

**FACT SHEET FOR LOTT CLEAN WATER ALLIANCE
BUDD INLET WASTEWATER TREATMENT PLANT
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
(NPDES) PERMIT WA0037061**

Purpose of this Fact Sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the LOTT Clean Water Alliance Budd Inlet Wastewater Treatment Plant.

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least 30 days before issuing the final permit. Copies of the fact sheet and draft permit for the LOTT Clean Water Alliance Budd Inlet Wastewater Treatment Plant, NPDES permit WA0037061, are available for public review and comment from June 13, 2017, until July 12, 2017. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

The LOTT Clean Water Alliance reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, wastewater discharges, or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as **Appendix E - Response to Comments**, and publish it when issuing the final NPDES permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

Summary

The LOTT Clean Water Alliance operates an activated sludge wastewater treatment plant that discharges to Budd Inlet. Ecology issued the previous permit for this facility on August 26, 2011.

The proposed permit contains the same effluent limits for 5-Day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), Fecal Coliform Bacteria, Total Inorganic Nitrogen (TIN), and pH as the permit issued in 2011. It does not include any significant changes.

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I. INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to the Department of Ecology (Ecology). The Legislature defined Ecology's Ecology authority and obligations for the wastewater discharge permit program in 90.48 Revised Code of Washington (RCW).

The following regulations apply to domestic wastewater NPDES permits:

- Procedures Ecology follows for issuing NPDES permits [chapter 173-220 Washington Administrative Code (WAC)]
- Technical criteria for discharges from municipal wastewater treatment facilities (chapter 173-221 WAC)
- Water Quality Criteria for Surface Waters (chapter 173-201A WAC)
- Water Quality Criteria for Groundwaters (chapter 173-200 WAC)
- Whole Effluent Toxicity Testing and Limits (chapter 173-205 WAC)
- Sediment Management Standards (chapter 173-204 WAC)
- Submission of Plans and Reports for Construction of Wastewater Facilities (chapter 173-240 WAC)

The following additional regulations apply to communities operating collection systems with Combined Sewer Overflows:

- Submission of Plans and Reports for Construction and Operation of Combined Sewer Overflow Reduction Facilities (chapter 173-245 WAC)
- US EPA CSO Control Policy (59 FR 18688)

These rules require any treatment facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A-Public** Involvement Information for more detail about the public notice and comment procedures.) After the public comment period ends, Ecology may make changes to the draft NPDES permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in **Appendix E**.

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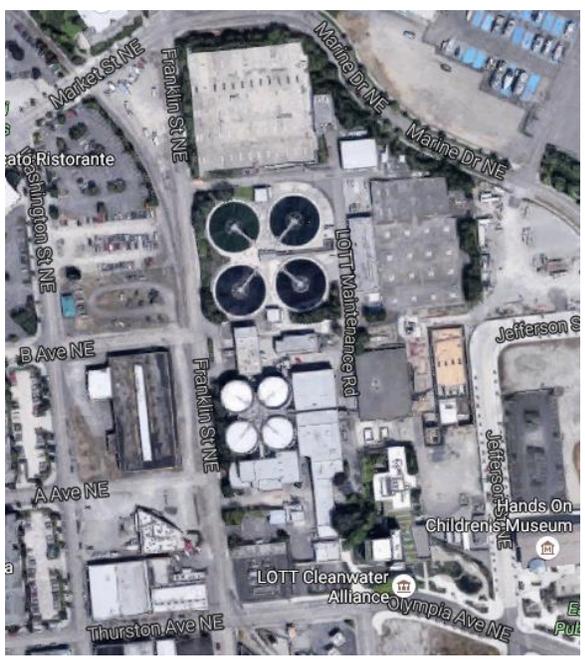
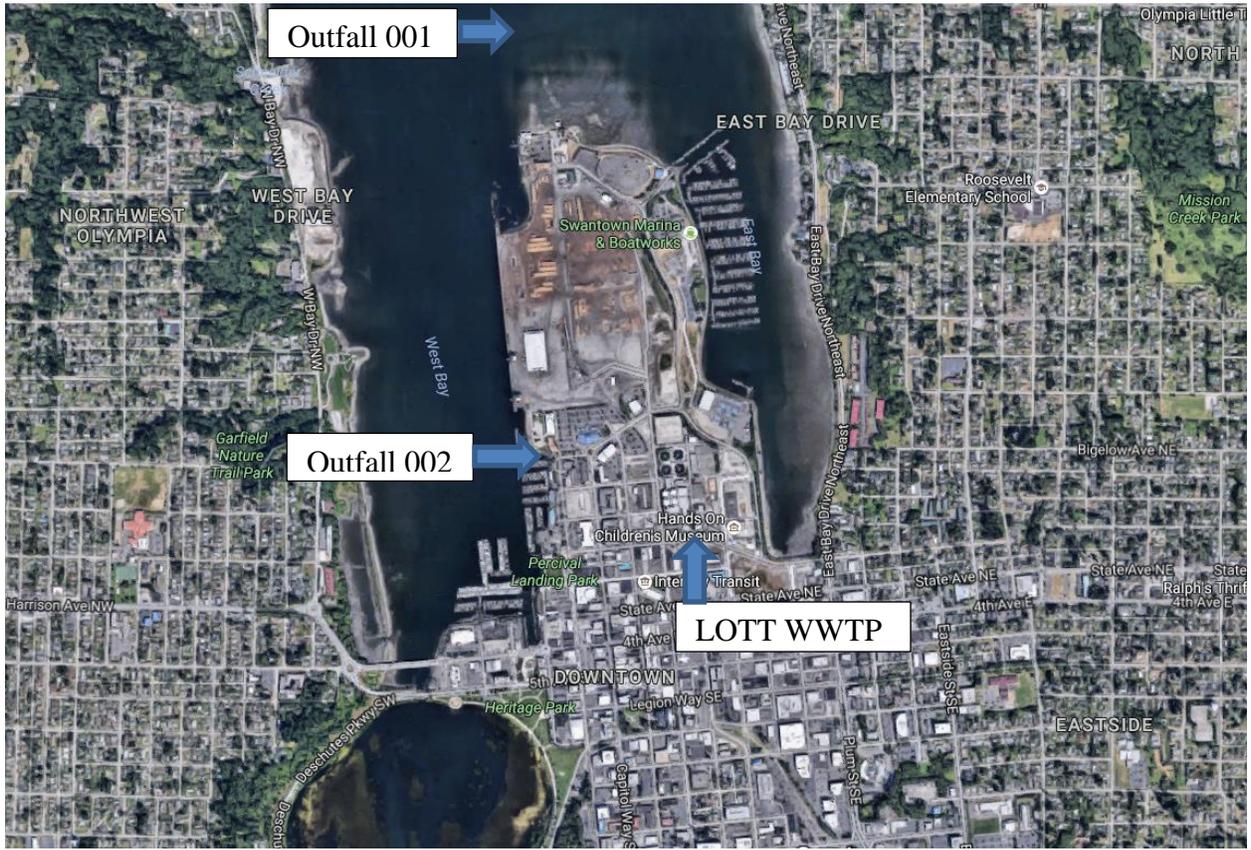
II. BACKGROUND INFORMATION

Table 1 - General Facility Information

Facility Information	
Applicant	LOTT Clean Water Alliance
Facility Name and Address	Budd Inlet Wastewater Treatment Plant 500 Adams Street Northeast Olympia, WA 98501
Contact at Facility	Name: Laurie Pierce Telephone #: 360-664-2333
Responsible Official	Name: Michael Strub, P.E. Title: Executive Director Address: 500 Adams Street Northeast Olympia, WA Telephone #: 360-664-2333
Type of Treatment	Activated Sludge/Advanced Treatment
Facility Location (NAD83/WGS84 Reference Datum)	Latitude: 47.048977 Longitude: -122.898837
Discharge Waterbody Name and Location (NAD83/WGS84 Reference Datum)	Budd Inlet Latitude: 47.05941 N Longitude: -122.9064
Permit Status	
Effective Date of Previous Permit	October 1, 2011
Application for Permit Renewal Submittal Date	March 1, 2016
Date of Ecology Acceptance of Application	March 24, 2016
Inspection Status	
Date of Last Non-sampling Inspection	November 3, 2016

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Figure 1 - Facility Location Map



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A. Facility Description

History

The LOTT Alliance's Budd Inlet Treatment Plant (BITP) is a regional facility serving portions of the cities of Lacey, Olympia, Tumwater, and Thurston County. The Budd Inlet secondary treatment facility was largely completed and on-line in August of 1982. Prior to that time a primary treatment facility served the area. The Budd Inlet facility currently provides advanced treatment for nitrogen removal. The BITP also treats a portion of the effluent to Class A Reclaimed Water. The LOTT Alliance system also includes a Class A Reclaimed Water Satellite Treatment plant that is covered by permit ST 6206. More of these satellite plants may be added to the system in the future.

The previous permit was issued in August 2011. LOTT has maintained good compliance with this permit. The BITP is an EPA major facility. LOTT maintains an approved pretreatment program.

