Fact Sheet for NPDES Permit WA0024490

City of Everett Water Pollution Control Facility

Date of Public Notice: October 17, 2023

Permit Effective Date: xx/xx/xxxx

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 City of Everett Water Pollution Control Facility (WPCF). The permit also regulates and authorizes discharges from thirteen untreated combined sewer overflow (CSO) outfalls that operate within the combined sewer system associated with the Everett Water Pollution Control Facility.

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 thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for the Everett WPCF, NPDES permit WA0024490, are available for public review and comment from October 17, 2023 until December 18, 2023. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

The City 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 F** - **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 Everett WPCF has two parallel treatment systems: a trickling filter/solids contact (TF/SC) system and an aeration/oxidation pond (lagoon) system. The trickling filter system discharges treated wastewater to Port Gardner Bay; the lagoon system discharges to the Snohomish River. The proposed permit authorizes discharges from both treatment systems and from 13 combined sewer overflow outfalls located within the northern portion of the City of Everett. Ecology issued the previous permit for this facility on September 30, 2015. The proposed permit includes new limits for pH at outfalls 015 and 025 and requires a laboratory study of effluent phthalates and chlordane to confirm the accuracy of reported results. TSS limits have been revised for outfall 015. New monthly monitoring for enterococci and E. coli bacteria have been proposed to address a change in water quality standards developed to protect primary contact recreation waters. Pretreatment requirements related to PBDE and PFAS as well as an updated CSO control compliance schedule have also been added to the proposed permit. The permit also requires updates to the existing Post-Construction Monitoring Plan in anticipation of additional CSO outfalls becoming controlled during the new permit term.

Table of Contents

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 Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to domestic wastewater NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 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 F**.

II. Background Information

Table 1 Facility Information

Applicant	City of Everett
Facility Name and Address	Everett Water Pollution Control Facility 4027 4th Street SE Everett, Washington 98205
Contact at Facility	Name: Derek Kerlee, WWTPO IV Title: Wastewater Quality Process Analyst Telephone #: (425) 257-6790 Email: dkerlee@everettwa.gov
Responsible Official	Name: Cassie Franklin Title: Mayor Address: 2930 Wetmore Ave, Ste 10A Everett, WA 98201 Telephone #: (425) 257-7115 Email: cfranklin@everettwa.gov
Type of Treatment	Combined Aerated/Facultative Lagoon System Trickling Filter/Solids Contact System
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.99283 Longitude: -122.17440
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	**Snohomish River** Lagoon System (outfall 015) Latitude: 48.004167 Longitude: -122.177222 **Snohomish River** Trickling Filter/Solids Contact System (outfall 025) Latitude: 47.991389 Longitude: -122.178889 *Limited authorization for periodic flushing of diffusers only*. **Port Gardner Bay** Trickling Filter/Solids Contact System (outfall 100) Latitude: 47.969444 Longitude: -122.246667
CSO Locations	See Table 2 for CSO outfall locations. The City has a total of 6 CSO outfalls in the Snohomish River and 7 CSO outfalls in Port Gardner.
See **Appendix D** for maps showing the location of the outfalls and service territory.	

Permit Status

Issuance Date of Previous Permit: September 30, 2015

Application for Permit Renewal Submittal Date: April 21, 2020

Date of Ecology Acceptance of Application: May 5, 2020

Inspection Status

Date of Last Non-sampling Inspection: August 19, 2021

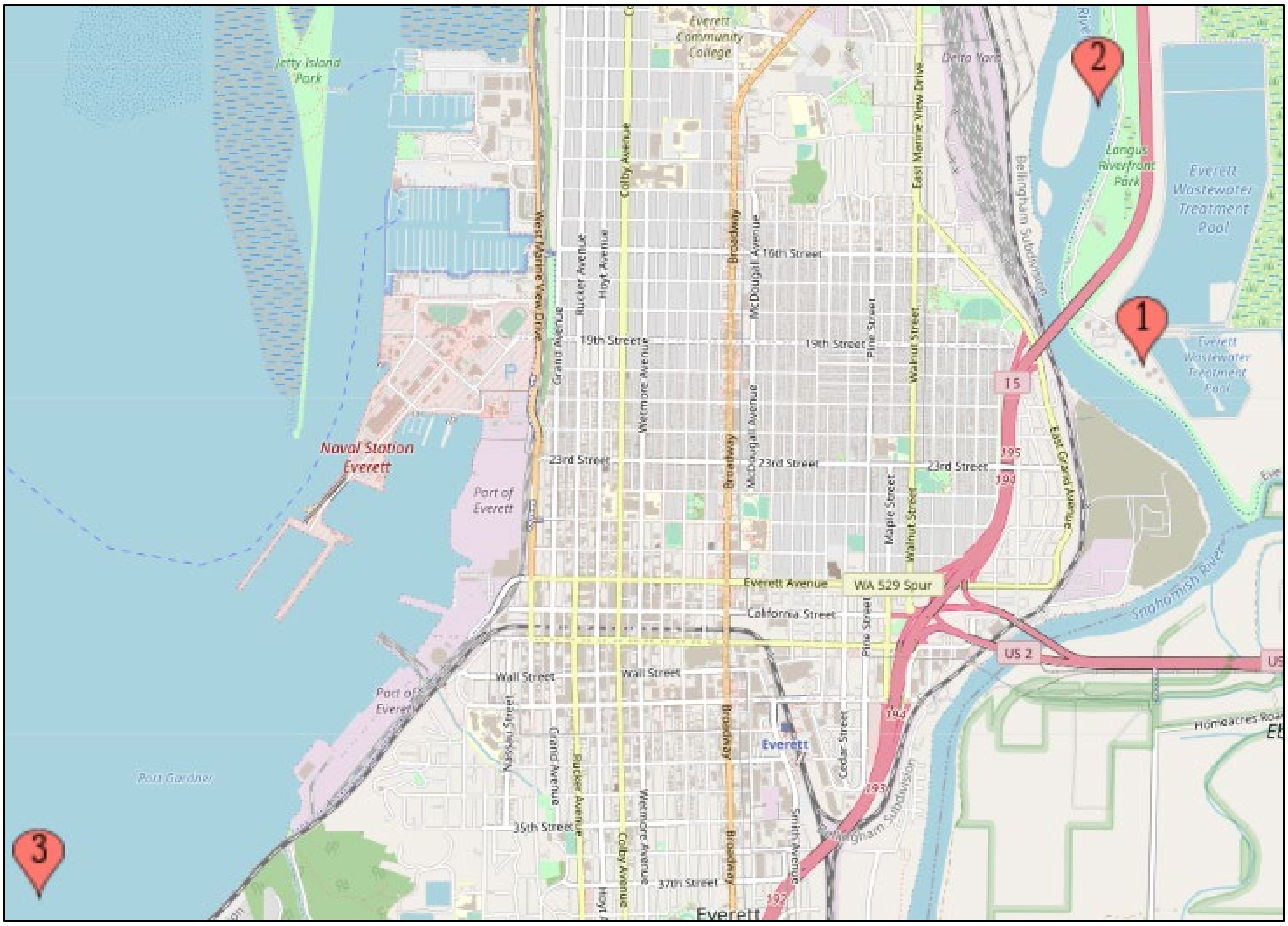

Figure 1. Location 1: Everett WPCF; Location 2: Outfall 015; Location 3: Outfall 100.

II.A. Facility description

1. History

Everett constructed its first sewers in 1890, three years before the City was incorporated. In 1897, after a sewer bond election passed, construction of the citywide system began in the north end of the City. The City constructed the original system as a combined sewer system that carries stormwater and sanitary sewage to the Water Pollution Control Facility (WPCF) for treatment. With population growth, the City expanded to the south and installed separate storm and sewer systems in the new areas. The current system serves 171,833 people (approximately 115,563 people in the City of Everett and 56,270 in nearby municipalities).

The City's sewer system originally discharged into the Snohomish River and Port Gardner Bay. The Snohomish County Health District constructed the WPCF in 1960 to provide wastewater treatment to the Everett area. The City took over operation of the facility in 1975. The original facility consisted of oxidation ponds and an outfall to the Snohomish River. Over time, the City added significant improvements to the plant, including aeration ponds and a chlorine contact channel in 1971, a new headworks in 1985, the trickling filter/solids contact system (TF/SC) in 1991, the South Effluent Pump Station (SEPS) for discharge to outfall 100 in Port Gardner Bay in 2005, and primary clarifiers in 2007. The City replaced surface aerators in the aeration ponds in 2010 to enhance treatment in the lagoon system. The City also started construction in 2014 to expand the TF/SC system to accommodate growth. The lagoon system was further upgraded in 2020 with a new chlorine disinfection system and an outfall modification project that improved the reliability and efficiency of effluent pumping. The WPCF currently consists of two parallel treatment systems: a trickling filter/solids contact (TF/SC) system (outfalls 100 and 025) and an aeration/oxidation pond system (outfall 015).

Everett's sewer service area consists of two distinct systems: the combined system in the north end of the City and the separated system in the south. The older combined system is generally bordered by Possession Sound, the Snohomish River, and Pigeon Creek Number 1. The separated system, which the City constructed after 1960, extends south from Pigeon Creek Number 1 to the southern city limits. In addition to serving the City of Everett, the WPCF provides wastewater treatment for neighboring sewer districts. These tributary sewer agencies have purchased reserve capacity in the following amounts: The Silver Lake Water and Sewer District has 6.6 MGD (maximum winter month flow) reserved; the Mukilteo Water and Wastewater District has 1.6 MGD (maximum average daily flow) reserved; and the Alderwood Water and Wastewater District has 1.5 MGD (maximum average daily flow) reserved. A map of the treatment area is included in Appendix D. Septic systems still serve a few hundred residential lots within the City and an unknown number in the larger service area.

The WPCF is located on a 350-acre land parcel owned by the City on Smith Island, east of the Snohomish River. The WPCF is bordered by Interstate 5 to the west, the Snohomish River to the south, and Union Slough to the east. A dike system protects the plant, which is located within the Snohomish River flood plain.

2. **Collection system status**

The City relies on gravity flow for most of the collection system. Interceptors collect the sewage draining to the west and pump it to the east, toward the WPCF. The collection system is comprised of 22 drainage basins and consists of approximately 330 miles of pipe ranging in size from 2.5-inches to 72-inches in diameter. The system has 31 active lift stations and 35 major flow regulator structures. All lift stations include telemetry systems for continuous monitoring of operating conditions. The City's dispatch center receives all alarms from the lift stations and provides notice to operations and maintenance staff whenever problems arise. The City also uses a SCADA system to remotely track operations and performance of each lift station. All lift stations include redundant power supplies with either dedicated standby generators or a second utility power feed. City technicians visit all the lift stations multiple times per week to conduct visual inspections and perform routine preventive maintenance. Technicians also perform thorough inspections of each lift station twice per year.

3. **Combined System and CSOs**

The combined system in the north end of the City serves an area of approximately 6,500 acres. Constructed between 1890 and 1963, the combined system requires a high maintenance effort due to its age. The City originally constructed its sewers with vitrified clay pipe, but since 1920 has used other pipe materials, such as concrete, ductile iron, polyvinyl chloride (PVC) and high-density polyethylene (HDPE). The combined system consists of approximately 2,785 manholes and 140 miles of 2.5- to 72-inch diameter pipelines, not including side sewers. During wet weather, stormwater and wastewater in excess of the capacity of the combined sewers can discharge through combined sewer overflow (CSOs) outfalls. Seven lift stations and 16 flow regulators in the combined collection system include overflows to either Port Gardner Bay or the Snohomish River. The City has 13 active CSO outfalls, 6 discharging to the Snohomish River and 7 discharging to Port Gardner Bay. The City has abandoned two other CSO outfalls that previously discharged to the Snohomish River. Table 2 below shows the location of each discharge.

Table 2 CSO Outfall Locations

Ecology Outfall ID	Everett CSO ID	Outfall Description	Receiving Water	Latitude	Longitude
005	PS01	Lift Station #8	Port Gardner Bay	48.000415	-122.223469
013	PS02	Lift Station #8	Port Gardner Bay	47.998904	-122.216061
012	PS03	15th & Grand Street	Port Gardner Bay	47.997053	-122.214166
011	PS04	Lift Station #5	Port Gardner Bay	47.984358	-122.219653
009	PS05	Lift Station #3	Port Gardner Bay	47.982584	-122.218904
008	PS06	W. Hewitt & Bond St.	Port Gardner Bay	47.979464	-122.221072
007	PS07	Lift Station #2	Port Gardner Bay	47.978237	-122.222371
016	SR01	Lift Station #9	Snohomish River	47.995277	-122.18143
017	SR02	Hayes Street	Snohomish River	47.995254	-122.181432
018	SR03	Siphon Headworks	Snohomish River	47.994794	-122.181279
019	SR04	Lift Station #32	Snohomish River	47.979755	-122.181949
026	SR07	East Pacific Avenue	Snohomish River	47.976652	-122.187303
028	SR08	E. 35th St. / LS #33	Snohomish River	47.970098	-122.188762

The City completed a CSO Control Plan in November 1987 to comply with chapter 90.48.480 RCW, which required development of “reasonable plans and compliance schedules for the greatest reasonable reduction of combined sewer overflows”. Ecology defined “reasonable minimum” in chapter 173-245 WAC as an average of no more than one untreated CSO discharge per outfall, per year, on average. As required by chapter 173-245 WAC, the City subsequently submitted updates to the CSO Control Plan, most recently in April 2020, to revise old projects or to propose new ones as needed to bring all CSO outfalls into compliance with the reasonable minimum requirement. The City’s original plan identified a 30-year timeline that would see the elimination of all uncontrolled CSOs. A 10-year extension was later granted, and the proposed permit includes compliance schedules on this new timeline for all remaining projects identified in the most recent CSO Control Plan Update.

Several CSO control projects were completed in the most recent permit term. In 2017 the East Grand Stormwater Separation and Regulator R4 and R39 Revision Projects were completed as was the Diversion Structure Zero Project and the Hayes Street Project. These projects were designed to reduce overflows from SRO1, SRO2, SRO3, and SRO4. In 2019 the Cleveland Avenue Sewer Replacement and Stormwater Separation Project and work on the Wet Weather Auxiliary Pump at Lift Station No. 32 was completed. These projects were designed to reduce overflows from SRO4. In 2020 the Grand Avenue Park Bridge Project and Sewer M Projects were completed. These projects were designed to reduce overflows from PSO1, PSO2, and PSO3. Work also began on projects to modify the 36th St. regulator and to install a 1.8 MG CSO storage facility, both projects are intended to bring SRO7 and SRO8 into compliance. In 2021, work was completed on the Jackson Park Area Stormwater Separation Project which was designed to ensure outfall SRO3 remains in compliance.

Based on monitoring data in Everett's 2022 Annual CSO Report (see Table 3), 6 of the City's 13 CSO outfalls do not yet meet the state's 20-year rolling average performance standard for the "greatest reasonable reduction" as defined in chapter WAC 173-245-020(22). One of the most significant remaining CSO control projects the City will be undertaking is to construct a wet weather control facility that will ensure storage of most of the combined sewer flows generated from the western portion of the combined service area. Sections G and H of the "Other Permit Conditions" portion of this fact sheet provide additional information on compliance schedules and other CSO control conditions in the proposed permit.

Table 3 CSO Control Status

Ecology Outfall ID	Everett CSO ID	Rolling 20-yr Annual Average	Controlled?
005	PS01	0.8	Yes
013	PS02	0.3	Yes
012	PS03	0.2	Yes
011	PS04	4.7	No
009	PS05	18.8	No
008	PS06	36.8	No
007	PS07	25.9	No
016	SR01	0.1	Yes
017	SR02	0.3	Yes
018	SR03	1.0	Yes
019	SR04	1.8	No
026	SR07	2.4	No
028	SR08	0.4	Yes

4. **Separated System**
The sanitary system in the south end of the City serves an area of 11,500 acres within the City and a total of 25,000 acres, including the contribution received from the Alderwood, Silver Lake, and Mukilteo districts. The system was constructed after 1963 originally using concrete pipe. Since 1982, Everett has used new materials including PVC and ductile iron and typically used rubber gaskets to seal the pipe joints. The separate system in the south end is where the main growth within Everett is expected to occur. The collection system consists of approximately 4,379 manholes and 190 miles (not including laterals) of 6- to 48-inch diameter pipelines.

