enhanced with bioswales and phytoremediation. | Same as LOS 1 | Same as LOS 1. | Same as LOS 1 plus constructed wetlands to provide additional treatment. |

| Programmatic “Level of Service” Alternatives | | | | | |
|---|---|---|--|---|--|
| Elements | No Action Alternative (LOS 0) | Alternative 1: Maintain Existing Level of Service – Marine Discharge (LOS 1) | Alternative 2: Augment Existing Level of Service – Marine Discharge (LOS 2) | Alternative 3: Augment Existing Level of Service – Partial Recycling (LOS 3) | –Alternative 4: Best Practice Level of Service – Full Recycling (LOS 4) |
| Facility Footprint | Current approved Plant (49.75 acres). | 21.3 acres additional (71.1 acres total). | 33.3 acres additional (83.1 acres total). | 41.3 acres additional (91.1 acres total). | 61.4 acres additional (111.2 acres total). |
| Construction Duration | Approximately 2 years (for currently approved facilities that are not yet constructed). | Intermittently for a combined total of 4 years | Intermittently for a combined total of 9 years. | Intermittently for a combined total of 10 years. | Intermittently for a combined total of 12 years. |
| # of Employees | 49 | 70 (at 2040) | 81 (at 2040) | 90 (at 2040) | 105 (at 2040) |

Note (1) The expanded capacity of 56 mgd (peak month) corresponds to an average day flow of 43 mgd, which is the projected capacity included in the adopted Unified Sewer Plan (Pierce County, 2001).

2.2 Project-Specific Actions

For each of the action alternatives described above, near-term or project-specific actions would be required to implement the level of service strategies. These actions include (1) site preparation and perimeter development, and (2) Phase 1 expansion:

- **Site preparation and perimeter development** activities are construction activities to prepare the site for future expansion, to buffer the Site from adjacent uses, and to improve site circulation in accordance with the Chambers Creek Properties Master Site Plan (2007). These activities are generally the same for each action alternative and include overall site earthwork; and construction of site circulation improvements, buffer /screening elements, and stormwater features. Site preparation and perimeter development activities are anticipated to be completed in 2011.
- **Phase 1 expansion** would be completed in 2015 (occurring after site preparation activities are completed). Phase 1 expansion includes projects to construct initial facility upgrades to replace aging equipment and meet projected increased capacity demands through 2025 or beyond, depending on permit requirements (minimum of an additional 10 mgd capacity), up to an additional 15 mgd capacity.

2.2.1 Site Preparation and Perimeter Development

Site preparation activities include site earthwork to prepare the Site for expanded facilities and to establish the perimeter. Most of the proposed expanded process facilities would be located west of the Plant in the expansion area of the Site (fill area), which is currently at a lower elevation than the existing Plant. Fill excavated from hills to the east of the Plant (eastern hills) would be used to raise the expansion area to match or nearly match the grades of the existing Plant (Figure 2-6). Excavation and regrading of the eastern hills is being conducted under a separate project to mitigate slope instability issues¹. It is anticipated that approximately 470,000 cubic yards of this fill material will be used to raise the Site to an elevation of 40 to 50 feet to achieve even grades for gravity fed treatment systems. Approximately 250,000 cubic yards of the fill material would be used to develop the perimeter buffer.

Perimeter development activities include construction of the expanded security fence, stormwater elements, and landscaping elements described above in Section 2.1.2.4. Natural screening in the form of hills and brush would be developed along the site perimeter to create a physical and visual screening of the Plant as seen from public use areas, and would reflect the landscape design of the Chambers Creek Properties. The Plant would continue to be restricted from public access for safety and security reasons. Circulation elements would also be constructed, consistent with the Chambers Creek Properties Master Site Plan (2007). Perimeter development activities are shown on Figures 2-1, 2-2, 2-3, 2-4, and 2-5 for each alternative. Table 2-2 summarizes the features of the site preparation and perimeter development for each alternative

¹ Project under review with the City of University Place per Shoreline Substantial Development Permit SSD09-0002 and State Environmental Policy Act environmental review SEP09-0005

Table 2-2. Summary of Components Associated with Site Preparation and Perimeter Development