Collection System Status

Each jurisdiction is responsible for their respective collection systems. Several major interceptors are identified as LOTT facilities and are owned and maintained by LOTT. As a part of the collection system planning process, each jurisdiction produces their own general sewer plans.

Thurston County currently has no collection lines that discharge into the LOTT sewer system. The city of Lacey is served primarily by a conventional collection system including 15 pump stations, over 309,500 linear feet of gravity flow sewer lines serving approximately 12 square miles. Portions of the Lacey sewer system have been designated to be served by Septic Tank Effluent Pumping (STEP) systems. The city of Tumwater is served by a conventional sewer system including over 223,894 feet of gravity sewer lines serving approximately 8 square miles. It also includes 15 wastewater pumping stations. The city of Olympia is served primarily by a conventional sewer system and some STEP systems serving a total of approximately 18 square miles. The system consists of over 698,212 feet of sewer pipe. The system has 51 lift stations. The system is primarily a separate sewer system; however, approximately 600 acres of the downtown area is served by a combined sewer system.

Since the downtown area within the city of Olympia is served by a combined sewer system, during major storm events the potential exists for a raw sewage overflow. A Combined Sewer Overflow (CSO) event occurs at the treatment plant when the equalization basins are full and the influent pumps are at capacity. Wastewater is directly discharged to the Fiddlehead outfall. LOTT has experienced only two CSO events since April 1991.

LOTT and the cities are working to control inflow and infiltration into the system. Basins are monitored for flow on a rotating basis. Repairs are made as needed. The system has a variety of commercial and small industrial dischargers into the system.

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Treatment Processes

You can find basic information describing wastewater treatment processes included in a booklet at the Water Environment Federation website at: <http://www.wef.org/publicinformation/default.aspx>.

The headworks of the Budd Inlet facility consists of four mechanically cleaned bar screens, two aerated grit removal channels, and five equalization basins (2.25 million gallons) used for storage during storm events. The plant has new (2013) primary clarifiers consisting of four basins. The primary systems have air scrubbers for odor control. Covered activated sludge basins provide secondary treatment. The biological nutrient removal system uses the four-stage Bardenpho process to remove nitrogen. The four-stage Bardenpho process includes alternating anoxic and aerobic basins in series which allows the aerobic and anoxic microbiological processes to occur. Ammonia and nitrate/nitrite forms of nitrogen are converted to nitrogen gas. The process requires a very high internal recycle ratio (approximately 4:1) for the process to work. The process consists of the first anoxic basin, the first aeration basin, the second anoxic basin and the second aeration basin. When the biological nitrogen removal process is not in operation, the first and second anoxic basins and the second aeration basin are bypassed. Clarification is provided by four secondary clarifiers. Secondary effluent is disinfected with an Ultraviolet (UV) system.

Some of the secondary effluent is directed to the reclaimed water system to produce class A reuse water. The reclaimed water facility at the Budd Inlet treatment plant is designed to have a firm capacity of 700 gallons per minute (about 1 MGD) with a peak capacity of approximately 1000 gpm (1.5 MGD). The reclaimed water facility is within the footprint of the Budd Inlet plant. The facility completed construction and was brought on-line in 2004.

The reclaimed water facility has continuous back wash counter current up flow filters. Polymer can be added to the water prior to filtration. Sodium hypochlorite solution is used for supplementary disinfection and residual control after the filtration. After the disinfection contact basins, the reclaimed water discharges to a 140,000 gallon clear well that supplies the distribution pumps, sending the Reclaimed Water into the conveyance system to reuse locations. Filter backwash is returned to the plant influent for treatment.

LOTT is starting design on the Process Improvements project that will change the biological nutrient removal system. The process will be optimized and reconfigured to replace aging equipment, reduce required energy, increase process reliability, and provide greater control and flexibility. Ecology has provided a \$2,010,000 FY 2017 State Revolving Fund (SRF) Loan to help fund this design project.

Solid Wastes/Residual Solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. LOTT drains grit, rags, scum, and screenings and disposes this solid waste at the Thurston County Waste and Recovery Center. Solids removed from the primary and secondary clarifiers are treated by dissolved air flotation, anaerobic digestion,

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and centrifuge dewatering. The solids are beneficially used and land applied. This facility has met the solid waste requirements for screening, as required by WAC 173-308-205.

Discharge Outfall

Treated and disinfected effluent is discharged from the Budd Inlet facility into Budd Inlet. Effluent is discharged via the north outfall line (Outfall 001), except in emergencies when the Fiddlehead outfall (Outfall 002) is used. Outfall 001 is a 48-inch line that extends 953 feet off of the shoreline with a 250-foot diffuser section with 55 ports. The 4.625-inch diameter ports are spaced 4.5 feet apart on center. Outfall 002 is a 48-inch open-ended pipe located at the Fiddlehead Marina. The North line is capable of handling 65 MGD at mean higher high water. Any excess flows are discharged via the 48-inch Fiddlehead line. The Fiddlehead discharge events occur infrequently when Olympia experiences its heaviest rainfall events.

B. Description of the Receiving Water

LOTT Clean Water Alliance discharges to Budd Inlet. Other nearby point source outfalls include Tamoshan, Seashore Villa, and Boston Harbor wastewater treatment plants. Significant nearby non-point sources of pollutants include stormwater. Section III E of this fact sheet describes any receiving waterbody impairments.

The ambient background data used for this permit includes the following from an Ecology long-term marine water quality station (BUD005):

Table 2 - Ambient Background Data

Parameter	Value Used
Temperature (highest annual 1-DADMax)	19.3° C
pH (Maximum / Minimum)	8.6 / 7.2 Standard Units
Dissolved Oxygen	8.5 mg/L
Salinity	28.3 psu
Density	21.2 sigma t

C. Wastewater Influent Characterization

LOTT Clean Water Alliance reported the concentration of influent pollutants in discharge monitoring reports. The influent wastewater is characterized as follows:

Parameter	Units	Average Value	Maximum Value
5-Day Biochemical Oxygen Demand (BOD ₅)	mg/L	265	620
BOD ₅	lbs/day	24,816	56,770
Total Suspended Solids (TSS)	mg/L	296	780

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Parameter	Units	Average Value	Maximum Value
TSS	lbs/day	24,324	73,940
Total Ammonia	mg/L	25.6	41.9
Total Ammonia	lbs/day	2,395	4,286
Total Nitrate + Nitrite	mg/L	2.0	4.3
TKN	mg/L	39.7	65.1
pH	Standard Units	6.7 (Min)	8.5
Flow	MGD	11.81	38.12

D. Wastewater Effluent Characterization

LOTT Clean Water Alliance reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from October 2011 to September 2016. The wastewater effluent at Outfall 001 is characterized as follows:

Parameter	Units	Average Value	Maximum Value
Summer BOD ₅	mg/L	3.12	7.43
Summer BOD ₅	lbs/day	225	646
Spring/Fall BOD ₅	mg/L	3.88	17.76
Spring/Fall BOD ₅	lbs/day	336	1677
Winter BOD ₅	mg/L	5.16	25.4
Winter BOD ₅	lbs/day	600	5770
TSS	mg/L	4.65	21.4
TSS	lbs/day	437	4769
Summer Total Ammonia	mg/L	0.44	9.97
Winter Total Ammonia	mg/L	3.33	21.5
Summer Total Nitrate & Nitrite	mg/L	1.85	10
Winter Total Nitrate & Nitrite	mg/L	3.8	17.6
Total Kjeldahl Nitrogen (TKN)	mg/L	3.08	20.9
Summer Total Inorganic Nitrogen (TIN)	mg/L	2.13	4.1
Summer TIN	lbs/day	156.15	298
Spring/Fall TIN	mg/L	2.47	7.22

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Parameter	Units	Average Value	Maximum Value
Spring/Fall TIN	lbs/day	221.13	763
Total Zinc	µg/L	51.56	226
Total Copper	µg/L	17.87	96.1
Total Lead	µg/L	0.49	2.16
Total Nickel	µg/L	1.55	9.0
Flow	MGD	10.66	35.62
Temperature	°C	17.4	23.1
Dissolved Oxygen	mg/L	7.54	9.0
Turbidity	NTU	1.9	13.8
Parameter	Units	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliforms	#/100 mL	12	39
Parameter	Units	Minimum Value	Maximum Value
pH	Standard Units	6.4	7.9

The reclaimed water at Outfall 005 is characterized as follows:

Parameter	Units	Average Value	Maximum Value
Flow	MGD	0.52	1.27
Turbidity	NTU	0.27	4.01
Dissolved Oxygen	mg/L	9.34	10.4
Temperature	°C	17.5	23.5
Total Coliforms	#/100ml	1	200
Total Nitrate	mg/L	2.44	6.78
Parameter	Units	Minimum Value	Maximum Value
pH	standard units	6.6	8.2
Total Residual Chlorine	mg/L	0.6	2.1

E. Summary of Compliance with Previous Permit Issued

The previous permit placed effluent limits on BOD₅, TSS, Fecal Coliform Bacteria, pH, TIN, Ammonia, Turbidity, Nitrate, and Total Coliform.

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LOTT Clean Water Alliance has mostly complied with the effluent limits and permit conditions throughout the duration of the permit issued on August 26, 2011. Ecology assessed compliance based on its review of the facility's information in the Ecology Permitting and Reporting Information System (PARIS), Discharge Monitoring Reports (DMRs), and on inspections.

