Final

Cascade Pole Engineering Design Report

Prepared for

Port of Olympia

June 2010

CH2MHILL

Signature Page

Final
Engineering Design Report
Cascade Pole Groundwater Treatment Plant Replacement
Port of Olympia, Washington
June 2010

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Acronyms

CPC	Cascade Pole Company
CULs	cleanup levels
DNAPL	dense non-aqueous phase liquid
EDR	Engineering Design Report
Ecology	Washington State Department of Ecology
GAC	granular activated carbon
gpm	gallons per minute
HASP	health and safety plan
HMI	human machine interface
IBC	International Building Code
IFC	International Fire Code
IMC	intermediate metal conduit
I/O	Input/Output
LNAPL	light non-aqueous phase liquid
LOTT	Lacey, Olympia, Tumwater, and Thurston County
lb/day	pounds per day
MCC	motor control center
MTCA	Model Toxics Control Act
O&G	oil and grease
O&M	operation and maintenance
PAHs	polynuclear aromatic hydrocarbons
PCP	pentachlorophenol
PFD	process flow diagram
PPE	personal protective equipment
PLC	programmable logic controller
ppb	parts per billion
ppm	parts per million

Port	Port of Olympia
PMM	power meter/monitor
PVC	polyvinyl chloride
RGS	rigid galvanized steel
SEPA	State Environmental Policy Act
SPD	surge protective device
TSS	total suspended solids
WAC	Washington Administrative Code

Engineering Design Report, Cascade Pole Groundwater Treatment Plant Replacement, Port of Olympia, Washington

1.0 Purpose

On July 3, 2004, the Washington State Department of Ecology (Ecology) and the Port of Olympia (Port) agreed to Amendment No. 1 to the Agreed Order No. DE 00TCPSR-753, which required the Port to conduct environmental cleanup action at the Cascade Pole site. Included within Amendment No. 1 to the Agreed Order was a requirement that the Port design and construct a new groundwater treatment system to replace the current system, which has been in operation since 1993 (Ecology, 2004). The purpose of this Engineering Design Report (EDR) is to provide design parameters and conceptual process information for the new groundwater treatment system. Furthermore, it is to meet the requirements of the Agreed Order, the Model Toxics Control Act (MTCA), and specifically, Section 173-340-400 (4)(a) of the Washington Administrative Code (WAC). This EDR is also in accordance with WAC 173-240 for Industrial Wastewater Treatment Facilities. Following acceptance of the EDR by Ecology, design plans and specifications will be prepared for the new groundwater treatment system to be implemented at the Cascade Pole site.

The replacement of the former groundwater treatment system is in compliance with the State Environmental Policy Act (SEPA, Chapter 197-11 WAC) through the determination of non-significance (DNS) in the agreed order amendment. Ecology has determined that this action will benefit the environment by diminishing the release of toxic chemicals from the site.

2.0 Site Background

The Cascade Pole site remediation system is located at the north end of the Port of Olympia peninsula between the east and west bays of Budd Inlet (Figure 1). The 17-acre former Cascade Pole site and adjacent parcels of land are owned and managed by the Port. From 1939 to 1957, numerous wood-treating companies leased this land from the Port. Cascade Pole Company (CPC) operated on the site from 1957 until 1986. The companies leasing the site used various chemicals (including creosote and pentachlorophenol) to preserve wood products, primarily utility poles and railroad ties. Creosote is primarily composed of polynuclear aromatic hydrocarbons (PAHs) and also contains phenols and cresols. Pentachlorophenol (PCP) is an organochlorine compound. Some PAHs and PCP are suspected human carcinogens and have been found at the site at elevated concentrations in soil, groundwater, surface water, and intertidal sediments.

In 1990, Ecology, the Port, and CPC signed a consent decree under authority of the MTCA, Chapter 70.105D RCW, to commence environmental remediation at the Cascade Pole site. In 1992 and 1993, a 350-foot sheet pile cutoff wall and a dense non-aqueous phase liquid (DNAPL) collection trench were installed on the northeast edge of the property (Figure 2). In 1993, a groundwater pump-and-treat system was installed to control further migration of contaminants out of the uplands and recover light non-aqueous phase liquid (LNAPL). In 1995, after several years of negotiations, the Port and CPC entered into an agreement that resulted in the Port taking control of remedial efforts at the Cascade Pole site. In 1996, Ecology granted

CPC permission to relinquish control to the Port in exchange for CPC contributing funds toward site cleanup activities. In 1997, a 3,520-foot-long underground slurry wall was installed to surround the 17-acre site and was tied to the previously installed sheet pile cutoff wall (Figure 2).

In 1998, under an agreed order, the Port paved 5.8 acres of the site within the containment wall to reduce infiltration of surface water into the highly contaminated area of the site. In 2000, the Port constructed an upland cell within the containment wall to store contaminated sediments removed from Budd Inlet. The contaminated sediments were placed in the upland containment cell in 2001. The containment cell was paved over by the Port in 2008. The remaining portion of the exposed land within the Cascade Pole site is expected to be capped in the near future.

The current groundwater treatment system consists of oil/water phase separation, biological treatment, filtration and clarification, and granular activated carbon (GAC) polishing. The system receives groundwater from 11 extraction wells at a total approximate average rate of 8 to 10 gallons per minute (gpm). Five of the wells are located in the vicinity of the upland contaminated sediments containment cell. The groundwater extraction system is operated to create an inward hydraulic gradient toward the containment area. Comments from Port personnel indicate that an estimated flow extraction rate of 25 gpm will maintain this inward hydraulic gradient within the containment cell. This EDR is intended to address the groundwater treatment system and is not associated with the groundwater extraction components. Treated groundwater is discharged to the Lacey, Olympia, Tumwater, and Thurston County (LOTT) discharge outfall/diffuser pipe that is routed through Port property adjacent to the current groundwater treatment system.

3.0 Cleanup Action Goals

The Port intends to replace the existing groundwater treatment plant (GWTP) with a new remediation system that is reliable and comprises proven system components. The specific goals of the new groundwater treatment system are as follows:

- Meet current NPDES discharge limits
- Have the capability to handle changing groundwater characteristics (e.g., a flow rate that is greater than the current system flow rate and up to 25 gpm, recovery of additional free-phase petroleum hydrocarbons, adequate space to expand the system components: additional GAC bed and solids filtration equipment, etc.)

Table 1 exhibits representative concentrations of various groundwater contaminants in the current groundwater treatment system, as represented by samples collected from the plant influent (i.e., untreated) and after phase separation (i.e., on the discharge of the current oil-water separator [OWS]), as well as the target NPDES discharge limits as indicated in the draft permit being developed for the site. The data summarized in Table 1 were provided by the Port on February 26, 2010 and were based on samples collected by the Port from November of 2003 to January 2010.

The groundwater treatment system is intended to treat groundwater delivered for treatment by the groundwater extraction system. Reliable operation of the groundwater treatment system is expected to assist in the site reaching the cleanup levels (CULs) established for the site (CPC, 1991)(Table 2); however, the expediency with which the CULs are achieved is related to many other factors beyond the reliable operation of the new groundwater treatment system and the parameters included within the EDR.

4.0 Responsible Parties

The Port continues to manage the Cascade Pole site cleanup activities, including the operation and maintenance (O&M) of the current pump-and-treat system. Mr. Don Bache is the Port's point of contact regarding the cleanup action and the primary operator of the current groundwater treatment system. Mr. Bache will retain his role with the implementation of the new groundwater treatment system.

Ecology (as the SEPA lead agency), is the regulatory agency monitoring the effectiveness of the remedial action at the Cascade Pole site. Ecology is also the regulatory agency that issues and enforces the NPDES water discharge permit, which identifies the required discharge parameters for the groundwater treatment system effluent. Mr. Mohsen Kourehdar is the representative for Ecology for the Cascade Pole site.

The City of Olympia is the liaison between the Port and Ecology in the permitting and planning of the new treatment system construction. A general building permit along with other permits (electrical, mechanical, plumbing) will be required for the site prior to beginning of construction activities. If any work is required in the right-of-way, a permit will also be required. Mr. Tom Hill is the City's permitting and inspection services manager and will conduct design reviews for the purpose of City permitting requirements.

CH2M HILL is the firm selected by the Port to provide engineering services for the new groundwater treatment system implementation. CH2M HILL will provide treatment system design and construction oversight services for the new treatment system. Mr. Martin Powers is the project manager for CH2M HILL.

5.0 Alternatives Considered

The existing groundwater treatment system consists of phase separation followed by biological treatment, particulate filtration, and GAC adsorption for final polishing. The following three groundwater treatment alternatives were considered for the new groundwater treatment system process:

- GAC only
- GAC preceeded by oil removal
- GAC preceeded by oil removal and biological treatment

The data shown in Table 3 were used by Calgon Carbon to estimate the GAC (Filtrasorb 300) consumption rate, assuming a continuous flow rate of 25 gpm. This flow rate is the maximum design flow rate, so actual GAC consumption is expected to be less. Use of the maximum flow rate combined with average concentrations should provide a conservative estimate of the actual GAC consumption. Information provided by Calgon Carbon (Appendix A) indicates that the GAC consumption rate to achieve non-detectable organic compounds in the effluent would be approximately 7.53 pounds per day (lb/day) if the plant influent (Table 3) was routed directly to the GAC treatment vessel and 3.35 lb/day if the effluent from the OWS was routed to the GAC vessel for treatment.

These GAC consumption rates were used to compare the annual operating costs. The GAC consumption rate is one of the following eight criteria considered for comparing the treatment alternatives:

- Annual Operating Cost
- Capital Cost of Equipment
- Personnel Required to Operate
- Schedule for Implementation
- Operability
- Area Required for System
- Aesthetics
- Reliability

For each of the preceding criteria, a relative comparison was made and a ranking was assigned, with a rank of 1 being most favorable and a rank of 3 being the least favorable. For example, the alternative with the highest capital cost has a rank of 3, and the alternative with the lowest capital cost has a rank of 1 for the capital cost criterion. For some criteria, two or more alternatives were given the same ranking where there was not a clear distinguishing factor.

Ranking for each criterion is shown in Table 4. Discussion of those criteria used to select the preferred alternative follows.

The only potential advantage of using biological treatment is a reduction in the GAC consumption. We were unable to fully evaluate the treatment efficiency of the current biological treatment system at the Cascade Pole site with the treatment system influent and OWS effluent data provided. However, the best possible performance of a biological treatment system would be removal of 100 percent of the organic load prior to the GAC system, which would essentially reduce GAC consumption to zero. CH2M HILL's experience with biological treatment of wastewater containing similar organics has shown that 100 percent removal is unlikely.

Even with 100 percent removal, the savings in GAC would amount to only 3.35 lb/day or 1,200 pounds per year in comparison to the alternative that includes GAC and oil removal. At a cost of $4 per pound of carbon plus $0.75 per pound disposal, maximum potential savings in carbon usage is $5,700 per year. Because the biological treatment system has added operating costs for aeration (blower horsepower), disposal of waste activated sludge, and more time required by operations personnel, the savings in carbon usage could be offset by these other operating costs. In addition, the added capital cost for the biological treatment system, which would be significantly greater than the cost of the GAC system, would likely result in a longer payback period, even if the biological system did have a net reduction in operating costs.

Because of the negligible cost advantages and other disadvantages (as indicated by a rank of 3 on various criteria shown in Table 4), biological treatment was eliminated from further consideration.

Comparison of GAC alone versus GAC with oil removal shows that GAC alone has a number of advantages, with only annual operating costs and reliability identified as more advantageous for GAC with oil removal. However, the advantages shown for GAC alone are minor advantages while the advantages shown for GAC with oil removal are more significant.

Relative advantages of GAC with oil removal are as follows.

- **Annual operating costs and reliability**. With oil removal, the estimated GAC consumption rate is reduced by about 4.2 lb/day compared to GAC alone, representing a potential savings of $7,300 per year. This estimated amount of savings is likely higher than what would actually occur because the estimated GAC consumption is conservative and because some oil would likely be removed in the influent equalization tank. However, there is a risk that GAC consumption could be greater than estimated, as shown by data presented in Table 3 due to blinding or coating of the GAC by oil. Calgon Carbon recommends that non-dissolved oil be removed ahead of the GAC because oil can coat the GAC, which reduces the adsorption capacity of the GAC. An upset condition in which a high concentration of oil enters the GAC vessel could compromise the entire bed of GAC, requiring the total replacement of the GAC bed. The cost to change out 2,000 pounds of GAC, which is the anticipated amount per vessel for the new treatment system, would be $9,500.
- **Operability and operations personnel**. With oil removal included, operators will need to spend more time to handle accumulated oily waste in the oil-water separator. However, it is expected that some oil will be removed in the influent equalization tank and may also accumulate in the dirty backwash tank. Therefore, operators will need to process oily waste whether the oil-water separator is part of the treatment process or not.
- **Area required**. The option that includes an oil-water separator requires about 2,200 square feet of area versus a total area required for GAC alone of about 2,000 square feet.
- **Capital costs**. The oil-water separator is an off-the-shelf system with an estimated capital cost of about $35,000.

Given the improved reliability, potential savings in GAC consumption, and relatively low added capital cost, the GAC with oil removal alternative is recommended. The next section describes this alternative in more detail.

6.0 Preferred Alternative and Description

A groundwater treatment system layout and a process flow diagram (PFD) for the preferred alternative are shown on Figures 3 and 4, respectively. The treatment steps include an influent equalization tank (T-1), where floating oil and suspended solids may be removed, followed by an OWS (E-1) and a dual-bed GAC (V-1A/B) system operated in series. The process design is based on a maximum flow rate of 25 gpm from the groundwater pumps plus stormwater from the new secondary containment area for the new process tanks. Estimated stormwater flow rate is expected to be less than 5 gpm. A detailed description of the process is provided below.

6.1 Groundwater Pump System

Each groundwater pump discharges into the existing groundwater collection piping, which will discharge into the influent equalization tank. The existing groundwater pumps will continue to be used. The new treatment system may slightly increase the head requirements for the groundwater pumps, and it is assumed that the capacity of the pumps will be sufficient with the new treatment system. The groundwater pump capacity will be verified during detailed design. New influent piping will be tied from the existing groundwater collection piping (inside CW-5 well sump, see Section on Civil) and routed to the influent equalization tank. As with the existing system, the groundwater pumps will operate automatically using level controls in each well. The electrical and control systems for the existing pump systems will be upgraded and consolidated with the electrical and control systems to be installed with the new groundwater treatment system (see sections 8.5 and 8.6).

6.2 Influent Equalization Tank (T-1)

The new influent equalization tank has a design 2-hour retention time. At 30 gpm (25 gpm from groundwater pumps plus 5 gpm from the stormwater sump), the tank volume is 3,600 gallons. The tank will discharge through an inverted elbow outlet or baffle system that will be designed to trap floating oil during normal operation. The 2-hour retention time should allow suspended solids and DNAPL to settle to the bottom of the tank. The tank bottom will be sloped to facilitate removal of settled material.

Periodically, the wastewater level in the tank will be raised by manually closing a valve on the tank discharge line to remove floating oil that accumulates in the tank. At the same time, the influent flow rate to the tank may be reduced by limiting the number of groundwater pumps that are in operation. The tank design will include an overflow weir above the normal outlet level. When the liquid level within the tank rises, wastewater on the surface, including any floating oil, will overflow the weir and exit the tank through the oily waste discharge line. This wastewater will normally be drained to the slop sump, which is an open sump. The plant operator will visually observe the wastewater flowing into the sump; when the wastewater no longer contains an appreciable amount of oil (or when the sump becomes full), the operator will close the manual valve on the oily wastewater discharge line and reopen the valve on the tank discharge line. Because this is entirely a manual operation, the operator will continuously oversee the operation.

The influent equalization tank will have access hatches on the top and side of the tank. A rolling ladder platform will be provided to access the tank top. The effluent and dirty backwash tanks will also have access hatches.

Settled solids and DNAPL will be drained from the tank through a drain line located at the bottom of the tank. This material may also be drained to the slop sump. Alternatively, this material could be pumped, using the portable air-diaphragm pump, directly to 55-gallon drums.

6.3 Oil-Water Separator (E-1)

Wastewater that discharges from the influent equalization tank outlet will flow into a standard OWS with an internal baffle system designed to trap floating oil. Trapped oil will be contained in an oil storage compartment, which is included with the OWS. Oil that collects in the oil storage compartment will be drained to the slop sump.

Wastewater discharge from the OWS will flow into a small level control tank. The level in this tank will be controlled by adjusting the speed of the GAC feed pumps (two, 100 percent capacity pumps). The level control setpoint will be set at a level below the normal operating level of the OWS so that the wastewater in the OWS is maintained at a somewhat constant level. It is important to maintain consistent liquid level in the OWS to ensure that only oil overflows into the oil compartment; if the level rises, then wastewater can overflow into the oil compartment.

The OWS will have removal covers to allow for periodic inspection and cleaning.

6.4 Granular Activated Carbon (V-1A/B)

The GAC system will consist of two vessels, each of which will contain 2,000 pounds of GAC (Calgon Carbon Model No. MD-72). An additional vessel will be held in reserve until needed. As described in the Alternatives Considered section, the yearly consumption of GAC is expected to be 1,200 pounds of virgin GAC, resulting in carbon changeout about once every 18 months. The vessels will be operated in series in a lead-lag manner.

The plant operator will collect samples on a bi-monthly basis from the effluent in the first vessel in series and analyze the samples for parameters listed in the NPDES permit. When these analyses indicate that carbon breakthrough has occurred, an order will be placed with the activated carbon supplier for activated carbon changeout. Breakthrough is defined as the point where PCP (which is assumed to be the controlling constituent) removal falls below 90 percent removal. Typical turnaround time for activated carbon changeout, from time of order to completion of the changeout, is less than 1 week. Just prior to the arrival of the activated carbon supplier at the site, the operator will close/open manual valves on the tanks to take the lead vessel offline and drain the vessel to the stormwater sump. When the activated carbon supplier arrives onsite, they will open hatches on the activated carbon vessel, vacuum out the spent activated carbon, and refill the vessel with fresh activated carbon; this process is expected to require less than 4 hours to complete.

Spent activated carbon will be placed in “super-sacks” and reprocessed according to regulatory requirements by the activated carbon supplier. Fresh activated carbon may be added to the vessel by lifting super-sacks (containing 1,000 to 2,000 pounds of activated carbon) above the vessel using a mobile crane capable of reaching above the activated carbon vessels. Activated carbon will be released from the super-sack from a bottom spout inserted into an open hatch on the activated carbon vessel. Alternatively, GAC changeout may be accomplished by removing the entire vessel of spent GAC for offsite recycling and replacement with a new GAC vessel of identical size filled with virgin GAC.

After the activated carbon has been replaced, the operator will initiate backwashing (see discussion below) of the fresh carbon to remove fines and stratify the activated carbon bed. Once backwashing is complete, the operator will adjust manual valves so that the vessel that was the lag vessel becomes the lead vessel, and the vessel with the new activated carbon becomes the lag vessel.

Effluent from the GAC system flows to the effluent holding tank. The GAC feed pumps will be sized to pump through the activated carbon vessels and on to the effluent holding tank.

The pressure differential across the GAC beds will be measured. If pressure drop increases to an unacceptable level, then the GAC may be backwashed to remove suspended solids from the carbon bed.

6.5 Effluent Holding Tank (T-2) and GAC Backwashing (T-3)

Discharge from the effluent holding tank will be pumped using the effluent discharge pump to the existing outfall line (see discussion in section 8.2) or to a newly installed outfall line. A flow meter installed on the discharge line will measure and record discharge volume. The outfall line discharges to the LOTT outfall line through an existing pressure/vacuum control valve, which will remain in use with the new treatment system (or will be replaced with a newly installed valve if necessary). The head required for the effluent discharge pump will be set to accommodate pressure drop through the existing outfall line and the existing pressure/vacuum control valve along with pressure drop for new piping. The effluent holding tank will be controlled to contain sufficient water to backwash the GAC vessels. The water level in the tank will be controlled with level switches that will trigger the effluent and backwash pumps to either discharge water or to backwash the GAC vessels.

The effluent holding tank will be sized for one backwash volume of a single GAC vessel. Backwash rate will be 13 gpm/ft^2 of GAC vessel cross-sectional area for a maximum of 40 minutes. The GAC vessel would require a backwash flow rate of 160 gpm and a total backwash volume of 6,500 gallons in a 40-minute period. The effluent holding tank volume will be a minimum of 6,500 gallons.

Dirty backwash from the GAC vessel will flow to the dirty backwash tank. This tank will have the same volume as the effluent holding tank, but will have a cone bottom to facilitate solids settling and concentration. After allowing a number of days for settling, an air-diaphragm pump will be used to recycle wastewater from the dirty backwash tank to the influent equalization tank.

It is anticipated that backwashing will occur infrequently, perhaps once every 3 months. Periodic backwashing is intended to prevent the GAC from “packing” and creating channelized flow conditions within the GAC vessels. Over time, if the GAC is not backwashed, it can become tightly bound (i.e., packed), which makes it difficult to remove the spent GAC. Backwashing will also be initiated if the differential pressure across the GAC bed increases to an unacceptable level, indicating that solids have accumulated in the GAC. In this case, an alarm will alert the operator to the high differential pressure, and the operator will initiate backwashing as described below.

To initiate a backwash, the operator will adjust manual valves on the GAC vessels to take the vessel to be backwashed offline, leaving the other vessel in operation. The operator will then start the backwash pump and adjust a manual valve to set the backwash flow rate at the required level. When the level in the effluent holding tank decreases to a pre-determined level (as controlled by a level switch), the effluent discharge pumps will be stopped automatically. A flow meter on the backwash line will measure the flow rate. Backwash will then continue for a specified time period set by the operator or until the effluent holding tank reaches a low level, whichever comes first. After backwashing is complete, the operator will adjust manual valves to place the GAC vessel back into service. The effluent holding tank will refill once backwash water is no longer required. When the level rises to a pre-determined level, the effluent discharge pump will start automatically.

6.6 Slop Sump (P-5), Slop Tank (T-4), and Slop Pump System

The slop sump will be an open-top sump (covered by grating) with a volume of 200 gallons and a sloped floor. This sump will be used by operators to manage waste material (liquid and solid oily waste). Waste material will be discharged through flexible hoses or pumped using a portable air-diaphragm pump. Waste material will come from a variety of locations in the treatment process, including the influent equalization tank oil skimmings, influent equalization tank settled solids, OWS oil compartment drainage, and dirty backwash tank settled solids. Whenever waste material is drained to the slop sump, the operator will observe the waste and shut off the pump or close the drain valve when the waste clears up (i.e., when wastewater is being drained instead of oily waste or solids). The sump contents will then be pumped to the slop tank using the portable air-diaphragm pump. If wastewater flows into the slop sump, the operator can also recycle the sump contents back to the influent equalization tank.

The slop tank will have a minimum volume of 750 gallons (based on current generation of 50 gallons/month) and a sloped bottom. The oily waste in the slop tank will separate into water and oil phases over time, with water and heavy solids settling to the bottom of the tank. The tank will have drain valves located at various levels on the tank to allow water to be drained into the slop sump; the portable air diaphragm pump can then be used to recycle the wastewater to the influent equalization tank.