| Site Preparation and Perimeter Development | | | | | |
|---|-------------------------------|--|----------------|----------------|--|
| Elements | LOS 0 | LOS 1 | LOS 2 | LOS 3 | LOS 4 |
| Earthwork | Not applicable, see note (1). | <ul style="list-style-type: none"> • 470,000 cy fill for Plant expansion • 250,000 cy fill for perimeter buffer | Same as LOS 1. | Same as LOS 1. | Same as LOS 1. |
| Visual Screening | Not applicable, see note (1). | Black PVC chain link fence around site. The fence will meander between perimeter maintenance road, buffer plantings, and pedestrian trails for a naturalistic edge. | Same as LOS 1. | Same as LOS 1. | Same as LOS 1. |
| Stormwater Facilities | Not applicable, see note (1). | Construction of retention ponds to capture runoff from impervious areas of the Site. Existing conveyance enhanced with bioswales and phytoremediation. | Same as LOS 1. | Same as LOS 1. | Same as LOS 1 plus constructed wetlands to provide additional treatment. |
| Circulation Elements | Not applicable, see note (1). | <ul style="list-style-type: none"> • Perimeter maintenance road – internal access road with 10-foot-wide utility corridor on either side, providing vehicular circulation for maintenance, emergency, and County vehicle access. • 20,000 sf dual-purpose construction staging / vehicle pull-out area and parking space during events on north boundary of site. • Auxiliary staging area on northwest boundary of site. • Public entrance to the Plant and golf course maintenance to be relocated to the south approximately 100 ft. Entry corridor will have enhanced landscaping. | Same as LOS 1. | Same as LOS 1. | Same as LOS 1. |
| Construction Duration | Not applicable, see note (1). | 1.5 years | Same as LOS 1. | Same as LOS 1. | Same as LOS 1. |

Note (1) No site preparation or perimeter development would occur under LOS 0, except as included under the adopted 2005 Chambers Creek Properties Master Site Plan Update.

2.2.2 Phase 1 Expansion

Phase 1 expansion facilities that would differ under each level of service alternative are described below and summarized in Table 2-3. Phase 1 expansion facilities are shown on Figures 2-1, 2-2, 2-3, 2-4, and 2-5 for each alternative.

2.2.2.1 LOS 1

Under LOS 1, initial projects to provide needed capacity expansion would include construction of additional treatment facilities (e.g., aeration basins, secondary clarifiers, and digesters), new maintenance/storage, and new administrative/laboratory buildings. Additional and expanded facilities under Phase 1 include the following:

- Three new aeration basins would be constructed adjacent to the existing basins.
- Two new secondary clarifiers would be added near the existing units.
- A new solids thickening building would be constructed.
- Two new digesters (affixed with covers to minimize odor emissions), a new digester equipment building, and one new storage digester would be constructed.
- Fertilizer manufacturing facility would be expanded.
- UV disinfection system would be expanded.
- Maintenance functions would be relocated to a retrofitted building at the north end of the site.
- Plant warehouse would be relocated to a retrofitted building at the north end of the site.
- Administration and laboratory functions would be relocated to a new building at the north end of the site.

2.2.2.2 LOS 2

In addition to the capacity expansion described under LOS 1, this alternative would include the following additional and expanded facilities under Phase 1:

- Additional odor control for certain facilities;
- A new blower building to house pumps, blowers, and other equipment related to the secondary treatment process expansion;
- Larger aeration basins with expansion to the west; and
- Upgrades to the UV disinfection system.

All other additional upgrades and expansion under Phase 1 would be minor, related primarily to upgrading maintenance/storage space and amenities and administration/laboratory space and amenities.

2.2.2.3 LOS 3

In addition to the upgrades and expansion described for LOS 2, initial reclaimed water production facilities would be constructed. Additional and expanded facilities under Phase 1 would include:

- New building to house a filtration system;
- Chlorine contact tank;
- Storage pond for the reclaimed water; and
- Pump station to allow for distribution.

All other additional upgrades and expansion under Phase 1 would be minor, related primarily to upgrading the disinfection system, maintenance/storage space and amenities, and administration/laboratory space and amenities. Initial production of 2 mgd of reclaimed water is anticipated under Phase 1 expansion and is expected to be used primarily for Plant process water, on-site irrigation, and on-site groundwater recharge.

2.2.2.4 LOS 4

In addition to the upgrades, expansion, and reclaimed water use described for LOS 3, this alternative would include the following additional and expanded facilities under Phase 1:

- Expansion of aeration basins (double that of LOS 2);
- Covering of all units for improved odor control; and
- A larger filtration system than that constructed under LOS3.

2.2.3 Summary of Phase 1 Expansion

Table 2-3 summarizes the features of Phase 1 expansion for each level of service alternative.

Table 2-3. Summary of Components Associated with Phase 1 Expansion

| Phase 1 Expansion | | | | |
|--|---------------------------|---------------------------|---------------------------|---------------------------|
| Elements | LOS 1 | LOS 2 | LOS 3 | LOS 4 |
| Area of Phase 1 Plant expansion | 128,000 SF (2.9 acres) | 210,000 SF (4.8 acres) | 246,000 SF (5.6 acres) | 430,000 SF (9.9 acres) |
| Tallest height of structures | 59 ft | 59 ft | 59 ft | 59 ft |
| Construction Duration | 2 years | 2.5 years | 2.5 years | 3 years |
| # of Employees (at 2015) | 52 | 59 | 62 | 62 |