5. **Industrial Discharges**
In addition to domestic sewage from residential and light commercial activities located within the service area, the treatment plant also receives pretreated industrial wastewater from permitted pretreatment facilities (11 Significant Industrial Users (SIUs) and 12 Categorical Industrial Users (CIUs). The City of Everett received approval of its pretreatment program on November 25, 1986.

The following table lists permitted pretreatment industries discharging to the WPCF.

Table 4 Significant Industrial Users

Name	Everett Permit Number	Industrial Process	Categorical Pretreatment Standards	Process Wastewater Flow (gpd)	Non-Process Wastewater Flow (gpd)
Achilles USA	7710	PVC Film Manufacturing	40 CFR 463.25	10,000	46,000
Airport Road Transfer Station	7735	Wash-down of tipping floor and compactor bays	N/A	4,400	1,600
Altasciences Preclinical	7729	Cagewashers and habitat washdowns	N/A	56,000	26,000
Aramark/Overall Laundry	7719	Commercial Laundry	N/A	80,000	20,000
Avtech Tyee	7718	Metal finishing, chromating	40 CFR 433.17	0	5,000
Bluestreak	7717	Metal finishing	40 CFR 433.17	29,000	11,000
Boeing	7704	Metal finishing associated with aircraft manufacture	40 CFR 433.17	60,000	540,000
Boeing	7739	Alodine pens	40 CFR 433.17	0	20,000
Cathcart Sanitary Landfill	7701	Leachate collection, vactor decant facility	N/A	76,000	0
Cintas Corporation	7736	Commercial laundry	N/A	55,000	10,000
Community Transit, Kasch Park Operations Base	7720	Bus and vehicle maintenance and cleaning	N/A	4,100	5,900
Community Transit, Hardeson Base	7721	Bus and vehicle maintenance and cleaning	N/A	1,300	9,700
Eckstrom Industries	7738	Metal finishing, metal blackening	40 CFR 433.17	<100	>4900
Everett Landfill	7713	Leachate collection	N/A	155,000	0
Fluke Corporation	7706	Metal finishing, thin film	40 CFR 433.17	2,600	80,000
JAMCO	7731	Metal finishing, anodizing	40 CFR 433.17	500	19,500
Kettle Cuisine	7703	Soup, side dishes	N/A	300,000	75,000
Naval Station Everett	7722	Bilge and compensating water treatment	N/A	6,000	38,000
Port Chatham (Trident Seafoods)	7723	Seafood smoking, canning, and packaging	N/A	100,000	80,000
Rail Makers NW	7733	Metal finishing, electro-polishing	40 CFR 433.17	<100	>200
Umbra Cuscinetti	7737	Metal finishing	40 CFR 433.17	200	4,800

Name	Everett Permit Number	Industrial Process	Categorical Pretreatment Standards	Process Wastewater Flow (gpd)	Non-Process Wastewater Flow (gpd)
United Technologies Aerospace Systems	7742	Alodine pens	40 CFR 433.17	0	5,000
Washington Marine Cleaning	7740	Centralized Waste Treatment	40 CFR 437.47	1,700	1,500
Total				942,000	1,014,100

6. Treatment processes

The following paragraphs describe the general treatment process at the WPCF. **Appendix D** contains a process flow schematic that illustrates the general process flow and a water balance for individual process components or treatment trains. Treatment at the WPCF consists of the following three general systems: common preliminary and biological pretreatment system, south trickling filter/solids contact system, and north lagoon system.

<u>Diversion Structure Zero, CSO Interceptor/Forebay, Headworks</u>

Primary influent enters the plant from three sources: Plant Influent North (combined system), Plant Influent South (separated system), and via the Snohomish River CSO interceptor (combined system).

The Snohomish River CSO Interceptor conveys combined sewage from the southeast portion of the combined system to the Plant's Headworks where the flow is measured, passes through a barscreen, and enters directly into Aeration Cell 1 (AC-1).

Plant Influent North flows originate in the northeast and western portions of the City's combined system and are conveyed from the Siphon Headworks to Diversion Structure Zero (DS-0) which conveys flow directly to the Headworks. During heavy rain events, the diversion structure bypasses a portion of the influent flow directly to the Oxidation Pond for treatment, otherwise Plant Influent North enters the Headworks at the Screwpump wet well. Four Archimedes screwpumps, rated at approximately 22 MGD each, lift flows from the Screwpump wet well to the Barscreen Forebay.

Plant Influent South, raw sanitary sewage from the separated system, enters the Headworks at the Barscreen Forebay where it combines with flow from the north combined system.

From the Barscreen Forebay, flow passes through the Headworks Barscreens. There are four Headworks Barscreens with a combined capacity of approximately 110 MGD. Following screening, the flow passes through four Parshall Flumes for flow measurement. Following the Parshall Flumes, the flow passes into a common channel which feeds the Grit Collectors. There are two Grit Collectors with a combined capacity of 80 MGD. Flows greater than 80 MGD are routed through the Grit Collector Bypass Channel through an automated slide gate. Following the Grit Collectors, the flows pass to a common channel, exit the Headworks, and proceed to Diversion Structure 1.

Diversion Structure One, Primary Clarifiers, Diversion Structure Two

Diversion Structure 1 (DS-1) is a distribution structure that regulates flow to the two Primary Clarifiers and Aeration Cell 1 (AC-1). The Primary Clarifiers have a capacity of 40 MGD. DS-1 flow up to 40 MGD is routed to the Primary Clarifiers. Flow to DS-1 in excess of 40 MGD is conveyed to AC-1. Settled primary sludge is pumped to one of five solids discharge ports in AC-1 or AC-2.

A portion of the Primary Clarifier Effluent, typically 12-15 MGD, is conveyed to the Trickling Filters via Diversion Structure 2. The remaining Primary Clarifier Effluent flow is conveyed to AC-1.

Trickling Filter/Solids Contact, Secondary Clarifiers (Outfall 100/025)

The Trickling Filter/Solids Contact (TF/SC) system is rated at 30 MGD, 10 MGD per trickling filter. Trickling Filter Influent flow is controlled by an influent recirculation system that recirculates up to 4 MGD per pump back to its wet well. Trickling Filter Effluent that is not recirculated flows to the Aeration Basins.

There are six Aeration Basins fitted with fine-bubble diffusers. The Aeration Basins may be configured in series, parallel; or various modes such as step feed, re-aeration, or plug flow depending on desired operating conditions and influent strength.

Effluent from the Aeration Basins flows to the Mixed Liquor Flow Control Structure. The Mixed Liquor Flow Control Structure distributes Mixed Liquor flow to the Plant's three Secondary Clarifiers.

Secondary Clarifier Effluent, Aeration Cell One recycle, South Effluent Pump Station

Secondary Clarifier Effluent discharges either to the Plant's South Chlorine Contact Channel/South Effluent Pump Station where it combines with effluent from the Marysville WWTP (when on-line) or is routed to AC-1 depending upon Plant conditions and lagoon levels. Chlorine residual and fecal coliform samples of the combined Marysville and Everett effluent are taken downstream of the effluent pumps following chlorine contact time. NPDES permit compliance sampling for parameters other than fecal coliform and chlorine residual occurs at the point that flows exit the secondary clarifiers. Sodium Hypochlorite is added for disinfection in the Secondary Clarifiers, at the entrance to the South Effluent Pump Station, or both.

Settled solids in the Secondary Clarifiers are returned to the Aeration Basins via the Plant's Return Secondary Sludge System. Excess solids inventory is wasted to one of six discharge ports in AC-1 or AC-2.

Aerated Lagoon, Oxidation Pond, and Polishing Pond (Outfall 015)

All Plant flow that is not treated and discharged to Outfall 100 passes through the Plant's lagoon system. The lagoon system consists of Aeration Cells 1 and 2 (collectively referred to as the Aerated Lagoon), the Oxidation Pond, the Polishing Pond, and the North Chlorine Contact Channel.

The Aeration Lagoon consists of two facultative cells (AC-1 & AC-2), each with an approximate volume of 33.5 million gallons. Aerated Lagoon Effluent that is not treated through the Trickling Filter/Solids Contact Plant passes through cells AC-1 & AC-2 in series and then is discharged from AC-2 into the 215-million-gallon Oxidation Pond.

Following the Oxidation Pond, lagoon system flow is conveyed to the 50-million-gallon Polishing Pond, then to a 0.6-acre chlorine contact channel before being discharged to the Snohomish River.

For disinfection, Sodium Hypochlorite is injected into the flow at the beginning of the chlorine contact channel. Sodium Bisulfite is added at the end of the chlorine contact channel to dechlorinate the effluent prior to discharge.

Following dechlorination, effluent flows to outfall 015 in the Snohomish River. Effluent is pumped to the river via the North Effluent Pump Station (NEPS) at higher river levels or flows by gravity at lower river levels.

7. Operator certification

Washington State law requires operators of municipal wastewater treatment plants to be certified at a level appropriate for the type and size of the facility. Guidance in Ecology's Permit Writer's Manual and WAC 173-230 classify the treatment system at the WPCF as a Group IV facility. As such, the operator in responsible charge of the day-to-day operations at the WPCF must, at a minimum, be rated as a Group IV operator. An operator certified for at least a Group III facility must oversee each scheduled shift at the facility. The Everett WPCF employs certified operators at various levels between Group I and Group IV, as well as OITs.

8. Facility Power Reliability

The TF/SC facility can receive power from two separate transmission grids that are owned and operated by Snohomish PUD. Power feeds enter the facility either from the south through a grid that supplies power to the City of Everett or from the north through a grid that supplies power to the City of Marysville. The facility does not have automatic switching capability. If one grid loses power, Snohomish PUD must manually switch power to the other grid. The City also owns portable generators that they can use at the TF/SC facility in emergency situations.

The Snohomish PUD transmission grid from Marysville is the main source of power for the North Lagoon Plant. During a power outage, an emergency generator at outfall 015 provides sufficient power to close a valve to stop gravity flow of effluent and to prevent the discharge of undisinfected effluent.

9. Discharge Outfalls

Trickling Filter/Solids Contact System, Port Gardner Bay Outfall (Outfall 100)

Kimberly-Clark Worldwide, Inc. (Kimberly-Clark) constructed outfall 100 in Port Gardner Bay in 2004 as a replacement of an outfall from their industrial wastewater treatment facility located at their Everett paper mill site. The City entered into an agreement with Kimberly-Clark to purchase capacity in the outfall for discharges from the TF/SC treatment system at the WPCF. The City of Marysville also purchased capacity in the outfall. With the closure of the Everett paper mill in 2012, the City agreed to purchase the outfall infrastructure from Kimberly-Clark and assume ownership and operation.

Outfall 100 discharges to Port Gardner Bay at a depth of about 350 feet and over 1,300 feet from the nearest shoreline. The outfall pipe is 63-inch diameter HDPE, which is buried in the intertidal and shallow subtidal area and then rests on the seabed with concrete anchors. The diffuser section is 1,556 feet in length, and it is laid along a gradual curve that starts at -340 feet and ends at -348 feet below mean lower low water (MLLW). The diffuser has 80 vertical risers with 90° elbows, and these terminate with 5-inch round ports on each diffuser orifice plate. The riser elbows are oriented so that the diffuser port openings alternate discharge directions along the length of the diffuser.

Trickling Filter/Solids Contact, Snohomish River Outfall (Outfall 025)

The City originally constructed the TF/SC treatment system with an outfall to the Snohomish River. In support of Ecology's 1999 Snohomish River Estuary Water Quality Improvement Project, the City agreed to divert all TF/SC flow from the Snohomish River Outfall 025 to a new outfall located in Port Gardner Bay (Outfall 100). As part of the agreement, the City would retain authority to discharge from Outfall 025 under emergency conditions or if maintenance required shutdown of Outfall 100.

Outfall 025 is in a 450-foot-wide section of the river approximately 500 feet east of the I-5 bridge over the Snohomish River and one mile upriver from Outfall 015. The outfall consists of a 48-inch diameter pipe connected to a 35-foot-long diffuser that extends approximately 200 feet into the river at a depth of -16 feet below mean lower low water datum. The diffuser has twelve 10-inch risers spaced 2.5 feet apart. The original design intended for effluent to discharge horizontally about 1-2 feet above the river bottom through pinch check valves. Sediment accumulations around the diffusers forced the City to take the outfall out of service in 2009. Although the City has evaluated alternatives to repair or replace the diffuser, budget constraints have delayed repairs. The City plans to continue efforts to restore the use of this outfall for emergency purposes.

North Lagoon Outfall (Outfall 015)

Effluent from the North Lagoon Plant enters the Snohomish River about 900 feet west of the polishing pond and about one mile downstream of the TF/SC facility. The river is approximately 350 feet wide at the location of the outfall. The outfall pipe is 48 inches in diameter. The diffuser is located at approximately -8 feet below mean lower low water datum. The diffuser is approximately 36 feet long and has sixteen 10-inch risers spaced 2.5 feet apart. Effluent discharges horizontally through pinch check valves.

10. Solid Wastes/Residual Solids

The treatment of wastewater at the Everett Water Pollution Control Facility produces a variety of solids. Grit and screenings are collected from the headworks and scum is removed from the inlet area of the aerated lagoons. Dewatered grit material and screenings are collected and transported to the Roosevelt Landfill in Klickitat County for disposal. Waste secondary sludge collected from the secondary clarifiers in the TF/SC facility is routed to aerated lagoon AC-2 for digestion/stabilization. Sheet piling added to the effluent end of AC-2 in 2010 improved solids retention within the cell. The City removes digested sludge collected from the bottom of the aerated lagoons every 1-2 years. Digested biosolids are processed in a 5-acre area at the south end of the oxidation pond prior to transportation off site. Biosolids that exceed pollutant concentration limits in WAC 173-308-160 Table 3 are transported to the Roosevelt Landfill in Klickitat County for disposal. Biosolids that do not exceed Table 3 limits are bid out for land-application and are typically land-applied at a City of Everett-owned agricultural site in Snohomish County.

II.B. Description of the receiving water

The WPCF and associated combined sewer overflow outfalls discharge to the Snohomish River Estuary and Port Gardner Bay. Other point source discharges include industrial discharges from dry docks at the Everett Shipyard and Hansen Boat Company. Significant nearby non-point sources of pollutants include sand and gravel mining operations, industrial stormwater from lumber mills, transportation facilities, and the Cedar Grove composting facility. Non-point municipal stormwater discharges in the vicinity are regulated under the City of Everett's Phase II Municipal Stormwater Permit and Snohomish County's Phase I Municipal Stormwater Permit (for areas outside of the Everett City Limits). Section II.E of this fact sheet describes any receiving waterbody impairments.

Ecology conducts long-term water quality monitoring of the Snohomish River at the Avenue D Bridge in Snohomish, located approximately 10 miles upriver of outfall 015 (monitoring station #07A090). Table 5 summarizes ambient conditions for conventional parameters measured between November 2015 and November 2019 (the most recent data set for which a data quality review had been completed for the monitoring station at the time this permit was drafted). The table also includes results from ambient metals monitoring conducted between October 2008 and August 2009 (6 total samples).

Table 5 Ambient Background Data, Snohomish River

Parameter	Average Value	90th Percentile Value	Geometric Mean Value
Temperature, 1-DADMax	9.9 °C	17.8 °C	--
Dissolved Oxygen	11.1 mg/L	9.2 mg/L (10th percentile)	--
Suspended Solids	20.0 mg/L	33.8 mg/L	--
pH (min/max range: 6.8-7.4)	7.1	7.2	--
Fecal Coliform	--	50/100 mL	15/100 mL
Total Ammonia-N	0.011 mg/L	0.014 mg/L	--
Nitrate + Nitrite N	0.199 mg/L	0.396 mg/L	0.169 mg/L
Total Phosphorus-P	0.025 mg/L	0.043 mg/L	--
Salinity at WPCF outfalls[1]	8.0 psu	--	--
Alkalinity (as CaCO3)	28.3 mg/L	47.5 mg/L	--
Arsenic	0.66 µg/L	0.8 µg/L	--
Chromium	0.28 µg/L	0.35 µg/L	--
Copper	0.87 µg/L	1.18 µg/L	0.83 µg/L
Lead	0.099 µg/L	0.191 µg/L	--
Mercury	0.0021 µg/L	0.0022 µg/L	0.002 µg/L
Nickel	0.38 µg/L	0.54 µg/L	0.36 µg/L
Zinc	3.2 µg/L	5.45 µg/L	--
[1] Data for ambient salinity taken from 1993 TMDL study.			