Judging from current operations, the expected volume of oily waste material is less than 10 gallons per month. When the slop tank becomes full or, periodically as required by regulations, the operator can use the potable air-diaphragm pump and flexible hoses to either transfer the waste material to a tanker truck or to fill 55-gallon drums. Given the small volume of waste generated, it is most likely that 55-gallon drums will be used for disposal.

6.7 Stormwater Sump and Pump (P-4)

The influent equalization tank, effluent holding tank, dirty backwash tank, slop sump, and slop tank will be located outside. Secondary containment will be sized at 110 percent of the largest tank volume and will consist of an 840-square-foot concrete slab with a concrete curb that is approximately 1.5 feet high to provide 7,150 gallons (110 percent of the 6,500-gallon volume in the effluent holding tank) of containment. All other equipment will be located inside.

Stormwater that falls within the secondary containment area will flow into the stormwater sump. The slop sump will have curbs around it to prevent stormwater from flowing into this sump. The stormwater sump will have a minimum volume of 2,000 gallons, which is sufficient to store a 25-year, 24-hour rain event (total of 3.8 inches of rain) (Miller et all, 1973). The stormwater sump pump will be a submersible pump that operates automatically using high/low level switches. Stormwater will be pumped to the influent equalization tank and treated as wastewater. In the event of failure of the stormwater pump, a high level switch in the containment area will alert the plant operator. The portable air-diaphragm pump can be used as backup, if necessary, to pump stormwater into the influent equalization tank. The secondary containment for the new tanks provides additional stormwater holding volume in the event that the portable air-diaphragm pump is not immediately put into use.

In addition to stormwater, process drains from the process area (where the process equipment is located inside a building) will flow to the stormwater sump. Process drains could include drains from the GAC vessels or trench drains around the perimeter of the process room.

7.0 Preliminary Design and Construction Schedule

Table 5 summarizes the preliminary design and construction schedule. Meeting this schedule depends on various factors, including changes that result from the Port, Ecology, and public comments; timely approval of any required permits; and timely preparation and Ecology approval of the final design and specifications.

A more detailed project schedule will be developed prior to commencing preparation of engineering specifications and drawings based on input received from the Port.

An operation and maintenance plan that presents technical guidance and regulatory requirements to ensure effective operation of the new groundwater treatment system will be submitted 30 days before construction completion to Ecology for approval.

The as-built plans and specifications will be submitted to Ecology within 120 days of construction completion for the new groundwater treatment system

8.0 Engineering Design and Operation Parameters

The following subsections describe the design criteria for components of the groundwater treatment system.

8.1 Architectural

This architectural section defines the siting, building features, and materials and construction, code requirements, and lead time for the building to be used to house the process components of the new groundwater treatment system. The building will be designed for a specified minimum life (e.g., 20 or 50 years).

Siting of Building

The new groundwater treatment system building will be located to the east of the existing groundwater treatment area, and south of Marine Drive NE. Primary access to the building would be from the west or east sides.

Building Features

The new treatment building's primary purpose will be to house specific components of the groundwater treatment system. The building will be approximately 1,300 square feet (43 feet by 30 feet), and will be located immediately south of the process tank area. A single process room will be provided on the main floor to house the GAC vessels and pumps, along with a large OWS, process pumps, and tanks. The process room will be served by an overhead roll-up door on the east wall, aligned with the GAC vessels. Trench drains located on the perimeter of the process room will prevent spills from exiting the building; the trench drains will be piped to drain to the stormwater sump located in the tank containment area.

An electrical equipment room will be located immediately north of the process room, with separate access – no direct connection between the two spaces. Additional building features will include a personal protective equipment (PPE) change room, which will provide access to the process room. This space provides the primary personnel access into/out of the process room and will include lockers, a bench, wall cabinets for storing/dispensing the PPE, a sink, and two drums for depositing soiled PPE clothing when leaving the treatment area. If financially feasible, two offices, a bathroom (sink and toilet) and a shower room may be included in the process building design. If installed, the offices will be air conditioned with a wall unit.

Building Materials and Construction

The treatment building will be a pre-engineered metal building, enclosed with prefinished metal roofing and siding. The building structure will be designed to allow attachment of pipe supports and building heaters. The building will be constructed with a concrete slab-on-grade floor, and have a minimum of 16 feet of clearance under the steel roof framing. The process and electrical rooms will be open to the roof, and the PPE change room will have a suspended acoustical tile ceiling. The roof and exterior walls will be insulated with blanket insulation, complying with current Washington State Energy Code, and exterior walls will be protected on the inside with prefinished metal liner panels. Interior partitions will be of metal stud construction with painted gypsum board on both faces. The partition walls facing into the process room will have additional protection of fiberglass reinforced polyester (FRP) panels covering the bottom 8 feet of gypsum wall board.

Hollow metal doors and frames will be used for all personnel doors, and roll-up doors will be of insulated steel construction. No external windows are planned for the building walls, but skylights will be provided in the roof to allow natural light into the process room.

Site security control is provided by a perimeter fence. Thus, no additional security controls will be implemented

Architectural Code Summary

In accordance with the 2009 International Building and Fire Codes (IBC and IFC), the groundwater treatment system building will be classified as follows:

- **Occupancy classification.** The entire Building will be classified as Group F-1, Factory Industrial, Moderate-Hazard, per IBC Section 306.
- **Construction type.** Type II-B (per IBC Chapter 6).
- **Allowable floor area.** The allowable floor area (Table 503) of a building of F-1 Occupancy/Type II-B construction is 15,500 square feet, so there are no additional code restrictions anticipated to be placed on this relatively small building of 1,450 square feet.

Lead Time for Equipment

After the design is approved, the lead time for delivery of the pre-fabricated building materials to the site is expected to be 10 to 12 weeks. Assuming the foundation is already in place, it is expected that the building would be fully erected in 2 to 3 weeks.

8.2 Civil

The area where the facility will be located (Figure 5) is at a low elevation relative to the area farther east and to the south of the facility location. It is anticipated that fill material will be used to raise the elevation approximately 2 to 3 feet to improve vehicle access to the new facility. This higher elevation will result in the new facility being 2 to 3 feet higher in elevation than the existing treatment system. Retaining walls (2 to 3 feet high) to the west and south of the new facility may be necessary if the existing space available does not allow for 3:1 slope gradients to transition to existing grade. A detailed site topographical survey will be necessary to finalize the site grading plan.

Vehicle traffic to the new treatment facility will be intermittent. GAC changeout, which is expected to occur only once per year or less, will be performed using a vacuum truck that will park next to the roll-up door. Waste disposal will also require moving 55-gallon drums from the facility. The Port owns a forklift that can be used for moving 55-gallon drums and placing them on a flatbed truck for offsite disposal. This forklift can also be used for lifting GAC super-sacks from the delivery trucking and placing them in the process room. The proposed traffic flow is shown on Figure 5, which will require backing in trucks to provide close access for offloading or loading of equipment and materials near the process building or tank containment pad. A minor amount of yard piping may be required to tie into the existing groundwater discharge piping and the existing outfall line. Approximate locations of the tie-in points to this existing piping are shown on Figure 5. Existing electrical and I&C wiring for the groundwater pumping system will also be tied as shown on Figure 5.

Any soil that is removed that cannot be used for backfill, thus requiring disposal, is likely contaminated and must be shipped offsite per the appropriate regulations. A specification will be prepared during detailed design that describes the appropriate procedures for identifying, handling, and disposing contaminated soil.

Electrical power to the new electrical room will be routed overhead from the existing power pole. In addition to the electrical power, site utilities include potable water and natural gas. Potable water and natural gas utilities will be routed underground to the new facility. Approximate locations of tie-in points to the existing utilities are shown on Figure 5.

It is assumed that existing fire hydrants are suitably located, and no expansion of the fire water system is planned.

Except for an area used for a decontamination pad, which will be located adjacent to the secondary containment area, stormwater from the access way to the east of the new facility will sheet flow to the grassy swale area to the north of the existing treatment system. Stormwater that falls on the decontamination pad could contain waste material; therefore, it will drain to the stormwater sump inside the tank secondary containment area.

During construction, suitable erosion and sedimentation control methods will be used to minimize soil runoff. Because the amount of excavation is minimal and the construction area is relatively small, no temporary stormwater ponds or stormwater treatment are anticipated.

The construction staging area will be identified by the Port as the site design is further developed.

8.3 Structural Design Basis and Criteria

Process Building

The process building will be a prefabricated metal building that is approximately 43 feet by 30 feet with a minimum height to the underside of the rigid frame of approximately 16 feet. Framing will consist of rigid frames and portal frames in the direction transverse to the rigid frames. The foundation of the prefabricated metal building will consist of concrete spread or strip footings.

Tank Containment Area

This structure will consist of a concrete slab-on-grade and a low-height perimeter wall or curb. The containment area will be sized to contain 110 percent of the largest tank fluid capacity. In addition to the containment area slab (with associated sumps and equipment pads), footers for a future pole barn to be installed over the tank containment pad may be installed.

Codes and Standards

- Building Code: IBC, 2009 Edition
- Minimum Design Loads for Buildings and other Structures: ASCE 7-05

Design Load Criteria

- Occupancy Category: II
- Snow Load:
  - Minimum Roof Snow Load: 30 psf
  - Ground Snow Load: Pg = 20 psf
  - Exposure Factor: Ce = 0.9
  - Importance Factor: Is = 1.0
  - Thermal Factor: Ct = 1.0, heated
- Seismic Loads:
  - Mapped Spectral Response Accelerations: Ss=1.27, S1=.47
  - Design Spectral Response Accelerations: Sds=.76, Sd1=.42
  - Seismic Design Category (SDC): D
  - Site Class: E
  - Seismic Importance Factor: Ie=1.0
  - Basic Seismic Force Resisting System: Ordinary Steel Moment Frame
  - Analysis Procedure Used: Equivalent Lateral Force Procedure
- Wind Load:
  - Basic Wind Speed: 85 mph (3-second gust)
  - Wind Importance Factor: Iw = 1.0
  - Wind Exposure: C
- Floor Loads:
  - Process and MCC Room: 300 psf

Soil Criteria

- Criteria will be based on data collected from a geotechnical boring at the site. This boring has been recently completed and data will be provided prior to the start of detailed design.
- Frost depth: 24 inches
- Water table is below the foundation
- Modulus of vertical subgrade reaction: Ks = 30 pci

- Restrained at-rest pressure: Ko = 0.52
- Non-restrained active pressure: Ka = 0.31
- Passive pressure: Kp = 7.4
- Allowable bearing pressure:
  - Spread footing, 2,500 psf for 5 feet by 5 feet and 2,900 psf for 7 feet by 7 feet.
  - Strip footing, 1,800 psf for 2-foot width and 2,200 psf for 4-foot width.

Materials

- Concrete: f'c = 4,000 psi , 28 day compressive strength
- Reinforcing steel: 60 ksi, ASTM A615

8.4 Building Services

HVAC Systems

- General: The installation will comply with the Washington State Energy Code and the Washington State Ventilation Code. All motors will be premium efficient where available.
  - Outdoor design conditions are as follows:
    - Summer DB/WB: 87º/67º (based on ASHRAE 0.4%)
    - Winter DB: 18ºF (based on ASHRAE 99.6%)
  - Indoor design Conditions are as follows:
    - Summer (cooling season): Approx 10º F above ambient temperature.
    - Winter (heating season): No cooler than 50º F
- Heating: The building process areas will utilize sealed combusting natural gas fired unit heaters to provide heat to all spaces of the building. The unit heaters will be sized to maintain a minimum of 50ºF. Unit heaters will be sized for faster recovery because of open roll-up doors. The PPE change room will receive a grill, and air will be ducted into the room from the heater serving the electrical room.
- Cooling: Cooling will provided by ventilation exhaust fan(s) only in main area of the process building. Exhaust fans will be sized for a minimum of 2.0 cubic feet per minute per square foot to offset the heat gains to the building due to summer temperatures and equipment heat generation. It is anticipated that the system will maintain approximately 10ºF above ambient temperature. The exhaust fans will be control both manually and by an adjustable thermostat. The fans will be wall-mounted propeller fans, either direct drive or belt drive. The louvers will be motorized combination louvers/dampers for both the intake opening and the exhaust opening from the fans. The exhaust fan for the PPE change room will be interlocked with the light switch. If financially feasible to install two offices in the process building, these offices will be cooled by a wall unit air conditioner unit.
- HVAC Controls: The controls systems for the HVAC system will be stand-alone controls. The preference will be to utilize controls furnished by the respective equipment manufacturers; however, some manufactures do not furnish controls with equipment and, in that case, suitable controls will be utilized. In all cases, the controls will be compatible

with the Washington State Energy Code. The process area exhaust fan will be controlled using a thermostat, volatile organic compound (VOC) sensor, and by the use of a manual override switch.

- Ventilation: Additional ventilation will be provided for the process area to control potential VOC buildup in the event of a spill. This will be accomplished using the cooling/ ventilation fan for the process area. The fan will be selected with a 2-speed motor, normal operation will be on low speed, and, as needed, the fan will be capable of operating at high speed or approximately twice the normal air flow.

Plumbing System

- The domestic water system will enter the building in a location coordinated with the civil site plan and will provide for the building potable water needs. Upon entering the building, the water line will be split into two services, both protected with a reduced pressure backflow device. One line will serve the domestic water needs, and the other line will serve the industrial water needs, which include hose bibs located in the process room and in the tank secondary containment area and pump seal water. There will be a combination emergency shower/eyewash in the process room and one outside in the tank secondary containment area. The sink located in the PPE change room will be stainless steel. The gas-fired water heater will be size to provide tepid water (when blended with cold water through a mixing valve) to one emergency shower at a time. Tepid water is utilized at a temperature of approximately 70°F. If financially feasible, a bathroom and shower room will be installed in the process building with a fully functioning toilet and hot and cold water supplies for a sink and a shower.
  - All of the above floor plumbing piping will be Type L soldered copper.
  - The water heater will be high-efficiency, natural gas-fired with sealed combustion.
- The compressed air system, which will be used primarily for powering the air-diaphragm pump, will consist of a packaged vertical tank air compressor. The compressor will be approximately 10 hp and will have a minimum of an 80-gallon storage tank. Air will be stored at a higher pressure and regulated down to approximately 90 psi for use within the facility.
  - All compressed air piping will be Type L soldered copper.
- The drainage and vent system will consist of all cast iron piping. The abovegrade drainage and vent piping will be no-hub, banded piping, and the belowgrade drainage and vent piping will be single–hub, cast iron piping. Floor drains will be located and coordinated with services within the facility including, but not limited to, locations such as near water heater(s), near the compressor, near pumps, near backflow devices, and at other locations required by the function of the building.

Applicable Codes

- 2009 International Building Code
- 2009 International Mechanical Code
- 2009 International Fuel Gas Code
- 2009 Uniform Plumbing Code

- 2007 Washington State Energy Code
- 2006 Washington State Ventilation Code.

Lead Time for Equipment

The lead time of all mechanical/plumbing equipment will be in the range of 2 to 4 weeks. Depending on the manufacturer chosen and the distributors available, much of the equipment may be available off the shelf.

8.5 Electrical

The only items of existing electrical power equipment to be considered for reuse are located in the existing container box housing the I&C equipment. The salvageable equipment includes the well pump starters and associated circuit breaker panels. All of the equipment in the existing service shack and process area should be decommissioned and salvaged for recycling by the construction contractor.

Power for the new groundwater treatment system and the existing wells will be provided from the existing metered overhead drop point. The existing well pump cables will need to be spliced, preferably in abovegrade junction boxes, to extend the circuits into the new electrical/control room. The motor control center (MCC) will be the major piece of electrical equipment to be considered for pre-purchase.

The National Electrical Code and the Washington State Electrical code will be the governing electrical authorities.

Assumptions

- The existing 400A, 277/480V, 3-phase, 4-wire electrical service equipment is old and will need to be replaced. The new service will also have 400A capacity and be installed in the new facility electrical room. The existing utility metering will remain in place, but new overhead drop conductors will be installed to allow both facilities to operate simultaneously during commissioning.
- The loads served by the new electrical service will be the existing well field pumps, the new process facility and equipment, and future expansion.
- All of the equipment in the existing service shack and process area will be decommissioned and salvaged for recycling once the new facility is operational. The only exception may be the well pump starters (see below).

Reuse of Existing Electrical Equipment

The well pump starters and associated breaker panels located in a utility trailer are the only existing electrical equipment that could be reused. Although the starters appear to be in good operating condition, they date from about 2000, so they are approximately a third of the way through their anticipated life span. If reused, they will need to be moved to the new electrical room where they will require somewhat more space than an MCC that is the proposed alternative. Although reusing this equipment may cost somewhat less, it complicates the transition from the existing process to the new process because the former will need to be shut down before the latter can be fully tested. Because the current project schedule is tight and the potential cost savings of reusing equipment is likely minimal, installation of new electrical equipment is recommended. Salvage of the existing electrical starters and associated panels will have some value, which can help offset the cost of new equipment.

Interface of Existing Electrical Systems with the New Facility

The only existing electrical systems that will remain in use are the well field pump/motors and sensors. Currently, the power and sensor conductors are routed through handholes to the utility trailer housing the motor starters and programmable logic controller (PLC) control panel. These conductors will need to be spliced because they are too short to reach the equipment in the new electrical room. Two pairs of two, aboveground, junction boxes for splicing will be installed, one pair just east of the utility trailer and the other pair on the east side of the new facility pad, possibly on or in the new process building.

New Electrical System

As stated above, the capacity of the new service will be 400A/480V/3-phase, which will provide sufficient spare capacity to power new wells and additions to the building. The preliminary estimated process load will be less than 120A.

The system will start with a service entrance rated, fused, manual transfer switch (MTS). The utility side of the switch will be fed from the overhead drop via a mast, and the emergency side will be connected to a 200A outside mobile generator plug. The plug is more than sufficient for a 100kW, 480V, 3-phase mobile generator, which would be capable of supplying the minimum 120A required to keep the plant operational. The common poles of the MTS will feed power to an MCC with full-size buckets for each starter and NEMA rated contactors with electronic overload blocks for all 480V motor loads such as well and process pumps and fans. In addition to the motor starters, the MCC will house several variable-frequency drives (VFD) for process pumps. A service-size surge protective device (SPD) and multifunction power meter/monitor (PMM) will be connected to the incoming power at the MCC. The SPD will protect against voltage spikes, and the PMM will detect utility power anomalies, such as low voltage or phase loss, and signal the PLC control panel to turn off any equipment that might be affected. The MCC will either house or provide power to a 15 to 30kVA, 480:208/120V, step-down transformer and circuit breaker panel for 120V loads such as lights and heat trace. Space will be allocated on one end of the MCC for the addition of at least three sections to accommodate future expansion.

If the building is expanded and on emergency power, it will very likely be necessary to isolate selected electrical to keep from overloading a 100kW generator.

Codes

The National Electrical Code and Washington State Electrical Code will inform the design with NEMA-rated and UL or CSA-listed electrical equipment.

Materials

- Electrical Room: NEMA 1 or 12 enclosures, rigid or intermediate galvanized steel (RGS or IMC), or aluminum conduit.
- Process area inside: NEMA 4X, stainless steel enclosures; FRP will be considered pending suitable corrosion resistance determination with RGS, IMC, or aluminum conduit.

- Process and other outside areas: NEMA 4X, stainless steel or aluminum enclosures, aluminum or RGS conduit.
- Buried or concrete encased conduit: These conduits will be either RGS or Schedule 80 polyvinyl chloride (PVC).
- Aluminum conduit: The use of aluminum conduit will depend on several factors, including the building material, resistance to corrosion by the process liquids, shielding required for conductors, and frequency of potential contact with concrete.
- Schedule 80 PVC conduit: The use of PVC conduit will depend on corrosion resistance and exposure to mechanical damage.

Design Considerations

- Use materials suitable for the environment.
- Minimize the variety of materials, such as type of conduit, as much as possible.
- Address life span and future availability of replacement equipment.
- Provide easy access to equipment and devices for use, maintenance, or exchange.
- Provide comprehensive device and conductor labeling.

Lead Time for Equipment

The lead time for the main piece of electrical equipment, the MCC, will be in the range of 12 to 16 weeks. Depending on the manufacturer chosen and the distributors available, much of the equipment may be available off the shelf.

8.6 Instrumentation and Control

The control system for the current groundwater treatment system at the Cascade Pole site consists of two PLCs, two human-machine interface (HMI) computers, and an alarm dialer system. One PLC and HMI are utilized for the treatment plant’s process equipment and the other PLC and HMI are utilized for the well pumps and associated sensors.

The treatment system’s process equipment is controlled by an Eagle Signal Controls Micro 190+ PLC. An HMI is attached to this PLC but it is presently non-operational. Both the PLC and the HMI are built on obsolete and unsupported technology, and it is recommended that they both be replaced with hardware and software using current technology.

The well pumps are controlled by an Allen Bradley SLC 5/04 PLC, which is housed in a separate control panel installed in the shipping container. This type of PLC is still sold and supported by Allen Bradley and, if preferred, could be reused with some expansion upgrades as outlined elsewhere in this report. An Allen Bradley Panelview 900 HMI is installed on the door of the Well Pumps Control Panel. This unit is also still supported by Allen Bradley and could potentially be reused to serve the same function, if desired.

As stated previously, the Allen Bradley PLC that presently controls the well pumps is very capable of running not only the well pumps, but also the new treatment process equipment. The unit presently does not have enough spare Input/Output (I/O) capacity to support the additional I/O required for the new process equipment and also does not have Ethernet capability. However, both of these shortcomings could be remedied by adding a new remote

I/O panel that would expand the I/O capacity of the existing PLC controller. This panel would be installed directly next to the existing panel after it is relocated in the new building and would provide the expansion needed to tie in the new plant equipment and also provide spare capacity for future expansion. Additionally, a media converter could be added to enable the PLC to communicate with other devices such as the plant HMI using Ethernet. Although this does remain a viable option, the disadvantage (aside from the fact that two separate control panels would exist instead of one) would relate to the controls cutover (changeover) to the new system. During the cutover, the system down time would include the time for disconnecting the existing control panel wiring, relocating the panel to the electrical room of the new building, extending the existing wire runs to reach the panel at its new location, and then reterminating them.

Conversely, instead of reusing the existing well pumps control panel, a new control panel could be fabricated that would contain a new Allen Bradley Ethernet-capable controller and would be sized to support all of the process equipment and well pumps and allow for future expansion. The advantages of having a new control panel include having all control functions housed in one panel and minimal controls-related system down time. The new panel could be installed while the existing well pumps are still in operation. Additionally, wiring runs could be extended from the new control panel to terminal junction panels that would be installed near the existing well pump control panel so that the system down time required for controls cutover would only consist of disconnecting wiring from the existing well pump control panel and reconnecting to the new terminal junction panels.