The following table summarizes the violations and permit triggers that occurred during the permit term. Permit triggers are not violations but rather when triggered require the permit holder to take an action defined in the permit.

Begin Date	Outfall	Parameter	Statistical Base	Units	Value	Limit
11/1/11	005	Total Coliforms	Maximum	#/100 mL	23.8	23
3/1/12	005	Total Coliforms	Maximum	#/100 mL	65.9	23
9/1/12	001	TIN	Average	mg/L	4.1	3
9/1/12	001	TIN	Average	lbs/day	298	288
9/1/13	001	TIN	Average	mg/L	3.02	3
9/1/13	005	Total Coliforms	Maximum	#/100 mL	69.7	23
10/1/13	005	Total Coliforms	Maximum	#/100 mL	40.6	23
12/1/13	005	Total Coliforms	Maximum	#/100 mL	56	23
1/1/14	005	Total Coliforms	Maximum	#/100 mL	45.3	23
4/1/14	001	BOD ₅	Weekly Average	lbs/day	1677	1350
4/1/14	001	BOD ₅	Weekly Average	mg/L	17.76	12
4/1/14	001	BOD ₅	Average	lbs/day	1145	900
4/1/14	001	BOD ₅	Average	mg/L	12.22	8
4/1/14	001	TIN	Average	lbs/day	763	338
4/1/14	001	TIN	Average	mg/L	7.22	3
7/1/14	005	Total Coliforms	Maximum	#/100 mL	45.3	23
1/1/15	005	Total Coliforms	Maximum	#/100 mL	42.9	23
2/1/15	005	Total Coliforms	Maximum	#/100 mL	27.1	23
4/1/16	005	Total Coliforms	Maximum	#/100 mL	200.5	23
6/1/16	005	Total Coliforms	Maximum	#/100 mL	23.8	23

The following table summarizes compliance with report submittal requirements over the permit term.

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Submittal Name	Due Date	Received Date
Infiltration And Inflow Evaluation	5/15/12	5/14/12
Infiltration And Inflow Evaluation	5/15/13	5/15/13
Infiltration And Inflow Evaluation	5/15/14	5/15/14
Infiltration And Inflow Evaluation	5/15/15	5/7/15
Infiltration And Inflow Evaluation	5/15/16	5/11/16
Wasteload Assessment	5/15/12	5/14/12
Wasteload Assessment	5/15/13	5/14/13
Wasteload Assessment	5/15/14	5/15/14
Wasteload Assessment	5/15/15	5/15/15
Wasteload Assessment	5/15/16	5/11/16
Pretreatment Report	3/1/12	3/1/12
Pretreatment Report	3/1/13	3/1/13
Pretreatment Report	3/1/14	2/25/14
Pretreatment Report	3/1/15	3/2/15
Pretreatment Report	3/1/16	3/1/16
Combined Sewer Overflow Report	5/15/12	5/14/12
Combined Sewer Overflow Report	5/15/13	5/15/13
Combined Sewer Overflow Report	5/15/14	5/15/14
Combined Sewer Overflow Report	5/15/15	5/7/15
Combined Sewer Overflow Report	5/15/16	5/11/16
Outfall Evaluation	3/1/15	3/1/15
Water Reuse Summary Report	1/31/12	2/1/12
Water Reuse Summary Report	1/31/13	1/13/13
Water Reuse Summary Report	1/31/14	2/3/14
Water Reuse Summary Report	1/31/15	1/31/15
Water Reuse Summary Report	1/31/16	1/29/16
Applications for Permit Renewal	3/1/16	3/1/16

F. State Environmental Policy Act (SEPA) Compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

III. PROPOSED PERMIT LIMITS

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility’s effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

A. Design Criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. The table below includes design criteria.

Table 7 - Design Criteria for the Budd Inlet WWTP

Parameter	Design Quantity
Maximum Month Design Flow (MMDF)	28 MGD
Maximum Day Flow	55 MGD
Peak Hourly Design Flow	64 MGD
BOD ₅ Loading for Maximum Month	37,600 lb/day
TSS Loading for Maximum Month	35,100 lb/day
Nitrogen Loading for Maximum Month	6,420 lb/day

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B. Technology-Based Effluent Limits

Federal and state regulations define technology-based effluent limits for domestic wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment (AKART) for domestic wastewater.

The federal CSO Control Policy (59 FR 18688) also requires entities with Combined Sewer Overflows to implement “Nine Minimum Controls” as technology-based performance standards for CSO discharges. Nine Minimum Controls are discussed in more detail in Section V of this fact sheet.

The table below identifies technology-based limits for pH, fecal coliform, BOD₅, and TSS, as listed in chapter 173-221 WAC. Section III.F of this fact sheet describes the potential for water quality-based limits.

Table 8 - Technology-Based Limits

Parameter	Average Monthly Limit	Average Weekly Limit
BOD ₅ (concentration)	30 mg/L	45 mg/L
BOD ₅ (concentration)	In addition, the BOD ₅ effluent concentration must not exceed 15 percent of the average influent concentration.	
TSS (concentration)	30 mg/L	45 mg/L
TSS (concentration)	In addition, the TSS effluent concentration must not exceed 15 percent of the average influent concentration.	
Parameter	Monthly Geometric Mean Limit	Weekly Geometric Mean Limit
Fecal Coliform Bacteria	200 organisms/100 mL	400 organisms/100 mL

Technology-based mass limits are based on WAC 173-220-130(3)(b), WAC 173-221-030(11)(b), WAC 173-220-130(1)(a) and (g), and WAC 173-221-040(1). Ecology calculated the monthly and weekly average mass limits for Winter Season BOD₅ and Total Suspended Solids as follows:

$$\begin{aligned} \text{Average Monthly Mass Effluent Limit} &= \text{Influent Mass Design Loading Criteria (lb/day) x 0.15} \\ \text{Average Weekly Mass Effluent Limit} &= 1.5 \times \text{Average Monthly Mass Effluent TSS Limit} \end{aligned}$$

Table 9 - Technology-Based Mass Limits

Parameter	Influent Loading (lbs/day)	Mass Limit (lbs/day)
Winter Season BOD ₅ Monthly Average	37,600	5640
Winter Season BOD ₅ Weekly Average		8460
TSS Monthly Average	35,100	5265
TSS Weekly Average		7898

C. Surface Water Quality-Based Effluent Limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a wasteload allocation developed during a basin wide Total Maximum Daily Load (TMDL) Study.

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA, 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses
- Cause acute or chronic toxicity to biota

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- Impair aesthetic values
- Adversely affect human health

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210, 2006) in the state of Washington.

Antidegradation

Description--The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply AKART.
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Facility Specific Requirements--This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.

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- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards. A TMDL is being completed for Budd Inlet.

Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

Combined Sewer Overflows

Chapter 173-245 WAC requires that "All CSO sites shall achieve and at least maintain the greatest reasonable reduction, and neither cause violations of applicable water quality standards, nor restrictions to the characteristic uses of the receiving water, nor accumulation of deposits which: (a) Exceed sediment criteria or standards; or (b) have an adverse biological effect." "The greatest reasonable reduction" means control of each CSO outfall such that an average of no more than one untreated discharge may occur per year. Ecology includes specific conditions in the proposed permit to ensure that LOTT Clean Water Alliance continues to make progress towards meeting water quality goals for each CSO outfall in its system. Section V of this fact sheet contains more detailed information on these CSO requirements.

Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive AKART. Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25 percent of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii)].

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

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The mixing zone analysis produces a numerical value called a Dilution Factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 4 means the effluent is 25 percent and the receiving water is 75 percent of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life *acute* criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life *chronic* criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water.
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. Ecology must specify both the allowed size and location in a permit.

The proposed permit specifies the size and location of the allowed mixing zone (as specified below).

2. The facility must fully apply AKART to its discharge.

Ecology has determined that the treatment provided at BITP meets the requirements of AKART (see “Technology-based Limits”).

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the water body’s critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or

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designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at Mean Lower Low Water (MLLW) for marine waters. Ecology’s *Permit Writer’s Manual* describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology’s website at: <https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html>.

Table 10 - Critical Conditions Used to Model the Discharge

Critical Condition	Value
Water Depth at MLLW of 8.3 feet	21.3 feet
Density Profile with a Difference of 7.4 Sigma-T Units Between 23 Feet and the Surface	15.5 – 22.9
Tenth (10 th) or 90 th Percentile Current Speeds for Acute Mixing Zone	0.9 cm/sec
Fiftieth (50 th) Percentile Current Speeds for Chronic and Human Health Mixing Zones	3.75 cm/sec
Maximum Average Monthly Effluent Flow for Chronic and Human Health Non-Carcinogen	28 MGD
Annual Average Flow for Human Health Carcinogen	10.7 MGD
Maximum Daily Flow for Acute Mixing Zone	55 MGD
Effluent Temperature	19.5 degrees C

Ecology obtained ambient data at critical conditions in the vicinity of the outfall from the mixing zone study conducted in 2009.