Table 6 lists the Port Gardner ambient data used for this permit. Ecology used data from its marine water sampling station PSS019, located near Hat Island, and the Effluent Mixing Study Outfall 100 (CH2Mhill, 2004).

Table 6 Ambient Background Data, Port Gardner Bay

Parameter	Average Value Used
Temperature, 1-DADMax	16.3 °C
pH	7.6 standard units
Dissolved Oxygen	6.4 mg/L
Alkalinity (as CaCO3)	182.5 mg/L
Fecal Coliform	1/100 mL dry weather
Salinity	29.4 psu

II.C. Wastewater influent characterization

The WPCF reported the concentration of influent pollutants in discharge monitoring reports (November 2015 – January 2022). The influent wastewater is characterized as follows:

Table 7 Wastewater Influent Characterization

Parameter	Units	Average Value	Maximum Value
Daily Flow	MGD	18.9	123.5
Monthly Average Biochemical Oxygen Demand (BOD_5)	mg/L	287	740
Monthly Average BOD_5	lbs/day	40,789	134,975
Monthly Average Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	mg/L	238	620
Monthly Average $CBOD_5$	lbs/day	33,816	216,298
Monthly Average Total Suspended Solids (TSS)	mg/L	239	720
Monthly Average TSS	lbs/day	34,134	171,554

II.D. Wastewater effluent characterization

The Everett WPCF reported in the permit application and in discharge monitoring reports the concentration of pollutants in the discharge to Port Gardner Bay via outfall 100 and to the Snohomish River via outfall 015. The tabulated data represents the quality of the wastewater effluent discharged from November 2015 – January 2022. The wastewater effluent is characterized as follows:

Table 8 Wastewater Effluent Single Sample Characterization, Outfall 100

Parameter	Units	Average Value	Maximum Value
Flow	MGD	11.7	21.0
$CBOD_5$	mg/L	9.4	16.0
$CBOD_5$	lbs/day	914	1,892
$CBOD_5$	% removal	96%	98%
TSS	mg/L	11.1	20.0
TSS	lbs/day	1,086	2,402
TSS	% removal	95%	98%
Dissolved Oxygen	mg/L	8.1	--
pH (6.0 Min – 8.0 Max)	standard units	6.9 (Average)	7.2 (95^{th} percentile)
Total Residual Chlorine	mg/L	0.46	0.55
Temperature	ºC	15.6	22.5
Ammonia	mg/L as N	16.9	28.3
Nitrate+Nitrite	mg/L as N	7.5	13.5
Total Kjeldahl Nitrogen (TKN)	mg/L as N	21.0	32.6
Total Phosphorous	mg/L as P	3.9	5.6
Ortho-phosphate	mg/L as P	3.3	4.9
Alkalinity (as $CaCO_3$)	mg/L	88	106
Hardness (as $CaC0_3$)	mg/L	72.7	83.1

Parameter	Units	Average Value	95^{th} Percentile
Fecal Coliform	cfu/100mL	92	258

Parameter	Units	Average	95^{th} Percentile	Maximum
Oil and Grease	mg/L	4.98	6	6

Total Dissolved Solids	mg/L	275	350	360
Antimony	µg/L	0.61	0.89	0.9
Arsenic	µg/L	0.83	1	1.1
Cadmium	µg/L	0.045	0.06	0.06
Chromium (Tri)	µg/L	0.67	1.1	1.3
Chromium (Hex)	µg/L	0.03	0.03	0.04
Copper	µg/L	6.16	8.33	8.4
Lead	µg/L	0.46	0.7	0.8
Mercury	ng/L	6.77	11.58	13.6
Nickel	µg/L	2.29	2.97	3
Silver	µg/L	0.06	0.08	0.08
Thallium	µg/L	0.17	0.25	0.26
Selenium	µg/L	0.9	0.9	0.9
Zinc	µg/L	33.36	42.02	44.4
Bis(2-Ethylhexyl) Phthalate	µg/L	20.49	73.76	89.2
Chlordane	µg/L	0.024	--	0.12
Chloroform	µg/L	0.27	0.27	0.27
Cyanide	µg/L	8.67	22.6	33
Diethyl phthalate	µg/L	0.57	0.84	0.85
Phenolics	µg/L	155	159.5	160
Note: Effluent samples associated with Outfall 100 were also analyzed for PCBs. None of the samples taken during the permit cycle contained PCBs in detectable amounts.				

Table 9 Wastewater Effluent Single Sample Characterization, Outfall 015

Parameter	Units	Average Value	Maximum Value
Flow	MGD	12.3	27.5
$CBOD_5$	mg/L	9.9	17.0
$CBOD_5$	lbs/day	1,016	2,635
$CBOD_5$	% removal	95%	98%
NBOD+CBOD (low river season)	lbs/day	2,422	3,192
TSS	mg/L	23.1	41.6
TSS	lbs/day	2,353	5,982
TSS	% removal	84%	96%
Dissolved Oxygen	mg/L	7.8	--
pH (6.4 Min - 9.0 Max)	standard units	7.4 (Average)	8.1 (95^{th} percentile)
Total Residual Chlorine	µg/L	9.1	14.0
Temperature	^{o}C	11.9	24.0
Ammonia	mg/L as N	22.4	32.1
Ammonia (low river season)	lbs/day	967	1,378
Nitrate+Nitrite	mg/L as N	0.8	2.1
TKN	mg/L as N	26.3	36.9
Total Phosphorous	mg/L as P	5.3	7.9
Ortho-phosphate	mg/L as P	4.6	7.1
Alkalinity (as $CaCO_3$)	mg/L	165	172
Hardness (as $CaC0_3$)	mg/L	68	90.4

Parameter	Units	Average Value	95th Percentile
Fecal Coliform	cfu/100mL	27	75

Parameter	Units	Average	95th Percentile	Maximum
Oil and Grease	mg/L	5.21	6	6
Total Dissolved Solids	mg/L	278.33	387.5	410
Antimony	µg/L	0.72	1	1
Arsenic	µg/L	1.73	3.1	4.1
Cadmium	µg/L	0.19	0.42	0.49
Chromium (Tri)	µg/L	1.64	4.47	5.1
Chromium (Hex)	µg/L	0.08	0.1	0.11
Copper	µg/L	7.45	12.13	24.5
Cyanide	µg/L	12.33	18.9	20
Lead	µg/L	2.9	5.56	11.4
Mercury	ng/L	16.09	27.75	68.5
Nickel	µg/L	3.04	3.99	5.4
Silver	µg/L	0.4	0.83	1.6
Thallium	µg/L	0.09	0.09	0.09
Zinc	µg/L	19.44	32.98	54.5
Bis (2-Ethylhexyl) phthalate	µg/L	9.45	18.9	19.8
Chloroform	µg/L	0.31	0.31	0.31
Diethyl phthalate	µg/L	0.24	0.24	0.24
PCB-aroclor 1254	µg/L	0.08	0.08	0.08
Phenolics (Total Phenols)	µg/L	114	114	114
Toluene	µg/L	3.52	4.12	4.19
Note: Effluent samples associated with Outfall 015 were analyzed for PCBs. None of the samples taken during the permit cycle contained PCBs in detectable amounts with the exception of Aroclor 1254 as indicated in the table above.				

II.E. Summary of compliance with previous permit issued

The previous permit placed effluent limits on $CBOD_5$, TSS, fecal coliform bacteria, pH, ammonia, total residual chlorine, and NBOD+CBOD. The Everett WPCF has complied with the effluent limits and permit conditions throughout the duration of the permit issued on September 30, 2015, with the exceptions listed below. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections. The following table summarizes the numeric effluent limit violations that occurred during the permit term.

Table 10 Permit Violations

Outfall	Monitoring Month	Parameter	Monthly Average Reported Value	Monthly Average Limit
015	November 2019	Ammonia	37.9 mg/L as N	31.4 mg/L as N
015	December 2019	Ammonia	38.9 mg/L as N	31.4 mg/L as N
015	November 2020	Ammonia	31.7 mg/L as N	31.4 mg/L as N
015	November 2022	Ammonia	32.3 mg/L as N	31.4 mg/L as N

In addition to the numeric effluent violations listed in Table 10, nine DMRs during the permit term contained at least one missing parameter result due to a failure to monitor for that parameter. The City also reported a failure in the disinfection system for Outfall 015 from June 4-5, 2022. Ecology issued a civil penalty of $13,000 on October 25, 2022 for permit violations related to this disinfection failure.

II.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 Federal Water Quality Criteria Applicable to Washington (40 CFR 131.45)
- 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.

III.A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for this facility's treatment plant in the Water Pollution Control Facility Phase C-1 Improvements design documents, dated February 2014 and prepared by Carollo Engineers. The table below includes design criteria from the referenced report.

Table 11 Design Criteria for the Everett WPCF (Phase C-1)

Parameter	Design Quantity
Total Maximum Month Design Flow (MMDF)	40.3 MGD
MMDF through North Plant (Lagoon System)	15.3 MGD
MMDF through South Plant (TF/SC System)	25.0 MGD
BOD_5 Loading for Maximum Month	83,000 lbs/day
TSS Loading for Maximum Month	89,000 lbs/day

III.B. Technology-based effluent limits

Federal and state regulations define some 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). In addition, the federal CSO Control Policy (59 FR 18688) 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 IV.F of this fact sheet.

Both the federal and state regulations allow alternate limits for waste stabilization ponds (lagoons), trickling filters, and facilities with less concentrated influent wastewater. Waste stabilization ponds with a design capacity below 2 million gallons per day or those that have received, prior to November 1987, Ecology's approval under chapter 173-240 WAC for a greater design capacity, can qualify for alternative limits. Trickling filters constructed and/or expanded prior to November 1984 are also allowed alternate limits. The lagoon system at the Everett WPCF qualifies for alternative limits since design criteria for that system was approved prior to

1987. The trickling filters/solids contact system does not qualify for alternative limits since Ecology first approved design criteria for that system after 1984.

Qualified lagoons may receive alternative limits for BOD_5 or $CBOD_5$ and TSS concentrations, calculated mass discharge and percent removal. Ecology uses past performance data when considering alternative limits for an existing facility and sets limits at levels consistently achievable at a 95% confidence level. The DMR data analysis shown in **Appendix E** shows that outfall 015 can consistently achieve standard technology-based limits for $CBOD_5$ concentration and percent removal. Therefore, the proposed permit will not apply alternative limits for this parameter.

To establish appropriate TSS limits, Ecology reviewed monthly average effluent data reported over the past 15 years, between March 2008 and March 2023. Review of this lengthy record is necessary since weather patterns that can fluctuate over periods of several years may skew the lagoon effluent data. For example, in years with cool, wet spring weather effluent TSS concentrations for the lagoons can be low and relatively stable. On the other hand, in years with warmer spring and summer periods, effluent TSS concentrations from the lagoons can be high and relatively variable due to increased algae growth. Analyzing data over a long period minimizes the weather-related impacts. As shown in **Appendix E**, the long-term data set demonstrates that the lagoons can consistently achieve a monthly average TSS concentration of 51 mg/L and a TSS removal efficiency of 80%. Ecology calculates the weekly average concentration limit as 1.5 times the monthly average limit.

Facilities that receive flows from combined sewers also quality for reduced percent removal limits during wet weather seasons. Ecology determines such reduced limits on a case-by-case basis and must base the limits on past performance. Monitoring data from November 2015 through January 2022 shows that influent $CBOD_5$ and TSS concentrations during wet weather months of November through April are more dilute than the average long term influent concentrations. Despite the dilution during wet weather, both facilities consistently achieve 85% removal of $CBOD_5$ during the wet weather season and the TF/SC facility consistently achieves 85% removal of TSS. Therefore, the proposed permit will not include alternate percent removal limits for the wet weather season.

The table below identifies technology-based limits for pH, fecal coliform, $CBOD_5$, 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 12 Technology-based Limits

Parameter	Average Monthly Limit	Average Weekly Limit
$CBOD_5$ (concentration)	25 mg/L	40 mg/L
$CBOD_5$ (concentration): In addition, the $CBOD_5$ effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.		

Parameter	Average Monthly Limit	Average Weekly Limit
TSS (concentration), TF/SC system	30 mg/L	45 mg/L
TSS (concentration), TF/SC system: In addition, the TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.		
TSS (concentration), lagoon system	51 mg/L	76.5 mg/L
TSS (concentration), lagoon system: In addition, the TSS effluent concentration must not exceed twenty-two percent (20%) of the average influent concentration.		

Parameter	Average Monthly Limit	Average Weekly Limit
Chlorine, TF/SC system	0.5 mg/L	0.75 mg/L
Chlorine, lagoon system	See discussion below about performance-based chlorine limits.	

Parameter	Monthly Geometric Mean Limit	Weekly Geometric Mean Limit
Fecal Coliform Bacteria	200 organisms/100 mL	400 organisms/100 mL

Parameter	Daily Minimum	Daily Maximum
pH	6.0 standard units	9.0 standard units

Ecology derived the technology-based monthly average limit for chlorine from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, *Wastewater Engineering, Treatment, Disposal and Reuse*, Third Edition, 1991. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/L.

The existing permit used the technology-based limits described above for discharges to Port Gardner Bay via outfall 100. The permit also has a water quality-based monthly average chlorine limit of 0.016 mg/L and a daily maximum limit of 0.083 mg/L for discharges from outfall 015 to the Snohomish River and the facility can comply with these limits. To prevent backsliding, the proposed permit will retain the lower limits for outfall 015 as performance-based limits.

Technology-based mass limits for $CBOD_5$ and TSS are based on WAC 173-220-130(3)(b) and WAC 173-221-030(11)(b). Ecology calculated the monthly and weekly average mass limits for $CBOD_5$ and Total Suspended Solids as follows:

Mass Limit	=	CL x DF x CF
Where	:	
CL	=	Technology-based concentration limits listed in the above table
DF	=	Maximum Monthly Average Design flow (MGD)

Mass Limit	=	CL x DF x CF
CF	=	Conversion factor of 8.34

Table 13 Technology-based Mass Limits

Outfall 100 – TF/SC Facility (25 MGD design flow)

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
$CBOD_5$ Monthly Average	25	3,190
$CBOD_5$ Weekly Average	40	5,100
TSS Monthly Average	51	6,508
TSS Weekly Average	76.5	9,762

Outfall 015 – Lagoon Facility (15.3 MGD design flow)

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
$CBOD_5$ Monthly Average	25	5,213
$CBOD_5$ Weekly Average	40	8,340
TSS Monthly Average	30	6,255
TSS Weekly Average	45	9,383

The proposed permit authorizes only intermittent discharges from outfall 025 to the Snohomish River for the purpose of diffuser maintenance and prohibits discharges from outfall 015 during the time period the facility discharges from outfall 025. Discharges from outfall 025 must meet technology-based concentration limits applicable to the TF/SC system. However, since this outfall has limited authorization for discharges, Ecology will not calculate specific technology-based mass limits for the outfall. The Everett WPCF must instead demonstrate that combined mass discharge from outfalls 015 and 025 do not exceed the mass limits for outfall 015 during any monitoring period when both outfalls are in service.

III.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 waste load allocation developed during a basin wide total maximum daily load study (TMDL).

1. **Numeric criteria for the protection of aquatic life and recreation**
   Numeric 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 numeric 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.

2. **Numeric criteria for the protection of human health**
Numeric criteria for the protection of human health are promulgated in Chapter 173-201A WAC and 40 CFR 131.45. These criteria are designed to protect human health 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.

3. **Narrative criteria**
Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2016) 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.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200; 2016) and of all marine waters (WAC 173-201A-210; 2016) in the state of Washington.

4. **Antidegradation**
Description — The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2016) 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 all known, available, and reasonable methods of prevention, control, and treatment (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.
- 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.
- 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.

5. 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 all known, available, and reasonable methods of prevention, control, and treatment (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% of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii) or WAC 173-201A-400(7)(b)(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.

The mixing zone analysis produces a numeric 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% and the receiving water is 75% 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 numeric criteria for that zone.

Most aquatic life *acute* criteria are 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. Most aquatic life *chronic* criteria are 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 and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- 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. The following discusses each relevant condition in the above regulation.

a. 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).

b. The facility must fully apply "all known, available, and reasonable methods of prevention, control and treatment" (AKART) to its discharge.

Ecology has determined that the treatment provided at the Everett WPCF meets the requirements of AKART.

c. 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 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://apps.ecology.wa.gov/publications/documents/92109.pdf.