Given the advantages and disadvantages of both alternative listed above, it is recommended that a new control panel and PLC be provided instead of reusing the existing well pumps control panel and controller.

Space will need to be provided in the electrical room to install the control panel. The estimated control panel dimensions are 72 inches wide by 72 inches tall by 24 inches deep, but the exact dimensions will need to be determined during detailed design. Equipment interfaces to the wells require intrinsically safe circuits to protect against inadvertent ignition of flammable gases. The existing well control interface signals are wired intrinsically safely, and adding future wells will likewise require intrinsically safe circuits. Space will be allocated in the control panel to add intrinsically safe circuits for future expansion. Additionally, an Uninterruptible Power Supply (UPS) will be installed in the control panel to allow the PLC, HMI, and alarm dialer to continue to function in the event of a power failure.

The control panel will be installed in the electrical room of the new building. Enclosure ratings will be as described in the Electrical section.

A new HMI will be installed inside a protective enclosure located in the treatment process area. This HMI will provide monitoring and control of the entire plant including the well pumps and the new treatment system. If preferred, an additional desktop HMI could be installed in the site trailer so that the system could be accessed without having to enter the process area.

The existing alarm dialer system consists of a Sensaphone 2000 Alarm Dialer that is capable of initiating both voice and pager alarm dialouts and allows remote acknowledgement of the alarms. The unit is installed inside the well pumps control panel, but the dialer is not presently connected to a phone line. This unit is still a supported model, but it is only capable of monitoring up to eight discrete alarms. The unit could be reused depending on the preference for the number of alarms that would need to be dialed out, but it is recommended that a new PC software-based alarm dialer be installed on the new plant HMI, which would allow for many more alarms to be dialed out. Note that a dedicated phone line will need to be installed to utilize an alarm dialer.

Remote access to monitor and control the plant can be provided by adding a remote connection to the plant control network and installing remote access software such as VNC or PCAnywhere on the plant HMI and remote computer. The remote connection could be provided by installing a dedicated phone line and an industrial dial-in network router or, alternatively, could be provided by installing a DSL connection and a VPN Firewall. Both options would provide reasonable security because a login and password would be required to access the plant control system. The advantage of using the dial-in network router with phone line is that it is the least expensive option. The advantage of using the DSL and Firewall alternative is that it would be faster, but more expensive. However, given the size of the plant's control system, the dial-in network router would provide sufficient network speed to allow a remote operator to monitor and control equipment and would be the most cost-effective solution. Therefore, the dial-in network router is the recommended alternative for remote access.

Lead Time for Equipment

The lead time for the I&C equipment will be in the range of 6 to 8 weeks. Depending on the manufacturer chosen and the distributors available, much of the equipment may be available off the shelf.

8.7 Expected Treatment Efficiencies

Influent Equalization Tank

The influent equalization tank is the initial process unit that provides preliminary treatment as well as equalization of groundwater influent flow and contaminant concentrations. All extracted groundwater will be pumped into the influent equalization tank at the GWTP, which provides a relatively large, quiescent volume of water for settling solids and separating floating product and materials. The tank will be sized for a minimum 2-hour hydraulic retention time (3,600 gallons for 25 gpm of groundwater and 5 gpm of stormwater), which is comparable to the retention time through the existing influent equalization tank (~2,000 gallons at an average of 17 gpm for 2007). Treatment removals for the influent equalization tank are anticipated to be comparable to historical performance of the existing GWTP (2003 through 2009) with effluent from the influent equalization tank similar to that shown in Table 5. Relevant influent equalization tank effluent concentrations for total suspended solids (TSS) and oil and grease (O&G) averaged 13 parts per million (ppm) and 11 ppm, respectively, over the 6-year period.

The pollutant concentrations reported are at levels that can be readily handled by the subsequent oil water separation step.

Oil Water Separator

A gravity-type OWS will be provided as the second process treatment step for removing the majority of any remaining non-soluble oil product. Pretreated groundwater will flow by gravity out of the equalization tank to the OWS, which will be sized for a continuous flow of 25 gpm. The dimensions of the OWS will conform to American Petroleum Institute standards for depth versus width to maintain proper flow velocity and for length to provide sufficient detention time for oil droplets to rise to the water surface before exiting the separator. Vertical baffles in the upper portion of the main compartment retain floating product at the water surface, while allowing the water to pass beneath the baffles to the outlet. Heavier solids and DNAPL will also sink in the main compartment and be retained by vertical baffles in the lower portion of the tank.

Treatment removals are anticipated to be comparable to the existing OWS that is reported to collect approximately 1 to 2 gallons of oily product per month. Although the quantity of recovered oily product may not appear to be large, the proportion of PAH contaminants removed with the oil is significant as indicated in Tables 6, 7, and 8. Over the 6-year monitoring record, the existing OWS reduced the total PAH concentration (for the 16 compounds of interest) from 2,189 parts per billion (ppb) to 1,191 ppb for an average 46 percent removal efficiency. PCP was reduced from 366 ppb to 280 ppb over the same time period for an average 24 percent removal efficiency through the OWS.

Solids Filtration (optional)

If necessary, a solids filtration system will be installed downstream of the OWS and prior to the GAC adsorption vessels. The filtration unit will be capable of removing solids with a nominal diameter of 25 microns. Further analysis of the current groundwater influent to the treatment system will be necessary before determining if the solids filtration will be necessary. Additionally, if significant back pressure at the GAC vessels is experienced or TSS results in short-circuiting within the GAC vessels, as indicated by effluent concentrations that exceed expectations for carbon breakthrough times, these will be considered a triggering factor for installing the solids filtration system.

Carbon Adsorption

As with the existing treatment system, two active GAC adsorber vessels (and one in reserve), will be provided in a lead/lag arrangement for the new groundwater treatment system. In addition to the two GAC vessels in use, a spare vessel of identical size will be stored as back-up capacity. Plans are to operate the vessels in series until PCP removal efficiency from the lead vessel drops below 90%. When this breakthrough occurs, the lead vessel will be brought off line, the lag vessel will become the lead vessel, and the spent carbon (former lead vessel) will have its GAC replaced and will serve as the “spare” GAC vessel. For the existing groundwater treatment system, GAC adsorption has effectively reduced all organic compound pollutant concentrations in the groundwater, specifically PCP and PAHs, to non-detection limits over the 6-year monitoring period (Table 9). The new GAC adsorbers (Calgon Carbon Model No. MD-72) are expected to perform similarly and are predicted to meet or exceed the 99.5 percent PCP removal efficiency requirement (Table 1). Based on a review of analytical data, the use of GAC without upstream treatment using biological treatment is recommended as the GAC usage rate would be approximately 7.5 pounds per day and the added cost for purchase and operation of a biological treatment system would not result in a beneficial reduction in the GAC usage rate.

9.0 Achieving Permit Compliance

Groundwater treatment processes are being provided with the new GWTP to meet the proposed effluent discharge limits and achieve full NPDES permit compliance as listed in Table 1. The performance of the treatment processes at the new groundwater treatment system is predicted to be comparable to those for the existing treatment system as shown in Table 8. Historical groundwater monitoring results show that influent TSS concentrations are relatively low (average 13 ppm) as would be expected for groundwater that has essentially been filtered through the subsurface soil structure. Heavier solids will settle out in both the influent equalization tank and OWS, with any remaining solids being effectively filtered out in the GAC vessels. GAC effluent (final treated effluent) has been shown to average 1.4 ppm of TSS, which is well below the proposed average monthly limit of 6 ppm. Solids filtration of the water will be considered for the final design between the OWS and GAC vessels based on additional data to be collected.

Historical monitoring results show that the pH of the extracted groundwater tends to increase from approximately 7 to just under 8 units, which falls well within the acceptable discharge pH range of 6 to 9.

PCP is effectively removed by activated carbon, as shown by the historical monitoring results, with effluent concentrations generally reaching non-detection limits (0.10 ppb). The treated effluent concentration has averaged 0.2 ppb over the past 2 full years, which is well below the proposed maximum daily concentration limit of 6.5 ppb. The existing GWTP has also achieved an average 99.87 percent PCP removal rate over the same period, which exceeded the average monthly 99.5 percent removal requirement. The new groundwater treatment system is expected to achieve comparable results in compliance with the permit limits.

PAHs are also effectively removed by activated carbon as shown by the historical monitoring results, with treated effluent concentrations generally reaching non-detection limits (0.10 ppb) over the past 6 years. As a result, the discharge limit for total PAHs was eliminated from the proposed discharge permit, with monitoring of the representative carcinogenic PAH (benzo(a)pyrene) to be conducted monthly.

10.0 Spill Control Features

Spill control features will be incorporated into the design and construction of the treatment system. In the event of any accidental spill, the response and cleanup actions will be consistent with the Port's spill prevention and containment procedures found in the current O&M plan. This spill plan may need to be updated to include the new treatment system and its components.

Potential spill sources associated with the construction of the new treatment system will be identified, and Best Management Practices will be implemented during construction. The system installation contractor will be required to implement plans and technical specifications in the bidding documents, which will be reviewed by the Port and CH2M HILL.

The most likely hazardous material release to occur during construction activities will be fuel or hydraulic oil from construction equipment and fleet vehicles. Other hazardous materials are not anticipated to be in significant quantities during the construction phase. If there is a spill, management will be consistent with the spill control plan that the contractor will submit prior to construction.

During the construction phase, erosion and sediment control measures will be implemented as required by weather conditions and may include the following:

- Plastic sheeting beneath and over soil stockpiles to prevent erosion.
- Straw bales, berms, or filter fabric to protect the soil stockpiles and excavations from runoff.
- Silt fencing or other erosion control measures across discharge points along the site boundary to control offsite erosion and sediment transport.
- Straw bales or filter fabric to protect existing catch basins at the site.

During the operation of the new treatment facility, spills within the process area and stormwater that falls within the secondary containment area will flow into the stormwater sump. The stormwater sump will have a minimum capacity of 2,000 gallons. The stormwater sump will have a submersible pump that will operate automatically using high/low level switches. Any liquids within the stormwater sump will be recycled to the influent equalization tank. In the event of stormwater pump failure , a high level switch in the containment area will alert the plant operator. A portable diaphragm pump can be used as backup, if necessary, to pump stormwater into the influent equalization tank.

11.0 Safety Features

All construction activities will be completed in accordance with design criteria, Washington Industrial Safety and Health Act (WISHA) regulations (WAC 296-800) for construction safety and work at hazardous waste sites, and local standards of practice for construction. The construction activities at the site will be designed to be completed with clean fill, asphalt, or concrete over soil that contains no contaminants above the cleanup action levels. When the cleanup actions are complete, potential exposure pathways (e.g., direct contact, ingestion, inhalation of dust, groundwater to surface water) will be eliminated, and the site will not pose a threat to future long-term workers at the site.

All personnel working at the facility will be trained to operate and run the equipment, ensuring their long term safety. The general public will not be allowed onsite unless properly trained or escorted by trained personnel.

The current O&M manual and the HASP will be replaced by a manual and plan that are specific to the new treatment system and its components. The new treatment system will be operated and maintained according to the procedures and criteria described in the approved operating plan.

12.0 Methods for Managing Treatment Residuals

Treatment residuals from the new groundwater treatment system include spent activated carbon and oily waste. Management of these residuals is described below. In addition, generated PPE waste will be deposited in 55-gallon drums for offsite disposal.

12.1 Granular Activated Carbon

GAC performance will be determined by analyzing samples taken downstream of the lead GAC vessel. When the samples indicate breakthrough the lead GAC vessel, a contract service (such as Calgon Carbon) will be used to remove and replace the GAC.

Prior to the contractor arriving at the site, the lead GAC vessel will be taken offline and drained to the stormwater sump in the secondary containment area. The stormwater pump will then transfer the drainage to the influent equalization tank. If necessary to break up any potential packing of the activated carbon bed, the plant operator may backwash the vessel prior to draining it.

The GAC replacement contractor will open the access hatches and use a vacuum system to remove the GAC. The spent GAC will be placed in containers, such as super-sacks, provided by the contractor. The contractor will either dispose of the spent activated carbon or regenerate it as required by regulations.

Fresh GAC will be provided in super-sacks, each of which contain 1,000 to 2,000 pounds of GAC. The plant operator will use a forklift to take the super-sacks off the delivery truck and place them on the ground just inside the process room, next to the roll-up door. A fork likft will be used to lift the supersack and place it on a platform above the GAC vessel. The contractor will release the GAC from the supersack and refill the vessel. A platform next to the GAC vessels will be provided for access to the underside of the supersack.

12.2 Oily Waste

Based on sampling done at the existing treatment plant, it is anticipated that most of the oily waste will be oily liquid with little or no solids. Therefore, no provision for dewatering solids is included in the new treatment system.

Oily waste may be captured in the influent equalization tank, OWS, and the dirty backwash tank. Drain lines will be provided on each of these vessels to allow transfer of oily waste to the slop sump, which will be located in the tank secondary containment area. A portable air diaphragm pump and flex hoses will be available to facilitate waste transfer. During transfer of wastes, the plant operator will observe the material in the slop sump and stop transfer when wastes are no longer present (i.e., when the drainage is mostly water).

Material collected in the slop sump will be pumped to the slop tank, which will be used to further separate water from the oily waste. Water will be decanted or drained from the slop tank to the slop sump using one of a series of valves located at various level of the slop tank. Water drained to the slop tank will then be pumped to the influent equalization tank.

Oily waste stored in the slop tank will periodically be pumped into 55-gallon drums using the portable air diaphragm pump. The 55-gallon drums will then be shipped offsite for disposal per the appropriate regulations.

13.0 Facility Specific Factors

Several factors need to be considered that affect the current and future activities at the site and are discussed in this section.

The potential for flooding at the site is minimal, even though it is located in one of the lowest points of the facility. In the event of flooding due to storm events, the facility will be able to immediately treat the stormwater through the treatment system. The system will be designed to treat stormwater that falls within process areas from a 25-year, 24-hour rain event. Larger storm events may cause some localized flooding in the tank secondary containment area that will require some time to process in the treatment system, as limited by the total treatment capacity throughput. To speed up processing of excess stormwater, groundwater pumping could be temporarily reduced to free up treatment capacity.

The treatment system location is surrounded to the east, west, and south by property leased to Weyerhaeuser. The lessee operates large machinery throughout the yard at their discretion. Operations at the log yard will not be affected during the construction or operation phase. The contractor, CH2M HILL, and the Port will devise a plan to minimize the staging footprint during the construction phase. The contractor will use the northernmost gate of the Port as the access point to minimize interference with the log yard operations.

Even though the site is located in the Port of Olympia peninsula, this project is exempt from obtaining a Shoreline Management Policy permit. The closest relative mean high water levels to the site are approximately 300 ft to the NE, and 450 ft to the West of the site (see Figure 6).

Because the Port is required to maintain a hydraulic control over the affected groundwater plume at the site, the construction phase will be coordinated so that groundwater treatment continues until the new system is installed and is ready to be activated.

Soil disturbance will be minimal during the construction phase, with only small trenches being excavated to connect the current extraction piping to the new treatment system and a moderate amount of grading work to prepare the ground for fill placement as sub-grade material for tank containment and process building concrete pads.

14.0 Construction Quality Control and Quality Assurance Methods

Construction quality control will be performed by the contractor, consistent with the requirements and provisions of the technical specifications. In accordance with WAC 173-340-400(7)(b), all aspects of construction will be performed under the oversight of a professional engineer registered in the State of Washington or a qualified field technician under the direct supervision of a professional engineer registered in the State of Washington.

Construction quality assurance (CQA) plan requirements will be provided in the construction bid documents (plans and specifications). At a minimum, the CQA plan will provide the following:

- Project organization
- Identification of CQA personnel and responsibilities
- Description of the construction testing
- Documentation of construction activities
- Change order procedures

At the conclusion of the installation, a completion report will be prepared. The completion report will include CQA documentation, as-built drawings, and a certification from the engineer that the work performed was conducted in substantial compliance with the plans and specifications. This report will be submitted to Ecology within 120 days of the conclusion of the installation of the groundwater treatment system.

Quality assurance includes compliance with health and safety requirements and performance standards outlined herein and within the specifications.

15.0 Health and Safety

This section presents the general guidelines for personnel safety and information on specific hazards associated with the Cascade Pole site. A site HASP will be prepared by the installation contractor and a copy will be maintained in the onsite office. It will be used for detailed guidance on health and safety procedures. This section can be used for informational purposes and general guidance.

Personnel involved in constructing the project will be required to comply with the health and safety training requirements corresponding with the task(s) they are performing. The operators of the current treatment system will be advised of the construction activities, and their HASP will be updated so that it includes field activities and procedures at the treatment system during the construction phase. Contractors and subcontractors who may come into contact with hazardous materials are required to use workers trained for hazardous waste work. The contractor personnel will also receive site contractor orientation training to work in the Port. It will be the contractor’s responsibility to meet all the requirements of WAC 296-155, Safety Standards for Construction, and the applicable provisions of the hazardous waste operations regulations, WAC 296-62, Part P and 29 CFR 1910.120. The Contractor will also have a site health and safety (H&S) officer who will oversee all contractor personnel to maintain compliance with health and safety requirements and regulations. Prior to starting work, the Contractor will submit a HASP to the Port’s engineer for review. The plan will include written documentation of employee training and medical certifications as required under WAC 296-62, Part P. Documentation of the following items is required for each site worker where work falls under the requirements of WAC 296-62, Part P:

- Initial 40-hour health and safety training and annual 8-hour refresher training
- Eight-hour supervisory training, required for the field supervisor
- Medical clearance from a licensed physician certifying that the worker is fit to participate in field activities and use PPE
- Current respirator fit test certification
- Current CPR and first aid certification for at least one member of each crew
- PPE for each worker at the highest level of protection required for this site (Level D)

Following the installation of the new groundwater treatment system, the Port will be responsible for updating and following a site-specific HASP. The HASP will be kept onsite within the office of the treatment building, available to anyone who visits the Site. The plan should include general health and safety practices, as well as information on hazards specific to the Cascade Pole site and the O&M activities.

15.1 Safe Work Permits

As a requirement of Port's HASP, safe work permits must be completed for specific activities to ensure that these activities have been thoroughly planned and applicable safety requirements are being performed. The safe work permits required to be completed for the treatment system O&M activities include:

- High Pressure and Pressurized Jetting
- Pipe and Equipment Opening
- Working at Elevations
- Disabling of Major Safety Equipment
- Control of Hazardous Energy (Lockout/Tag out)
- Confined Space Entry
- Hot Work (i.e., brazing, grinding, soldering, welding)
- Working on Energized Electrical Equipment
- Working in Trenches and Excavations

15.2 Potential Hazards

A list of potential hazards that can be found at the Cascade Pole site is summarized in Table 10.

16.0 Compliance Monitoring Requirements

Compliance monitoring is one of the threshold requirements for cleanup actions under WAC 173-340-360(2)(a)(iv). Compliance monitoring as defined in WAC 173-340-410 requires the following three types of monitoring: protection monitoring, performance monitoring, and confirmational monitoring.

- Protection monitoring is performed to confirm that human health and the environment are adequately protected during the construction and O&M periods of the action. The contractor will address the protection monitoring in a HASP generated for the construction phase of the treatment system and will be reviewed by the Port and Ecology.

- Performance monitoring is completed to confirm that the "cleanup action has attained cleanup standards or if appropriate other performance standards such as monitoring necessary to demonstrate compliance with a permit, or where a permit exemption applies, the substantive requirements of other laws" (WAC 173-340-410). Performance monitoring is achieved through the Port's ongoing groundwater sampling program and the collection of samples from the groundwater treatment system to verify compliance with the NPDES permit.

- Confirmational monitoring is performed to confirm the long-term effectiveness of the cleanup action once cleanup standards, remediation levels, or other performance standards have been attained. Confirmation monitoring is not required at the site at this time.

  Compliance monitoring requirements will be detailed in the Operation and Maintenance Manual to be prepared for the new groundwater treatment system. This O&M plan is will be submitted to Ecology 30 days before construction completion of the new groundwater treatment system.

17.0 References

Cascade Pole Company. Preliminary Cleanup Standards Analysis. Cascade Pole Site. January 24, 1991.

J. R Miller, R. H. Frederick, and R. J. Tracey. NOAA Atlas 2: *Precipitation Frequency Atlas of the Western United States,* Volume IX. Washington, 1973

Washington State Department of Ecology, Amendment No. 1 to Agreed Order No. DE 00TCPSR-753. July 3, 2004.

Washington State Department of Ecology. Interim Actions, WAC 173-340-400 et al, Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC. Washington State Department of Ecology Toxics Cleanup Program, Publication 94-06, Revised October 2005.

Tables

TABLE 1
Current Groundwater Representative Contaminants and NPDES Limitations
Cascade Pole Site, Olympia, Washington

	Current Average Influent-Treatment Concentrations		Current NPDES Effluent Limitations	
	Plant Influent	**After Oil Removal**	**Monthly Average**	**Daily Maximum**
Constituent	(mg/L)	(mg/L)	(ug/L)	(ug/L)
Pentachlorophenol	0.21	0.16	6.5	8.2
TOTAL PAHs	1.323	0.431	48	48
pH	7.0-8.5 at all times			
Treatment System Removal Efficiency for Pentachlorophenol	99.5% at all times			

TABLE 2
Cleanup Standards
Cascade Pole Site, Olympia, Washington

Chemical	Groundwater (ug/L)	Soil (mg/kg)
TEF	8.60E-09	8.60E-10
CPAH	2.96E-02	2.96E-03
PCP	5	0.5
Benzene	5	0.5
Acenapthene	150	15
Fluoranthene	16	1.6
Ethyl Benzene	430	43
Toluene	5000	500
Pyrene	123	12.3
Copper	2.9	0.3
Flourene	1745	174.5
Naphthalene	490	49
Xylenes	36500	3650

TABLE 3
Average Organics Concentrations and Estimated GAC Consumption for Existing Treatment Plant
Cascade Pole Site, Olympia, WA

Constituent	Plant Influent	After Oil Removal
Pentachlorophenol (mg/L)	0.21	0.16
Naphthalene (mg/L)	0.68	0.032
Fluorene (mg/L)	0.079	0.052
Acenapthene (mg/L)	0.17	0.12
Anthracene (mg/L)	0.23	0.16
Phenanthrene (mg/L)	0.15	0.056
Chrysene (mg/L)	0.014	0.011
TOTAL (PCP + PAHs) (mg/L)	1.53	0.59
Estimated GAC (Filtrasorb 300) Consumption @ 25 gpm (lbs/day)[a]	7.53	3.35

[a] See consumption rate calculations in Appendix A.

TABLE 4
Alternatives Comparison[a] - Criteria Rankings[b]
Cascade Pole Site, Olympia, Washington

	GAC Only	GAC With Oil Removal	GAC With Oil Removal and Biological Treatment
Annual Operating Cost	2	1	3
Capital Cost of Equipment	1	2	3
Personnel Required to Operate	1	1	3
Schedule for Implementation	1	1	2
Operability	1	1	3
Area Required for System	1	2	3
Aesthetics	1	1	2
Reliability	2	1	3
Median Score:	**1**	**1**	**3**

[a] For this comparison, the GAC system includes an influent equalization tank and a backwash system (clean and dirty backwash tanks) for backwashing the GAC. The GAC with oil removal adds an oil-water separator following the influent equalization tank. The GAC with oil removal and biological treatment would add an aerobic bioreactor vessel.GAC with oil removal and biological treatment would add an aerobic bioreactor vessel.