4. Supporting information must clearly indicate the mixing zone would not:
 - Have a reasonable potential to cause the loss of sensitive or important habitat.
 - Substantially interfere with the existing or characteristic uses.

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- Result in damage to the ecosystem.
- Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with Whole Effluent Toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics, and the discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone

changes. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum Size of Mixing Zone

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute Mixing Zone

- The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.

Ecology determined the acute criteria will be met at 10 percent of the distance of the chronic mixing zone.

- The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.

As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- Comply with Size Restrictions

The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

9. Overlap of Mixing Zones

This mixing zone does not overlap another mixing zone.

D. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). The tables included below summarize the criteria applicable to the receiving water's designated uses.

- Aquatic life uses are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.
 1. Extraordinary quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
 2. Excellent quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
 3. Good quality salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
 4. Fair quality salmonid and other fish migration.

The *Aquatic Life Uses* and the associated criteria for this receiving water are identified below.

Table 11 - Marine Aquatic Life Uses and Associated Criteria

Good Quality	
Temperature Criteria – Highest 1D MAX	19°C (66.2°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	5.0 mg/L
Turbidity Criteria	<ul style="list-style-type: none"> • 10 NTU over background when the background is 50 NTU or less; or • A 20 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH Criteria	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

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- To protect shellfish harvesting, Fecal Coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.
- The *recreational uses* are primary contact recreation and secondary contact recreation.

The recreational uses for this receiving water are identified below.

Table 12 - Recreational Uses

Recreational Use	Criteria
Secondary Contact Recreation	Enterococci organism levels must not exceed a geometric mean value of 70 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 208 colonies/100 mL.

- The *miscellaneous marine water uses* are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

E. Water Quality Impairments

Budd Inlet is listed on the current 303(d) and is impaired for Dissolved Oxygen. Ecology is currently conducting a TMDL Analysis on Budd Inlet/Capital Lake. When completed the TMDL may include waste load allocations (WLA) for BITP.

F. Evaluation of Surface Water Quality-Based Effluent Limits for Narrative Criteria

Ecology must consider the narrative criteria described in WAC 173-201A-260 when it determines permit limits and conditions. Narrative water quality criteria limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health.

Ecology considers narrative criteria when it evaluates the characteristics of the wastewater and when it implements AKART as described above in the technology-based limits section. When Ecology determines if a facility is meeting AKART it considers the pollutants in the wastewater and the adequacy of the treatment to prevent the violation of narrative criteria.

In addition, Ecology considers the toxicity of the wastewater discharge by requiring WET testing when there is a reasonable potential for the discharge to contain toxics. Ecology’s analysis of the need for WET testing for this discharge is described later in the fact sheet.

G. Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water.

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Conversely, a pollutant such as BOD₅ is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

The diffuser at Outfall 001 is 250 feet long with a diameter of 48 inches. The diffuser has a total of 55 evenly spaced 4.625 inch diameter ports. The distance between ports is 4.5 feet. The diffuser depth is approximately 13 feet. Ecology obtained this information from the Dilution Ratio Study Report submitted in February 2009.

Chronic Mixing Zone -- WAC 173-201A-400(7)(b) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 200 feet plus the depth of water over the discharge ports and may not occupy more than 25 percent of the width of the water body as measured during MLLW.

The horizontal distance of the chronic mixing zone is 213 feet. The mixing zone extends from the bottom to the top of the water column.

Acute Mixing Zone -- WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10 percent of the distance established for the chronic zone. The acute mixing zone for Outfall 001 extends 21.3 feet in any direction from any discharge port.

Ecology determined the dilution factors that occur within these zones at the critical condition using the LOTT Alliance Mixing Zone Dye Tracer Study Report. The dilution factors are listed below.

Table 13 - Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	35.3	48.9
Human Health, Carcinogen		48.9
Human Health, Non-carcinogen		48.9

Ecology determined the impacts of Dissolved Oxygen deficiency, nutrients, pH, fecal coliform, ammonia, metals, and temperature as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

Nutrients -- Ecology is completing a TMDL, referenced above, to establish effluent limits for the following nutrient: Nitrogen. The proposed permit includes effluent limits for Total Inorganic Nitrogen (TIN) derived from the engineering report on the design of the nitrogen removal process.

Dissolved Oxygen--BOD₅ and Ammonia Effects -- Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the

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regulated mixing zone. The BOD₅ of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand potential in the receiving water.

With the performance-based limits on BOD₅ in the summer, this discharge results in a small amount of BOD₅ relative to the amount of dilution in the receiving water at critical conditions. The performance-based limits will ensure that dissolved oxygen does not get worse in the receiving water.

pH -- Compliance with the technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards of surface waters because of the high buffering capacity of marine water.

Fecal Coliform -- Ecology modeled the numbers of Fecal Coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 mL and a dilution factor of 48.9.

Under critical conditions, modeling predicts no violation of the water quality criterion for fecal coliform. Therefore, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria.

Turbidity -- Ecology evaluated the impact of turbidity based on the range of TSS in the effluent and Turbidity of the receiving water. Ecology expects no violations of the Turbidity criteria outside the designated mixing zone provided the facility meets its technology-based TSS permit limits.

Toxic Pollutants -- Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the Surface Water Quality Criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the Surface Water Quality Standards.

The following toxic pollutants are present in the discharge: Ammonia and Metals. Ecology conducted a reasonable potential analysis on these parameters to determine whether it would require effluent limits in this permit.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of Unionized Ammonia depends on the Temperature, pH, and Salinity of the receiving marine water. To evaluate Ammonia toxicity, Ecology used the available receiving water information from the Budd Inlet Scientific Study (1998) and Ecology spreadsheet tools.

No valid ambient background data were available for some metals and organic chemicals. It is clear from the Reasonable Potential Analysis that background concentrations, even if assumed to be zero, were largely irrelevant. Ecology used zero for background in these cases. Valid ambient background data were available for some other metals from the Budd Inlet scientific Study (1998). Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of Water Quality Standards.

Ecology determined that toxic chemicals that had data pose no reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991 as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

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Water Quality Criteria for most metals published in chapter 173-201A WAC are based on the dissolved fraction of the metal (see footnotes to table WAC 173-201A-240(3); 2006). LOTT may provide data clearly demonstrating the seasonal partitioning of the Dissolved Metal in the ambient water in relation to an effluent discharge. Ecology may adjust a metal's translator on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Temperature -- The state Temperature Standards [WAC 173-201A-200-210 and 600-612] include multiple elements:

- Annual Summer Maximum Threshold Criteria (June 15 to September 15)
- Supplemental Spawning and Rearing Season Criteria (September 15 to June 15)
- Incremental Warming Restrictions
- Protections Against Acute Effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

- Annual Summer Maximum and Supplementary Spawning/Rearing Criteria

Each water body has an annual maximum Temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum Temperature (7-DADMax). The 7-DADMax Temperature is the arithmetic average of seven consecutive measures of daily maximum Temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum Temperature (1-DMax).

- Incremental Warming Criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

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At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background Temperature and even if doing so would cause the Temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25 percent or less of the critical flow. This is because the fully mixed effect on Temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- Protections for Temperature Acute Effects

Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent Temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge.

General lethality and migration blockage: Measurable (0.3°C) increases in Temperature at the edge of a Chronic Mixing Zone are not allowed when the receiving water Temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

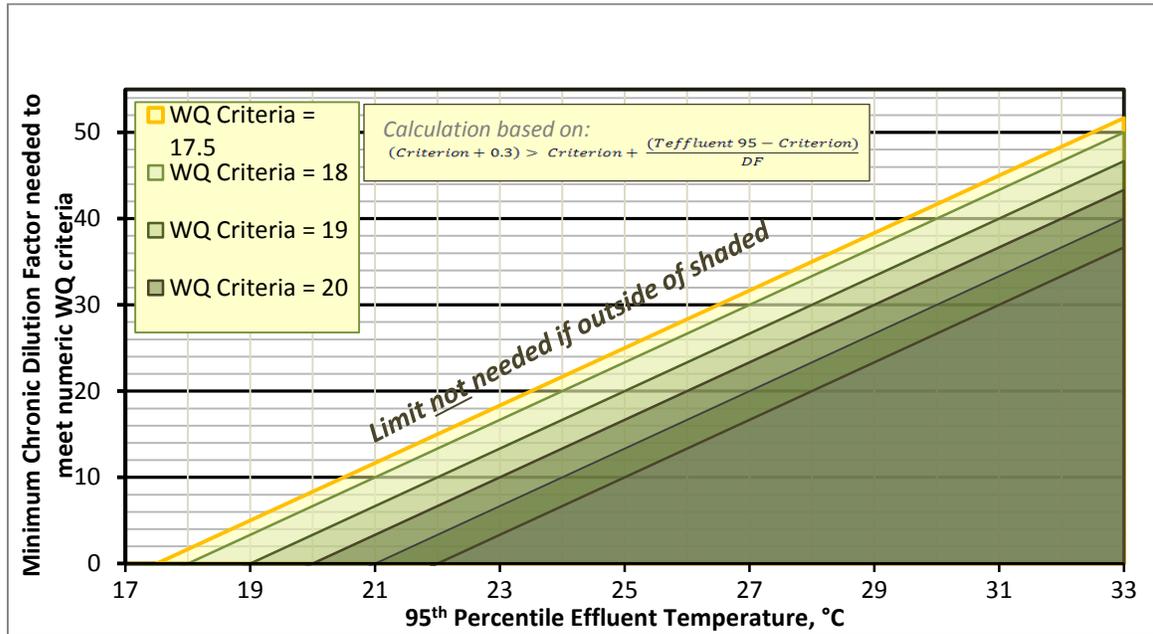
Reasonable Potential Analysis

Annual Summer Maximum and Incremental Warming Criteria: Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum, and the incremental warming criteria at the edge of the Chronic Mixing Zone during critical conditions. No reasonable potential exists to exceed the Temperature criterion where:

$$(\text{Criterion} + 0.3) > [\text{Criterion} + (\text{Teffluent95} - \text{Criterion})/\text{DF}].$$

The figure below graphically portrays the above equation and shows the conditions when a permit limit will apply.