Cosmopolitan Engineering prepared a supplemental mixing zone study in 1996 that used dye studies and computer modeling to determine dilution for discharges to the Snohomish River from outfalls 015 and 025. Table 14 summarizes the critical conditions used in that study. Critical conditions listed in Table 15 for Port Gardner are from the Effluent Mixing Study Outfall 100, prepared by CH2M Hill for Kimberly-Clark in 2004. The modeling for outfall 100 used the combined flow rates for discharges from Kimberly-Clark, the Everett WPCF and the Marysville WWTP and assigned the same dilution factor to all discharges.

Table 14 Critical Conditions Used to Model the Snohomish River Discharges (outfall 015 and 025)

Critical Condition	Value
The seven-day-average low river flow with a recurrence interval of ten years (7Q10)	1051 cfs
River depth at MLLW and the 7Q20 period at outfall 015	8 feet
River depth at MLLW and the 7Q20 period at outfall 025	16 feet
Channel width near outfall 015	350 feet
Channel width near outfall 025	450 feet

Critical Condition	Value
Design flow rate used for outfall 015 dilution modeling	16 MGD
Design flow rate used for outfall 025 dilution modeling	8 MGD
Reflux factor due to tide reversal (expressed as steady-state percent of effluent concentration remaining in mixing zone due to build-up)	3.9%

Table 15 Critical Conditions Used to Model the Port Gardner (outfall 100)

Critical Condition	Value
Average Water depth at MLLW	344 feet
Minimum ambient density stratification profile with a range of 1.021 g/cm3 at the surface and 1.023 g/cm3 at a depth of 105 meters (344 feet)	
Maximum ambient density stratification profile with a range of 1.014 g/cm3 at the surface and 1.023 g/cm3 at a depth of 105 meters (344 feet)	
10th percentile current speeds for acute mixing zone	1.2 cm/sec
90th percentile current speeds for acute mixing zone	11.1 cm/sec
50th percentile current speeds for chronic and human health mixing zones	5.3 cm/sec
Maximum average monthly effluent flow for chronic and human health non-carcinogen	58.5 MGD
Maximum daily flow for acute mixing zone	69.9 MGD
Average effluent density of 0.996 g/cm^3	

d. 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.
- 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.

e. 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.

f. 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 for outfall 100 changes. Plume orientation within the mixing zones for outfalls 015 and 025 may also change due to tidally-influenced flow reversal of the Snohomish River. Each 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 for 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. In addition, the dilution factor authorized for outfall 100 is based on the combined design flows for the Everett WPCF TF/SC system, the Marysville WWTP and the Kimberly-Clark mill's treatment plant, which was approximately 2.3 times larger than the design flow for just the Everett's TF/SC system. Using these older flow assumptions results in a conservative dilution factor for effluent discharged from the City of Everett.

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

g. Maximum size of mixing zone.

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

h. 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% 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.

i. Overlap of mixing zones.

This mixing zone does not overlap another mixing zone.

j. Not Discussed – applicable to mixing zones for stormwater discharges.

k. Combined sewer overflows.

Washington's surface water quality standards allow Ecology to authorize a mixing zone for untreated CSO discharges (WAC 173-201A-400(11)). This allowance provides a once per year exemption to the numeric size criteria discussed in parts 7 and 8 above as well as an exemption to the overlap restriction discussed in part 9 above. However, the standards do not allow this mixing zone if doing so would create a condition that has a reasonable potential to cause a loss of sensitive our important habitat, substantially interfere with existing or characteristic uses, result in damage to the ecosystem, or adversely affect public health (see part 4 above). The standards also limit this mixing zone allowance to only those CSO outfalls that comply with the requirements for "controlled" outfalls defined in chapter WAC 173-245.

Section IV.F of this fact sheet discusses the ongoing practices, monitoring, and reporting requirements required to verify that implemented CSO control strategies comply with water quality standards. The City's 2017 Post-Construction Monitoring Plan also discusses mixing zone eligibility for untreated CSO outfalls and describes some of the monitoring Everett will perform to validate compliance.

III.D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. The tables included below summarize the criteria applicable to the receiving waters' designated uses.

Aquatic life uses are designated based on the presence of, or the intent to provide protection for the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The state water quality standards (WAC 173-201A-602) designate the Snohomish River in the vicinity of outfalls 015 and 025 for freshwater aquatic life uses of salmonid spawning, rearing, and migration. Although the standards assume a freshwater environment for the designated use, the standards also acknowledge that freshwater criteria may not be appropriate in brackish estuaries. The standards include the following allowances in WAC 173-201A-260(3)(e):

> *In brackish waters of estuaries, where different criteria for the same use occurs for fresh and marine waters, the decision to use the fresh water or the marine water criteria must be selected and applied on the basis of vertically averaged daily maximum salinity, referred to below as "salinity." The fresh water criteria must be applied at any point where ninety-five percent of the salinity values are less than or equal to one part per thousand, except that the fresh water criteria for bacteria applies when the salinity is less than ten parts per thousand; and the marine water criteria must apply at all other locations where the salinity values are greater than one part per thousand, except that the marine criteria for bacteria applies when the salinity is ten parts per thousand or greater.*

Based on ambient data collected during the development of the Snohomish Estuary TMDL and in support of the 1995 Mixing Zone Study for outfalls 015 and 025, the average salinity in the reach near the Everett WPCF is 8.0 parts per thousand (ppt). Since this salinity level is above the 1.0 ppt threshold listed above, Ecology will use marine numeric criteria associated with Possession Sound in evaluating the impacts of discharges from outfalls 015 and 025.

Table 612 of the water quality standards (WAC 173-201A-612) identifies Possession Sound, which includes Port Gardner, as "Excellent quality" for 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. Table 16 below lists the numeric criteria that Ecology will apply to Port Gardner and the Snohomish River Estuary.

1. Marine Aquatic Life Uses and Associated Criteria

Table 16 Excellent Quality

Criteria	Limit
Temperature Criteria – Highest 1D MAX	16°C (60.8°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	6.0 mg/L
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 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.

Bacteria numeric standards

Ecology sets E. coli standards to protect human health from enteric diseases that can result from recreational contact with contaminated freshwater, and enterococci to protect recreational contact in marine waters. The following provides the basis for numeric bacteria standards that apply to Port Gardner and to the Snohomish River discharge areas.

OUTFALL 015/025

- The recreational use for the lower Snohomish River is primary contact recreation. Ecology recently updated the water contact recreation bacteria criteria, effective January 2021, which included updates to the indicator organism. As freshwater bacteria standards are still applied to lower Snohomish River discharges from the Everett WPCF on account of area salinity levels (*freshwater criteria for bacteria applies when the salinity is less than ten parts per thousand*), consequently E. coli bacteria must now be monitored to protect this designated recreational use. *E. coli* organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL.
- WAC 173-201A-602 also includes a modified fecal coliform standard for the Snohomish River from mouth to latitude 47.942, longitude -122.1719 (southern tip of Ebey Island at river mile 8.1). Outfalls 015 and 025 discharge into this segment. The applicable standard for this segment is: "Fecal coliform organism levels shall both not exceed a geometric mean value of 200 colonies/100 mL and not have more than 10 percent of the samples obtained for calculating the mean value exceeding 400 colonies/100 mL." https://app.leg.wa.gov/WAC/default.aspx?cite=173-201A-602

OUTFALL 100

- The recreational use for Port Gardner is primary contact recreation. Enterococci organism levels within an averaging period must not exceed a geometric mean of 30 CFR or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample values exist) obtained within the averaging period exceeding 110 CFU or MPN per 100 mL.
- To protect shellfish harvesting, fecal coliform organism levels discharging to marine water 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.

To protect designated uses for both active Everett WPCF discharge locations, E. coli, fecal coliform, and enterococci monitoring will be required for a time to demonstrate compliance with both standards in both marine and freshwater.

Additional designated uses

- The Snohomish River is designated for water supply uses, which include domestic, agricultural, industrial, and stock watering.
- The miscellaneous freshwater and marine water uses that apply to Port Gardner include wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

III.E. Water quality impairments

Snohomish River Estuary

Ecology listed the Snohomish River Estuary as an impaired water body for dissolved oxygen in 1996. In response to that impairment, Ecology submitted a water quality improvement plan for the basin in 1999. The plan, which EPA approved in 2002, placed waste load allocations on $CBOD_5$ and ammonia from several point sources, including the Everett WPCF outfalls. The proposed permit incorporates these waste load allocations as water quality-based limits for $CBOD_5$ and ammonia-nitrogen in the form of a combined parameter NBOD+CBOD. Since the facility does not routinely use outfall 025, the proposed permit applies the waste load allocation only to outfall 015. The proposed permit also prohibits discharges from outfall 015 whenever the facility discharges from outfall 025 and applies mass-based limits on outfall 015 to outfall 025.

Port Gardner – Puget Sound

The 2014 Water Quality Assessment identified 136 impaired area 303(d) listings for dissolved oxygen in the Salish Sea and 331 Category 2 listings indicating waters of concern. Ecology's extensive ongoing scientific investigations supporting the Puget Sound Nutrient Reduction Project demonstrate that the cumulative impact of point and nonpoint sources of nutrients, specifically nitrogen, contribute to areas of dissolved oxygen depletion in Puget Sound and the Salish Sea. Ecology is developing the Puget Sound Nutrient Reduction Plan (NRP) to address dissolved oxygen impairment listings in Puget Sound in a comprehensive manner. See the Puget Sound Nutrient Reduction Project webpage (https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Helping-Puget-Sound/Reducing-Puget-Sound-nutrients/Puget-Sound-Nutrient-Reduction-Project) for more information about this effort.

Ecology documented near-shore sediment impairments in the past in portions of Port Gardner near the City's CSO outfalls. Ecology's Toxic Cleanup Program is working with the Port of Everett to clean up existing sediment contamination in the near-shore environment. The proposed permit does not allow the City's CSO discharges to impair water or sediment quality near the outfalls. Section IV.F of this fact sheet discusses post-construction monitoring the City must conduct to demonstrate that controlled CSO discharges do not impair water or sediment quality.

III.F. Evaluation of surface water quality-based effluent limits for narrative criteria

Ecology must consider the narrative criteria described in WAC 173-201A-160 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 all known, available, and reasonable methods of treatment and prevention (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 whole effluent toxicity (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.

Studies conducted by the Washington State Department of Fish and Wildlife have found elevated levels of polybrominated diphenyl ethers (PBDEs) in juvenile Chinook salmon populations in the Snohomish River estuary. PBDEs are flame retardants once widely used in common household products. These compounds are known to be persistent, bioaccumulative, and toxic. In one study, two PBDE congeners, BDE-047 and BDE-099, were detected in every fish tissue sample collected from the lower Snohomish (O'Neill, et.al, 2015). These two congeners in particular have been linked to impaired fish immune function and an increase in their susceptibility to disease (Arkoosh, et.al, 2010 and 2013). Snohomish estuary whole body fish tissue samples were found containing PBDE concentrations above disease susceptibility effects concentrations (O'Neill, et.al, 2015). Although bans have reduced their commercial use, existing products continue to release PBDEs into wastewater conveyances. Two of the three most prevalent PBDE congeners consistently detected in Everett WPCF effluent during monitoring events that occurred in the time period from 2020-2022 were BDE-047 and BDE-099.

There are currently no numeric water quality criteria for PBDEs in Washington State, however the Clean Water Act calls for the prohibition of the discharge of toxics in toxic amounts (33 U.S.C. § 1251(a)(3)). Ecology is further bound by WAC 173-201A-240 which states that "(1) Toxic substances shall not be introduced above natural background levels in waters of the state which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic toxicity to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department."

In recognition of the risks posed to aquatic life in the Snohomish River from PBDEs, the proposed permit requires Everett's delegated pretreatment program to take actions to identify and control sources of PBDEs. The proposed actions include requiring significant industrial users to identify and employ best management practices that may reduce the amount of PBDEs they introduce into the City's wastewater collection systems.

The proposed permit also requires the Everett WPCF to collect influent samples for PBDE analysis during the first and third quarters of the final two years of the permit cycle and to compare this information to baseline influent PBDE data collected in recent years so that some preliminary assessment of the effectiveness of source control efforts can be made.

For influent monitoring and source tracking purposes, the permit allows the use of either EPA Method 8270ESIM or EPA Method 1614. Method 1614 is the more sensitive method, provides information about a broader array of congeners, and was the method used previously to evaluate WPCF influent and effluent, forming a baseline of PBDE concentrations at the facility. Method 8270ESIM is an alternative method that is sufficiently sensitive at this time for the most prevalent congeners of concern found in Snohomish River fish tissue and in Everett wastewater (that is BDE-047, BDE-099, and BDE-209). The City notified Ecology via e-mail on August 22, 2023 that they intend to use the more sensitive method, EPA Method 1614, to do PBDE analysis associated with this permit. Ecology's WQWebDMR online monitoring data intake portal will be set up according to the congener list and sensitivities of EPA Method 1614. A discussion containing PBDE summary data and an evaluation of industrial user BMP implementation work will be required as part of the Everett WPCF's existing annual pretreatment report submittal requirements. Ecology will reevaluate the need for PBDE-related permit conditions in the next permit cycle.

III.G. Evaluation of surface water quality-based effluent limits for numeric criteria

1. Mixing zones and dilution factors

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. Conversely, a pollutant such as biochemical oxygen demand (BOD_5) 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 three outfalls associated with the WPCF use diffusers to help disperse treated effluent into the receiving water. The following list summarizes the characteristic of each diffuser:

- Outfall 015: 36-ft long diffuser with sixteen 10-inch ports spaced 2.5 feet apart. Depth of the diffuser is 8 feet at MLLW. Effluent discharges horizontally through pinch check valves.
- Outfall 025: 35-ft long diffuser with twelve 10-inch ports spaced 3 feet apart. Depth of the diffuser is 16 feet at MLLW. Effluent discharges horizontally through pinch check valves.
- Outfall 100: The diffuser section is 1,556 feet in length and is laid along a gradual curve that starts at a depth of 340 feet and ends at a depth of 348 feet MLLW. The section has 80 risers with 90° elbows oriented in alternating directions that terminate in 5-inch round ports.

To establishing mixing zone size restrictions, the water quality standards categorize all marine waters in Puget Sound as “estuarine”. In addition, although the water quality standards assign freshwater designated uses for the Snohomish River, the reach in the vicinity of outfalls 015 and 025 is considered and “estuary” due to significant tidal variations and tidally-influenced flow reversal. Ecology limits the size of mixing zones for outfalls in estuaries according to the following restrictions.

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% of the width of the water body as measured during MLLW.

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% of the distance established for the chronic zone.

Table 17 lists the horizontal maximum size restrictions for each outfall's chronic and acute mixing zones. **Appendix D** contains illustrations showing the approximate size and orientation of the authorized zones.

Table 17 Mixing Zone Size Restrictions

Outfall	Chronic Mixing Zone Size	Acute Mixing Zone Size
015	The chronic mixing zone extends 208 feet downstream and 208 feet upstream of each diffuser port. The width of the mixing zone is 87.5 feet (25% of 350 feet) and is centered on the middle of the multi-port diffuser at a location 180 feet from the east bank of the river at MLLW.	The acute mixing zone extends 20.8 feet upstream and 20.8 feet downstream from each diffuser port. The width of the mixing zone is 77.6 feet (36-foot diffuser length plus 20.8 feet on each end) and is centered on the middle of the multi-port diffuser.
025	The chronic mixing zone extends 216 feet downstream and 216 feet upstream of each diffuser port. The width of the mixing zone is 112.5 feet (25% of 450 feet) and is centered on the middle of the multi-port diffuser at a location 222.5 feet from the east bank of the river at MLLW.	The acute mixing zone extends 21.6 feet upstream and 21.6 feet downstream from each diffuser port. The width of the mixing zone is 78.2 feet (35-foot diffuser length plus 21.6 feet on each end) and is centered on the middle of the multi-port diffuser.
100	The chronic mixing zone extends 540 feet (based on minimum depth of 340 feet) in any horizontal direction from each discharge port of the multi-port diffuser section.	The acute mixing zone extends 54.0 feet in any horizontal direction from each discharge port of the multi-port diffuser section.