[b] For each of the preceding criteria, a relative comparison was made and a ranking was assigned, with a rank of 1 being most favorable and a rank of 3 being the least favorable. For example, the alternative with the highest capital cost has a rank of 3, and the alternative with the lowest capital cost has a rank of 1 for the capital cost criterion. For some criteria, two or more alternatives were given the same ranking where there was not a clear distinguishing factor.

TABLE 5
Design and Construction Schedule Milestones
Cascade Pole Site, Olympia, Washington

	Date
EDR Review and approval	5/27/2010
Civil/Concrete/Building Specifications Completed	8/1/2010
Remaining Component Specifications Completed	9/14/2010
Site Civil/Concrete & Building Constructed	1/14/2011
Remainder System Components Completed	5/27/2011
New treatment system initiated	6/6/2011

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	9/10/03		9/24/03		10/8/03		10/22/03		11/5/03		11/20/03		12/3/03		12/17/03		12/29/03		1/9/04		1/26/04		2/11/04	
Conductivity (umhos/cm)	4740		5130		4080		5500		4560		4820		4160		4950		3950		3600		4310		3920	
Total Dissolved Solids (mg/L)	2690		2900		2270		2704		2524		2704		2310		2710		2150		1950		2383		2140	
Total Suspended Solids (mg/L)	24		12		24		21		15		11		20		20		16		22		7		0.5	U
O&G [HEM] (mg/L)	11.2		8		4.9		6.6		3.3		3.6		6.7		2.8		5.3		62		5.4		3.5	
Total Hardness (mg/L)	790		904		830		830		680		680		686		780		730		698		710		510	
Alkalinity (mg/L)	628		594		640		700		500		606		700		706		686		634		694		684	
Dissolved Oxygen (mg/L)	7.86		7.52		2.58		2.73		0.37		2.82		1.43		1.81		5.27		2.6		2.19		5.67	
pH	6.99		7.01		6.92		6.96		7.69		6.84				7.01		7.22		7.08		7.23		7.01	
BOD (mg/L)	135		46		45		40		48		19		39		48		29		160		41		11	
COD (mg/L)	75		101		95		105		94		49		108		100		91		290		94		33	
Total Phosphorous (mg/L)	0.2		0.1	U	0.29		0.2		0.11		0.2		0.5		0.1	U	9.2		0.2		0.2		0.2	
Nitrate (mg/L-N)	3.7		4.3		2.9		4.9		5.5		6.4		4.5		4.9		3.6		2.6		2.9		2.3	
Total Organic Carbon (mg/L)	44		29		143		45		39		22		36		14		30		176		23		12	
1,2,4-Trichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dimethylphenol (ug/L)	423		362		240		217		470		82		509		10	U	310		680		465		35	
2,4-Dinitrophenol (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
2,4-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	82		10	U	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chloronaphthalene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylnapthalene (ug/L)	1280		656		765		1031		744		90		1090		10	U	391		2880		1020		280	
2-Methylphenol (ug/L)	205		64		19		97		286		26		68		10	U	10	U	46		100		10	U
2-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
3,3-Dichlorobenzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4,6-Dinitro-2-Methylphenol (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4-Bromophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chlorophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methylphenol (ug/L)	315		49		10	U	107		416		23		46		10	U	10	U	11		75		10	U
4-Nitroaniline (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4-Nitrophenol (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Acenapthene (ug/L)	636		358		350		282		181		118		230		10	U	233		1810		343		107	
Acenapthylene (ug/L)	20		10		10		14		11		10	U	10		10	U	10	U	49		11		10	U
Aniline (ug/L)																								
Anthracene (ug/L)	148		49		74		99		60		40		27		10	U	32		618		67		23	
Azobenzene (ug/L)			10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzidine (ug/L)																								
Benzo(a)Anthracene (ug/L)	49		20		21		25		17		12		10	U	10	U	10	U	216		19		10	U

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	9/10/03		9/24/03		10/8/03		10/22/03		11/5/03		11/20/03		12/3/03		12/17/03		12/29/03		1/9/04		1/26/04		2/11/04	
Benzo(b)Fluoranthene (ug/L)	22		10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	73		10	U	10	U
Benzo(k)Fluoranthene (ug/L)	28		10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	80		10	U	10	U
Benzo(ghi)Perylene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	24		10	U	10	U
Benzo(a)Pyrene (ug/L)	20		10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	18		10	U	10	U
Benzoic Acid (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	147		50	U
Benzyl Alcohol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Biphenyl	147		92		85		123		82		40		106		10	U	10	U	614		99		44	
Bis(2-Chloroethyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Butylbenzyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbazole (ug/L)	121		46		10	U	101		10	U	25		39		10	U	26		98		47		23	
Chrysene (ug/L)	48		22		10	U	27		18		14		10	U	10	U	10	U	254		20		10	U
Di-n-Butyl Phthalate (ug/L)	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Di-n-Octyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	20		10	U	10	U
Dibenzofuran (ug/L)	346		10	U	120		144		117		59		82		10	U	72		952		110		54	
Dibenzothiophene (ug/L)	122		21		60																			
Diethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dimethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/L)	273		84		133		198		122		80		32		10	U	35		1150		106		42	
Fluorene (ug/L)	381		123		218		186		134		100		96		10	U	93		72		200		60	
Hexachlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachloroethane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Indeno(1,2,3-cd)Pyrene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	30		10	U	10	U
Isophorone (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitroso-Di-n-Propylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-nitrosodimethylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Napthalene (ug/L)	3310		1990		2290		3020		1200		60		2940		10	U	437		3260		2860		1060	
Nitrobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol (ug/L)	1190		572		914		448		678		550		534		112		531		802		452		128	
Phenanthrene (ug/L)	701		336		394		429		154		257		92		10	U	102		2300		311		98	
Phenol (ug/L)	84		10	U	10	U	10		46		10	U	10	U	10	U	10	U	10	U	11		10	U
Pyrene (ug/L)	119		55		73		72		54		46		17		10	U	22		980		60		23	
Pyridine																								
Tetrachlorophenol (ug/L)	164		89		108		140		238		112		176		18		126		203		159		16	
bis(2-Chloroethoxy)Methane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)Phthalate (ug/L)	10	U	10	U	15		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-chloroisopropyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total PAHs																								

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	3/17/04		3/31/04		4/14/04		4/28/04		5/12/04		5/26/04		6/10/04		6/23/04		7/7/04		7/21/04		8/4/04		8/16/04	
Conductivity (umhos/cm)	7460		3830		3600		5050		4040		4540		5000		5220		5340		4670		5110		5190	
Total Dissolved Solids (mg/L)	4560		2060		2020		2910		2205		2470		2930		3170		3180		2660		2980		2960	
Total Suspended Solids (mg/L)	14.7		9.3		31		14.7		13.3		10.7		16		14.5		46		6.5		15		16.5	
O&G [HEM] (mg/L)	6.2		2.7		8		11		2	U	5		2		6		3.8		3		11		3	
Total Hardness (mg/L)	1200		720		740		900		620		660		920		770		1000		960		1000		930	
Alkalinity (mg/L)	542		674		532		610		672		626		633		694		692		647		613		650	
Dissolved Oxygen (mg/L)	1.87		4.39		6.27		4.88		4.08		5		3.35		5.01		10.35		6.97		4.8		3.53	
pH	7.05		7.03		7.44		8.29		6.63		7.06		7.15		6.77		6.97		6.89		7.03		7.09	
BOD (mg/L)	28		38		13		29		47		19		21		25		28		16		92		11.8	
COD (mg/L)	83		98		97		69		34		49		65		81		73		72		53		47	
Total Phosphorous (mg/L)	0.2		0.1		0.3		0.2		0.1	U	0.1	U	0.4		0.1	U	0.2		0.26		0.2		0.4	
Nitrate (mg/L-N)	6.62		1.53		6.31		3.6		3.14		2.6		5.2		4.4		11		4.8		13		4.8	
Total Organic Carbon (mg/L)	13		20		20		22		14		21		31		38		24		25		18		18	
1,2,4-Trichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	14		10	U
2,4,6-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	12		17		10	U
2,4-Dichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dimethylphenol (ug/L)	40		244		253		196		10	U	10	U	46		250		266		31		46		23	
2,4-Dinitrophenol (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	10	U
2,4-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chloronaphthalene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylnapthalene (ug/L)	139		362		1080		528		10	U	153		364		581		900		326		363		167	
2-Methylphenol (ug/L)	14		52		58		13		10	U	10	U	14		10	U	80		10		13		11	
2-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
3,3-Dichlorobenzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4,6-Dinitro-2-Methylphenol (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4-Bromophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chlorophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methylphenol (ug/L)	13		49		42		10	U	10	U	10	U	20		10	U	87		10		13		12	
4-Nitroaniline (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4-Nitrophenol (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Acenapthene (ug/L)	130		175		474		320		30		10	U	336		311		489		242		335		136	
Acenapthylene (ug/L)	10	U	10	U	20		12		10	U	10	U	10	U	10	U	15		20		10	U	10	U
Aniline (ug/L)	10	U	10	U	10	U	20	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Anthracene (ug/L)	41		44		124		60		10	U	22		63		38		60		38		56		37	
Azobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzidine (ug/L)	20	U	20	U	20	U	10	U	10	U	10	U	20	U	20	U	20	U	20	U	20	U	20	U

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	3/17/04		3/31/04		4/14/04		4/28/04		5/12/04		5/26/04		6/10/04		6/23/04		7/7/04		7/21/04		8/4/04		8/16/04	
Benzo(a)Anthracene (ug/L)	10	U	10	U	32		14		10	U	10	U	20		10	U	16		12		24		12	
Benzo(b)Fluoranthene (ug/L)	10	U	10	U	16		10	U	10	U	10	U	10	U	10	U	10	U	13		10	U	10	U
Benzo(k)Fluoranthene (ug/L)	10	U	10	U	17		10	U	10	U	10	U	10		10	U	10	U	13		10	U	10	U
Benzo(ghi)Perylene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/L)	10	U	10	U	15		10	U	10	U	10	U	10	U	10	U	10	U	11		10	U	10	U
Benzoic Acid (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Benzyl Alcohol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Biphenyl	44		47		122		74		10	U	24		83		92		10	U	10	U	68		41	
Bis(2-Chloroethyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Butylbenzyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbazole (ug/L)	24		26		41		40		10	U	11		89		56		62		14		65		48	
Chrysene (ug/L)	10	U	10	U	36		16		10	U	10	U	22		10	U	17		13		26		14	
Di-n-Butyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Di-n-Octyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenzofuran (ug/L)	69		58		237		98		10	U	46		148		155		228		84		111		75	
Dibenzothiophene (ug/L)	15		13		36		23		10	U	10	U	28		16		26		18		27		16	
Diethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dimethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/L)	53		60		241		98		10	U	45		116		41		100		67		172		66	
Fluorene (ug/L)	89		72		302		114		10	U	55		178		162		259		99		204		94	
Hexachlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachloroethane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Indeno(1,2,3-cd)Pyrene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Isophorone (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitroso-Di-n-Propylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-nitrosodimethylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Napthalene (ug/L)	32		843		2450		928		10	U	620		2360		1120		2800		1720		2020		1220	
Nitrobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol (ug/L)	357		342		589		477		10		139		282		487		626		215		184		164	
Phenanthrene (ug/L)	146		170		460		296		10	U	105		351		180		340		242		428		195	
Phenol (ug/L)	10	U	11		12		10	U	10	U	10	U	10	U	10	U	37		10		12		10	U
Pyrene (ug/L)	49		35		104		56		10	U	30		80		22		58		44		88		47	
Pyridine	10	U	10	U	10	U	20	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachlorophenol (ug/L)	32		88		98		62		10	U	13		34		102		106		28		26		18	
bis(2-Chloroethoxy)Methane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	14		10	U	10	U	10	U
bis(2-chloroisopropyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total PAHs																								

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	9/1/04		9/15/04		10/13/04		11/22/04		12/20/04		1/19/05		2/16/05		3/17/05		4/13/05		5/11/05		6/8/05		7/6/05	
Conductivity (umhos/cm)	5310		5860		4390		6340		4520		4620		5230		4150		3740		3940		3810		3290	
Total Dissolved Solids (mg/L)	3160		3480		2500		3570		2510		2500		3200		2500		2200		2300		2000		1900	
Total Suspended Solids (mg/L)	17.2		10.5		12.7		20		2.7		11		17		13		6		5.7		6.6		110	
O&G [HEM] (mg/L)	2		3.9		3.5		9.9		9.5		18		67		22		7.1		4.5		6.5		6.8	
Total Hardness (mg/L)	820		990		690		990		830		660		1000		840		820		770		720		640	
Alkalinity (mg/L)	800		750		462		642		694		700		694		4.13		3.95		500		630		554	
Dissolved Oxygen (mg/L)	8.34		7.41		6.02		1.45		2.44		6.9		5.12		7.2		6.88		6.34		9.45		3.23	
pH	7.8		7.01		7.78		7.08		7.03		6.75		6.96		6.72		5.4		7.61		6.98		7.51	
BOD (mg/L)	5		18		9		22		50		15		80		75		18		10		15		16	
COD (mg/L)	43		55		40		99		86		95		110		95		57		54		50		81	
Total Phosphorous (mg/L)	0.2		0.1	U	0.1	U	0.3		0.3		0.2		1.2		0.4		0.32		0.39		0.41		0.41	
Nitrate (mg/L-N)	8.6		5.7		9.3		4.5		5.1		1.5		2.2		1.6		0.9		0.5	U	1.16		7	
Total Organic Carbon (mg/L)	12		11		10		24		19		39		24		41		12		17		11		20	
1,2,4-Trichlorobenzene (ug/L)	10	U	10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol (ug/L)	10	U	10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	
2,4,6-Trichlorophenol (ug/L)	10	U	12		10	U	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dimethylphenol (ug/L)	17		20		19		53		216		330		10	U	30		13		10	U	19		66	
2,4-Dinitrophenol (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
2,4-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chloronaphthalene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylnapthalene (ug/L)	10	U	92		10	U	10		553		924		2580		607		167		10	U	10	U	10	U
2-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	78		91		10	U	10	U	10	U	10	U	10	U	10	U
2-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
3,3-Dichlorobenzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4,6-Dinitro-2-Methylphenol (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4-Bromophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4-Chlorophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methylphenol (ug/L)	10	U	10	U	10	U	20		116		140		10	U	10	U	10	U	10	U	10	U	10	U
4-Nitroaniline (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
4-Nitrophenol (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Acenapthene (ug/L)	100		105		31		565		289		460		1550		385		166		10	U	62		42	
Acenapthylene (ug/L)	17		10	U	21		54		10		11		68		19		10	U	10	U	10	U	67	
Aniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Anthracene (ug/L)	32		24	U	10	U	182		50		82		470		144		26		10	U	10	U	16	
Azobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	9/1/04		9/15/04		10/13/04		11/22/04		12/20/04		1/19/05		2/16/05		3/17/05		4/13/05		5/11/05		6/8/05		7/6/05	
Benzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)Anthracene (ug/L)	11		10	U	10	U	48		11		21		154		57		10	U	10	U	10	U	16	
Benzo(b)Fluoranthene (ug/L)	10	U	10	U	10	U	33		10	U	10	U	61		29		10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/L)	10	U	10	U	10	U	18		10	U	10	U	49		20		10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	12		10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/L)	10	U	10	U	10	U	17		10	U	10	U	54		23		10	U	10	U	10	U	10	U
Benzoic Acid (ug/L)	50	U	50	U	10	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Benzyl Alcohol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Biphenyl	10	U	33		10	U	10	U	66		86		620		147		42		10	U	10	U	10	U
Bis(2-Chloroethyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Butylbenzyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbazole (ug/L)	10	U	41		10	U	10	U	47		40		142		81		56		10	U	10	U	10	U
Chrysene (ug/L)	12		10	U	10	U	48		12		22		190		65		10	U	10	U	10	U	18	
Di-n-Butyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Di-n-Octyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	11		10	U	10	U	10	U	10	U	10	U
Dibenzofuran (ug/L)	50		52		10	U	236		86		103		900		230		72		10	U	23		10	U
Dibenzothiophene (ug/L)	11		12		10	U	41		20		33		223		68		13		10	U	10	U	10	U
Diethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dimethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/L)	54		42		25		385		85		172		990		303		58		10	U	13		77	
Fluorene (ug/L)	67		68		10	U	385		174		343		1050		257		82		10	U	26		11	
Hexachlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachloroethane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Indeno(1,2,3-cd)Pyrene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	18		10	U	10	U	10	U	10	U	10	U
Isophorone (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitroso-Di-n-Propylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-nitrosodimethylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Napthalene (ug/L)	10	U	926		10	U	10	U	1540		2120		5200		1400		1510		10	U	10	U	10	U
Nitrobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol (ug/L)	97		119		142		422		577		1060		834		871		446		250		133		760	
Phenanthrene (ug/L)	102		114		10	U	296		233		374		2160		579		160		10	U	10	U	11	
Phenol (ug/L)	10	U	10	U	10	U	10	U	37		46		10	U	10	U	10	U	10	U	10	U	10	U
Pyrene (ug/L)	45		31		18		339		42		58		710		198		37		10	U	10	U	48	
Pyridine	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachlorophenol (ug/L)	14		16		31		46		94		127		115		21		12		26		10	U	130	
bis(2-Chloroethoxy)Methane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)Phthalate (ug/L)	10	U	18		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-chloroisopropyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total PAHs																								

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	8/4/05		10/12/05		11/9/05		12/7/05		1/4/06		2/1/06		3/15/06		4/12/06		5/10/06		6/14/06		7/12/06		8/9/06		9/6/06		10/4/06		11/1/06	
Conductivity (umhos/cm)	3920		2600		4200		2490		2530		4110		4570		4480		4100		4290		4560		4600		4870		5010		3610	
Total Dissolved Solids (mg/L)	2200		1500		2400		1300		1400		2300		2500		2440		2300		2400		2500		2700		2800		2800		2000	
Total Suspended Solids (mg/L)	13		6.5		6.7		12		14		19		9.5		16		8.8		19		17		9.6		12		11		9.6	
O&G [HEM] (mg/L)	2	U	2.9		2.9		10		4		12		6.3		3.2		4.6		6.8		7		3.2		4.5		3.3		3.6	
Total Hardness (mg/L)	810		600		690		550		580		620		710		628		830		680		810		890		750		820		970	
Alkalinity (mg/L)	410		450		580		540		540		700		720		770		720		790		790		750		840		870		750	
Dissolved Oxygen (mg/L)	8.43		8.7		2.67		4.55		4.41		3.39		1.72		7.19		4.17		5.3		1.99		6.41		3.72		2.76		3.18	
pH	6.59		7.9		7.07		6.95		7.01		6.69		6.61		7.24		7.13		7.11		6.82		6.76		6.77		6.84		6.93	
BOD (mg/L)	33		6		29		23		43		68		78		20		46		45		63		21		62		30		31	
COD (mg/L)	61		36		31		90		52		113		140		65		87		79		130		73		66		76		43	
Total Phosphorous (mg/L)	0.35		0.4		0.64		0.77		0.32		0.24		0.48		0.27		0.32		0.36		0.52		0.18		0.36		0.26		0.19	
Nitrate (mg/L-N)	1.1		2.4		5		1.7		2.2		5.4		15.2		4		3.2		8.7		7.3		6.5		5		7		4.2	
Total Organic Carbon (mg/L)	15		20		13		39		35.2		46		42		19		39		25		33		25		18		32		14	
1,2,4-Trichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	12		10	U	10	U	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	11		10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dimethylphenol (ug/L)	60		10	U	25		236		10	U	442		931		34		256		112		226		10	U	13		25		12	
2,4-Dinitrophenol (ug/L)	50	U	50	U	50	U	50	U	10	U	10	U	50	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chloronaphthalene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylnapthalene (ug/L)	10	U	10	U	10	U	362		340		1150		1310		10	U	896		262		316		247		170		256		280	
2-Methylphenol (ug/L)	42		10	U	18		83		88		110		277		10	U	85		39		60		10	U	10		19		10	U
2-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
3,3-Dichlorobenzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline (ug/L)	50	U	50	U	50	U	50	U	10	U	10	U	50	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4,6-Dinitro-2-Methylphenol (ug/L)	50	U	50	U	50	U	50	U	10	U	10	U	50	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Bromophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloroaniline (ug/L)	50	U	50	U	50	U	50	U	10	U	50	U	50	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chlorophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methylphenol (ug/L)	10	U	10	U	10	U	108		94		207		372		10	U	126		52		81		10	U	11		20		10	U
4-Nitroaniline (ug/L)	50	U	50	U	50	U	50	U	10	U	10	U	50	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Nitrophenol (ug/L)	50	U	50	U	50	U	50	U	10	U	10	U	50	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acenapthene (ug/L)	68		30		75		490		232		592		636		246		498		10	U	230		235		166		199		97	
Acenapthylene (ug/L)	31		11		10	U	14		10	U	15		19		15		14		10	U	10	U	10	U	10	U	10	U	10	U
Aniline (ug/L)	10	U	10	U	10	U	10	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Anthracene (ug/L)	10	U	10	U	10	U	20	U	29		184		158		32		85		64		23		24		19		22		18	
Azobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	376		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	8/4/05		10/12/05		11/9/05		12/7/05		1/4/06		2/1/06		3/15/06		4/12/06		5/10/06		6/14/06		7/12/06		8/9/06		9/6/06		10/4/06		11/1/06	
Benzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)Anthracene (ug/L)	10	U	10	U	10	U	33		10	U	42		42		10	U	15		20		10	U	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene (ug/L)	10	U	10	U	10	U	13		10	U	18		16		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/L)	10	U	10	U	10	U	14		10	U	19		22		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/L)	10	U	10	U	10	U	15		10	U	19		18		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzoic Acid (ug/L)	50	U	50	U	50	U	50	U	50	U	50	U	50	U	10	U	10	U	17		10	U	10	U	10	U	10	U	10	U
Benzyl Alcohol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Biphenyl	10	U	10	U	10	U	10	U	12		93		228		10	U	91		10	U	39		35		31		41		29	
Bis(2-Chloroethyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Butylbenzyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbazole (ug/L)	10	U	10	U	10	U	49		28		75		115		44		109		60		14		68		74		92		32	
Chrysene (ug/L)	10	U	10	U	10	U	36		10	U	46		46		10	U	18		21		10	U	10	U	10	U	10	U	10	U
Di-n-Butyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	47		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Di-n-Octyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenzofuran (ug/L)	10	U	10	U	15		268		70		164		328		73		203		99		69		70		57		72		50	
Dibenzothiophene (ug/L)	10	U	10	U	10	U	43		14		84		79		14		39		26		10		13		10		12		10	U
Diethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dimethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/L)	38		16		16		236		47		340		266		53		119		123		35		50		38		28		31	
Fluorene (ug/L)	10	U	10	U	10	U	274		72		376		350		86		219		109		64		78		60		75		52	
Hexachlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachloroethane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Indeno(1,2,3-cd)Pyrene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Isophorone (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitroso-Di-n-Propylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-nitrosodimethylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Napthalene (ug/L)	10	U	10	U	10	U	10	U	33		2830		3450		10	U	2950		27		1540		1170		157		829		1300	
Nitrobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol (ug/L)	245		158		143		470		560		780		1190		213		614		278		332		237		316		273		129	
Phenanthrene (ug/L)	10	U	10	U	10	U	534		118		733		615		179		329		270		65		199		98		143		78	
Phenol (ug/L)	10	U	10	U	10	U	26		10	U	38		97		10	U	40		19		14		10	U	10	U	13		10	
Pyrene (ug/L)	20		10		11		192		31		256		205		45		109		86		25		35		28		21		28	
Pyridine	10	U	10	U	10	U	10	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Tetrachlorophenol (ug/L)	55		10		25		106		86		134		258		33		103		51		43		29		30		25		13	
bis(2-Chloroethoxy)Methane (ug/L)	10	U	10	U	10	U	10	U	278		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)Phthalate (ug/L)	10	U	10	U	12		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-chloroisopropyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total PAHs																														