Figure 2 - Dilution Necessary to Meet Criteria at Edge of Mixing Zone



$$(19 + 0.3) > (19 + (21.8 - 19)/48.9).$$

$$19.3 > 19.06$$

Therefore, the proposed permit does not include a temperature limit. The permit requires additional monitoring of effluent temperatures. Ecology will reevaluate the reasonable potential during the next permit renewal.

H. Human Health

Washington’s water quality standards include 97 numeric human health-based criteria that Ecology must consider when writing NPDES permits.

Ecology determined the effluent may contain chemicals of concern for human health, based on the facility’s status as an EPA major discharger.

Ecology evaluated the discharge’s potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology’s *Permit Writer’s Manual* to make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, and an effluent limit is not needed.

I. Sediment Quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional

information about sediments at the Aquatic Lands Cleanup Unit website. <http://www.ecy.wa.gov/programs/tcp/smu/sediment.html>

Ecology determined that this discharge has potential to cause a violation of the sediment quality standards because it is an EPA Major discharger. The proposed permit includes a Special Condition requiring LOTT to demonstrate either:

- The point of discharge is not an area of deposition; or
- Toxics do not accumulate in the sediments even though the point of discharge is a depositional area.

J. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

- *Acute toxicity tests measure mortality as the significant response* to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.
- *Chronic toxicity tests measure various sublethal toxic responses*, such as reduced growth or reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Laboratories accredited by Ecology for WET testing know how to use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate an NOEC, LC50, EC50, IC25, etc. Ecology gives all accredited labs the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (<https://fortress.wa.gov/ecy/publications/SummaryPages/9580.html>), which is referenced in the permit. Ecology recommends that LOTT Clean Water Alliance send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water acute or chronic toxicity. The proposed permit will not include an acute or chronic WET limit. LOTT Clean Water Alliance must retest the effluent annually for chronic toxicity before submitting an application for permit renewal.

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization

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- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased. LOTT Clean Water Alliance may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after the process or material changes have been made.

K. Groundwater Quality Limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

LOTT Clean Water Alliance does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

L. Comparison of effluent limits with the previous permit issued on October 1, 2011

Table 14 - Comparison of Previous and Proposed Effluent Limits

Parameter	Basis of Limit	Previous Effluent Limits: Outfall 001 & 002		Proposed Effluent Limits: Outfall 001 & 002	
		Average Monthly	Average Weekly	Average Monthly	Average Weekly
Winter Season BOD ₅ (November – March)	Technology	30 mg/L 5640 lbs/day 85% removal of influent BOD ₅	45 mg/L 8460 lbs/day	30 mg/L 5640 lbs/day 85% removal of influent BOD ₅	45 mg/L 8460 lbs/day
Spring/Fall Season BOD ₅ (April, May, & October)	Performance	8 mg/L 900 lbs/day 85% removal of influent BOD ₅	12 mg/L 1350 lbs/day	8 mg/L 900 lbs/day 85% removal of influent BOD ₅	12 mg/L 1350 lbs/day
Summer Season BOD ₅ (June- September)	Performance	7 mg/L 671 lbs/day 85% removal of influent BOD ₅	10.5 mg/L 1006 lbs/day	7 mg/L 671 lbs/day 85% removal of influent BOD ₅	10.5 mg/L 1006 lbs/day
TSS	Technology	30 mg/L 5265 lbs/day 85% removal of influent TSS	45 mg/L 7898 lbs/day	30 mg/L 5265 lbs/day 85% removal of influent TSS	45 mg/L 7898 lbs/day
Spring/Fall Season TIN (April, May, & October)	Technology/ Performance	3 mg/L 338 lbs/day		3 mg/L 338 lbs/day	

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		Previous Effluent Limits: Outfall 001 & 002		Proposed Effluent Limits: Outfall 001 & 002	
Parameter	Basis of Limit	Average Monthly	Average Weekly	Average Monthly	Average Weekly
Summer Season TIN (June - September)	Technology/ Performance	3 mg/L 288 lbs/day		3 mg/L 288 lbs/day	
Winter Season Total Ammonia (as N) (November – March) at Outfall 001	WQ	26 mg/L	36 mg/L	26 mg/L	36 mg/L
Winter Season Total Ammonia (as N) (November – March) at Outfall 002	WQ	22 mg/L	31 mg/L	22 mg/L	31 mg/L
Total Recoverable Copper at Outfall 002	WQ	6 µg/L	7.5 µg/L	6 µg/L	7.5 µg/L
Parameter		Monthly Geometric Mean Limit	Weekly Geometric Mean Limit	Monthly Geometric Mean Limit	Weekly Geometric Mean Limit
Fecal Coliform Bacteria	Technology	200/100 mL	400/100 mL	200/100 mL	400/100 mL
Parameter		Limit		Limit	
pH	Technology	6.0 – 9.0		6.0 – 9.0	

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		Previous Effluent Limits: Outfall 005		Proposed Effluent Limits: Outfall 005	
Parameter	Basis of Limit	Average Monthly	Sample Maximum	Average Monthly	Sample Maximum
Flow	Technology	1.5 MGD		1.5 MGD	
Dissolved Oxygen	Technology	Present		Present	
Turbidity	Technology	2 NTU	5 NTU	2 NTU	5 NTU
Total Nitrate (as N)	Technology	10 mg/L		10 mg/L	
Parameter	Basis of Limit	7-day Median	Sample Maximum	7-day Median	Sample Maximum
Total Coliform	Technology	2.2 MPN/ 100 mL	23 MPN/ 100 mL	2.2 MPN/ 100 mL	23 MPN/ 100 mL
Parameter	Basis of Limit	Limit		Limit	
pH	Technology	6.0 – 9.0		6.0 – 9.0	
Chlorine Residual	Technology	Detectable		Detectable	

IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

A. Wastewater Monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-09) for Activated Sludge Plants > 5.0 MGD Average Design Flow.

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Ecology has included some additional monitoring of nutrients in the proposed permit to establish a baseline for this discharger. It will use this data in the future as it develops TMDLs for dissolved oxygen and establishes WLAs for nutrients.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Biosolids monitoring is required by the current state and local Solid Waste Management Program and also by EPA under 40 CFR 503.

As a pretreatment Publicly Owned Treatment Works (POTW), the LOTT Clean Water Alliance is required to sample influent, final effluent, and sludge for toxic pollutants in order to characterize the industrial input. Sampling is also done to determine if pollutants interfere with the treatment process or pass-through the plant to the sludge or the receiving water. LOTT will use the monitoring data to develop local limits which commercial and industrial users must meet.

B. Lab Accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at this facility for:

Table 15 - Accredited Parameters

Parameter Name	Category	Method Name	Matrix Description
Ammonia	General Chemistry	EPA 350.1_2_1993	Non-Potable Water
TKN	General Chemistry	EPA 351.2_2_1993	Non-Potable Water
Dissolved Oxygen	General Chemistry	Hach 10360 Rev 1.1	Non-Potable Water
Turbidity	General Chemistry	SM 2130 B-01	Non-Potable Water
Specific Conductance	General Chemistry	SM 2510 B-97	Non-Potable Water
Solids, Total	General Chemistry	SM 2540 B-97	Non-Potable Water
Solids, Total Suspended	General Chemistry	SM 2540 D-97	Non-Potable Water
Chlorine (Residual), Total	General Chemistry	SM 4500-Cl D-00	Non-Potable Water
pH	General Chemistry	SM 4500-H+ B-00	Non-Potable Water
Nitrite	General Chemistry	SM 4500-NO ₂ ⁻ B-00	Non-Potable Water
Nitrate	General Chemistry	SM 4500-NO ₃ ⁻ F-00	Non-Potable Water
Nitrate + Nitrite	General Chemistry	SM 4500-NO ₃ ⁻ F-00	Non-Potable Water
Dissolved Oxygen	General Chemistry	SM 4500-O G-01	Non-Potable Water
BOD ₅	General Chemistry	SM 5210 B-01	Non-Potable Water

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Parameter Name	Category	Method Name	Matrix Description
Fecal Coliform-Count	Microbiology	SM 9222 D (m-FC)-97	Non-Potable Water
Total Coli/Ecoli - Count	Microbiology	SM 9223 B (Colilert® QTray)	Non-Potable Water
Solids, Total, Fixed and Volatile	General Chemistry	SM 2540 G-97	Solid and Chemical Materials

C. Effluent Limits which are Near Detection or Quantitation Levels

Water quality-based effluent concentration limits may be near the limits of current analytical methods to detect or accurately quantify. The Method Detection Level (MDL) also known as Detection Level (DL) is the minimum concentration of a pollutant that a laboratory can measure and report with a 99 percent confidence that its concentration is greater than zero (as determined by a specific laboratory method). The Quantitation Level (QL) is the level at which a laboratory can reliably report concentrations with a specified level of error. Estimated concentrations are the values between the DL and the QL. Ecology requires permitted facilities to report estimated concentrations. When reporting maximum daily effluent concentrations, Ecology requires the facility to report “less than X” where X is the required detection level if the measured effluent concentration falls below the detection level.