The Everett Water Pollution Control Facility, Re-rating and Effluent Mixing Zone Study (Brown and Caldwell, April 1996) presented mixing zone analyses for outfalls 015 and 025 that were based on modeling calibrated by dye studies. The Effluent Mixing Study Outfall 100, prepared by CH2M Hill in 2004 for Kimberly-Clark Worldwide, provided a mixing zone analysis for the Port Gardner outfall that was based on computer modeling of the combined effluent flow from the Kimberly-Clark treatment facility, the Everett WPCF, and the Marysville WWTP under various ambient conditions. The proposed permit uses the dilution factors from these studies as the maximum allowable dilution from each outfall. Table 18 summarizes the authorized dilution factors for each outfall.

Table 18 Authorized Dilution Factors

Outfall 015

Criteria	Acute	Chronic
Aquatic Life	6.4	14.2
Human Health, Carcinogen		14.2
Human Health, Non-carcinogen		14.2
Seasonal Temperature		26.7

Outfall 025

Criteria	Acute	Chronic
Aquatic Life	7.3	15.6
Human Health, Carcinogen		15.6
Human Health, Non-carcinogen		15.6
Seasonal Temperature		

Outfall 100

Criteria	Acute	Chronic
Aquatic Life	156	696
Human Health, Carcinogen		696
Human Health, Non-carcinogen		696
Seasonal Temperature		

For each outfall, Ecology determined the impacts of dissolved oxygen deficiency, pH, fecal coliform, chlorine, ammonia, metals, other toxics, and temperature as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also considers the variability of pollutant concentrations in both the effluent and the receiving water.

2. **Dissolved Oxygen — Nutrients, BOD_5 and Ammonia Effects**

Ecology's Puget Sound Nutrient Reduction Project evaluated the cumulative impact of anthropogenic sources of nutrients using the Salish Sea Model (Ahmed et al, 2019). That model's simulations predict that nutrients discharged from wastewater treatment plants have a reasonable potential to contribute to existing low dissolved oxygen levels, below state water quality criteria, in the Salish Sea (which includes Puget Sound). On December 1, 2021, Ecology issued the Puget Sound Nutrient General Permit (PSNGP) to regulate the discharge of Total Inorganic Nitrogen from 58 domestic wastewater treatment plants that discharge to marine and estuarine waters in Washington's waters of the Salish Sea (https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Nutrient-Permit). The Everett WPCF is covered by the PSNGP, which includes requirements for the control and monitoring of nutrients. This individual permit does not contain limits or other conditions related to the regulation of nutrients.

Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The 5-day Biochemical Oxygen Demand (BOD_5) 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.

Port Gardner, Outfall 100

With technology-based limits, discharges from outfall 100 results in a small amount of $CBOD_5$ and NBOD relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits, in combination with the Puget Sound Nutrient General Permit that addresses other sources of oxygen demand, will ensure that dissolved oxygen criteria are met in the receiving water.

Snohomish River, Outfalls 015 and 025

The Snohomish river estuary was listed as an impaired water body for dissolved oxygen in 1996. The 1999 Snohomish River Estuary Dissolved Oxygen TMDL established waste load allocations (WLAs) for carbonaceous biochemical oxygen demand ($CBOD_5$) and ammonia for discharges occurring during the July-October critical season from wastewater treatment plants in the basin, including from the Everett WPCF. The TMDL established the following waste load allocations for the Everett WPCF. Allocations were based on discharges that were occurring in 1999, which included continuous discharges from both Snohomish River outfalls from the WPCF.

Table 19 TMDL-based Waste Load Allocations for Everett WPCF

Outfall	Ammonia-N (lbs/day)	$CBOD_5$ (lbs/day)
Outfall 015, lagoon system	876	1,668
Outfall 025, TF/SC system	667	494
Everett WPCF's WLA to Snohomish River Estuary	1,543	2,162

Part of the City's response to the TMDL was to partner with Kimberly-Clark and the City of Marysville to construct the deep-water outfall (outfall 100) in Port Gardner and to redirect flow from outfall 025 to that new outfall. Because of this transfer, the City now discharges TF/SC effluent through outfall 100 and does not discharge into the Snohomish River from the TF/SC system, except for occasional flushing. Therefore, Ecology applies the total load allocations for ammonia and $CBOD_5$ to the maximum daily limits for the lagoon system which discharges to the Snohomish River, via Outfall 015.

Effluent mass loading limits for $CBOD_5$ and ammonia are related because both represent an oxygen demand that affects dissolved oxygen levels in the river. Ecology allows an exchange of waste load allocations between $CBOD_5$ and ammonia if the overall daily load remains constant. Based on river modeling studies, Ecology established a WLA exchange rate for Snohomish Estuary Dischargers of 2.1 pounds of $CBOD_5$ for each pound of ammonia. Using this exchange, the total WLA can be expressed as a combined parameter, that Ecology calls "NBOD+CBOD", which is calculated as follows:

NBOD+CBOD lbs/day = (2.1*ammonia lbs/day) + $CBOD_5$ lbs/day

WLA = (2.1 * 1,543) + 2,162 = 5,402 lbs/day NBOD+CBOD

The WLA above is the maximum daily limit (MDL) for this parameter. According to federal NPDES regulations, all permit limits must be expressed as both average monthly and maximum daily limits. The average monthly limit (AML) is calculated according to the method in EPA's Technical Support Document for Water Quality-based Toxics Control (1991). See **Appendix E** for detailed calculations. The AML calculation is affected by effluent variability and number of samples per month. Ecology calculated the average monthly limit based on 16 sampling events per month (4 per week) and a calculated coefficient of variation (CV) of 0.26, which is based on a statistical analysis of monitoring data over the last permit term. The average monthly limit calculated based on current performance resulted in a numeric limit of 3,419 lbs/day. Since this calculated limit is higher than the existing permit limit, Ecology will retain the existing average monthly limit to prevent backsliding. Therefore, the average monthly and daily maximum limits for the proposed permit are:

MDL = WLA = 5,402 lbs/day NBOD+CBOD

AML = 3,043 lbs/day NBOD+CBOD

The proposed permit will continue to enforce technology-based limits for $CBOD_5$ concentration during the critical season.

3. pH

Due to the high buffering capacity of marine water and the large amount of dilution provided by outfall 100, compliance with the technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards in Port Gardner. Therefore, Ecology will retain technology-based pH limits for outfall 100.

Since the average salinity levels in the Snohomish River are generally low and outfalls 015 and 025 have low dilution, Ecology used modeling to determine whether technology-based limits have a reasonable potential to violate the numeric pH standards with respect to the resultant mixed pH and the amount of pH change in the river. The modeling estimates the pH of a saltwater mixture from two sources based on the mixed temperature, alkalinity and salinity. The results of the modeling from outfalls 015 and 025 are in **Appendix E**.

The modeling predicts that discharges from outfall 015 with a pH of 6.0 have a potential to reduce pH below the numeric criteria of 7.0 and will result in a pH change greater than 0.5 standard units at the edge of the chronic mixing zone. Ecology determined that a pH limit of 6.8 is necessary for outfall 015 to ensure compliance with water quality standards. Effluent monitoring from November 2015 through January 2022 demonstrates that the lagoon facility can generally comply with a lower limit of 6.8, reporting a pH of less than 6.8 standard units fifteen times during this period (<1% of the time). Discharges with a pH of 9.0 will result in a pH change greater than 0.5 standard units at the edge of the chronic mixing zone. Ecology determined that an upper pH limit of 8.8 is necessary for outfall 015 to ensure compliance with water quality standards. Effluent monitoring from November 2015 through January 2022 demonstrates that the lagoon facility can comply with an upper limit of 8.8 and only reported a higher pH of 9.0 once in June 2020.

Modeling also predicted that a pH of 6.0 has the potential to reduce pH below the numeric criteria of 7.0 at the edge of the chronic mixing zone for outfall 025. Ecology determined that a minimum pH limit of 6.6 is necessary to ensure discharges from outfall 025 meet applicable water quality standards. Discharges with a pH of 9.0 will not adversely impact water quality. Table 20 summarizes the proposed pH limits for the three outfalls.

Table 20 pH Limit Summary

Outfall	Minimum Daily pH Limit	Maximum Daily pH Limit
Outfall 015, lagoon system	6.8	8.8
Outfall 025, TF/SC system	6.6	9.0
Outfall 100, TF/SC system	6.0	9.0

4. **Bacteria**
In the previous permit cycle, Ecology modeled the number of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 mL and the chronic dilution factors for each outfall. That analysis showed no violation of the fecal coliform recreational use criterion under critical conditions. The domestic technology-based limits for fecal coliform in WAC 173-221 are still in effect. Without effluent data for enterococci or *E.coli*, Ecology cannot determine whether the discharges will violate recreational use criteria for these parameters. Given that the characteristics of the receiving water and the discharge have not changed substantially since the analysis conducted in the previous permit cycle, and the transition is a change in bacterial indicator not more or less stringent than the previous criterion, the proposed permit will maintain the technology-based effluent limit for fecal coliform. In addition, the permittee will be required to monitor for fecal coliform, enterococci (Outfall 100) and *E. coli* (Outfall 015/025). Ecology will then use this data to assess the reasonable potential to exceed applicable recreational use criteria in the next iteration of this permit.

5. **Turbidity**
Ecology evaluated the impact of turbidity based on the range of total suspended solids 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 total suspended solids permit limits.

6. **Toxic Pollutants (aquatic life)**
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 have been confirmed in discharges from the Everett WPCF during the permit cycle:

TF/SC System (outfalls 100 and 025): ammonia, arsenic, chlordane, residual chlorine, cadmium, chromium, copper, cyanide, lead, mercury, nickel, selenium, silver, and zinc.

Lagoon System (outfall 015): ammonia, arsenic, residual chlorine, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, and zinc.

Ecology conducted a reasonable potential analysis (see **Appendix E**) to determine whether effluent limits must be required in this permit.

Ammonia 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 for the Snohomish River from monitoring station #07A090 and Ecology spreadsheet tools. No valid ambient ammonia background data was available for Port Gardner Bay.

Additional valid ambient background data exists for the Snohomish River discharges including for all toxic pollutants identified above except for chlorine, cadmium, and silver. Ecology used all applicable data to evaluate reasonable potential for these discharges to cause a violation of water quality standards. As with ammonia, valid ambient background data was not available for the Port Gardner Bay discharge consequently Ecology used zero for background for reasonable potential calculations involving the discharge from outfall 100.

Ecology derived effluent limits for the toxic pollutants (cyanide at outfall 025) determined to have a reasonable potential to cause a violation of water quality standards. Ecology calculated effluent limits using methods from EPA, 1991 as shown in **Appendix E**. The reasonable potential calculations that were employed assume a continuous discharge, however, which is not occurring at outfall 025 at this time. Outfall 025 has not been used for many years due to sediment accumulation around the diffusers that have made it inoperable. If the Everett WPCF opts to send flows to outfall 025 for an extended period of time in the future, Ecology may modify the permit to incorporate protective effluent limits listed below. In such case, the flow duration would need to exceed four days, the exposure period assumed in the chronic standard development, in order to trigger consideration of the following permit limit:

Cyanide (contingent limit based on aquatic life criteria): 33.1 ug/L average monthly limit, 66.4 ug/L max daily limit

Ecology also determined that chlordane sample results are "inconclusive". Six of seven consecutive chlordane samples taken from the outfall 100 discharge (which is also the theoretical discharge quality for outfall 025) did not have detectable levels of chlordane with the exception of one sample taken in 2016 wherein the amount of chlordane was detectable but was present in an amount close to the quantitation limit. The proposed permit requires repeat testing to verify the concentrations. Once the repeat testing has concluded, Ecology will reevaluate the reasonable potential for exceedance of aquatic life and human health criteria. If follow-up testing indicates the need for a limit, Ecology will modify the permit accordingly.

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)).

7. Temperature

The state temperature standards for marine waters (WAC 173-201A-210) include multiple elements:

a. Annual 1-Day maximum criteria
b. Incremental warming restrictions
c. Guidelines on preventing acute lethality and barriers to migration of salmonids

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

a. Annual 1-Day maximum criteria

Each marine water body has an annual maximum temperature criterion [WAC 173-201A-210(1)(c)(i)-(ii) and WAC 173-201A-612]. These threshold criteria (e.g., 13, 16, 19, 22°C) protect specific categories of aquatic life by controlling the effect of human actions on water column temperatures. The threshold criteria apply at the edge of the chronic mixing zone. Criteria for marine waters and some fresh waters are expressed at the highest 1-Day annual maximum temperature (1-DMax). Ecology concludes that there is no reasonable potential to exceed the temperature standard when the mixture of ambient water and effluent at the edge of the chronic mixing zone is less than the criteria of 16°C.

b. Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-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 (T_i), calculated as:

$$T_i = \frac{12}{(T_{amb} - 2)}$$

This increment is permitted only to the extent doing so does not cause temperatures to exceed the annual maximum criteria.

c. Guidelines to prevent acute mortality or barriers to migration of salmonids. These site-level considerations do not override the temperature criteria listed above.

   i. 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 2-seconds after discharge.

   ii. General lethality and migration blockage: Temperatures at the edge of a chronic mixing zone must not exceed either a 1DMax of 23°C or a 7DADMax of 22°C. When adjacent downstream temperatures are 3°C or more cooler, the 1DMax at the edge of the chronic mixing zone must not exceed 22°C.

   iii. Lethality to incubating fish: The temperature must not exceed 17.5°C at locations where eggs are incubating.

Outfall 100

Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum and the incremental warming criteria (see **Appendix E**). The discharge is only allowed to warm the water by a defined increment when the background (ambient) temperature is cooler than the assigned threshold criterion. Ecology allows warming increments only when they do not cause temperatures to exceed either the annual maximum or supplemental spawning criteria. The incremental increase for this discharge is within the allowable amount. Therefore, the proposed permit does not include a temperature limit.

Ecology also considered the acute effects the discharge may have in the receiving water. Outfall 100 discharges treated domestic wastewater that traditionally does not approach temperatures near 33°C. Therefore, no reasonable potential exists for instantaneous lethality. Furthermore, ambient records do not indicate that receiving water temperatures approach 17.5°C or 23°C. Based on this analysis, the proposed permit does not include any temperature limits for discharges from outfall 100.

Outfall 015

Based on available ambient data, temperature in the Snohomish River Estuary in the vicinity of outfall 015 is warmer than the marine criteria of 16°C. Ecology found reasonable potential for discharges from outfall 015 to exceed water quality standards for temperature. Ecology must establish a limit to the amount of heat discharged from this outfall.

Ecology's calculations use the 90th percentile of ambient data collected between November 2015 and September 2019 (17.8° C), the 95th percentile of daily maximum effluent data collected between November 2015 and June 2020 (24.0° C), and the authorized chronic dilution factor of 14.2. The analysis determined that a temperature limit of 20°C would be needed for the lagoon effluent to meet the applicable temperature standards.

Based on past performance, the lagoon facility cannot comply with a temperature limit of 20°C year-round. This observation was also made during preparation of the previous permit with an effective date of November 1, 2015. What follows is a description from that fact sheet of the derivation of the existing seasonal flow limit for outfall 015 that was established to protect the Snohomish River from temperature in the discharge to outfall 015.

Given the likelihood of violating a temperature limit, Ecology evaluated alternatives for limiting the amount of heat discharged through outfall 015. One alternative considered modifies the allowed mixing zone for temperature. Ecology's 2010 Water Quality Guidance Manual entitled "Procedures to Implement the State's Temperature Standards through NPDES Permits" identifies a provision in the water quality standards that allows Ecology to exceed the numeric size criteria of a mixing zone in certain conditions. Based on this allowance, Ecology evaluated the impacts of modifying the authorized dilution factor applied to temperature by limiting the flow from outfall 015. Ecology's analysis first looked at the record of 90th percentile ambient temperature and 95th percentile effluent temperature for each month. This examination revealed that the discharge would only have a potential to exceed the temperature standard during the months of July through September. As such, Ecology determined that any limit should apply only during this time.

During the low river flow period established in the Snohomish River Estuary TMDL (July through October), plant staff generally must limit flow through the lagoon system and outfall 015 to ensure compliance with the NBOD+CBOD mass limit required to protect the river from dissolved oxygen depletion. Flow records for the lagoon facility show that the average flow from outfall 015 during the period range between 3.0 MGD to 5.0 MGD and does not typically exceed 7.8 MGD on any given day (September 2014 was an outlier that had at least one day of flow at 14.3 MGD).