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluient Analytes	12/13/06		1/10/07		2/7/07		3/7/07		4/4/07		5/2/07		6/13/07		7/11/07		8/8/07		9/5/07		10/3/07		11/14/07		12/12/07		1/9/08	
Conductivity (umhos/cm)	2100		2290		2630		1820		2590		2740		2120		4030		3040		2670		2810		2640		2080		1960	
Total Dissolved Solids (mg/L)	1190		1240		1500		1000		1500		1610		1600		2300		1700		1450		1500		1500		1100		1030	
Total Suspended Solids (mg/L)	10		16		12.8		17		8		16		9.8		5.3		21		7.3		11		7.5		6.8		5.8	
O&G [HEM] (mg/L)	5.1		38		3.5		37		15.5		55		5.2		6.5		131		5.1		11		10		6.5		4.6	
Total Hardness (mg/L)	470		540		300		400		570		660		650		783		330		540		640		640		446		461	
Alkalinity (mg/L)	490		550		530		510		573		390		627		605		625		522		635		583		528		540	
Dissolved Oxygen (mg/L)	1.80		0.93		1.07		0.19		3.1		1.36		3.84		2.72		0.95		8.4		6.13		5.8		6.73		4.71	
pH	7.05		6.94		6.98		6.91		7.03		6.88		7.04		6.85		7.38		7.46		6.92		6.91		7.02		6.92	
BOD (mg/L)	27		72		34		76		150		150		25		112		47		27		49		72		15		24	
COD (mg/L)	50		150		79		148		112		200		74		160		260		83		130		150		54		40	
Total Phosphorous (mg/L)	0.39		0.52		0.82		0.56		0.4		0.68		0.41		0.63		0.5		0.29		0.7		0.7		0.5		0.56	
Nitrate (mg/L-N)	2.2		4.2		64		1.6		5.1		10		8.5		12		8.9		9.6		6.9		6.9		9.7		3	
Total Organic Carbon (mg/L)	16		84		35		49		76		120		109		86		24		15		23		33		26		13	
1,2,4-Trichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dimethylphenol (ug/L)	66		22		10		10	U	17		1000		10	U	13		10	U	10	U	206		583		22		12	
2,4-Dinitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chloronaphthalene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylnapthalene (ug/L)	53		1470		517		1520		571		2690		43		249		2220		11		346		850		334		206	
2-Methylphenol (ug/L)	10	U	11		10	U	10	U	10	U	239		10	U	12		10	U	10	U	44		157		10	U	10	U
2-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
3,3-Dichlorobenzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4,6-Dinitro-2-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Bromophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chlorophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methylphenol (ug/L)	10	U	16		14		16		10	U	250		10	U	10	U	10	U	10	U	49		181		14		10	
4-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acenapthene (ug/L)	167		633		287		590		286		1250		136		195		704		120		134		421		198		130	
Acenapthylene (ug/L)	10	U	13		10	U	10	U	10	U	20		20		10	U	10	U	10	U	10	U	10	U	10	U	10	U
Aniline (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Anthracene (ug/L)	20		131		30		103		32		212		18		19		74		12		28		49		18		11	
Azobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluient Analytes	12/13/06		1/10/07		2/7/07		3/7/07		4/4/07		5/2/07		6/13/07		7/11/07		8/8/07		9/5/07		10/3/07		11/14/07		12/12/07		1/9/08	
Benzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)Anthracene (ug/L)	10	U	36		10	U	30		10	U	67		10	U	10	U	20		10	U	10		13		10	U	10	U
Benzo(b)Fluoranthene (ug/L)	10	U	11		10	U	11		10	U	22		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/L)	10	U	13		10	U	10	U	10	U	25		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/L)	10	U	12		10	U	10	U	10	U	23		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzoic Acid (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	20		10	U
Benzyl Alcohol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Biphenyl	10	U	10	U	59		149		80		337		14		38		171		10	U	40		10	U	38		32	
Bis(2-Chloroethyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Butylbenzyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbazole (ug/L)	10	U	23		19		76		10	U	129		10	U	115		19		10	U	38		80		29		27	
Chrysene (ug/L)	10	U	36		10	U	31		10	U	63		10	U	10	U	21		10	U	10		14		10	U	10	U
Di-n-Butyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Di-n-Octyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenzofuran (ug/L)	56		324		115		251		127		629		55		92		346		41		67		182		55		47	
Dibenzothiophene (ug/L)	10	U	46		11		41		13		77		10	U	11		37		10	U	10		11		10	U	10	U
Diethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dimethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/L)	32		216		50		176		65		278		38		25		132		33		56		87		24		20	
Fluorene (ug/L)	56		326		113		267		119		613		58		91		323		40		74		183		57		48	
Hexachlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachloroethane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Indeno(1,2,3-cd)Pyrene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Isophorone (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitroso-Di-n-Propylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-nitrosodimethylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Napthalene (ug/L)	10	U	2010		454		3190		164		5530		10	U	650		882		10	U	954		2080		1040		1120	
Nitrobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol (ug/L)	232		400		178		308		129		792		224		75		58		114		262		1210		134		218	
Phenanthrene (ug/L)	62		533		155		564		163		728		78		102		404		19		122		297		91		56	
Phenol (ug/L)	10	U	17		13		15		10	U	56		10	U	10	U	10	U	10	U	16		41		10		11	
Pyrene (ug/L)	17		187		30		132		43		327		28		18		77		23		40		44		16		13	
Pyridine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Tetrachlorophenol (ug/L)	44		50		28		40		14		254		19		10	U	10	U	14		51		252		19		24	
bis(2-Chloroethoxy)Methane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	14		10	U	10	U	10	U	10	U	10	U
bis(2-chloroisopropyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total PAHs																												

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	2/6/08		3/5/08		4/2/08		5/14/08		6/11/08		7/9/08		8/6/08		9/3/08		10/1/08		11/5/08		12/3/08		1/7/09		2/5/09		3/4/09		4/1/09	
Conductivity (umhos/cm)	1800		2100		2300		2000		2400		2400		2500		2300		2200		2500		2300		1400		2500		2900		3200	
Total Dissolved Solids (mg/L)	990		1400		1300		1070		1400		1300		1400		1300		1300		1300		1300		740		1400		1600		1800	
Total Suspended Solids (mg/L)	7		5.8		6.4		4.3		5.3		8.3		9.3		5.8		5.8		4.8		5.6		3.7		7		2.7		5	
O&G [HEM] (mg/L)	4.3		32		4.9		2.6		2.1		2.8		7		44		2	U	2	U	2	U	2.7		2	U	5.1		4.3	
Total Hardness (mg/L)	445		560		520		500		470		518		630		490		490		582		670		290		230		670		618	
Alkalinity (mg/L)	496		480		470		520		470		520		570		510		590		570		550		300		500		630		700	
Dissolved Oxygen (mg/L)	3.86		6.75		9.46		4.2		9.31		8.01		10.1		5.45		8.01		9.85		8.52		8.67		10.6		7.29		7	
pH	7.05		7.01		7.87		7.00		7.89		7.25		7.18		7.12		7.29		7.57		7.84		8.06		7.8		6.92		7.13	
BOD (mg/L)	26		87.8		20		51		23		33		37		27		2	U	15		89		2	U	2	U	33		30	
COD (mg/L)	71		140		57		39		28		36		61		21		31		27		18		20		47		67		69	
Total Phosphorous (mg/L)	0.6		0.44		0.58		0.4		0.4		0.6		0.6		0.25		0.29		0.23		0.39		0.18		0.56		0.84		0.62	
Nitrate (mg/L-N)	2.2		4.7		5.1		2.9		4.1		4.3		2.1		3.5		2.2		3.8		3.5		2.2		4		1.7		1.6	
Total Organic Carbon (mg/L)	13		34		15		9		8		14		12		8		10		14		10		6		11		15		13	
1,2,4-Trichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4,5-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4,6-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dimethylphenol (ug/L)	16		486		14		13		10	U	55		27		10	U	10	U	10	U	10	U	10	U	10	U	10	U	20	
2,4-Dinitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,4-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chloronaphthalene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Chlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylnapthalene (ug/L)	418		1830		260		102		10	U	45		227		16		11		10	U	10	U	10	U	10	U	91		228	
2-Methylphenol (ug/L)	10	U	80		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
3,3-Dichlorobenzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4,6-Dinitro-2-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Bromophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Chlorophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methylphenol (ug/L)	12		88		10	U	10	U	10	U	12		10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	14	
4-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acenapthene (ug/L)	220		562		199		89		43		112		133		56		42		34		10	U	10	U	12		153		177	
Acenapthylene (ug/L)	10	U	107		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Aniline (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	10	U	10	U	10	U	10	U	10	U	10	U
Anthracene (ug/L)	22		104		24		10	U	10	U	14		17		10	U	10	U	10	U	10	U	10	U	10	U	23		16	
Azobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	2/6/08		3/5/08		4/2/08		5/14/08		6/11/08		7/9/08		8/6/08		9/3/08		10/1/08		11/5/08		12/3/08		1/7/09		2/5/09		3/4/09		4/1/09	
Benzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Benzo(a)Anthracene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzoic Acid (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzyl Alcohol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Biphenyl	40		177		54		18		10	U	10	U	42		10	U	10	U	10	U	10	U	10	U	10	U	27		44	
Bis(2-Chloroethyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Butylbenzyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbazole (ug/L)	45		128		32		16		10	U	13		30		10	U	10	U	10	U	10	U	10	U	10	U	44		46	
Chrysene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Di-n-Butyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Di-n-Octyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenzofuran (ug/L)	85		269		97		39		16		47		62		22		14		13		10	U	10	U	10	U	54		66	
Dibenzothiophene (ug/L)	10	U	38		12		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	12		10	U
Diethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dimethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/L)	37		126		34		20		15		29		31		13		10	U	10		10	U	10	U	10	U	37		29	
Fluorene (ug/L)	82		220		103		39		20		54		66		23		12		15		10	U	10	U	10	U	58		66	
Hexachlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Hexachloroethane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Indeno(1,2,3-cd)Pyrene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Isophorone (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitroso-Di-n-Propylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
N-nitrosodimethylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Napthalene (ug/L)	646		5220		36		24		10	U	14		1040		10	U	10	U	10	U	10	U	10	U	10	U	580		1490	
Nitrobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol (ug/L)	259		1320		237		139		95		497		259		98		162		11		47		30		41		125		144	
Phenanthrene (ug/L)	146		340		143		49		10	U	33		86		10	U	10	U	13		10	U	10	U	10	U	130		84	
Phenol (ug/L)	10	U	30		10	U	10	U	10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	
Pyrene (ug/L)	24		107		19		12		18		16		21		10	U	10	U	10	U	10	U	10	U	10	U	30		23	
Pyridine	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachlorophenol (ug/L)	34		268		28		20		11		52		52		16		15		10	U	10	U	10	U	10	U	12		35	
bis(2-Chloroethoxy)Methane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	23		10	U	10	U	10	U
bis(2-chloroisopropyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Total PAHs																														

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	5/6/09		6/3/09		7/1/09		8/5/09		9/2/09		10/28/09		11/11/09		12/21/09		1/13/10		*Avg*	*Max*	*Min*
Conductivity (umhos/cm)	2500		3200		3000		3800		3100		2900		2570		2430		2600		3644	7460	1400
Total Dissolved Solids (mg/L)	1400		1800		1600		9.94		1800		1600		1500		1400		1500		2037	4560	9.94
Total Suspended Solids (mg/L)	9		5.5		7.5		15		22		1.5		5.6		4		8		13	110	0.5
O&G [HEM] (mg/L)	5.2		22		5.2		6.9		15		5		2.1		2.8		29		10.9	131	2
Total Hardness (mg/L)	630		700		645		630		655		585		586		579		629		682	1200	230
Alkalinity (mg/L)	660		680		650		640		590		600		620		600		630		598	870	4
Dissolved Oxygen (mg/L)	4.02		6.46		1.54		9.94		6		5.68		6.57		3.97		6.13		5.14	10.60	0.19
pH	7.08		7.18		7.32		7.5		7.39		7.24		7.1		7.04		7.19		7.12	8.29	5.40
BOD (mg/L)	24		42		56		25		66		44		14		32		80		42	160	2
COD (mg/L)	51		69		48		47		120		83		41		29		120		80	290	18
Total Phosphorous (mg/L)	0.51		0.6		0.32		0.54		0.5		0.38		0.44		0.1	U	0.82		0.5	9.2	0.1
Nitrate (mg/L-N)	2.9		7.7		4.5		7.81		3.5		8.2		11		2.6		0.5	U	5.5	64.0	0.5
Total Organic Carbon (mg/L)	15		12		12		13		50		11		13		10		21		29	176	6
1,2,4-Trichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
1,2-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
1,3-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
1,4-Dichlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
2,4,5-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	14	10
2,4,6-Trichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	17	10
2,4-Dichlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
2,4-Dimethylphenol (ug/L)	69		10	U	10	U	13		212		21		11		10	U	51		130	1,000	10
2,4-Dinitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	28	50	10
2,4-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	11	82	10
2,6-Dinitrotoluene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
2-Chloronaphthalene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
2-Chlorophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
2-Methylnapthalene (ug/L)	133		300		10	U	95		617		10	U	128		61		1560		484	2,880	10
2-Methylphenol (ug/L)	12		10	U	10	U	10	U	51		10	U	10	U	10	U	10	U	37	286	10
2-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
2-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
3,3-Dichlorobenzidine (ug/L)	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	20	20
3-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	28	50	10
4,6-Dinitro-2-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	28	50	10
4-Bromophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
4-Chloro-3-Methylphenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
4-Chloroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	16	50	10
4-Chlorophenyl-phenylether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
4-Methylphenol (ug/L)	15		10	U	10	U	10	U	67		10	U	10	U	10	U	12		43	416	10
4-Nitroaniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	28	50	10
4-Nitrophenol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	28	50	10
Acenapthene (ug/L)	148		142		136		178		357		391		126		191		814		279	1,810	10
Acenapthylene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	18		15	107	10
Aniline (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	15	20	10
Anthracene (ug/L)	18		13		11		29		69		152		18		28		197		58	618	10
Azobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	14	376	10

TABLE 6
Existing GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)
GWTP Influent Equalization Tank Effluent Concentrations (2003-2009)

EQ Tank Effluent Analytes	5/6/09		6/3/09		7/1/09		8/5/09		9/2/09		10/28/09		11/11/09		12/21/09		1/13/10		*Avg*	*Max*	*Min*
Benzidine (ug/L)	22		20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	22	10
Benzo(a)Anthracene (ug/L)	10	U	10	U	10	U	20		30		32		10	U	10		84		21	216	10
Benzo(b)Fluoranthene (ug/L)	10	U	10	U	10	U	12		15		20		10	U	10	U	37		13	73	10
Benzo(k)Fluoranthene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	14		12	80	10
Benzo(ghi)Perylene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	24	10
Benzo(a)Pyrene (ug/L)	10	U	10	U	10	U	10	U	12		14		10	U	10	U	26		12	54	10
Benzoic Acid (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	30	147	10
Benzyl Alcohol (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Biphenyl	10	U	10	U	10	U	17		81		10	U	10	U	40		230		64	620	10
Bis(2-Chloroethyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Butylbenzyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Carbazole (ug/L)	41		38		10	U	34		45		10	U	43		48		118		42	142	10
Chrysene (ug/L)	10	U	10	U	10	U	19		24		32		10	U	11		78		22	254	10
Di-n-Butyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	47	10
Di-n-Octyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Dibenz(a,h)Anthracene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	20	10
Dibenzofuran (ug/L)	68		59		28		62		169		185		51		78		409		124	952	10
Dibenzothiophene (ug/L)	10	U	10	U	10	U	11		22		66		10	U	13		95		25	223	10
Diethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Dimethyl Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Fluoranthene (ug/L)	27		25		35		96		175		208		37		60		436		109	1,150	10
Fluorene (ug/L)	62		61		28		74		196		227		57		96		491		136	1,050	10
Hexachlorobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Hexachlorobutadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Hexachlorocyclopentadiene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Hexachloroethane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Indeno(1,2,3-cd)Pyrene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	30	10
Isophorone (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
N-Nitroso-Di-n-Propylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
N-Nitrosodiphenylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
N-nitrosodimethylamine (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Napthalene (ug/L)	43		1780		10	U	628		2470		10	U	1130		10	U	3360		1,150	5,530	10
Nitrobenzene (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Pentachlorophenol (ug/L)	181		161		282		114		1010		339		94		50		136		366	1,320	10
Phenanthrene (ug/L)	85		77		10	U	119		378		545		106		196		1110		254	2,300	10
Phenol (ug/L)	10	U	10	U	10	U	10	U	24		10	U	10	U	10	U	10	U	16	97	10
Pyrene (ug/L)	10	U	19		23		68		123		153		21		49		310		78	980	10
Pyridine	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	15	20	10
Tetrachlorophenol (ug/L)	10	U	21		74		13		338		34		26		14		40		65	338	10
bis(2-Chloroethoxy)Methane (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	13	278	10
bis(2-Ethylhexyl)Phthalate (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	23	10
bis(2-chloroisopropyl)Ether (ug/L)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	10	10
Total PAHs																			2,167	14,218	140

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	01/02/03		01/15/03		01/29/03		5/12/2004		5/26/2004		09/01/04		09/15/04		10/13/04		10/27/04		11/10/04	11/22/04		12/08/04		12/20/04		02/02/05		02/16/05
TOC (mg/l)	30		27		36		12		18		13		14		10		12		16	18		10		17		12		125
COD (mg/l)	99		78		90		32		35		47		50		42		66		130	89		58		55		25		330
DO (mg/l)	6.45		6.17		5.93		8.21		4.36		7.53		4.85		1.87		4.47		0.13	4.4		5.58		5.04		7.62		4.71
pH	7.22		7.14		7.44		6.77		7.14		7.38		7.04		7.08		7.25		7.32	7.24		6.99		7.06		7.52		6.94
PCP (ug/l)	824		255		528		13		109		74		63		122		66		122	226		164		264		92		290
Acenaphthene (ug/l)	530		212		502		36		83		45		111		10	U	40		5460	357		52		101		10	U	1370
Acenaphthylene (ug/l)	12		6	J	12		10	U	10	U	10	U	10	U	10	U	10	U	195	15		10	U	10	U	10	U	80
Anthracene (ug/l)	152		47		155		10	U	18		10	U	15		10	U	10		2160	72		17		31		10	U	412
Benzo(a)Anthracene (ug/l)	29		9	J	34		10	U	10	U	10	U	10	U	10	U	10	U	800	37		10	U	10	U	10	U	128
Benzo(b)Fluoranthene (ug/l)	11		10	U	12		10	U	10	U	10	U	10	U	10	U	10	U	369	17		10	U	10	U	10	U	60
Benzo(k)Fluoranthene (ug/l)	14		10	U	14		10	U	10	U	10	U	10	U	10	U	10	U	137	16		10	U	10	U	10	U	58
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	113	10	U	10	U	10	U	10	U	13
Benzo(a)Pyrene (ug/l)	12		10	U	15		10	U	10	U	10	U	10	U	10	U	10	U	300	19		10	U	10	U	10	U	44
Chrysene (ug/l)	32		11		38		10	U	10	U	10	U	10	U	10	U	10	U	925	43		10	U	10		10	U	162
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	95	10	U	10	U	10	U	10	U	14
Fluoranthene (ug/l)	275		64		253		12		32		18		28		10	U	24		4100	232		28		53		10	U	886
Fluorene (ug/l)	283		78		276		20		48		15		62		10	U	22		5500	155		49		96		10	U	908
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	143	10	U	10	U	10	U	10	U	21
Naphthalene (ug/l)	3380		1140		2140		10	U	144		10	U	266		10	U	10	U	8880	10	U	84		325		10	U	3260
Phenanthrene (ug/l)	696		198		608		26		85		10	U	80		10	U	10	U	7290	24		36		93		10	U	1836
Pyrene (ug/l)	192		48		208		10	U	27		14		25		10	U	18		3740	188		18		31		10	U	654
Total All PAH (ug/l)	5,648		1,873		4,297		214		527		212		677		160		224		40,207	1,215		374		820		160		9,906

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	03/02/05		03/17/05		03/30/05		04/13/05		04/27/05		05/11/05		05/25/05		06/08/05		06/22/05		07/06/05		07/20/05		09/23/05	
TOC (mg/l)	11		32		9		10		20		16		14		16		18		21		15		16	
COD (mg/l)	50		76		21		43		39		46		127		37		46		84		45		43	
DO (mg/l)	4.02		5.93		6.39		6.07		3.34		6.36		2.56		6.33		6.36		4.37		6.17		8.63	
pH	7.44		7.33		7.76		7.18		7.28		7.74		7.64		6.99		6.8		7.70		7.34		7.96	
PCP (ug/l)	224		156		39		318		199		123		289		95		81		1230		384		41	
Acenaphthene (ug/l)	60		131		25		206		95		10	U	515		120		92		14		10	U	10	U
Acenaphthylene (ug/l)	12		10	U	10	U	10	U	10	U	10	U	32		10	U	10	U	10	U	10	U	10	U
Anthracene (ug/l)	17		68		10	U	34		26		10	U	257		16		17		10	U	10	U	10	U
Benzo(a)Anthracene (ug/l)	12		28		10	U	10	U	10	U	10	U	126		10	U	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene (ug/l)	10	U	12		10	U	10	U	10	U	10	U	63		10	U	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/l)	10	U	13		10	U	10	U	10	U	10	U	50		10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	19		10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/l)	10	U	11		10	U	10	U	10	U	10	U	58		10	U	10	U	10	U	10	U	10	U
Chrysene (ug/l)	14		30		10	U	10	U	10		10	U	95		10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/l)	72		137		24		49		66		11		671		49		35		26		10	U	10	U
Fluorene (ug/l)	11		103		10	U	82		41		10	U	329		41		56		18		10	U	10	U
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	23		10	U	10	U	10	U	10	U	10	U
Naphthalene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	16		10	U	10	U	10	U	10	U	10	U
Phenanthrene (ug/l)	10	U	195		10	U	177		29		10	U	642		10	U	79		10	U	10	U	10	U
Pyrene (ug/l)	48		79		15		28		30		10	U	406		27		20		19		10	U	10	U
Total All PAH (ug/l)	326		857		194		676		387		161		3,312		363		399		197		160		160	