V. OTHER PERMIT CONDITIONS

A. Reporting and Record Keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Prevention of Facility Overloading

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require LOTT to:

- Take the actions detailed in proposed permit Special Condition S.4.
- Design and construct expansions or modifications before the treatment plant reaches existing capacity.
- Report and correct conditions that could result in new or increased discharges of pollutants.

Special Condition S4 restricts the amount of flow.

C. Operation and Maintenance (O&M)

The proposed permit contains Special Condition S5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that LOTT takes adequate

safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment.

D. Pretreatment

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes “pass-through” or “interference.” This general prohibition is from 40 CFR §403.5(a). **Appendix C** of this fact sheet defines these terms.
- The second section reinforces a number of specific state and federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). These reinforce that the POTW may not accept certain wastes, which:
 1. Are prohibited due to Dangerous Waste Rules
 2. Are explosive or flammable
 3. Have too high or low of a pH (too corrosive, acidic or basic)
 4. May cause a blockage such as grease, sand, rocks, or viscous materials
 5. Are hot enough to cause a problem
 6. Are of sufficient strength or volume to interfere with treatment
 7. Contain too much petroleum-based oils, mineral oil, or cutting fluid
 8. Create noxious or toxic gases at any point

Forty (40) CFR Part 403 contains the regulatory basis for these prohibitions, with the exception of the pH provisions which are based on WAC 173-216-060.

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written authorization from Ecology. These discharges include:
 1. Cooling water in significant volumes
 2. Stormwater and other direct inflow sources
 3. Wastewaters significantly affecting system hydraulic loading, which do not require treatment

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Ecology delegated authority to LOTT for permitting, monitoring, and enforcement over industrial users discharging to their treatment system to provide more direct and effective control of pollutants. Ecology oversees the delegated Industrial Pretreatment Program to assure compliance with federal pretreatment regulations (40 CFR Part 403) and categorical standards and state regulations (chapter 90.48 RCW and chapter 173-216 WAC).

E. Solid Wastes

To prevent water quality problems the facility is required in permit Special Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under chapter 70.95J RCW, chapter 173-308 WAC "Biosolids Management," and chapter 173-350 WAC "Solid Waste Handling Standards." The disposal of other Solid Waste is under the jurisdiction of the Thurston County Health Department.

Requirements for monitoring sewage sludge and record keeping are included in this permit. Ecology will use this information, required under 40 CFR 503, to develop or update local limits.

F. Combined Sewer Overflows

Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same piping system. Most of the time, combined sewer systems transport all wastewater to a sewage treatment plant, where it is treated and then discharged to a water body. During periods of heavy rainfall or snowmelt, however, the wastewater volume in a combined sewer system can exceed the capacity of the Combined Sewer System or treatment plant. For this reason, Combined Sewer Systems are designed to overflow occasionally and discharge excess wastewater directly to nearby streams, rivers, or other water bodies. Chapter 173-245 WAC and EPA's CSO control policy (59 FR 18688) identify the required measures for control of overflows from combined sewer systems.

CSO Reduction Plan/Long-Term Control Plan and CSO Reduction Plan Amendments

Ecology requires municipalities to initially develop CSO Reduction Plans per chapter 173-245 WAC requirements. These plans are substantially equivalent to the Long-Term Control Plan (LTCP) as defined by EPA in its CSO control policy. Chapter 173-245 WAC requires that "All CSO sites shall achieve and at least maintain the greatest reasonable reduction, and neither cause violations of applicable water quality standards, nor restrictions to the characteristic uses of the receiving water, nor accumulation of deposits which: (a) Exceed sediment criteria or standards; or (b) have an adverse biological effect." "The greatest reasonable reduction" means control of each CSO outfall such that an average of no more than one untreated discharge may occur per year.

Under EPA's CSO Control Policy's presumption approach, CSO controls are presumed to attain WQS if certain performance criteria are met. Ecology presumes that a program that meets the criteria specified in WAC 173-245 and EPA's CSO control policy provides an adequate level of control to meet the water quality-based requirements of the Clean Water Act. This presumption must be verified via a post-construction monitoring program by

characterization, monitoring, and modeling of the system, including consideration of sensitive areas.

Nine Minimum Controls

Municipalities with Combined Sewer Overflow outfalls must implement nine minimum controls as technology-based standards for CSO discharges. The nine minimum controls are largely programmatic policies and practices designed to minimize the impacts untreated CSOs have on human health and the environment. It is not possible with current knowledge and technology to calculate numeric water quality-based effluent limits for CSOs. Ecology may include numeric water quality-based effluent limits in the future permits only after the long-term control plan is in place and after collection of sufficient water quality data.

The nine minimum controls include:

1. Use proper operations and maintenance practices within the combined collection system to reduce the magnitude, frequency and duration of CSOs.
2. Implement procedures that maximize storage capacity of the combined collection system.
3. Minimize pollution from non-domestic wastewater sources through close management of a pretreatment program.
4. Maximize treatable flow to the wastewater treatment plant during wet weather.
5. Prevent CSO discharges during dry weather and properly report any dry weather CSO discharges immediately to Ecology.
6. Implement procedures to control solid and floatable materials in CSOs.
7. Implement and maintain a pollution prevention program designed to keep pollutants from entering the combined sewer system.
8. Establish a process to notify the public when and where CSOs occur.
9. Monitor CSO outfalls to characterize CSO impacts and the efficacy of CSO controls, including event-based monitoring of all CSO flow quantity, frequency and duration.

CSO Monitoring

The proposed permit requires LOTT to monitor the volume, duration, and precipitation associated with each CSO discharge event at each identified outfall.

Annual CSO Report

LOTT must submit annual reports according to the requirements of WAC 173-245-090(1). This report: (a) details the past year's frequency and volume of combined sewage discharge from each CSO site, (b) explains the previous year's CSO reduction accomplishments, and

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(c) lists the projects planned for the next year. The report must indicate whether a CSO site has increased over the baseline annual condition. If an increase has occurred, the Permittee must propose a project and/or schedule to reduce that site below its baseline conditions. The report must document implementation of the nine minimum controls, and wet weather operation (flow blending) at the treatment plant.

LOTT must also assess in its annual reports whether identified outfalls meet the state standard of one untreated discharge per year per CSO. Assessment may be based on a long-term average which is currently defined as five years.

G. Outfall Evaluation

The proposed permit requires LOTT Clean Water Alliance to conduct an outfall inspection and submit a report detailing the findings of that inspection (Special Condition S.11). The inspection must evaluate the physical condition of the discharge pipe and diffusers, and evaluate the extent of sediment accumulations in the vicinity of the outfall.

H. Contributing Jurisdictions

Proposed permit Condition S13 applies to the contributing jurisdictions of LOTT, namely Lacey, Olympia, Tumwater, and Thurston County. The contributing jurisdictions have pretreatment, reporting, loading, and operation and maintenance requirements in the permit. Each jurisdiction must properly operate and maintain their respective collection systems, and responsibly respond to and report spills.

I. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual domestic wastewater NPDES permits issued by Ecology.

J. Reclaimed Water (R) Conditions

Proposed Permit Limitations (R1)

The Reclaimed Water Act, Chapter 90.46 RCW requires that reclaimed water be adequately and reliably treated prior to distribution and beneficial use. State regulations require that limitations set forth in a permit issued under Chapter 90.48 RCW must be either technology- or water quality-based. Municipal wastewater must also be treated using AKART and not pollute the waters of the state. The minimum criteria to demonstrate compliance with these requirements are derived from the Water Reclamation and Reuse Standards and Chapter 173-221 WAC.

The permit includes limitations on the quantity and quality of the Reclaimed Water that has been determined to protect the quality of the ground water. The approved Engineering Report includes specific design criteria for this facility. Water quality-based limitations are based upon compliance with the Ground Water Recharge Criteria (RCW 90.46.080) which are the Drinking Water Standards for the parameters noted and the Ground Water Quality Standards (Chapter 173-200 WAC) for other parameters that require regulation.

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The more stringent of the water quality-based or technology-based limits are applied to each of the parameters of concern. Each of these types of limits is described in more detail below.