As discussed in the mixing zone section of this fact sheet, the authorized dilution factor for outfall 015 was calculated based on a design flow rate of 16 MGD and the 7Q20 river flow of 1,051 cfs. Since typical plant practice is to limit flow during the critical period, modifying the dilution factor for temperature is justified as long as actual discharge rates remain below the modeled design flow rate. To ensure this occurs, Ecology decided to apply a flow limit as a way to manage temperature from the outfall. Ecology used an iterative approach to examine the impacts altering the amount of flow from outfall 015 would have on the reasonable potential for the discharge to exceed the temperature criteria. When calculating dilution based on a percentage of ambient flow, as described in WAC 173-201A-400, reducing the effluent flow rate while keeping the ambient flow rate constant at the 7Q20 flow of 1,051 cfs results in an increase in the calculated dilution factor for the outfall. To determine the minimum dilution needed to ensure that the applicable temperature criteria are met at the edge of the chronic mixing zone, Ecology recalculated the temperature impacts based on the seasonal (July-

September) 95th percentile of effluent temperature (26.3°C), the seasonal 90th percentile of ambient temperature (19.1°C), and a variety of dilution factors. This iterative exercise revealed that a dilution factor of 24.1, which corresponds to an effluent flow rate of 29.4 MGD, is needed to ensure temperature does not exceed the water quality criteria at the edge of the chronic mixing zone during the season. Since this flow rate is greater than the flow restriction imposed in the prior permit, Ecology proposes to keep a seasonal maximum daily flow limit of 10.2 MGD in the new permit for outfall 015 in lieu of a numeric temperature limit. To avoid backsliding, Ecology will only use this modified dilution for purposes of temperature compliance and will not use this higher dilution for other parameters.

Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum and the incremental warming criteria using the dilution factor calculated for temperature in the previous permit, which was 26.7 (see **Appendix E**). The incremental increase for this discharge was thus found to be within the allowable amount. Therefore, the proposed permit does not include a temperature limit but does retain the same seasonal flow restriction applied in the previous permit.

With respect to acute effects, data indicates that lagoon effluent temperature does not approach 33°C and ambient temperature does not approach 23°C. Therefore, a temperature limit is not needed for these factors. Compliance with the flow limit proposed above is sufficient to protect against lethality to incubating fish that may be present in the vicinity of the outfall.

Outfall 025

The proposed permit limits the frequency and duration of discharges from outfall 025 to no more than once per week and for no more than three hours for each discharge. The proposed permit also prohibits simultaneous discharge from outfall 025 and 015. Given these restrictions, Ecology believes there is minimal risk for outfall 025 to cause violations of the chronic and acute temperature standards.

III.H. Human health

Washington's water quality standards include numeric human health-based criteria for priority pollutants 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 and data indicating the discharge contains regulated chemicals. 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.

Outfall 025 has not been used for many years due to sediment accumulation around the diffusers that have made it inoperable. If repaired for potential use in the future, it would function as an intermittent discharge only. Accordingly, Outfall 025 was not evaluated in this section given the long-term, chronic exposures intrinsic to the derivation of human health criteria. Monitoring of active outfalls conducted by the Everett WPCF during the past permit term identified the following chemicals of concern for human health:

TF/SC System (outfalls 100): antimony, bis(2-Ethylhexyl)phthalate, chlordane, chloroform, cyanide, diethyl phthalate, mercury, nickel, selenium, thallium, and zinc.

Lagoon System (outfall 015): antimony, bis(2-Ethylhexyl)phthalate, chloroform, cyanide, diethyl phthalate, mercury, nickel, thallium, toluene, and zinc.

Additional valid ambient background data exists for the Snohomish River discharges including for all toxic pollutants identified above except for antimony, thallium, chloroform, toluene, and phthalates. Ecology used all applicable data to evaluate reasonable potential for these discharges to cause a violation of water quality standards. Where valid ambient background data was not available, Ecology used zero for background for reasonable potential calculations.

Ecology determined that bis(2-ethylhexyl) phthalate sample results were "inconclusive" and so effluent limits were not proposed at this time. Ecology suspects that sampling errors may have caused an overestimation of phthalate concentrations in samples from the WPCF. The proposed permit requires repeat testing with sample collection in glass containers to verify the concentrations. Once the repeat testing has concluded, Ecology will reevaluate the reasonable potential for exceedance of human health criteria. If follow-up testing indicates the need for a limit, Ecology will modify the permit accordingly.

As mentioned previously, the evaluation also showed that existing data resulted in an ambiguous determination for chlordane for outfall 100. The proposed permit requires the facility to submit additional data for chlordane as well before the next permit reissuance. If follow-up testing indicates the need for a limit, Ecology will modify the permit accordingly.

III.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. (https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups)

Outfalls 015 and 025

The 1995 mixing zone study determined that average river velocity at low flow periods was in the range of 1.5 ft/sec to 2.0 ft/sec. Flow velocities in this range are sufficient to keep small particles onto which pollutants would adsorb, such as clays and silts, in suspension. Although the study revealed that tidal changes caused flow reversal in the river, the length of time flows would slow to a velocity where deposition may occur was generally short (approximately 1 hour per tide cycle). This data suggests a low potential for sediment deposition in the vicinity of the outfalls.

Ecology's Toxic Cleanup Program contracted with SAIC to conduct a comprehensive study of sediments in Port Gardner and the Snohomish River Estuary in 2008. This study included sampling locations near outfalls 015 and 025. Data from this study showed that the predominant grain size of sediments near the outfalls is medium to coarse sand and that the sediments contained very little silt or clay. This is consistent with the expectation of low deposition due to high river currents. In addition, the study found that the sediments contained some metals (copper, zinc, arsenic, lead, and chromium), but concentrations of these metals were approximately one order of magnitude lower than the numeric sediment quality standards for marine waters. Since past testing has not revealed any contamination at or near the sediment management standards and ambient conditions do not favor sediment deposition near the outfalls, Ecology has not required the Everett WPCF to conduct additional sediment monitoring near outfalls 015 and 025.

Outfall 100

Kimberly-Clark conducted a sediment survey of the region surrounding outfall 100 in June 2004 and again in December 2012. Both sediment sampling events did not reveal any concentrations of pollutants in excess of the marine sediment quality standards. Since past testing has not shown exceedances of the sediment management standards, Ecology has not required the Everett WPCF to conduct additional sediment monitoring near outfall 100.

CSO Outfalls

Chapter 173-245-015 WAC states, in part, that CSO sites may not cause accumulations of deposits that exceed sediment criteria or standards. The proposed permit will require the City of Everett to continue monitoring to demonstrate that controlled CSO outfalls do not adversely impact sediments near the outfalls. See Part IV of this fact sheet for more information on this requirement.

PBDEs in Sediment

While prior sediment sampling results did not show exceedances of the sediment management standards, the Environmental Assessment Program (EAP) recently collected sediment samples in the Snohomish River both upstream and downstream of Outfall 015 that indicated the presence of PBDEs in river sediment. Data from this EAP study will be added to the EIM database under Study ID: WHOB010. PBDEs have thus been documented in Everett WPCF effluent, in Snohomish River surface waters, in river sediment, and in fish tissue taken from resident fish. PBDEs are known persistent, bioaccumulative toxins. Their presence in area fish tissue at levels of concern to aquatic life prompted the addition of corresponding permit language including monitoring and source control requirements for PBDEs.

Ecology screening criteria for determining if sediment monitoring should be required includes a question about the likely presence of bioaccumulative toxic chemicals that may have accumulated in sediment or benthic biota. EAP data suggests that this presence within the mixing zone is possible, though there is some uncertainty regarding the origin of PBDEs in EAP's Snohomish River samples. There are also no sediment management standards for PBDEs with which to compare any sediment sampling results. Consequently, Ecology cannot determine the potential for the Everett WPCF discharge to cause a violation of sediment quality standards in the Snohomish River on account of PBDEs.

Because the proposed permit includes requirements to reduce PBDEs via source control, Ecology will not require sediment monitoring for PBDEs during this permit term but will reevaluate this condition at the time of the next permit renewal. If in the future Ecology determines there is potential for a violation of sediment quality standards, Ecology may require the Everett WPCF 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.

III.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://apps.ecology.wa.gov/publications/documents/9580.pdf), which is referenced in the permit. Ecology recommends that the Everett WPCF send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

WET testing conducted during the previous permit term showed the facility’s effluent has a reasonable potential to cause acute toxicity in the receiving water. The proposed permit will include an acute toxicity limit. **The effluent limit for acute toxicity is: No acute toxicity detected in a test sample representing the acute critical effluent concentration (ACEC).** The acute critical effluent concentration (ACEC) is the concentration of effluent at the boundary of the acute mixing zone during critical conditions. The ACEC for each outfall is:

- 15.6% effluent from the lagoon treatment system for outfall 015
- 13.7% effluent from the TF/SC treatment system for outfall 025
- 0.64% effluent from the TF/SC treatment system for outfall 100

Compliance with an acute toxicity limit is measured by an acute toxicity test comparing test organism survival in the ACEC (using a sample of effluent diluted to equal the ACEC) to survival in nontoxic control water. The Everett WPCF is in compliance with the acute toxicity limit if there is no statistically significant difference in test organism survival between the ACEC sample and the control sample. Due to the limited discharge authorization for outfall 025, the proposed permit does not apply the acute toxicity limit to that outfall. However the permit applies a limit to outfall 100 and requires testing done on the TF/SC effluent to include dilutions at the ACEC concentrations for both outfall 100 and outfall 025.

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water chronic toxicity. The proposed permit will not include a chronic WET limit. The Everett WPCF must retest the effluent 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
- 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. The Everett WPCF may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after the process or material changes have been made.

III.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). The Everett WPCF does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

III.L. Comparison of effluent limits with the previous permit (effective November 1, 2015)

Table 21 Comparison of Existing and Proposed Effluent Limits – Outfall 100

Parameter	Basis of Limit	Existing permit limit		Proposed permit limit	
		Average Monthly	Average Weekly	Average Monthly	Average Weekly

		Existing permit limit		Proposed permit limit	
$CBOD_5$	Technology	25 mg/L 5,513 lbs/day 85% Removal	40 mg/L 8,340 lbs/day	25 mg/L 5,513 lbs/day 85% Removal	40 mg/L 8,340 lbs/day
TSS	Technology	30 mg/L 6,255 lbs/day 85% Removal	45 mg/L 9,383 lbs/day	30 mg/L 6,255 lbs/day 85% Removal	45 mg/L 9,383 lbs/day
Fecal Coliform Bacteria	Technology	200/100 mL	400/100 mL	200/100 mL	400/100 mL
Total Residual Chlorine	Technology	0.5 mg/L	0.75 mg/L	0.5 mg/L	0.75 mg/L
Parameter		**Daily Limit (min-max)**		**Daily Limit (min-max)**	
pH	Technology	6.0-9.0		6.0-9.0	
Parameter		**Limit**		**Limit**	
Whole Effluent Toxicity	Water Quality	No toxicity at the ACEC of 0.64% Effluent		No toxicity at the ACEC of 0.64% Effluent	

Table 22 Comparison of Existing and Proposed Effluent Limits – Outfall 015

		Existing permit limit		Proposed permit limit	
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
$CBOD_5$	Technology	25 mg/L 3,190 lbs/day (Nov-Jun) 85% Removal[1]	40 mg/L 5,100 lbs/day (Nov-Jun)	25 mg/L 3,190 lbs/day (Nov-Jun) 85% Removal[1]	40 mg/L 5,100 lbs/day (Nov-Jun)
TSS	Technology	59 mg/L[2] 7,529 lbs/day 79% Removal	88.5 mg/L 11,293 lbs/day	51 mg/L[2] 6,508 lbs/day 80% Removal	76.5 mg/L 9,762 lbs/day
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
Fecal Coliform Bacteria[3]	Technology	200/100 mL	400/100 mL	200/100 mL	400/100 mL
Parameter		**Daily Limit (min-max)**		**Daily Limit (min-max)**	
pH[4]	Tech/WQ	6.4-9.0		6.8-8.8	
Parameter		**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
NBOD+CBOD (Equiv. $CBOD_5$)	TMDL	3,043 lbs/day (Jul-Oct)	5,402 lbs/day (Jul-Oct)	3,043 lbs/day (Jul-Oct)	5,402 lbs/day (Jul-Oct)
Total Residual Chlorine[5]	WQ	16 µg/L	83 µg/L	16 µg/L	83 µg/L
Ammonia	WQ	31.4 mg/L as N	47.1 mg/L as N	31.4 mg/L as N	47.1 mg/L as N
Flow[6]	WQ	N/A	10.2 MGD (Jul-Sep)	N/A	10.2 MGD (Jul-Sep)
Parameter		**Limit**		**Limit**	
Whole Effluent Toxicity	Water Quality	No toxicity at the ACEC of 15.6% Effluent		No toxicity at the ACEC of 15.6% Effluent	

		Existing permit limit	Proposed permit limit

[1] WAC 173-221-050(2) allows alternative $CBOD_5$ concentration and percent removal limits for lagoon facilities. The previous permit applied technology-based concentration limits based on a demonstrated capability for the lagoon system to meet technology-based limits. Monitoring data from this permit cycle also demonstrates the lagoon's capability to consistently achieve 85% removal of $CBOD_5$. Consequently, the proposed permit extends the application of technology-based limits to the percent removal limit as well.
[2] TSS limits are performance-based according to WAC 173-221-050(2). Ecology's Permit Writers Manual allows for lagoon TSS limits of up to 75 mg/l monthly average.
[3] Fecal coliform limits are calculated as geometric means rather than arithmetic averages.
[4] The previous permit applied a mix of water-quality and technology-based limits for pH. The proposed permit applies a water quality-based limit for both the daily minimum and maximum pH.
[5] The Total Residual Chlorine limit does not change, only the reporting unit has changed for consistency with other facilities with water quality-based chlorine limits.
[6] Seasonal flow limit is added in lieu of a temperature limit.

Table 23 Comparison of Existing and Proposed Effluent Limits – Outfall 025[1]

		Existing permit limit		Proposed permit limit [2]	
Parameter	Basis of Limit	Average Monthly	Daily Max	Average Monthly	Daily Max
Cyanide	Water Quality	NA	NA	33.1 µg/L	66.4 µg/L
Parameter		**Daily Limit (min-max)**		**Daily Limit (min-max)**	
pH	Tech/WQ	6.1-9.0		6.6-9.0	
Parameter		**Maximum Daily**		**Maximum Daily**	
Total Residual Chlorine	Water Quality	95 µg/L		95 µg/L	

[1] Existing effluent limits for $CBOD_5$, TSS, and fecal coliform set for outfall 100 in permit special condition S1.B. will continue to apply to outfall 025.
[2] Ecology may modify the permit to include new cyanide limits at Outfall 025 if the outfall is restored to function and intermittent use.

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.

IV.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 92-109). The proposed permit retains the monitoring frequencies for routine parameters that were specified in the previous permit.

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.

Ecology updated the water contact recreation bacteria criteria, effective January 1, 2021, and eliminated all recreational uses except for primary contact criteria in both fresh and marine waters. Primary contact criteria changed to *E.coli* for freshwater and to enterococci for marine water. Because the Everett WPCF has an effluent limit based on recreation, this permit requires monitoring of fecal coliform, E. coli, and enterococci during this permit cycle. Ecology will reevaluate bacteria limits based on the new indicators during the next permit cycle.

As a pretreatment publicly owned treatment works (POTW), the City of Everett 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. The City will use the monitoring data to develop local limits that commercial and industrial users must meet.

IV.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). The City of Everett operates an environmental lab at the Water Pollution Control Facility that is accredited for testing drinking water, non-potable water, and solids for general chemistry, microbiology, and most metals. A complete list of accredited parameters and methods is available through Ecology's searchable Lab Accreditation database:

https://apps.ecology.wa.gov/laboratorysearch/SearchLabName.aspx?CompanyID=667

IV.C. Effluent limits which are near detection or quantitation levels

The water quality-based effluent concentration limits for residual chlorine discharged through outfalls 015 and 025 are 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

V.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).

V.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 the City 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 S.4 restricts the amount of flow.

V.C. Operation and maintenance

The proposed permit contains Special Condition S.5 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 the Everett WPCF takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment.

V.D. Pretreatment

1. Duty to enforce discharge prohibitions

This provision prohibits the publicly owned treatment works (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:
    - Are prohibited due to dangerous waste rules.
    - Are explosive or flammable.
    - Have too high or low of a pH (too corrosive, acidic or basic).
    - May cause a blockage such as grease, sand, rocks, or viscous materials.
    - Are hot enough to cause a problem.

- Are of sufficient strength or volume to interfere with treatment.
- Contain too much petroleum-based oils, mineral oil, or cutting fluid.
- Create noxious or toxic gases at any point.