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	09/28/05		10/12/05		10/26/05		12/07/05		12/21/05		01/04/06		01/18/06		02/01/06		02/15/06		03/01/06		03/15/06		03/29/06	
TOC (mg/l)	26		22		24		10		8.4		10.6		32		28		40		22		53		23	
COD (mg/l)	50		33		57		25		34		31		92		69		93		85		120		72	
DO (mg/l)	5.38		7.79		6.12		4.39		6.27		4.95		10.9		6.5		6.74		1.2		5.33		5.36	
pH	7.20		7.43		6.43		7.08		7.48		7.15		7.32		7.20		7.34		7.00		6.78		6.94	
PCP (ug/l)	784		10	U	320		12		228		207		1180		838		1080		448		1080		529	
Acenaphthene (ug/l)	107		10	U	201		17		172		92		321		318		374		428		700		326	
Acenaphthylene (ug/l)	10	U	10	U	10		10	U	11		10	U	10		10		14		12		24		10	U
Anthracene (ug/l)	33		10	U	46		10	U	53		33		77		38		105		72		153		40	
Benzo(a)Anthracene (ug/l)	10	U	10	U	16		10	U	14		10	U	10		10	U	18		26		37		10	U
Benzo(b)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10		16		10	U
Benzo(k)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	12		17		10	U
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	11		17		10	U
Chrysene (ug/l)	10	U	10	U	17		10	U	17		10	U	11		10		21		29		41		10	U
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/l)	61		10	U	69		12		68		46		115		57		120		179		236		51	
Fluorene (ug/l)	58		10	U	107		10	U	83		53		152		169		186		252		352		96	
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	134		37		50		681		2680		10	U
Phenanthrene (ug/l)	51		10	U	48		10	U	155		105		206		98		272		448		560		175	
Pyrene (ug/l)	32		10	U	87		10		75		67		44		39		63		135		181		30	
Total All PAH (ug/l)	442		160		671		169		718		496		1,140		846		1,283		2,325		5,044		818	

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	04/12/06		04/26/06		05/10/06		05/24/06		06/14/06		06/28/06		07/12/06		07/26/06		08/09/06		08/23/06		09/06/06		09/20/06	
TOC (mg/l)	13		16		27		35		29		51		19		13		24		9		14		17	
COD (mg/l)	48		52		62		75		84		120		73		50		71		23		62		60	
DO (mg/l)	4.71		5		5.56		4.55		3.86		0.64		3.47		5.81		5.43		10.69		2.59		5.24	
pH	6.76		6.92		6.99		6.98		7.10		7.10		7.02		7.16		7.00		8.17		7.22		7.25	
PCP (ug/l)	233		225		558		980		560		659		229		118		244		12		491		369	
Acenaphthene (ug/l)	244		233		454		618		258		422		218		10	U	84		10	U	165		158	
Acenaphthylene (ug/l)	37		10	U	11		19		10	U	10		10	U	10	U	10	U	10	U	10	U	10	U
Anthracene (ug/l)	34		31		76		107		72		58		16		10	U	10	U	10	U	20		17	
Benzo(a)Anthracene (ug/l)	10	U	10	U	10		24		22		24		10	U	10	U	10	U	10	U	12		10	U
Benzo(b)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10		10	U	10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chrysene (ug/l)	10	U	10	U	12		26		24		25		10	U	10	U	10	U	10	U	12		10	U
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/l)	59		30		97		150		137		136		22		10	U	30		10	U	67		24	
Fluorene (ug/l)	88		72		214		279		92		201		72		10	U	10		10	U	40		55	
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene (ug/l)	10	U	33		1450		1770		10	U	777		10	U	10	U	10	U	10	U	10	U	10	U
Phenanthrene (ug/l)	172		102		317		421		189		320		30		10	U	10	U	10	U	10	U	66	
Pyrene (ug/l)	50		21		69		100		94		86		19		10	U	18		10	U	45		16	
Total All PAH (ug/l)	774		612		2,770		3,574		968		2,119		477		160		262		160		451		436	

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	12/13/06		12/27/06		01/10/07		01/24/07		02/07/07		02/21/07		03/07/07		03/21/07		05/02/07		05/17/07		05/30/07		06/13/07	
TOC (mg/l)	23		37		23		27		26		18		32		13		20		16		19		49	
COD (mg/l)	62		79		59		99		63		28		37		43		26		39		60		65	
DO (mg/l)	12.9		11.1		9.12		4.87		3.42		10.75		6.23		5.36		12.62		3.87		9.26		9.24	
pH	7.14		7.11		7.3		7.04		7.05		7.16		7.00		7.05		7.35		7.15		7.44		7.08	
PCP (ug/l)	833		712		272		846		189		189		513		81		64		96		441		270	
Acenaphthene (ug/l)	357		684		349		592		193		330		397		296		62		182		502		171	
Acenaphthylene (ug/l)	10	U	12		10	U	13		10	U	10	U	10	U	10	U	10	U	10	U	10		10	U
Anthracene (ug/l)	73		147		42		93		18		42		66		37		10	U	18		145		19	
Benzo(a)Anthracene (ug/l)	19		30		12		24		10	U	11		18		15		10	U	10		25		10	U
Benzo(b)Fluoranthene (ug/l)	10	U	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/l)	10	U	10		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chrysene (ug/l)	21		30		12		25		10	U	13		19		15		10	U	11		25		10	U
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/l)	110		211		63		131		28		72		117		84		10	U	50		112		34	
Fluorene (ug/l)	165		344		155		251		78		140		189		128		15		62		229		66	
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene (ug/l)	109		254		303		2820		10	U	10	U	307		48		10	U	10	U	324		10	U
Phenanthrene (ug/l)	268		551		211		410		96		175		379		171		10	U	15		339		86	
Pyrene (ug/l)	58		165		52		107		17		52		88		57		10	U	36		93		24	
Total All PAH (ug/l)	1,250		2,488		1,269		4,526		530		915		1,650		921		217		464		1,864		500	

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	06/27/07		07/11/07		07/25/07		09/05/07		09/19/07		10/03/07		10/17/07		10/31/07		11/14/07		11/28/07		12/12/07		12/26/07	
TOC (mg/l)	103		60		25		14		17		14		18		15		20		17		25		19	
COD (mg/l)	36		84		43		90		64		62		81		48		71		76		60		46	
DO (mg/l)	10.65		4.55		9.36		9.53		5.97		7.89		3.95		6.28		8.38		7.97		8.88		8.01	
pH	8.00		7.55		7.07		7.43		7.43		6.98		6.94		7.15		7.33		7.35		7.16		7.34	
PCP (ug/l)	40		133		230		177		177		151		167		456		138		150		340		235	
Acenaphthene (ug/l)	10	U	10	U	322		140		174		167		212		230		188		318		182		138	
Acenaphthylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Anthracene (ug/l)	10	U	10	U	41		10	U	15		21		36		22		16		64		17		14	
Benzo(a)Anthracene (ug/l)	10	U	10	U	13		10	U	10	U	10	U	15		10	U	10	U	29		10	U	10	U
Benzo(b)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	18		10	U	10	U
Benzo(k)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	11		10	U	10	U
Chrysene (ug/l)	10	U	10	U	14		10	U	10	U	10	U	15		10	U	10	U	28		10	U	10	U
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/l)	10	U	10	U	74		23		50		43		75		35		23		167		28		26	
Fluorene (ug/l)	10	U	10	U	136		25		40		66		91		93		59		187		62		53	
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene (ug/l)	10	U	10	U	87		10	U	10	U	848		10	U	10	U	10	U	1280		10	U	10	U
Phenanthrene (ug/l)	10	U	10	U	185		10	U	10	U	126		161		104		20		383		78		63	
Pyrene (ug/l)	10	U	12	U	49		16		36		27		56		29		16		115		19		19	
Total All PAH (ug/l)	160		162		991		324		425		1,388		741		613		422		2,650		486		413	

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	01/09/08		01/23/08		02/06/08		02/20/08		03/05/08		03/19/08		04/02/08		04/16/08		04/30/08		05/14/08		05/28/08		06/11/08	
TOC (mg/l)	11		18		16		17		23		13		16		16		11		12		10		10	
COD (mg/l)	32		68		49		68		28		54		65		33		42		18		42		36	
DO (mg/l)	8.36		7.14		7.66		5.62		9.87		6.44		2.81		2.84		8.31		7.6		5.45		5.4	
pH	7.07		6.93		7.10		7.03		7.41		7.17		7.22		7.03		7.02		7.00		7.79		7.50	
PCP (ug/l)	228		318		298		464		395		258		258		268		184		186		164		196	
Acenaphthene (ug/l)	168		279		232		263		325		135		211		192		179		104		10	U	178	
Acenaphthylene (ug/l)	10	U	10	U	10	U	10	U	15	U	10	U	10	U	13		10	U	10	U	12		10	U
Anthracene (ug/l)	17		40		29		27		61		17		21		17		20		10	U	10	U	13	
Benzo(a)Anthracene (ug/l)	10	U	12		10	U	10	U	17		10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chrysene (ug/l)	10	U	13		10	U	10	U	17		10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/l)	32		73		59		33		128		27		28		30		33		22		10	U	33	
Fluorene (ug/l)	64		139		116		127		161		54		106		74		78		36		10	U	78	
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene (ug/l)	378		1790		1640		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Phenanthrene (ug/l)	114		232		202		143		293		57		110		10	U	96		10	U	10	U	10	U
Pyrene (ug/l)	20		45		36		26		90		18		22		33		38		15		10	U	33	
Total All PAH (ug/l)	883		2,693		2,404		719		1,177		408				459		544		297		162		445	

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	06/25/08		07/09/08		07/23/08		08/06/08		08/20/08		09/03/08		09/17/08		10/01/08		10/15/08		10/29/08		11/05/08		11/19/08	
TOC (mg/l)	32		10		9		12		12		9		10		10		8		14		20		12	
COD (mg/l)	130		45		43		41		29		41		26		33		26		51		37		33	
DO (mg/l)	2.2		0.65		9.59		16.8		3.8		3.78		10.6		5.16		6.47		5.22		6.1		6.87	
pH	7.15		7.03		7.11		7.29		7.35		7.45		8.52		7.20		7.89		7.36		7.16		7.33	
PCP (ug/l)	1212		295		343		191		115		274		260		182		114		137		41		280	
Acenaphthene (ug/l)	369		79		85		83		39		13		71		25		10	U	35		83		78	
Acenaphthylene (ug/l)	11		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Anthracene (ug/l)	64		10	U	85		10		10	U	13		10	U	10	U	10	U	10	U	10	U	13	
Benzo(a)Anthracene (ug/l)	26		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene (ug/l)	15		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chrysene (ug/l)	23		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/l)	144		17		14		21		17		32		17		10	U	10	U	14		19		28	
Fluorene (ug/l)	174		10		22		28		10	U	44		18		10	U	10	U	10	U	38		32	
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene (ug/l)	10	U	10	U	22		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Phenanthrene (ug/l)	108		10	U	29		10	U	10	U	10	U	10	U	10	U	10	U	10	U	39		10	U
Pyrene (ug/l)	90		11		10		15		10		21		13		10	U	10	U	10		13		16	
Total All PAH (ug/l)	1,084		237		357		267		196		233		239		175		160		189		302		277	

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	12/03/08	12/16/08	12/29/08	01/07/09	01/21/09	02/05/09	02/18/09	03/04/09	03/18/09	04/01/09	04/15/09	04/29/09
TOC (mg/l)	12	13	17	11	16	16	14	17	13	14	14	17
COD (mg/l)	42	9.7	42	30	52	36	50	55	40	44	51	57
DO (mg/l)	6.15	8.13	4.0	8.14	6.84	10.1	8.5	7.08	7.53	8.73	7.6	3.18
pH	7.13	7.12	6.86	7.18	6.81	8.10	6.97	7.12	6.92	7.20	7.39	7.73
PCP (ug/l)	214	87	100	100	161	22	457	153	149	153	126	154
Acenaphthene (ug/l)	96	74	129	62	126	10 U	96	120	118	100	129	90
Acenaphthylene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene (ug/l)	21	10 U	16	17	16	10 U	11	14	14	10 U	11	25
Benzo(a)Anthracene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)Fluoranthene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)Fluoranthene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(ghi)Perylene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)Pyrene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	11
Dibenz(a,h)Anthracene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene (ug/l)	29	17	26	32	21	10 U	18	22	21	18	24	45
Fluorene (ug/l)	54	34	60	39	60	10 U	44	68	48	41	36	45
Indeno(1,2,3-cd)Pyrene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene (ug/l)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	284	10 U	10 U	10 U	10 U
Phenanthrene (ug/l)	45	10 U	56	48	67	10 U	33	78	46	17	10 U	13
Pyrene (ug/l)	19	11	15	23	15	10 U	12	20	15	13	16	38
Total All PAH (ug/l)	364	256	402	321	405	160	314	696	362	299	326	357

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	05/06/09		05/20/09		06/03/09		06/17/09		07/01/09		07/08/09		07/22/09		08/05/09		08/19/09		09/02/09		09/16/09	
TOC (mg/l)	11		14		11		11		13		11		12		10		14		12		10	
COD (mg/l)	2		43		36		45		59		52		41		42		30		18		55	
DO (mg/l)	7.77		7.9		11.5		6.9		10.9		5.27		4.1		11.1		5.25		8.52		6.35	
pH	7.36		7.51		7.22		7.32		7.65		7.35		7.28		7.60		7.36		7.46		7.06	
PCP (ug/l)	53		110		192		114		616		149		118		89		75		144		154	
Acenaphthene (ug/l)	20		359		118		136		112		110		168		113		60		12		137	
Acenaphthylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Anthracene (ug/l)	10	U	65		11		18		10	U	11		13		10	U	10	U	10	U	13	
Benzo(a)Anthracene (ug/l)	10	U	31		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(b)Fluoranthene (ug/l)	10	U	18		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)Pyrene (ug/l)	10	U	14		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chrysene (ug/l)	10	U	32		10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene (ug/l)	10	U	135		37		30		23		21		42		32		20		14		26	
Fluorene (ug/l)	10	U	208		30		56		19		47		68		28		18		10	U	67	
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene (ug/l)	10	U	10	U	10	U	243		10	U	63		10	U	10	U	10	U	10	U	10	U
Phenanthrene (ug/l)	10	U	419		10	U	97	U	10	U	51		22		10	U	10	U	10	U	63	
Pyrene (ug/l)	10	U	147		23		30		17		15		34		32		11		11		11	
Total All PAH (ug/l)	170		1,488		329		700		291		408		447		325		229		167		417	

TABLE 7
Existing GWTP OWS Effluent Concentrations (2003-2009)
Cascade Pole Site, Olympia, Washington

OWS Effluent Analytes (a)	09/30/09		10/14/09		10/28/09		11/11/09		11/23/09	12/21/09	Min	*Avg*	Max
TOC (mg/l)	12		10		11		13		11	11	8	19	125
COD (mg/l)	63		74		62		57		48	18	2	56	330
DO (mg/l)	9.17		11.3		6.45		6.38		4.87	6.82	0.13	6.5	16.8
pH	7.13		7.03		7.30		7.09		7.32	7.18	6.43	7.2	8.52
PCP (ug/l)	178		172		121		162		87	50	10	280	1230
Acenaphthene (ug/l)	145		154		118		167		128	171	10	226	5460
Acenaphthylene (ug/l)	10	U	10	U	10	U	10	U	10	10	6	13	195
Anthracene (ug/l)	10	U	14		14		23		16	18	10	52	2160
Benzo(a)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	10	9	21	800
Benzo(b)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	10	10	14	369
Benzo(k)Fluoranthene (ug/l)	10	U	10	U	10	U	10	U	10	10	10	12	137
Benzo(ghi)Perylene (ug/l)	10	U	10	U	10	U	10	U	10	10	10	11	113
Benzo(a)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	10	10	13	300
Chrysene (ug/l)	10	U	10	U	10	U	10	U	10	10	10	22	925
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U	10	U	10	U	10	10	10	11	95
Fluoranthene (ug/l)	26		28		45		44		34	26	10	96	4100
Fluorene (ug/l)	70		64		53		71		45	86	10	129	5500
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U	10	U	10	U	10	10	10	11	143
Naphthalene (ug/l)	10	U	10	U	10	U	10	U	10	10	10	304	8880
Phenanthrene (ug/l)	46		29		33		124		72	125	10	180	7290
Pyrene (ug/l)	13		16		31		25		20	22	10	75	3740
Total All PAH (ug/l)	410		405		394		554		415	548	160	1,191	40207

TABLE 8
Existing and Proposed GWTP Limitations
Cascade Pole Site, Olympia, Washington

		Performance Data (2003-2009)			Proposed Permit Limits		Old Permit Limits	
Parameter	**Units**	**EQ Effluent**	**OWS Effluent**	**Carbon/Final Effluent[a]**	**Avg Monthly[b]**	**Max Daily[b]**	**Avg Monthly**	**Max Daily**
Total Suspended Solids (TSS)	ppm	13	ND	1.4	6	15	NL	NL
pH	s.u.	7.1	7.2	7.8	6.0-9.0	6.0-9.0	7.0-8.5	7.0-8.5
Pentachlorophenol (PCP)	ppb	366	280	0.2	NL	6.5	6.5	8.2
PCP Removal	%			99.87	99.5	NA	99.5	NA
Acenapthene	ppb	279	226	0.10 U				
Acenapthylene	ppb	15	13	0.10 U				
Anthracene	ppb	58	52	0.10 U				
Benzo(a)anthracene (c)	ppb	21	21	0.10 U				
Benzo(b)fluoranthene (c)	ppb	13	14	0.10 U				
Benzo(k)fluoranthene (c)	ppb	12	12	0.10 U				
Benzo(g,h,i)perylene (c)	ppb	10	11	0.10 U				
Benzo(a)pyrene (c)	ppb	12	13	0.10 U	Report		NA	NA
Chrysene (c)	ppb	22	22	0.10 U				
Dibenz(a,h)anthracene (c)	ppb	10	11	0.10 U				
Fluoranthene	ppb	109	96	0.10 U				
Fluorene	ppb	136	129	0.10 U				
Indeno(1,2,3-c,d)pyrene (c)	ppb	10	11	0.10 U				
Napthalene	ppb	1,150	304	0.10 U				
Phenanthrene	ppb	254	180	0.10 U				
Pyrene	ppb	78	75	0.10 U				
Total PAHs	ppb	2,167	1,191	1.60 U	NL	NL	48	48

NOTES:
[a] Averages for 2008 thru 2009; typical of non-detects for PAHs and PCP in Final Effluent
[b] Minimum sampling once/two weeks
[c] = carcinogenic PAH
NA = not applicable
NL = no limit defined
U = detection limit

TABLE 9
Existing GWTP Final Discharge Monitoring Results- GAC Effluent (2008-2009)
Cascade Pole Site, Olympia, Washington

Final (Carbon) Effluent	1/9/08		1/23/08		2/6/08		2/20/08		3/5/08		3/19/08		4/2/08		4/16/08	
TSS (mg/l)	0.5		0.5	U	1.7		0.75	U	0.5		12		0.5		0.7	
Cu (mg/l)	0.002	U	0.0002	U	0.002	U	0.0002	U	0.002	U	0.0002	U	0.002	U	0.0002	U
pH	7.71		7.84		7.84		7.71		7.75		7.77		7.78		7.65	
PCP (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Acenaphthene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Acenaphthylene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Anthracene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(a)Anthracene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(b)Fluoranthene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(k)Fluoranthene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(ghi)Perylene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(a)Pyrene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Chrysene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Dibenz(a,h)Anthracene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Fluoranthene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Fluorene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Indeno(1,2,3-cd)Pyrene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Naphthalene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Phenanthrene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Pyrene (ug/l)	0.10	U	0.10	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Total All PAH (ug/l)	1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60	

TABLE 9
Existing GWTP Final Discharge Monitoring Results- GAC Effluent (2008-2009)
Cascade Pole Site, Olympia, Washington

Final (Carbon) Effluent	4/30/08		5/14/08		5/28/08		6/11/08		6/25/08		7/9/08		7/23/08		8/6/08		8/20/08		9/3/08		9/17/08	
TSS (mg/l)	1.3		0.7		0.5	U	0.5	U	7.5		0.7		2		0.5	U	0.5	U	0.5	U	1	
Cu (mg/l)	0.0002	U	0.002	U	0.0002	U	0.002	U	0.0002	U	0.002	U	0.0002	U	0.002	U	0.002	U	0.002	U	0.002	U
pH	7.57		7.66		7.63		7.76		7.61		7.57		7.83		7.76		7.96		7.73		8.1	
PCP (ug/l)	3.78		0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.21		0.1	U	0.1	U	0.1	U	0.1	U
Acenaphthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Acenaphthylene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(a)Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(b)Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(k)Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(ghi)Perylene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(a)Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Chrysene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Dibenz(a,h)Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Fluorene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Indeno(1,2,3-cd)Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Naphthalene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Phenanthrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Total All PAH (ug/l)	1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60	

TABLE 9
Existing GWTP Final Discharge Monitoring Results- GAC Effluent (2008-2009)
Cascade Pole Site, Olympia, Washington

Final (Carbon) Effluent	10/1/08		10/15/08		10/29/08		11/5/08		11/19/08		12/3/08		12/16/08		12/29/08		1/7/09		1/21/09		2/5/09		2/18/09		3/4/09	
TSS (mg/l)	0.5	U	1.7		0.5	U	1.3		0.5	U	3		1.6		6.3		1.5		1.5		0.5	U	2.5		0.5	U
Cu (mg/l)	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
pH	7.74		8.06		8.09		7.8		7.92		7.79		8.01		7.46		7.51		7.48		7.57		7.49		7.54	
PCP (ug/l)	0.1	U	0.1	U	0.1	U	0.34		0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Acenaphthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Acenaphthylene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Benzo(a)Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Benzo(b)Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Benzo(k)Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Benzo(ghi)Perylene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Benzo(a)Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Chrysene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Dibenz(a,h)Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Fluorene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Indeno(1,2,3-cd)Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Naphthalene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Phenanthrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10	U	0.10	U	0.1	U
Total All PAH (ug/l)	1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60	