Technology-Based Effluent Limitations

All waste discharge permits issued by Ecology must specify conditions requiring all known available and reasonable methods of prevention, control, and treatment of discharges to waters of the State (WAC 173-216-110). All Reclaimed Water Permits must assure that the effluent has been adequately and reliably treated so that as a result of that treatment, it is suitable for a beneficial use or controlled use that would not otherwise occur and is no longer considered a wastewater (RCW 90.46.010(40)).

The authority and duties for Reclaimed Water use are in addition to those already provided in law with regard to sewage and wastewater collection, treatment and disposal for the protection of public health and the safety of the State's waters. All waste discharge permits issued by Ecology must specify conditions requiring all known available and reasonable methods of prevention, control, and treatment of discharges to waters of the State (WAC 173-216-110). For land application, the permit requires the Reclaimed Water to be applied at agronomic rates.

The Water Reclamation and Reuse Standards, 1997, outline the requirements for the additional level of treatment technology as well as water quality limits necessary for public health protection during the use of Reclaimed Water. The standards provide four classes of Reclaimed Water, Classes A, B, C, and D.

This facility produces Class A Reclaimed Water. Class A is the highest quality of reclaimed water and therefore provides the broadest range of reuse opportunities. Conversely, Class A Reclaimed Water requires the most stringent treatment and water quality limitations. The technology and water quality requirements for the production of Class A Reclaimed Water are as follows:

1. "Class A Reclaimed Water" is Reclaimed Water that had been adequately and reliably treated and, at a minimum is, at all times, an oxidized, coagulated, filtered and disinfected wastewater.
2. Oxidized is defined as wastewater in which the organic matter has been stabilized such that the BOD5 does not exceed 30 mg/L and TSS does not exceed 30 mg/L, is nonputrescible and contains dissolved oxygen.
3. Coagulated wastewater is defined as an oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated prior to filtration by the addition of chemicals or by an equally effective method.
4. Filtered wastewater is defined as an oxidized, coagulated wastewater which has been passed through natural undisturbed soils or filter media, such as sand or anthracite, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 Nephelometric Turbidity Units (NTU), determined monthly, and does not exceed 5 NTU at any time.

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5. Adequate disinfection is defined as the median number of Total Coliform organisms in the wastewater after disinfection does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last seven days for which analyses have been completed, and the number of Total Coliform organisms does not exceed 23 per 100 milliliters in any sample.
6. A Chlorine Residual shall be maintained in the Reclaimed Water during conveyance from the reclamation facility to the use areas.

Monitoring Requirements (R2)

Monitoring, recording, and reporting are specified to verify that the treatment process is functioning correctly, that ground water criteria are not violated, and that reclaimed water limitations are being achieved

The reclaimed water monitoring and testing schedule is detailed in the proposed permit under Condition R2. Specified monitoring frequencies take into account the quantity and variability of the reclaimed water, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

Monitoring for total nitrogen is being required to further characterize the Reclaimed Water. This pollutant could have a significant impact on the quality of the ground water.

Reporting and Recordkeeping (R3)

The conditions of R3 are based on the authority to specify appropriate reporting and recordkeeping requirements to prevent and control the distribution or use of inadequately treated wastewater.

Reclaimed Water Distribution and Use (R4)

These permit requirements are based on the Water Reclamation and Reuse Standards authorized in Chapter 90.46 RCW. The standards contain requirements to assure that distribution and use of Reclaimed Water are protective of public health and the environment at all times. These include prohibitions on bypass, alarms and storage or alternative disposal of substandard water, maintenance of operational records, cross connection control, use area restrictions and enforceable contracts and a local Reclaimed Water Use Ordinance.

Operations and Maintenance (R5)

The proposed permit contains Condition R5 as authorized under the Water Reclamation and Reuse Standards and RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture, treatment and protection of public health and the environment.

VI. PERMIT ISSUANCE PROCEDURES

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with Water Quality Standards for Surface Waters, with Sediment Quality Standards, or with Water Quality Standards for Groundwaters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed Permit Issuance

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of five years.

VII. REFERENCES FOR TEXT AND APPENDICES

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APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to LOTT Clean Water Alliance. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Application on June 13, 2016, and June 20, 2016, in the *Olympian* to inform the public about the submitted application and to invite comment on the reissuance of this permit.

Ecology will place a Public Notice of Draft on June 13, 2017, in the *Olympian* to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Tells where copies of the draft permit and fact sheet are available for public evaluation (a local public library, the closest regional or field office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period.
- Tells how to request a public hearing about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting*, which is available on our website at <https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html>.

You may obtain further information from Ecology by telephone, 360-407-6278, or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

The primary author of this permit and fact sheet is Dave Dougherty.

APPENDIX B --YOUR RIGHT TO APPEAL

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
<p>Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive Southeast Lacey, Washington 98503</p> <p>Pollution Control Hearings Board 1111 Israel Road Southwest, Suite 301 Tumwater, Washington 98501</p>	<p>Department of Ecology Attn: Appeals Processing Desk P.O. Box 47608 Olympia, Washington 98504-7608</p> <p>Pollution Control Hearings Board P.O. Box 40903 Olympia, Washington 98504-0903</p>

APPENDIX C--GLOSSARY

1-1-DMax or 1-day Maximum Temperature -- The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-day Average of the Daily Maximum Temperatures -- The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute Toxicity --The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART -- The acronym for “all known, available, and reasonable methods of prevention, control and treatment.” AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate Point of Compliance -- An alternative location in the ground water from the point of compliance where compliance with the ground water standards is measured. It may be established in the ground water at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An “early warning value” must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient Water Quality -- The existing environmental condition of the water in a receiving water body.

Ammonia -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual Average Design Flow (AADF -- average of the daily flow volumes anticipated to occur over a calendar year.

Average Monthly Discharge Limit -- The average of the measured values obtained over a calendar month's time.

Background Water Quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of ground water at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95 percent upper tolerance interval with a 95 percent confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best Management Practices (BMPs) -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and

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practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD5 -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD₅ is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass -- The intentional diversion of waste streams from any portion of a treatment facility.

Categorical Pretreatment Standards -- National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity -- The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA) -- The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection-Without Sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection-With Sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite Sample -- A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity -- Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring -- Uninterrupted, unless otherwise noted in the permit.

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Critical Condition -- The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of Receipt -- This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection Limit -- See Method Detection Level.

Dilution Factor (DF) -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10 percent by volume and the receiving water 90 percent.

Distribution Uniformity -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early Warning Value -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, ground water, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement Limit -- The concentration assigned to a contaminant in the ground water at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a ground water criterion will not be exceeded and that background water quality will be protected.

Engineering Report -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria -- Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Ground Water -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial User -- A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

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Industrial Wastewater -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local Limits -- Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major Facility -- A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limit -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum Day Design Flow (MDDF) -- The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum Month Design Flow (MMDF) -- The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum Week Design Flow (MWDF) -- The largest volume of flow anticipated to occur during a continuous seven-day period, expressed as a daily average.

Method Detection Level (MDL) -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Minor Facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

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Mixing Zone -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES) -- The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH -- The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak Hour Design Flow (PHDF) -- The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak Instantaneous Design Flow (PIDF) -- The maximum anticipated instantaneous flow.

Point of Compliance -- The location in the ground water where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the ground water as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential Significant Industrial User (PSIU) --A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

1. Exceeds 0.5 percent of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
2. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes). Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL) -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to $(1, 2, \text{ or } 5) \times 10^n$, where n is an integer (64 FR 30417).

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ALSO GIVEN AS: The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Reasonable Potential -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible Corporate Officer -- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Significant Industrial User (SIU) --

1. All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
2. Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug Discharge -- Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil Scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and

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have 5,3,or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid Waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD₅ -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD₅ test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD₅ test is sufficient to remove the particulate organic fraction.

State Waters -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-Based Effluent Limit -- A permit limit based on the ability of a treatment method to reduce the pollutant.

Total Coliform Bacteria--A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total Dissolved Solids--That portion of total solids in water or wastewater that passes through a specific filter.

Total Suspended Solids (TSS) -- Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset -- An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-Based Effluent Limit -- A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

APPENDIX D--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found in the PermitCalc workbook on Ecology's webpage at: <http://www.ecy.wa.gov/programs/wq/permits/guidance.html>.

Simple Mixing:

Ecology uses simple mixing calculations to assess the impacts of certain conservative pollutants, such as the expected increase in fecal coliform bacteria at the edge of the chronic mixing zone boundary. Simple mixing uses a mass balance approach to proportionally distribute a pollutant load from a discharge into the authorized mixing zone. The approach assumes no decay or generation of the pollutant of concern within the mixing zone. The predicted concentration at the edge of a mixing zone (C_{mz}) is based on the following calculation:

$$C_{mz} = Ca + \frac{(Ce - Ca)}{DF}$$

where: C_e = Effluent Concentration

C_a = Ambient Concentration

DF = Dilution Factor

Reasonable Potential Analysis:

The spreadsheets Input 2 – Reasonable Potential, and LimitCalc in Ecology's PermitCalc Workbook determine reasonable potential (to violate the aquatic life and human health water quality standards) and calculate effluent limits. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets are taken directly from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b).