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:
  - Cooling water in significant volumes.
  - Stormwater and other direct inflow sources.
  - Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Ecology delegated authority to the City of Everett 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).

As sufficient data becomes available, the Everett WPCF must, in consultation with Ecology, reevaluate its local limits in order to prevent pass-through or interference. If any pollutant causes pass-through or interference, or exceeds established sludge standards, the Everett WPCF must establish new local limits or revise existing local limits as required by 40 CFR 403.5. In addition, Ecology may require revision or establishment of local limits for any pollutant that causes a violation of water quality standards or established effluent limits, or that causes whole effluent toxicity. Ecology may modify this permit to incorporate additional requirements relating to the establishment and enforcement of local limits for pollutants of concern.

2. Additional requirements for PBDEs

Due to identified fish tissue impacts in the Snohomish River from PBDE congeners that have also been identified in Everett WPCF influent and effluent as discussed in Section III.E. of this fact sheet, the proposed permit includes the following required actions:

- Identify industrial users with discharges suspected of containing PBDEs.
- Require these industrial users to implement Best Management Practices that will reduce or eliminate PBDEs from their discharges.
- In the annual pretreatment report, include the following additional information:

  - Industrial user monitoring results, if any monitoring was conducted in the previous calendar year.
  - A description of source identification methods and activities conducted during the previous calendar year.
  - A description of industrial user source reduction activities planned, in progress, or completed.
- In each of the two final years of the permit cycle, conduct two PBDE sampling events on Everett WPCF influent only, and compare those values with the baseline influent PBDE concentrations documented at the Everett WPCF in March and May of 2020, April of 2021, and July of 2022. Provide these monitoring results in the subsequent annual pretreatment report and comment on what can be concluded about the effectiveness of PBDE minimization efforts being implemented through the pretreatment program.

3. Additional requirements for PFAS

Per- and polyfluoroalkyl substances (PFAS) are a class of persistent chemicals known as widespread pollutants that have been found in food, water, people, and the environment. Ecology began work in 2016 in collaboration with the Department of Health to develop a Chemical Action Plan (CAP) to prevent potential exposure to people and the environment from PFAS. Ecology issued an interim CAP in 2018 and a final version in 2021.

In 2022, the state legislature amended the Pollution Prevention for Healthy People and Puget Sound Act (Chapter 70A.350 RCW) to establish a timeline for Ecology to regulate PFAS in consumer products as a class of priority toxic chemicals. In September 2022, Ecology published a revised PFAS Chemical Action Plan that include a recommendation to “Understand and manage PFAS in waste”, which included recommendations related to wastewater treatment. In a separate action, the US-EPA issued guidance in December 2022 that recommended strategies permitting authorities should use to control discharges of PFAS at their sources. Consistent with the 2022 revised CAP recommendations, the proposed permit includes the following requirements that are based on EPA’s permitting recommendations:

- Identify and locate all possible industrial users with discharges that are expected or suspected to contain PFAS.
- Identify Best Management Practices the Everett pretreatment program can require of permitted significant industrial users for the reduction or elimination of PFAS in their discharges.

V.E. Solid wastes

To prevent water quality problems the facility is required in permit Special Condition S8 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 Snohomish County Health District.

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.

V.F. Combined sewer overflows

Combined sewer systems (CSS) are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same piping system. Most of the time, CSS 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 CSS can exceed the capacity of the conveyance system or treatment plant. For this reason, CSSs are designed to overflow occasionally and discharge excess wastewater directly to nearby streams, rivers, or other water bodies. State and federal regulations authorize these discharges under limited circumstances. Chapter 173-245 WAC and EPA's CSO control policy (59 FR 18688) identify the conditions for authorization and the required measures for controlling overflows from combined sewer systems.

Federal regulations require all combined sewer overflows (CSO) to comply with both technology-based and water quality-based requirements of the Clean Water Act. Similarly, state regulations require the use of all known, available, and reasonable methods of prevention and control to achieve and maintain the "greatest reasonable reduction" in CSO discharges. State regulations also state that CSO discharges may not:

- Cause violations of applicable water quality standards,
- Restrict the characteristic uses of the receiving water,
- Cause accumulation of deposits that exceed sediment criteria or standards or have an adverse biological effect.

As discussed below, technology-based requirements include implementing a CSO reduction plan designed to minimize the frequency of discharges and meet a performance standard of no more than one untreated CSO discharge per year, on average, for each CSO outfall. In addition, the proposed permit requires implementation of Nine Minimum Controls as technology-based requirements to minimize the impact of pollutants in that one discharge. Finally, the proposed permit requires the development and implementation of a Post-Construction Monitoring Plan to verify that discharges from CSO outfalls comply with applicable water quality standards.

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

The state legislature amended chapter 90.48 RCW in 1985 to establish a requirement for Ecology to work with local governments to develop "reasonable plans and compliance schedules for the greatest reasonable reduction of combined sewer overflows…at the earliest possible date" (RCW 90.48.480). Ecology codified the requirement as chapter 173-245 WAC in

1987. This regulation established a maximum allowable discharge frequency for untreated CSOs.

Ecology required municipalities to develop CSO reduction plans for approval by January 1, 1988. As required by chapter 173-245 WAC, these plans documented how the municipality planned to reduce the discharge frequency of each CSO outfall to a performance standards of no more than one untreated discharge per year, on average. These plans are substantially equivalent to the long-term control plan (LTCP) defined by EPA's CSO control policy (59 FR 18688).

The City has received approval for multiple plans to control CSOs over the years, most recently receiving approval for a 2020 CSO Control Plan Update on June 3, 2020. The proposed permit includes a compliance schedule for projects identified in that plan.

Compliance with performance standard

Ecology defines the technology-based performance standard for controlled CSOs as achieving a discharge frequency of no more than one discharge per year, on average, for each outfall. Once achieved, Chapter 173-245-015 WAC requires municipalities to maintain compliance with this standard. The proposed permit defines the means of assessing compliance with the standard and identifies adaptive management procedures the City must take if a previously controlled outfall fails to maintain compliance.

Averaging period and compliance: The proposed permit specifies assessing compliance with the performance standard each year based on a 20-year averaging period. This assessment uses the actual number of discharges monitored during each year following completion of CSO projects along with the number of discharges estimated by a calibrated hydraulic model for the years prior to completing the control project. The proposed permit requires the City to report the calculated 20-year moving average in an annual report to document compliance with the performance standard.

Adaptive Management: The proposed permit uses an adaptive management process to address potential noncompliance with the CSO performance standard. This process starts with comparing the results of annual calculations of the 20-year moving average number of discharges with the performance standard of no more than one discharge per year. Ecology considers any previously controlled outfall that fails to meet the performance standard for two consecutive years as a potential violation of the standard. If this occurs, the adaptive management process requires the City to take corrective actions. Acceptable actions may range from verifying monitoring accuracy to developing and constructing new structural control projects. The proposed permit requires using the CSO annual report as the means of documenting the scope, schedule, and effectiveness of selected corrective actions.

Nine Minimum Controls

Municipalities with combined sewer overflow outfalls must also implement nine minimum controls as a second set of 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.

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.

Post-Construction Monitoring Program

Under EPA's CSO control policy's (59 FR 18688) presumption approach, CSO controls are presumed to attain water quality standard (WQS) if certain performance criteria are met. It is not possible with current knowledge and technology to calculate numeric water quality-based effluent limits for untreated CSOs. However, Washington's regulations allow Ecology to authorize a mixing zone for outfalls that comply with the technology-based requirements described above as a means for evaluating compliance with numeric water quality criteria. While Ecology presumes that a program that meets the technology-based requirements in state and federal regulations provides an adequate level of control to meet the water quality-based requirements of the Clean Water Act, the City must perform post-construction monitoring to verify compliance.

Consistent with the federal CSO control policy, the proposed permit requires the City to implement a post-construction monitoring program that includes characterization, monitoring, and modeling of the system necessary to verify compliance with applicable water quality standards. The program must include consideration of sensitive areas. It applies to any CSO outfall that complies with the performance standard for controlled outfalls.

Ecology approved the City's 2017 CSO post-construction monitoring plan in January 2018. However, this approved plan does not accurately reflect the current state water quality standards related to recreational contact. In addition, the plan did not identify post-construction monitoring for all outfalls. Therefore, the City must update the plan to adequately demonstrate that all controlled CSO discharges will not impair water or sediment quality. Specific changes the update must make include:

REQUIRED UPDATES TO THE 2017 POST-CONSTRUCTION MONITORING PLAN

1. Section 3.3.1 lists Port Gardner/Inner Everett Harbor (area of PS01, 2, and 3) as "Good Marine Quality" and "Secondary Contact Recreation". Washington's surface water quality standards no longer include "Secondary Contact Recreation" as a recognized use. The City must update the plan to demonstrate that controlled CSOs in this area do not interfere with the current designated use of "Primary Contact Recreation".

2. Since outfalls PS04, PS05, PS06, and PS07 are expected to achieve controlled status during the permit term, the PCMP must be updated to document how the City will conduct water quality and sediment quality monitoring near these outfalls once they achieve "control" status.

3. Section 3.3 must address the role that aquatic life uses, such as salmonid migration and rearing, played in developing the post construction monitoring plan. In particular, this section must provide sufficient information to justify that granting a mixing zone will "not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health", as required by WAC 173-201A-400(4). In addition, demonstrating compliance with narrative water quality criteria generally requires that the plan should, at a minimum, include proactive post-storm surveillance to observe whether visual impacts or odors are present in relation to the CSO.

4. Section 3.4 indicates an intent to continue "real-time level monitoring of frequency and duration of CSOs to satisfy the requirements of the presumption approach". The updated plan must first establish eligibility for an unlimited mixing zone, as discussed in #3 above. The plan must include this justification to allow for a conclusion that water quality monitoring is not needed to demonstrate compliance with numeric water quality standards.

5. Section 4.4 concludes that there is no need for sediment monitoring in Port Gardner. The plan update must not rely solely on the absence of an exceedance of documented sediment management standards in historical data, but should also address depositional potential near the Port Gardner outfalls (e.g. by modeling the receiving water near the outfalls) and addressing likely pollutants bound to CSO sediments. The Snohomish River conclusions in the 2017 PCMP are adequate.

CSO Monitoring and Reporting

Along with the post-construction monitoring program discussed above, the proposed permit requires, at a minimum, the City to monitor the volume, duration and precipitation associated with each CSO discharge event at each identified outfall. The proposed permit also requires reporting the results of this monitoring electronically through the WQWebDMR system, consistent with requirements of EPA's e-reporting rules.

The City must also submit annual reports according to the requirements of WAC 173-245-090(1). This report must contain the following information:

- A summary of the past year's frequency and volume of untreated combined sewage discharge from each CSO outfall along with an assessment of whether the discharge volume or frequency has increased over baseline annual conditions.
- A discussion of the previous year's CSO reduction accomplishments.
- A list of the projects planned for the next year (if any).
- A comparison of each outfalls' average discharge frequency with the CSO performance standard.
- A discussion of any corrective actions required by an adaptive management strategy for controlled CSOs.
- A discussion of compliance with the Nine Minimum Controls.
- A summary of results from post-construction monitoring completed during the reporting year.
- Identification of any outfall with a compliance status that changed during the reporting period.

V.G. Compliance schedule

The 2020 CSO Control Plan Update included a review of a 20-year rolling average of City of City of Everett CSO sites, identifying six that continued to exceed the one event per year requirement. These locations include PSO4 through PSO7, SRO4, and SRO7. The Plan Update noted that two projects were completed in 2019 that targeted SRO4 and so that location had changed to a post-construction monitoring phase. Projects which were needed to control the remaining CSO sites have been added to the proposed permit under a compliance schedule and include the following:

1. Projects addressing overflows at SRO7. Targeted completion date: December 31, 2027.
   - Completion of Sewer O improvements, Phase 2
   - Modifications to the weir elevation at regulators at 36th Street and SR08
   - 1.8-million-gallon storage tank upstream of the 36th Street Regulator
   - Modifications to the Pine Street Regulator weir elevation
2. Projects addressing overflows at PS04, PS05, PS06, PS07. Targeted completion date: December 31, 2027.

   Conversion of the former Kimberly-Clark wastewater treatment facility to a temporary storage facility for combined sewer flows as well as a storage and treatment facility for stormwater. Site construction is scheduled to start in 2025. Project completion is anticipated by December 31, 2027.

3. As part of the next CSO Control Plan Update, provide a determination of the need for installation of a 48-inch overflow from the Pine Street Regulator to the 72-inch Snohomish River Interceptor.

V.H. 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.

VI. Permit Issuance Procedures

VI.A. Permit modifications

Ecology may modify this permit to impose numeric 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.

VI.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 5 years.

VII. References for Text and Appendices

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Appendix A — Public Involvement Information

Ecology proposes to reissue a permit to the City of Everett Water Pollution Control Facility. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on October 17, 2023 in the Everett Herald 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 (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://apps.ecology.wa.gov/publications/documents/0307023.pdf

You may obtain further information from Ecology by telephone, 206-594-0000, or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
P.O. Box 330316,
Shoreline, WA 98133-9716

The primary author of this permit and fact sheet is Tonya Lane.

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.

Table B1 Address and Location Information

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Appendix C — Glossary

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 RCW 90.48.520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance – An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater 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 (intermittent) discharge limit – The average of the measured values obtained over a calendar months time taking into account zero discharge days.

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 groundwater 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% upper tolerance interval with a 95% 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 (BMP) – 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 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 BOD_5 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 BOD_5 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.

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 level – 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.

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% by volume and the receiving water 90%.

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, groundwater, 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 groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater 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 WAC 173-240-130.

Enterococci – A subgroup of fecal streptococci that includes *S. faecalis, S. faecium, S. gallinarum,* and *S. avium.* The enterococci are differentiated from other streptococci by their ability to grow in 6.5% sodium chloride, at pH 9.6, and at 10°C and 45°C.

E. coli – A bacterium in the family Enterobacteriaceae named Escherichia coli and is a common inhabitant of the intestinal tract of warm-blooded animals, and its presence in water samples is an indication of fecal pollution and the possible presence of enteric pathogens.

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.

Groundwater – 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.

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 stormwater 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 501, 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 7-day period, expressed as a daily average.

Method detection level (MDL) – See Detection Limit.

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.

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 groundwater 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 groundwater 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:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. 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, or 5) x 10^n, where n is an integer. (64 FR 30417).
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 or contribute to 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).

Sample Maximum – No sample may exceed this value.

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 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 BOD_5 – 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 BOD_5 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 BOD_5 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 stormwater 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.