TABLE 9
Existing GWTP Final Discharge Monitoring Results- GAC Effluent (2008-2009)
Cascade Pole Site, Olympia, Washington

Final (Carbon) Effluent	3/18/09		4/1/09		4/15/09		4/29/09		5/6/09		5/20/09		6/3/09		6/17/09		7/1/09		7/8/09		7/22/09		8/5/09		8/19/09	
TSS (mg/l)	0.5	U	0.5	U	0.5		1		0.5	U	2		1.2		0.5		0.5		2		1		0.7		0.5	
Cu (mg/l)	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
pH	7.62		7.83		7.81		7.9		7.82		7.79		7.66		7.97		7.99		8.17		7.91		7.78		8.03	
PCP (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Acenaphthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Acenaphthylene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(a)Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(b)Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(k)Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(ghi)Perylene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(a)Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Chrysene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Dibenz(a,h)Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Fluorene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Indeno(1,2,3-cd)Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Naphthalene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.12		0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Phenanthrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Total All PAH (ug/l)	1.60		1.60		1.60		1.60		1.60		1.60		1.62		1.60		1.60		1.60		1.60		1.60		1.60	

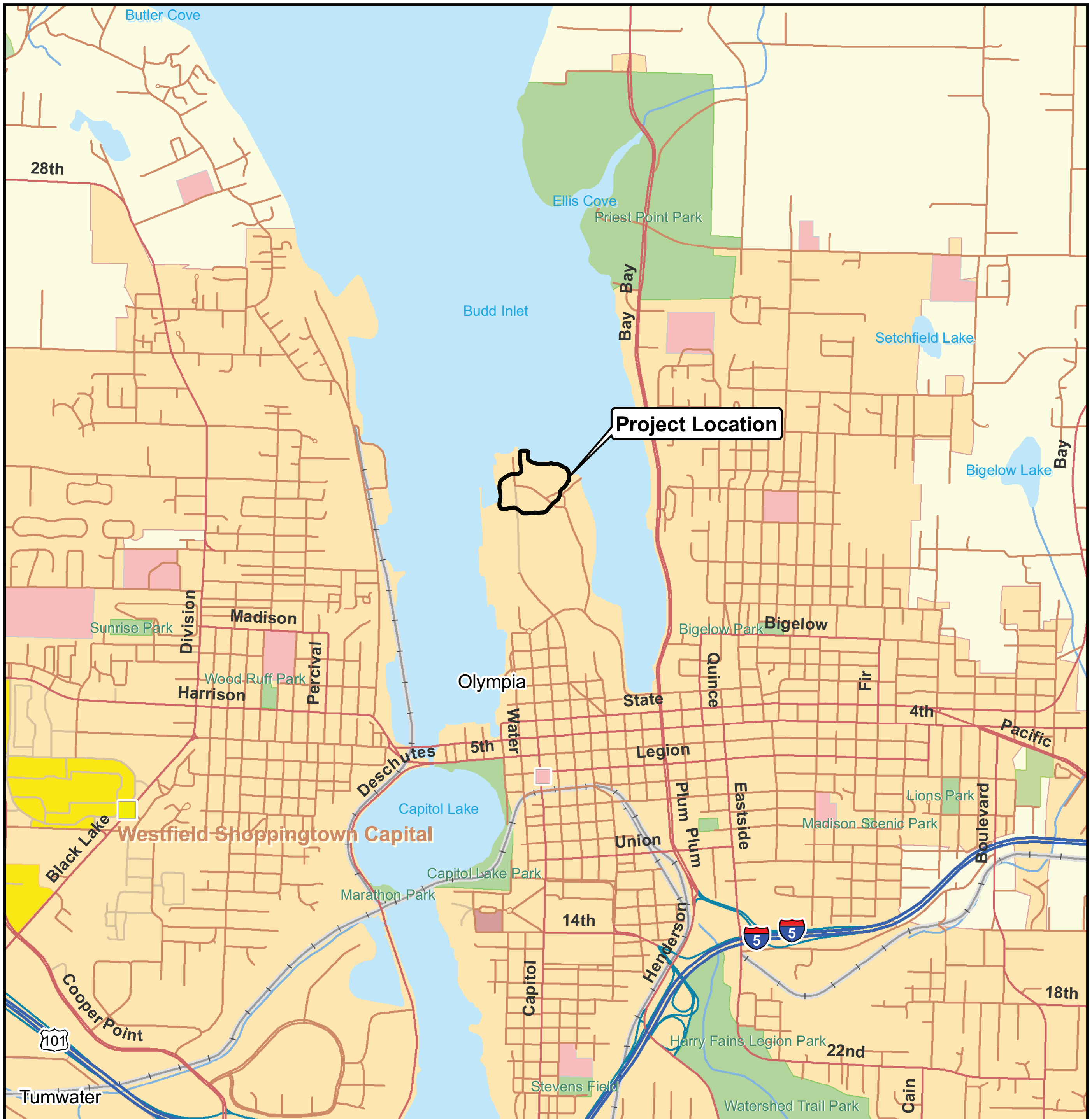
TABLE 9
Existing GWTP Final Discharge Monitoring Results- GAC Effluent (2008-2009)
Cascade Pole Site, Olympia, Washington

Final (Carbon) Effluent	9/2/09		9/16/09		9/30/09		10/14/09		10/28/09		11/11/09		11/23/09		12/9/09		12/21/09		AVG	MAX
TSS (mg/l)	0.5	U	0.8		0.5	U	0.5	U	1		1		0.5	U			1.5		1.37	12.00
Cu (mg/l)	0.002	U	0.002	U	0.002	U	1.000	U	1.000	U	1.000	U	1.000				1.000	U	0.10	1.00
pH	8.02		8		6.87		7.78		7.72		7.8		7.75		8.18		7.93		7.78	8.18
PCP (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.17	3.78
Acenaphthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Acenaphthylene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Benzo(a)Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Benzo(b)Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Benzo(k)Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Benzo(ghi)Perylene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Benzo(a)Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Chrysene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Dibenz(a,h)Anthracene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Fluoranthene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Fluorene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Indeno(1,2,3-cd)Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Naphthalene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.12
Phenanthrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Pyrene (ug/l)	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.10 U	0.10
Total All PAH (ug/l)	1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60		1.60 U	

TABLE 10
Potential Site Hazards
Cascade Pole Site, Olympia, Washington

Procedures and Instructions Developed to Address Principal Hazards	Reference Documents
General Hazards and Housekeeping (Slips Trips and Falls)	HASP, SOPs
Hazard Communication	HASP
Training needs	HASP, SOPs, O&M Manual
COC Exposure	HASP, SOPs
Shipping and Transportation of Chemical Products	HASP
Emergency Response	HASP, O&M Manual
Manual Lifting	HASP, SOPs
Noise	HASP, O&M Manual
Hot Surfaces (Burns)	HASP, SOPs
Fire	HASP, SOPs
Electrical	HASP
Lock Out Tag Out	SOPs, Work Permit
Hand and Power Tool Inspections	SOPs
Ladders	HASP, SOPs
Heat and Cold Stress	HASP, SOPs
Compressed Gas Cylinders	HASP
Procedures for Locating Buried Utilities	HASP
IDW Drum Sampling	HASP
Confined Space Entry	HASP
Pressure Washing	HASP, Work Permit
Biological Hazards (Snakes, Poison Ivy, Ticks, Stings)	HASP, SOPs
Blood borne Pathogens, Cuts, and Lacerations	HASP, SOPs
Welding and Cutting, Other Ignition Source Producing Tasks	HASP, Work Permit
Heavy Machinery	HASP
Cranes, Hoists, and Rigging	HASP
Excavations	HASP, Work Permit
Earthmoving Equipment	HASP
Working at Elevations	HASP, Work Permit
Respiratory Protection	HASP
Forklifts	HASP

Figures



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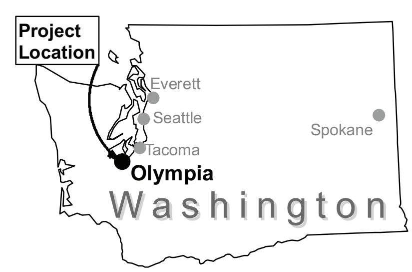
0 0.5 1

Miles

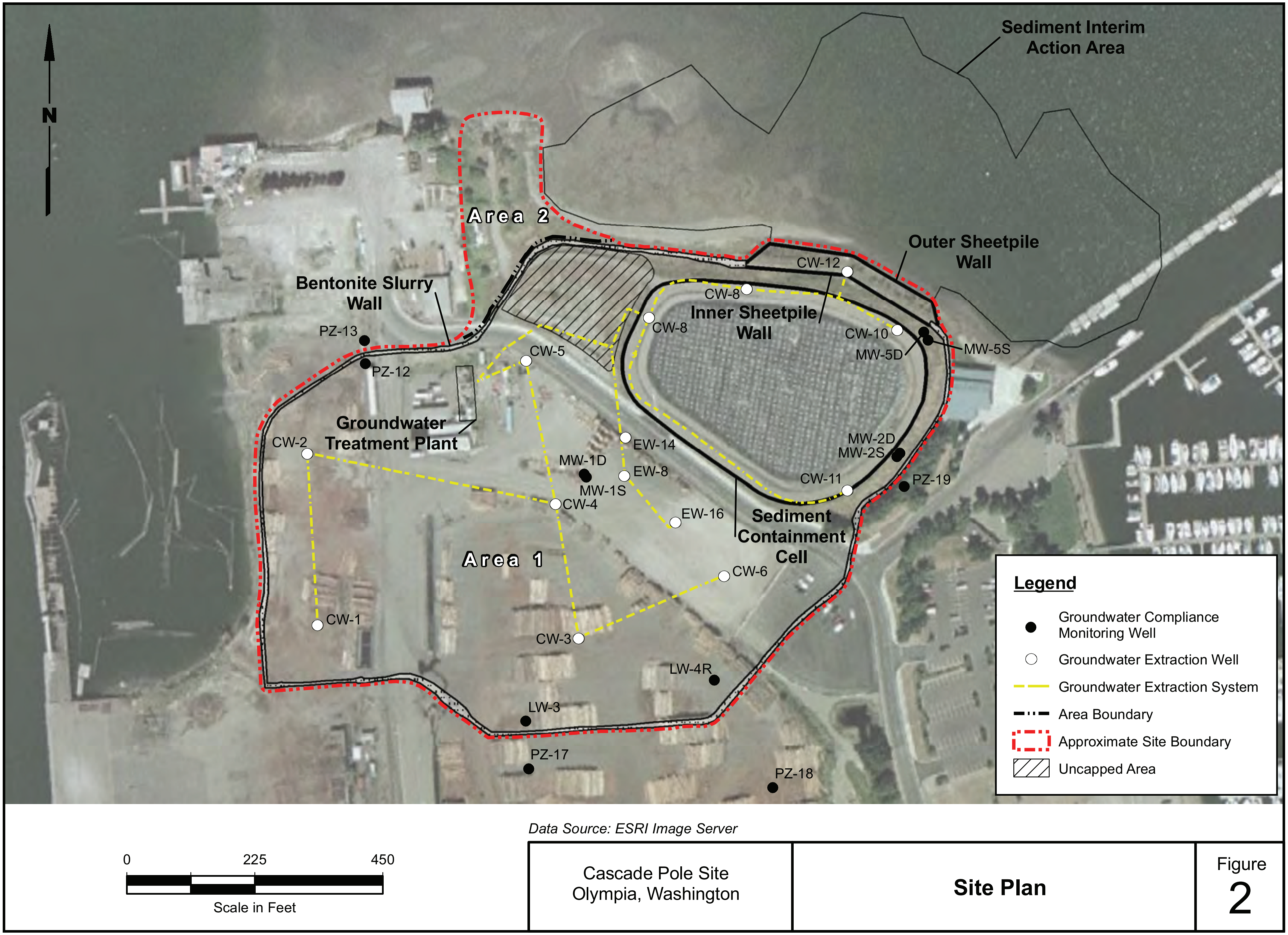


Data Source: ESRI 2006

Y:\Projects\021035\MapDocs\Fig1.mxd 11/26/2008

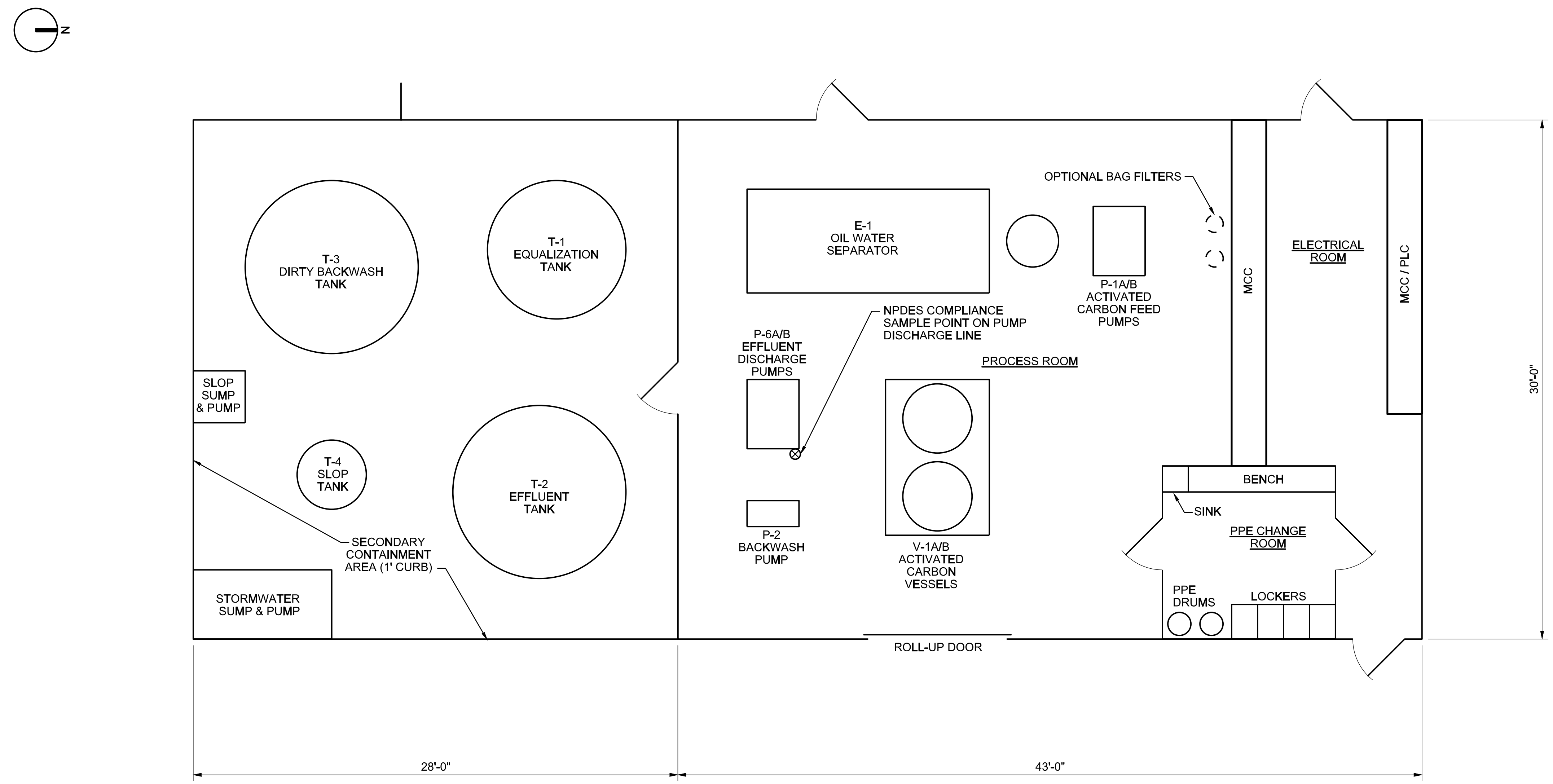
Cascade Pole Site Olympia, Washington	**Vicinity Map**	Figure 1

Y:\Projects\021035\MapDocs\8.5_11\Fig2.mxd 12/3/2008



Data Source: ESRI Image Server

Cascade Pole Site Olympia, Washington	**Site Plan**	Figure 2



PLAN

1/4"=1'-0"

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FIGURE 3

GROUNDWATER TREATMENT SYSTEM LAYOUT

PORT OF OLYMPIA
CASCADE POLE
GROUNDWATER
TREATMENT SYSTEM

NO.	DATE	REVISION	BY	APVD

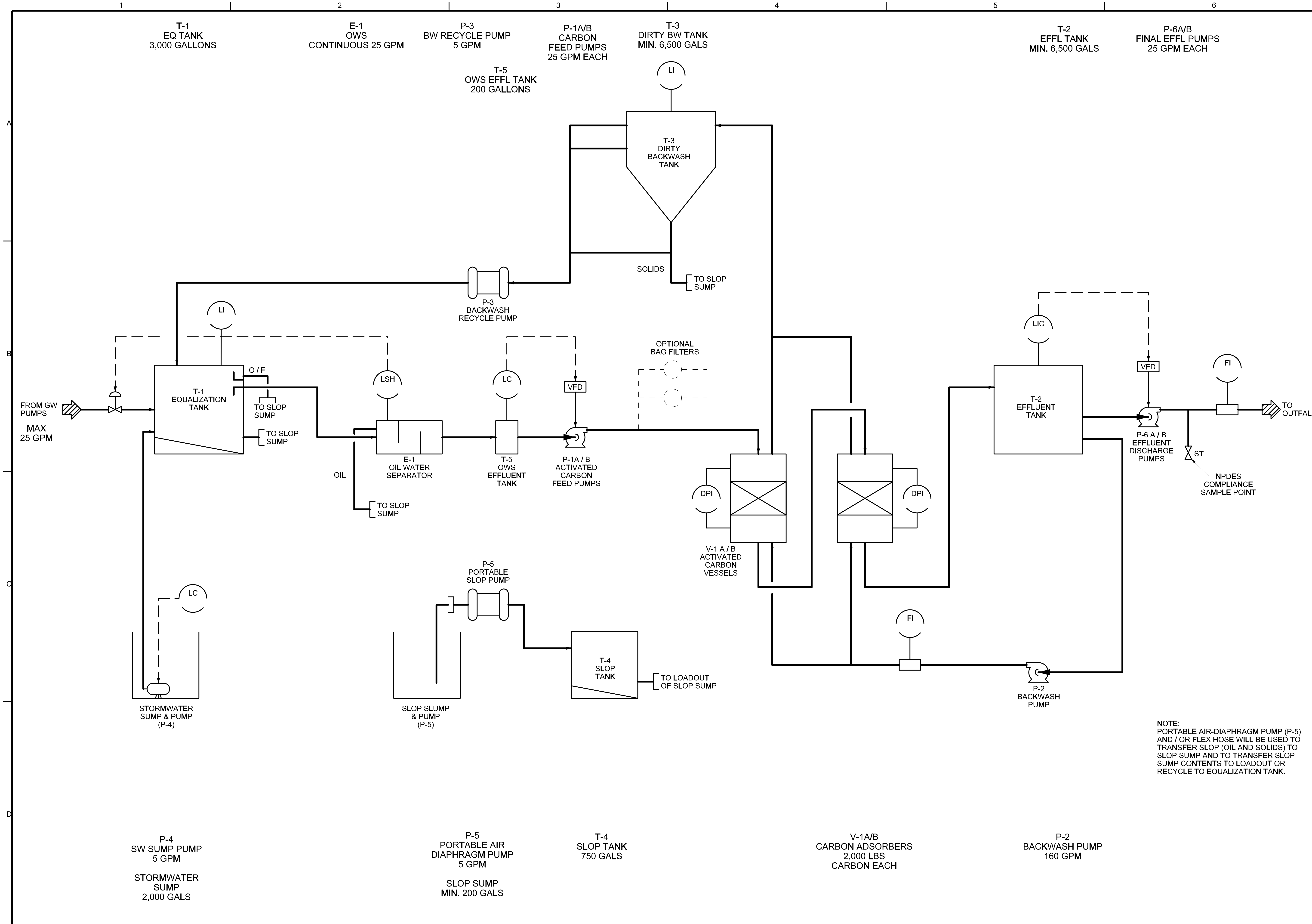
DSGN	DR	CHK	APVD

NO	DATE	DESCRIPTION	APVR	N

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	APRIL 2010
PROJ	402907
DWG	Figure 3
SHEET	

ISSUED FOR 100% REVIEW



CH2MHILL

PORT OF OLYMPIA
CASCADE POLE
GROUNDWATER
TREATMENT SYSTEM

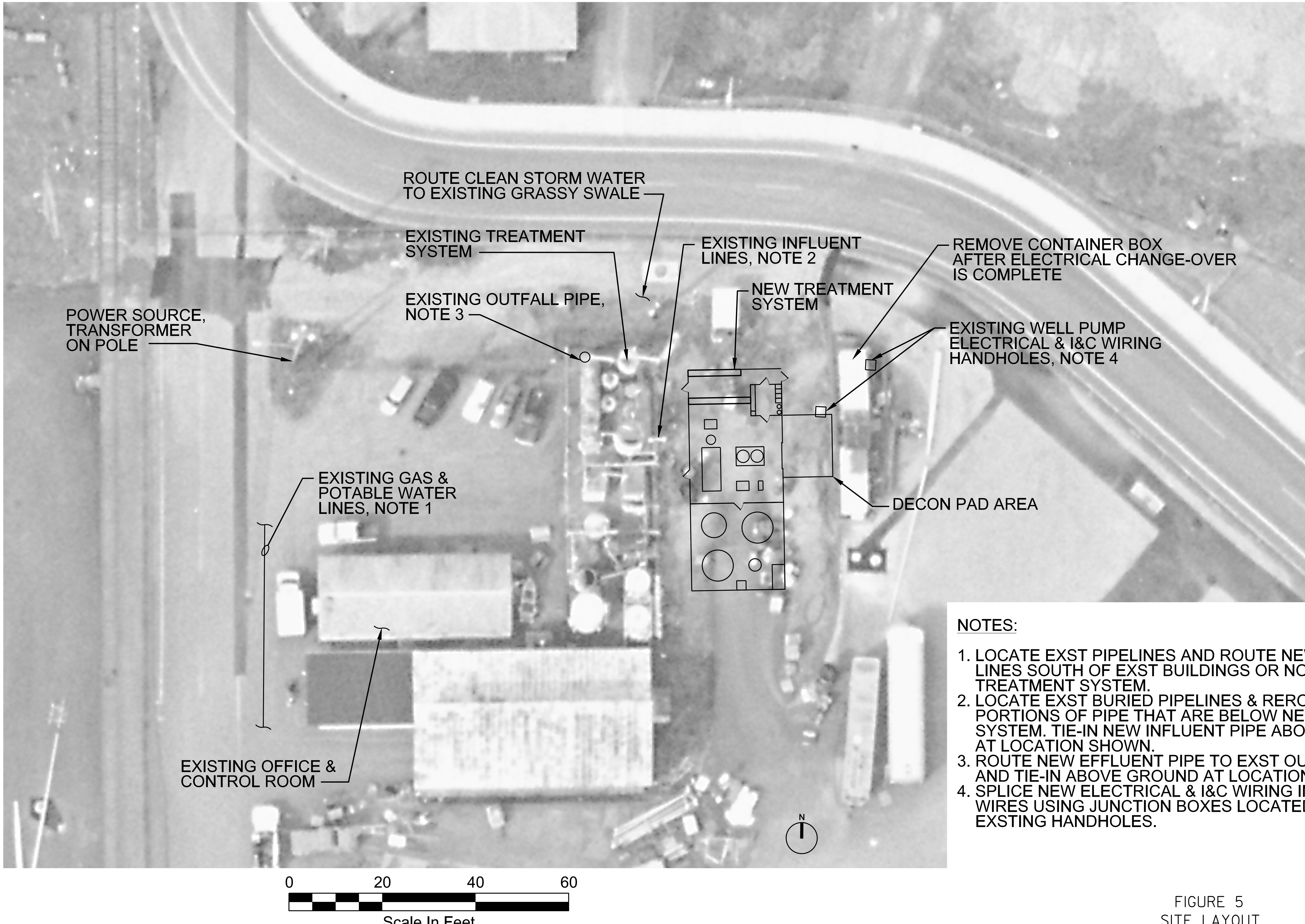
FIGURE 4
PROCESS FLOW DIAGRAM

NO.	DATE
DESCRIPTION	REVISION
APVR BY	APVD
DSGN	DR
CHK	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	APRIL 2010
PROJ	402907
DWG	Figure 4
SHEET	

ISSUED FOR 100% REVIEW



NOTES:

1. LOCATE EXST PIPELINES AND ROUTE NEW SUPPLY LINES SOUTH OF EXST BUILDINGS OR NORTH OF EXST TREATMENT SYSTEM.
2. LOCATE EXST BURIED PIPELINES & REROUTE PORTIONS OF PIPE THAT ARE BELOW NEW TREATMENT SYSTEM. TIE-IN NEW INFLUENT PIPE ABOVE GROUND AT LOCATION SHOWN.
3. ROUTE NEW EFFLUENT PIPE TO EXST OUTFALL PIPE AND TIE-IN ABOVE GROUND AT LOCATION SHOWN.
4. SPLICE NEW ELECTRICAL & I&C WIRING INTO EXST WIRES USING JUNCTION BOXES LOCATED WITHIN 10' OF EXSTING HANDHOLES.