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Reasonable Potential Calculation

Facility	LOTT Clean Water Alliance
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	35.3	48.9
Human Health Carcinogenic		48.9
Human Health Non-Carcinogenic		48.9

Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH3	COPPER - 744058 6M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	NICKEL - 7440020 9M - Dependent on hardness	SILVER - 7740224 11M dependent on hardness.	ZINC- 7440666 13M hardness dependent	ARSENIC (inorganic)	ARSENIC (dissolved) 7440382 2M	ANTIMONY (INORGANIC) 7440360 1M	BERYLLIUM 7440417 3M	CADMIUM - 7440439 4M Hardness dependent
		Effluent Data	# of Samples (n)	900	60	60	60	60	60	36	36	12
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	10,440	25.5	0.9	2.1	0.13	65.7		1.3		0.009	0.05
	Calculated 50th percentile Effluent Conc. (when n>10)				1		37	1.27		0.3		
Receiving Water Data	90th Percentile Conc., ug/L	300	0.4	0	0.4	0	0		0			0
	Geo Mean, ug/L				0.4		0	0		0		
Water Quality Criteria	Aquatic Life Criteria, Acute ug/L	37,754	4.8	210	74	1.9	90	-	69	-	-	42
	Chronic ug/L	5,671	3.1	8.1	8.2	-	81	-	36	-	-	9.3
	WQ Criteria for Protection of Human Health, ug/L	-	-	-	100	-	1000	0.14	-	90	-	-
	Metal Criteria Acute	-	0.83	0.951	0.99	0.85	0.946	-	1	-	-	0.994
	Chronic	-	0.83	0.951	0.99	-	0.946	-	-	-	-	0.994
	Carcinogen?	N	N	N	N	N	N	Y	Y	N	Y	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2 = \ln(CV^2 + 1)$	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.997	0.951	0.951	0.951	0.951	0.951	0.951	0.920	0.951	0.920
Multiplier		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max concentration (ug/L) at edge of...	Acute	587	0.988	0.024	0.448	0.003	1.761		0.037		0.001
	Chronic	507	0.825	0.018	0.434	0.003	1.271		0.027		0.001
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO	NO		NO		NO

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		
Permit Limit Coeff. Var. (CV), decimal		
Waste Load Allocations, ug/L	Acute	
	Chronic	
Long Term Averages, ug/L	Acute	
	Chronic	
Limiting LTA, ug/L		
Metal Translator or 1?		
Average Monthly Limit (AML), ug/L		
Maximum Daily Limit (MDL), ug/L		

Human Health Reasonable Potential

s	$s^2 = \ln(CV^2 + 1)$	0.55451	0.554513	0.554513	0.55451
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.951	0.951	0.920	0.779
Multiplier		0.39886	0.398862	0.458542	0.65281
Dilution Factor		48.9	48.9	48.9	48.9
Max Conc. at edge of Chronic Zone, ug/L		0.41227	7.6E-01	2.6E-02	0.00613
Reasonable Potential? Limit Required?		NO	NO	NO	NO

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Reasonable Potential Calculation - Page 2

Facility	LOTT Clean Water Alliance
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	35.3	48.9
Human Health Carcinogenic		48.9
Human Health Non-Carcinogenic		48.9

Pollutant, CAS No. & NPDES Application Ref. No.		CHROMIUM(TRI) -16065831 5M	MERCURY 7439976 8M	SELENIUM 7782492 10M	THALLIUM 7440280 12M	PHENOL 108952 10A	CYANIDE 57125 14M	METHYLENE CHLORIDE 75092 22V	TOLUENE 108883 25V	1,4-DICHLOROBENZENE 106467 22B	DI-n-BUTYLPHTHALATE 84742 26B	BUTYLBENZYL PHTHALATE 85687 15B	
		Hardness dependent											
Effluent Data	# of Samples (n)	36	36	36	12	3	12	3	3	3	3	3	
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
	Effluent Concentration, ug/L (Max. or 95th Percentile)	0.5	0.003	0.7		9	8	0.35	0.7	0.235	0.7	0.2	
	Calculated 50th percentile Effluent Conc. (when n>10)		0.002	0.6	0.005		3						
Receiving Water Data	90th Percentile Conc., ug/L		0	0		0							
	Geo Mean, ug/L		0	0	0	0	0	0	0	0	0	0	
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-	1.8	290	-	-	1	-	-	-	-	
		Chronic	-	0.025	71	-	-	1	-	-	-	-	
	WQ Criteria for Protection of Human Health, ug/L		-	0.15	200	6.3	70000	100	100	130	200	12000	0.013
	Metal Criteria Translator, decimal	Acute	-	0.85	-	-	-	-	-	-	-	-	-
		Chronic	-	-	-	-	-	-	-	-	-	-	-
	Carcinogen?		N	N	N	N	N	Y	N	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950
s	$s^2 = \ln(CV^2 + 1)$	0.555	0.555	0.555
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.920	0.920	0.779
Multiplier		1.00	1.00	1.63
Max concentration (ug/L) at edge of...	Acute	0.000	0.020	0.368
	Chronic	0.000	0.014	0.266
Reasonable Potential? Limit Required?		NO	NO	NO

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		
Permit Limit Coeff. Var. (CV), decimal		
Waste Load Allocations, ug/L	Acute	
	Chronic	
Long Term Averages, ug/L	Acute	
	Chronic	
Limiting LTA, ug/L		
Metal Translator or 1?		
Average Monthly Limit (AML), ug/L		
Maximum Daily Limit (MDL), ug/L		

Human Health Reasonable Potential

s	$s^2 = \ln(CV^2 + 1)$	0.55451	0.554513	0.55451	0.554513	0.554513	0.554513	0.55451	0.55451	0.55451	0.55451
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.920	0.920	0.779	0.368	0.779	0.368	0.368	0.368	0.368	0.368
Multiplier		0.45854	0.458542	0.65281	1.204861	0.652812	1.204861	1.20486	1.20486	1.20486	1.20486
Dilution Factor		48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9
Max Conc. at edge of Chronic Zone, ug/L		4.1E-05	0.01227	0.0001	0.221753	6.1E-02	8.6E-03	0.01725	0.00579	0.01725	0.00493
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

**FACT SHEET FOR LOTT CLEAN WATER ALLIANCE
BUDD INLET WASTEWATER TREATMENT PLANT
NPDES PERMIT WA0037061**

Reasonable Potential Calculation - Page 3

Facility	LOTT Clean Water Alliance
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	35.3	48.9
Human Health Carcinogenic		48.9
Human Health Non-Carcinogenic		48.9

Pollutant, CAS No. & NPDES Application Ref. No.		BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	NAPHTHALENE 91203 39B	DIMETHYLPHTHALATE 131113 25B	FLUORENE 86737 32B	DIETHYLPHTHALATE 84662 24B	ANTHRACENE 120127 3B	FLUORANTHENE 206440 31B	PYRENE 129000 45B				
		Effluent Data	# of Samples (n)	3	3	3	3	3	3	3	3		
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	1.8	0.47	0.022	0.034	2.4	0.028	0.028	0.024				
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L												
	Geo Mean, ug/L	0		0	0	0	0	0	0	0			0
Water Quality Criteria	Aquatic Life Criteria, ug/L	-	-	-	-	-	-	-	-	-			-
		Acute											
		Chronic											
	WQ Criteria for Protection of Human Health, ug/L	0.046	-	600	10	200	100	6	8				
	Metal Criteria Translator, decimal	-	-	-	-	-	-	-	-	-			-
	Acute												
	Chronic												
	Carcinogen?	Y	N	N	N	N	N	N	N				N

Aquatic Life Reasonable Potential

Effluent percentile value	
s	$s^2 = \ln(CV^2 + 1)$
Pn	$Pn = (1 - \text{confidence level})^{1/n}$
Multiplier	
Max concentration (ug/L) at edge of...	Acute
	Chronic
Reasonable Potential? Limit Required?	

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month	
LTA Coeff. Var. (CV), decimal	
Permit Limit Coeff. Var. (CV), decimal	
Waste Load Allocations, ug/L	Acute
	Chronic
Long Term Averages, ug/L	Acute
	Chronic
Limiting LTA, ug/L	
Metal Translator or 1?	
Average Monthly Limit (AML), ug/L	
Maximum Daily Limit (MDL), ug/L	

Human Health Reasonable Potential

s	$s^2 = \ln(CV^2 + 1)$	0.55451	0.554513	0.55451	0.554513	0.554513	0.554513	0.55451
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.368	0.368	0.368	0.368	0.368	0.368	0.368
Multiplier		1.20486	1.204861	1.20486	1.204861	1.204861	1.204861	1.20486
Dilution Factor		48.9	48.9	48.9	48.9	48.9	48.9	48.9
Max Conc. at edge of Chronic Zone, ug/L		0.04435	0.000542	0.00084	0.059134	6.9E-04	6.9E-04	0.00059
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO	NO	NO

*FACT SHEET FOR LOTT CLEAN WATER ALLIANCE
BUDD INLET WASTEWATER TREATMENT PLANT
NPDES PERMIT WA0037061*

APPENDIX E--RESPONSE TO COMMENTS

[Ecology will complete this section after the public notice of draft period.]