FIGURE 5
SITE LAYOUT

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FILE NAME:

Scale in Feet

Cascade Pole Site Olympia, Washington	Site Location Relative to Mean High Water Level	Figure 6

Appendix A

From: TYork@calgoncarbon-us.com
Sent: Monday, March 22, 2010 8:31 PM
To: Farmer, Bill/SEA
Subject: RE: Cascade Pole Carbon Adsorbers - Scenario #2
Attachments: Plant Influent.pdf; bio filter effluent.pdf; 2009PAHs_BF.XLS

Hi Bill,

I blended most of the PAH's into Anthracine. Based on this the program defaults due to a two phase solution. It then adjust the program to show an alternative solubility.

based on this you can see the carbon use rates are very low.

Keep in mind any sheen that is not picked up by the oil water separator will coat the activated carbon.

Troy

(See attached file: Plant Influent.pdf)(See attached file: bio filter effluent.pdf)

Troy A York
Technical Sales Representative
Calgon Carbon Company
2738 SE Hill Street
Prineville OR 97754
541-416-8100 (office)
503-913-4001 (cell)
541-416-8101 (fax)
www.calgoncarbon.com

<Bill.Farmer@CH2M.com>

03/16/2010 08:43 PM

To <TYork@calgoncarbon-us.com>

cc

Subject RE: Cascade Pole Carbon Adsorbers - Scenario #2

What about "low" concentrations say 15 ppm or below? Or below 5 ppm?

OK - you made me do it. I've attached summary of actual data for Bio Influent (or OWS Effluent) for 2009 which we can take as the Carbon Influent for your adsorbers (with the oil removal step for the proposed system). Consider any values of "10" as below the detection limit but we took the DL as the value in the total. Note Penta(PCP) value above in table. Also compared to "Plant Influent" (which is actually after EQ), which shows significant removal in the OWS, eh?
Good night, BF

-----Original Message-----
From: TYork@calgoncarbon-us.com [mailto:TYork@calgoncarbon-us.com]
Sent: Tuesday, March 16, 2010 8:21 PM
To: Farmer, Bill/SEA
Subject: Re: Cascade Pole Carbon Adsorbers - Scenario #2

(Message sent from BlackBerry device)
Any free product is going to coat the GAC.
Troy York
Calgon Carbon
503-913-4001

----- Original Message -----
From: [Bill.Farmer@CH2M.com]
Sent: 03/16/2010 09:14 PM CST
To: Troy York
Subject: RE: Cascade Pole Carbon Adsorbers - Scenario #2

Thanks
How about O&G? What concentrations give you heartburn?
BF

-----Original Message-----
From: TYork@calgoncarbon-us.com [mailto:TYork@calgoncarbon-us.com]
Sent: Tuesday, March 16, 2010 8:11 PM
To: Farmer, Bill/SEA
Subject: Re: Cascade Pole Carbon Adsorbers - Scenario #2

Hi Bill,

I forwarded your request to our application engineering for review of the compounds. I should have a response on Wednesday.

The carbon use rate for accuracy would require actual water data.
However, for general rule of thumb use rates for comparison I can use the
1/3 rule you mentioned. Keeping in mind this is just a range of change in the use rate.

Our modeling program takes into account competing compounds when compared to different types of GAC, flow rate, temp, etc. The report will be in rate of elution from first to break through to the last.

Troy

Troy A York
Technical Sales Representative
Calgon Carbon Company
2738 SE Hill Street
Prineville OR 97754
541-416-8100 (office)
503-913-4001 (cell)
541-416-8101 (fax)
www.calgoncarbon.com

<Bill.Farmer@CH2M
.com>

To

03/16/2010 03:46 PM

<TYork@calgoncarbon-us.com>

cc

Subject

Cascade Pole Carbon Adsorbers - Scenario #2

Hey Troy - As mentioned, we're going to be considering a treatment alternative to include oil removal. Looking at the existing GWTP data, their OWS typically knocks the organics down to about one/third of what goes in. Apparently the PAHs have an affinity for the oil phase and are preferentially removed, which is a good thing.
Is that a good enough estimate for you to consider as a second scenario for influent to carbon (1/3 of the concentrations previously provided) or would you prefer a data summary of OWS effluent (which will be more work for me).
Do you estimate carbon life strictly based on pounds organics removed per pound of carbon?
Or do you take into account chromatographic effects for each compound and/or preferential adsorption?
Or does one compound that is more prone to break-through dictate carbon replacement?

The permit requires:

Total PAHs (16 cmpds): 48 ppb both Daily Max & Monthly Avg
Pentachlorophenol: 8.2 ppb Daily Max & 6.5 Monthly Avg
pH: 7.0-8.5
Discharge is to Puget Sound.

Thanks, BF

From: Farmer, Bill/SEA
Sent: Monday, March 15, 2010 4:39 PM
To: Troy York (TYork@calgoncarbon-us.com)
Subject: Cascade Pole Carbon Adsorbers

Hey Troy - Here are some data from 2003-9 for the groundwater treatment system influent (it's actually EQ Tank effluent). Can you give me some idea on carbon life and any other issues? I summarized for each year and boiled down the one spreadsheet to just the PAHs, however, the other organics will take up some adsorption sites.
The current system includes the following processes but we're considering just relying on an EQ Tank to remove gross O&G and TSS and then organics removal in carbon adsorbers. The obvious trade-off is carbon replacement cost vs. O&M to operate the bio system.
Current GWTP: EQ Tank effluent runs through an oil water separator but they apparently do not recover much free product there.
Then it goes thru a biological system before routing thru the final carbon polish (two beds).

Proposed System: EQ Tank then carbon adsorbers - with option to add oil removal step in between as necessary.

We want to be able to backwash the carbon to prolong life and deal with any solids or mineral scaling buildup. We like prolonged high-rate backwash to fully fluidize the bed and get material out of there.

Regarding O&G, it appears that the plant influent typically averages between 5 and 15 ppm although they had some higher spikes in 2007 for some reason (and a few lesser spikes in other years).
At what concentration does O&G become a significant problem?
Is it a free phase problem or do elevated "dissolved" concentrations also pose issues?
Once O&G is adsorbed into the carbon bed can it be removed or is the user faced with replacing the carbon?

As currently stands, we are designing for 25 gpm to be handled by lead/lag arrangement and one standby bed. So, the triplex unit would be in order.

How soon can you provide some estimate of carbon life? Feel free to contact me with any questions.
Thanks, BF

Bill Farmer, PE
CH2M HILL, Bellevue, WA
425-233-3551

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Calgon Carbon Corporation WaterAds Report

Temperature (F): 60.0 Flow Rate (gal/min): 25 3/22/10

Pressure (atm): 1.0

Adsorbate (Listed In Order of Elution-First is on Top)	Concentration (ppm)	Adsorbent Use Rate (lbs/day) Filtrasorb 300 (1975)				
Pentachlorophenol	0.156	0.847				
Naphthalene	0.032	0.711				
Fluorene	0.052	0.657				
Acenapthene	0.118	0.579				
Anthracene	0.163	0.379				
Phenanthrene	0.056	0.154				
Chrysene	0.011	0.018				
Totals:	5.88E-1					

Note: This information has been generated using Calgon Carbon's proprietary predictive model. No safety factors have been incorporated into these results. Appropriate safety factors should be applied as necessary. There is no expressed or implied warranty regarding the suitability or applicability of results.

Calgon Carbon Corporation WaterAds Report

Temperature (F): 60.0 Flow Rate (gal/min): 25 3/22/10

Pressure (atm): 1.0

Adsorbate (Listed In Order of Elution-First is on Top)	Concentration (ppm)	Adsorbent Use Rate (lbs/day) Filtrasorb 300 (1975)				
Pentachlorophenol	0.214	2.200				
Naphthalene	0.681	2.111				
Fluorene	0.079	1.242				
Acenapthene	0.168	0.963				
Anthracene	0.23	0.651				
Phenanthrene	0.146	0.341				
Chrysene	0.014	0.023				
Totals:	1.53E0					

Note: This information has been generated using Calgon Carbon's proprietary predictive model. No safety factors have been incorporated into these results. Appropriate safety factors should be applied as necessary. There is no expressed or implied warranty regarding the suitability or applicability of results.

TABLE 4
PORT OF OLYMPIA TREATMENT PAD
MONITORING RESULTS

BIOREACTOR INFLUENT	**01/07/09**	**01/21/09**	**02/05/09**	**02/18/09**	**03/04/09**	**03/18/09**	**04/01/09**	**04/15/09**	**04/29/09**	**05/06/09**	**05/20/09**	**06/03/09**	**06/17/09**	**07/01/09**	**07/08/09**	**07/22/09**	**08/05/09**	**08/19/09**	**09/02/09**	**09/16/09**	**09/30/09**	**10/14/09**	**10/28/09**	**11/11/09**	**11/23/09**	**12/21/09**	**Bio Influent 2009 AVG**	**Plant Influent 2009 AVG**
TOC (mg/l)	11	16	16	14	17	13	14	14	17	11	14	11	11	13	11	12	10	14	12	10	12	10	11	13	11	11	13	15
COD (mg/l)	30	52	36	50	55	40	44	51	57	2	43	36	45	59	52	41	42	30	18	55	63	74	62	57	48	18	45	58
TSS (mg/l)																												
PCP (ug/l)	**100**	**161**	**22**	**457**	**153**	**149**	**153**	**126**	**154**	**53**	**110**	**192**	**114**	**616**	**149**	**118**	**89**	**75**	**144**	**154**	**178**	**172**	**121**	**162**	**87**	**50**	**156**	**214**
Cu (mg/l)																												
DO (mg/l)	8.14	6.84	10.1	8.5	7.08	7.53	8.73	7.6	3.18	7.77	7.9	11.5	6.9	10.9	5.27	4.1	11.1	5.25	8.52	6.35	9.17	11.3	6.45	6.38	4.87	6.82	7.63	6.5
TDS (mg/l)																												
pH	7.18	6.81	8.10	6.97	7.12	6.92	7.20	7.39	7.73	7.36	7.51	7.22	7.32	7.65	7.35	7.28	7.60	7.36	7.46	7.06	7.13	7.03	7.30	7.09	7.32	7.18	7.29	7.31
TIX (mg/l)																												
Naphthalene (ug/l)	10 U	10 U	10	10	284	10	10	10	10	10	10	10	243	10	63	10	10	10	10	10	10	10	10	10	10	10	32	681
Acenaphthylene (ug/l)	10 U	10 U	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Acenaphthene (ug/l)	62	126	10	96	120	118	100	129	90	20	359	118	136	112	110	168	113	60	12	137	145	154	118	167	128	171	118	168
Fluorene (ug/l)	39	60	10	44	68	48	41	36	45	10	208	30	56	19	47	68	28	18	10	67	70	64	53	71	45	86	52	79
Phenanthrene (ug/l)	48	67	10	33	78	46	17	10	13	10	419	10	97	10	51	22	10	10	10	63	46	29	33	124	72	125	56	146
Anthracene (ug/l)	17	16	10	11	14	14	10	11	25	10	65	11	18	10	11	13	10	10	10	13	10	14	14	23	16	18	16	33
Fluoranthene (ug/l)	32	21	10	18	22	21	18	24	45	10	135	37	30	23	21	42	32	20	14	26	26	28	45	44	34	26	31	62
Pyrene (ug/l)	23	15	10	12	20	15	13	16	38	10	147	23	30	17	15	34	32	11	11	11	13	16	31	25	20	22	24	45
Benzo(a)Anthracene (ug/l)	10 U	10 U	10	10	10	10	10	10	10	10	31	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	11	14
Chrysene (ug/l)	10 U	10 U	10	10	10	10	10	10	11	10	32	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	11	14
Benzo(b)Fluoranthene (ug/l)	10 U	10 U	10	10	10	10	10	10	10	10	18	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	11
Benzo(k)Fluoranthene (ug/l)	10 U	10 U	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Benzo(a)Pyrene (ug/l)	10 U	10 U	10	10	10	10	10	10	10	10	14	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	11
Indeno(1,2,3-cd)Pyrene (ug/l)	10 U	10 U	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Dibenz(a,h)Anthracene (ug/l)	10 U	10 U	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Benzo(ghi)Perylene (ug/l)	10 U	10 U	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total All PAH (ug/l) *	321	405	160	314	696	362	299	326	357	170	1,488	329	700	281	408	447	325	229	167	417	410	405	394	554	415	548	**427**	**1456**
Total 1st 8 PAH (ug/l) **	241	325	80	234	616	282	219	246	276	90	1,353	249	620	211	328	367	245	149	87	337	330	325	314	474	335	468	**326**	**1224**
																											Bio Influent 2009 AVG (=OWS Effl)	**Plant Influent 2009 AVG (=OWS Infl)**

TABLE 5
PORT OF OLYMPIA TREATMENT PAD
MONITORING RESULTS

BIOREACTOR EFFLUENT	**01/07/09**		**01/21/09**	
TOC (mg/l)	8		11	
COD (mg/l)	20		40.0	
TSS (mg/l)				
PCP (ug/l)	23		45	
Cu (mg/l)				
DO (mg/l)	10.4		10.2	
TDS (mg/l)				
pH	7.93		7.69	
TIX (mg/l)				
Naphthalene (ug/l)	10	U	10	U
Acenaphthylene (ug/l)	10	U	10	U
Acenaphthene (ug/l)	10	U	10	U
Fluorene (ug/l)	10	U	10	U
Phenanthrene (ug/l)	10	U	10	U
Anthracene (ug/l)	10	U	10	U
Fluoranthene (ug/l)	10	U	10	U
Pyrene (ug/l)	10	U	10	U
Benzo(a)Anthracene (ug/l)	10	U	10	U
Chrysene (ug/l)	10	U	10	U
Benzo(b)Fluoranthene (ug/l)	10	U	10	U
Benzo(k)Fluoranthene (ug/l)	10	U	10	U
Benzo(a)Pyrene (ug/l)	10	U	10	U
Indeno(1,2,3-cd)Pyrene (ug/l)	10	U	10	U
Dibenz(a,h)Anthracene (ug/l)	10	U	10	U
Benzo(ghi)Perylene (ug/l)	10	U	10	U
Total All PAH (ug/l) *	160		160	
Total 1st 8 PAH (ug/l) **	80		80	

TABLE 6
PORT OF OLYMPIA TREATMENT PAD
MONITORING RESULTS

_ CARBON MID-POINT	**01/07/09**	**01/21/09**
TOC (mg/l)		
COD (mg/l)		
TSS (mg/l)		
PCP (ug/l)	1.50	4.20
Cu (mg/l)		
DO (mg/l)		
TDS (mg/l)		
pH	7.57	7.48
TIX (mg/l)		
Naphthalene--SIM (ug/l)	0.10 U	0.10 U
Acenaphthylene--SIM (ug/l)	0.10 U	0.10 U
Acenaphthene--SIM (ug/l)	0.10 U	0.10 U
Fluorene--SIM (ug/l)	0.10 U	0.10 U
Phenanthrene--SIM (ug/l)	0.10 U	0.10 U
Anthracene--SIM (ug/l)	0.22	0.26
Fluoranthene--SIM (ug/l)	0.10 U	0.15
Pyrene--SIM (ug/l)	0.10 U	0.17
Benzo(a)Anthracene--SIM (ug/l)	0.10 U	0.10 U
Chrysene--SIM (ug/l)	0.10 U	0.10 U
Benzo(b)Fluoranthene--SIM (ug/l)	0.10 U	0.10 U
Benzo(k)Fluoranthene--SIM (ug/l)	0.10 U	0.10 U
Benzo(a)Pyrene--SIM (ug/l)	0.10 U	0.10 U
Indeno(1,2,3-cd)Pyrene--SIM (ug/l)	0.10 U	0.10 U
Dibenz(a,h)Anthracene--SIM (ug/l)	0.10 U	0.10 U
Benzo(ghi)Perylene--SIM (ug/l)	0.10 U	0.10 U
Total All PAH (ug/l) *	1.72	1.88
Total 1st 8 PAH (ug/l) **	0.92	1.08

TABLE 7
PORT OF OLYMPIA TREATMENT PAD
MONITORING RESULTS

SYSTEM DISCHARGE	01/07/09		01/21/09	
TOC (mg/l)				
COD (mg/l)				
TSS (mg/l)	1.5		1.5	
PCP (ug/l)	0.10	U	0.10	U
Cu (mg/l)				
Dissolved Cu (mg/l)	0.002	U	0.002	U
DO (mg/l)				
TDS (mg/l)				
pH	7.51		7.48	
TIX (mg/l)				
Naphthalene--SIM (ug/l)	0.10	U	0.10	U
Acenaphthylene--SIM (ug/l)	0.10	U	0.10	U
Acenaphthene--SIM (ug/l)	0.10	U	0.10	U
Fluorene--SIM (ug/l)	0.10	U	0.10	U
Phenanthrene--SIM (ug/l)	0.10	U	0.10	U
Anthracene--SIM (ug/l)	0.10	U	0.10	U
Fluoranthene--SIM (ug/l)	0.10	U	0.10	U
Pyrene--SIM (ug/l)	0.10	U	0.10	U
Benzo(a)Anthracene--SIM (ug/l)	0.10	U	0.10	U
Chrysene--SIM (ug/l)	0.10	U	0.10	U
Benzo(b)Fluoranthene--SIM (ug/l)	0.10	U	0.10	U
Benzo(k)Fluoranthene--SIM (ug/l)	0.10	U	0.10	U
Benzo(a)Pyrene--SIM (ug/l)	0.10	U	0.10	U
Indeno(1,2,3-cd)Pyrene--SIM (ug/l)	0.10	U	0.10	U
Dibenz(a,h)Anthracene--SIM (ug/l)	0.10	U	0.10	U
Benzo(ghi)Perylene--SIM (ug/l)	0.10	U	0.10	U
Total All PAH (ug/l) *	1.60		1.60	
Total 1st 8 PAH (ug/l) **	0.80		0.80	

TABLE 8
PORT OF OLYMPIA TREATMENT PAD
MONITORING RESULTS

% BIOREACTOR REDUCTION	01/07/09	01/21/09
TOC	27.3%	31.3%
COD	33.3%	23.1%
TSS		
PCP	77.0%	72.0%
Cu		
DO		
TDS		
pH	-10.4%	-12.9%
TIX		
Naphthalene	0.0%	0.0%
Acenaphthylene	0.0%	0.0%
Acenaphthene	83.9%	92.1%
Fluorene	74.4%	83.3%
Phenanthrene	79.2%	85.1%
Anthracene	41.2%	37.5%
Fluoranthene	68.8%	52.4%
Pyrene		33.3%
Benzo(a)Anthracene	0.0%	0.0%
Chrysene	0.0%	0.0%
Benzo(b)Fluoranthene	0.0%	0.0%
Benzo(k)Fluoranthene	0.0%	0.0%
Benzo(a)Pyrene	0.0%	0.0%
Indeno(1,2,3-cd)Pyrene	0.0%	0.0%
Dibenz(a,h)Anthracene	0.0%	0.0%
Benzo(ghi)Perylene	0.0%	0.0%
Total All PAH *	50.2%	60.5%
Total 1st 8 PAH **	66.8%	75.4%

TABLE 9
PORT OF OLYMPIA TREATMENT PAD
MONITORING RESULTS

_ % CARBON 1 REDUCTION	**01/07/09**	**01/21/09**
TOC	100.00%	100.00%
COD	100.00%	100.00%
TSS		
PCP	93.48%	90.67%
Cu		
DO		
TDS		
pH		
TIX		
Naphthalene	99.00%	99.00%
Acenaphthylene	99.00%	99.00%
Acenaphthene	99.00%	99.00%
Fluorene	99.00%	99.00%
Phenanthrene	99.00%	99.00%
Anthracene	97.80%	97.40%
Fluoranthene	99.00%	98.50%
Pyrene	99.00%	98.30%
Benzo(a)Anthracene	99.00%	99.00%
Chrysene	99.00%	99.00%
Benzo(b)Fluoranthene	99.00%	99.00%
Benzo(k)Fluoranthene	99.00%	99.00%
Benzo(a)Pyrene	99.00%	99.00%
Indeno(1,2,3-cd)Pyrene	99.00%	99.00%
Dibenz(a,h)Anthracene	99.00%	99.00%
Benzo(ghi)Perylene	99.00%	99.00%
Total All PAH *	98.93%	98.83%
Total 1st 8 PAH **	98.85%	98.65%

TABLE 10
PORT OF OLYMPIA TREATMENT PAD
MONITORING RESULTS
_ % OVERALL PCP REDUCTION

	01/07/09	**01/21/09**
Influent PCP (ug/l)	100	161
Effluent PCP (ug/l)	0.10	0.10
% Overall Reduction	99.90%	99.94%
Required % Reduction	99.50%	99.50%