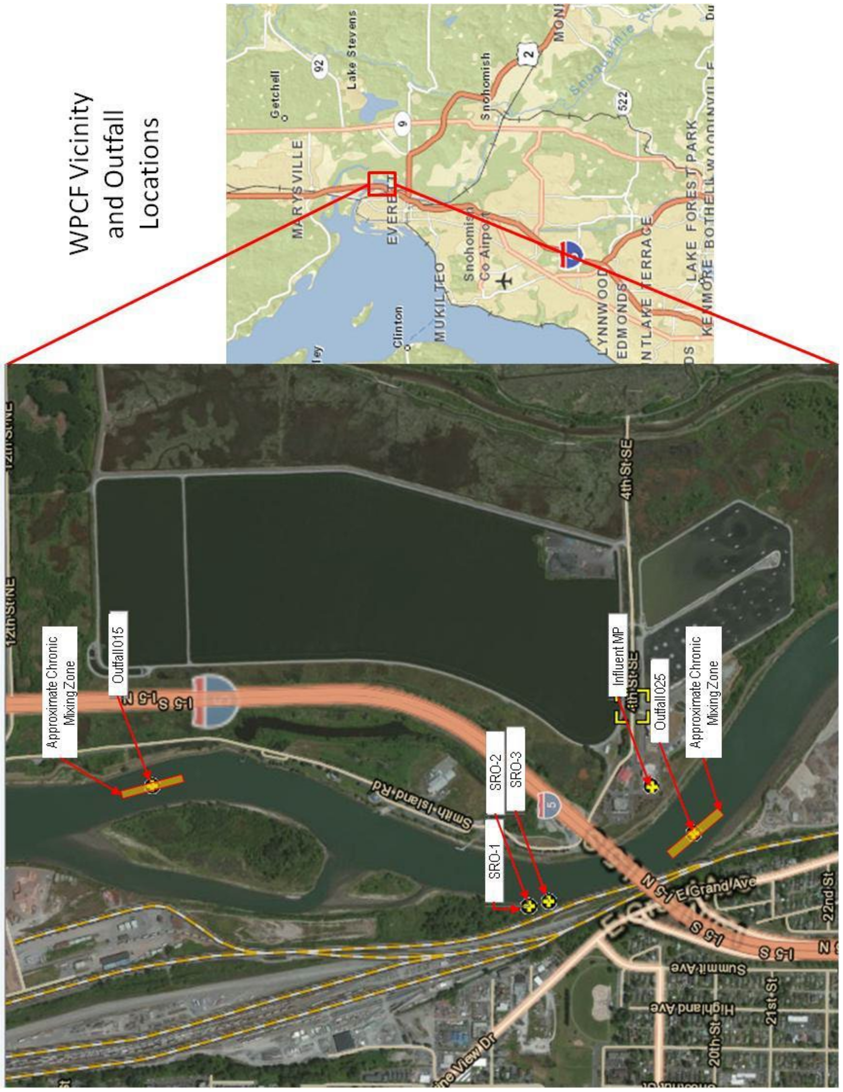
Total maximum daily load (TMDL) – A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

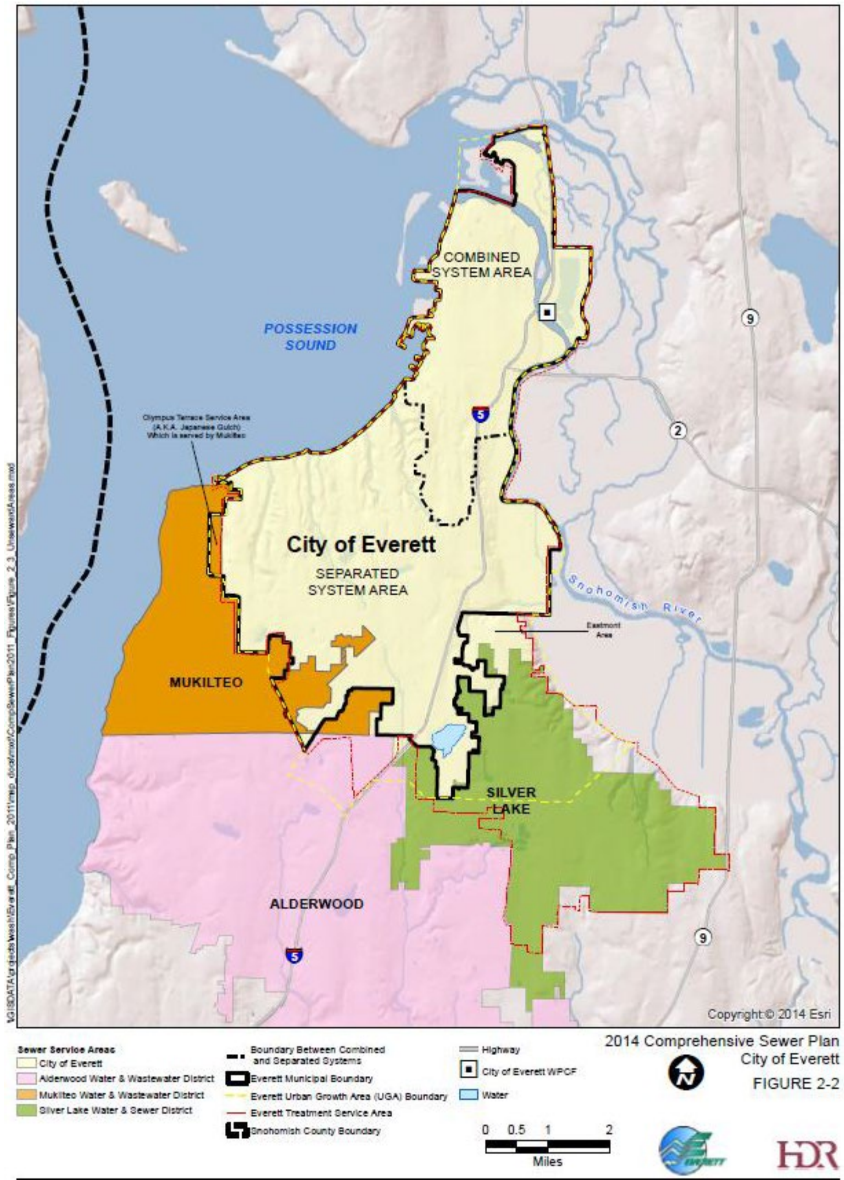
Total suspended solids (TSS) – Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, 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 — Maps and Facility Overview

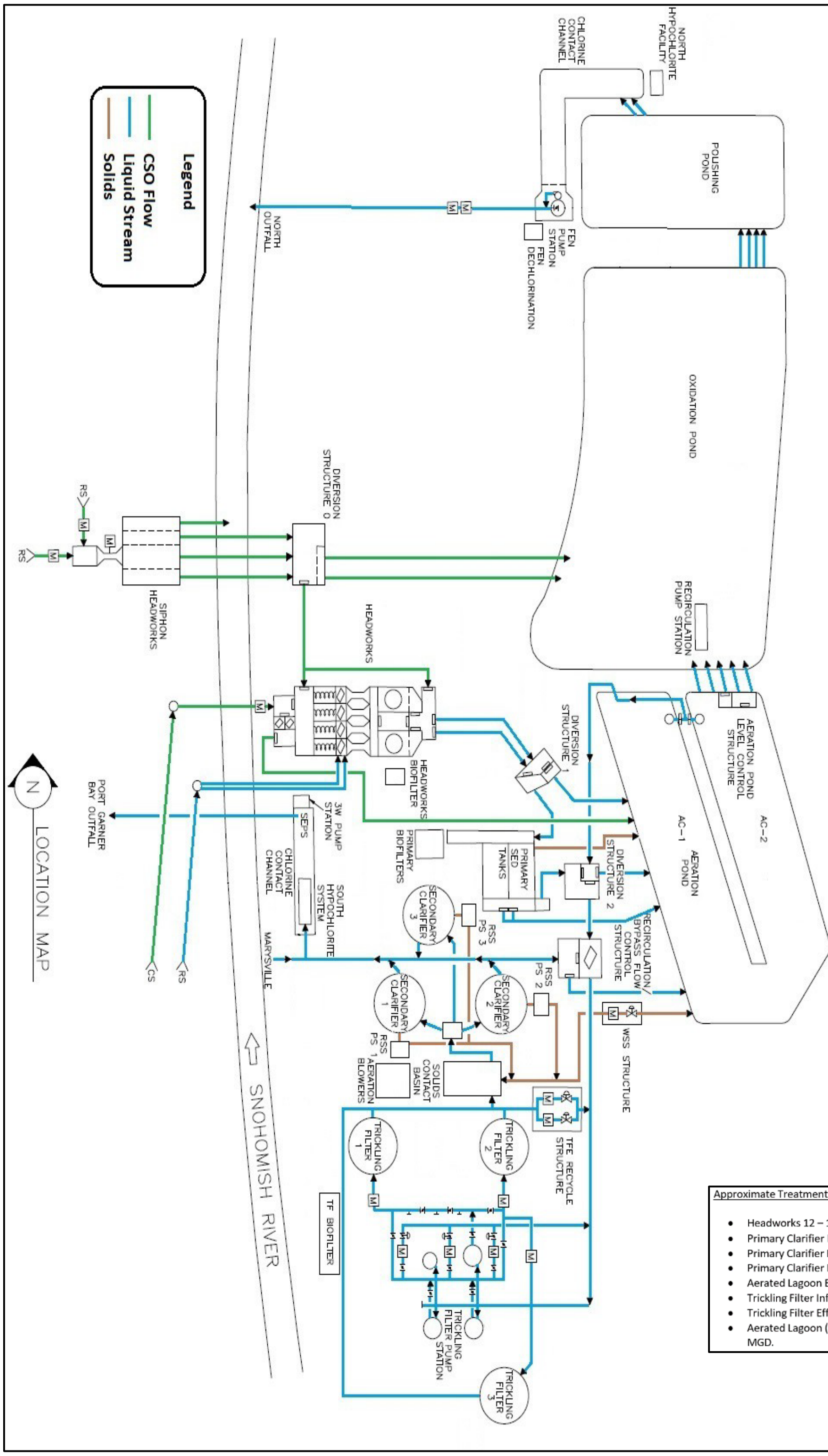




CSO Locations


City of Everett Water Pollution Control Facility, NPDES Permit No. WA-002449-0, G.1.a - CSO Discharge Points
Sewer Outfall Site Location Map
Legend
CSO Outfall (Eliminated)
CSO Outfall (Active)
City of Everett WPCF
Outfall Main
Sewer Interceptor
Gravity Main
Force Main
Outfall 100 (DWO)
Combined / Sanitary Boundary
PSO1
PSO2
PSO3
PSO4
PSO5
PSO6
PSO7
PSO8
SRO1
SRO2
SRO3
SRO4
SRO7
SRO8
WPCF
Outfall 100
Port Gardner Bay
10TH ST
19TH ST
23RD ST
EVERETT AVE
HEWITT AVE
PACIFIC AVE
41ST
52ND ST SE
BROADWAY AVE
COLBY AVE
W MARINE VIEW DR
WALNUT ST
E MARINE VIEW DR
N BROADWAY
RUCKER AVE
S 3RD AVE
S 2ND AVE
BEVERLY LANE
GLENWOOD AVE
RESERVOIR #1
RESERVOIR #4
RESERVOIR #2
RESERVOIR #3
529
5
City of Everett Public Works Utility Mapping
Date: 9/23/2013
Document Path: G:\Basemaps\Vicinity\Sewer\Combined_CSO_Locations.mxd

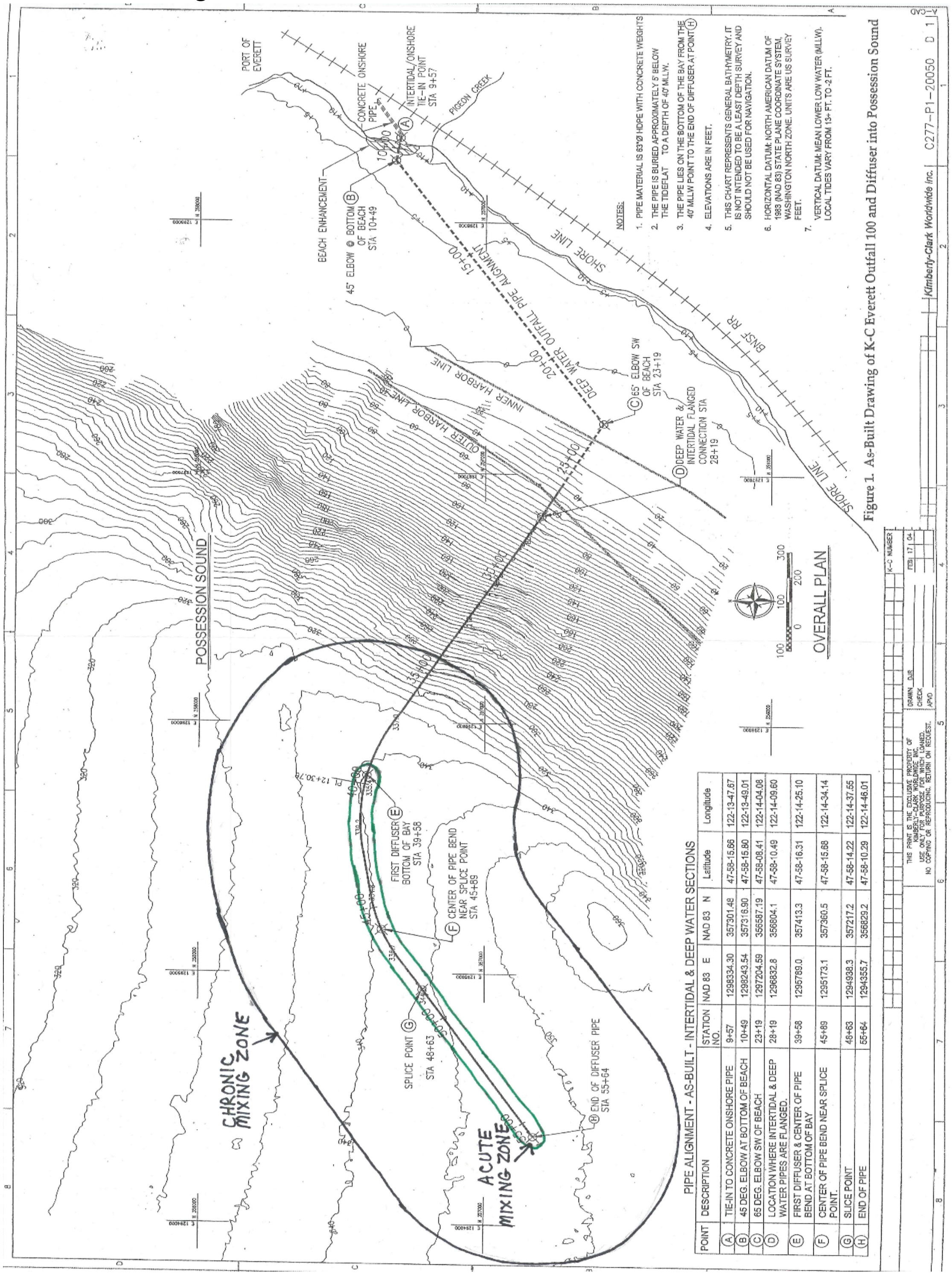
Facility Process Flow Diagram



Approximate Treatment Unit Daily Flows

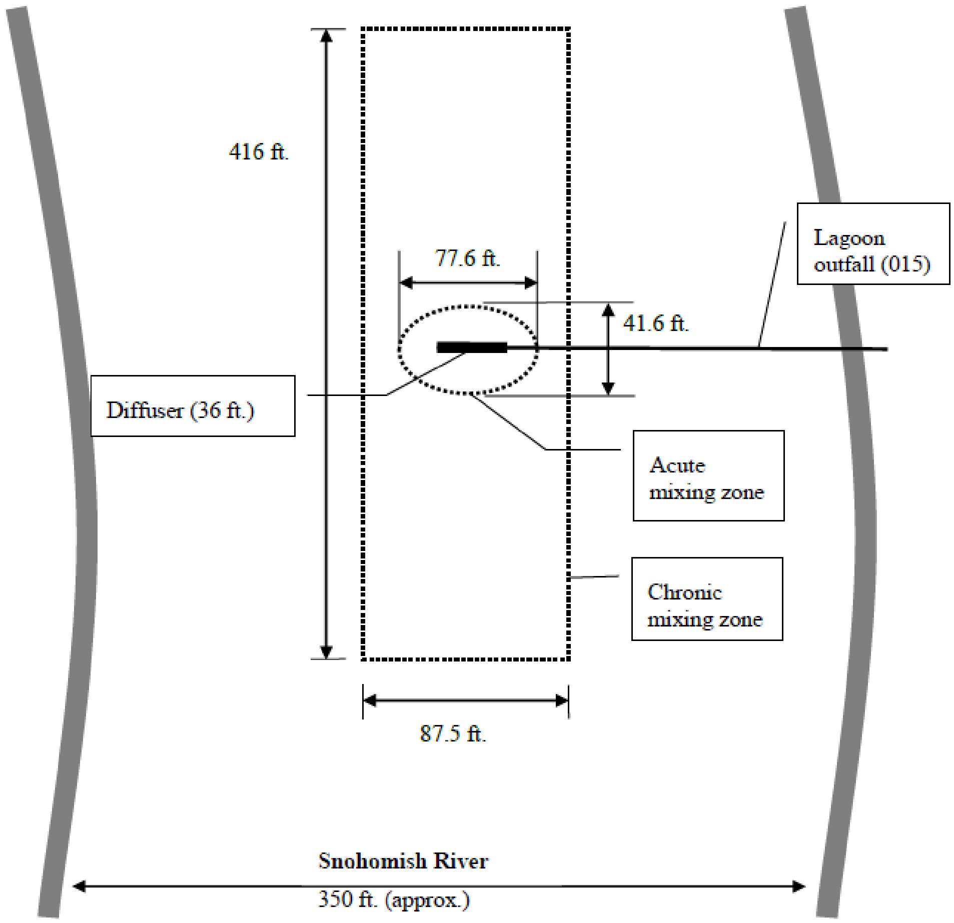
- Headworks 12 – 124 MGD
- Primary Clarifier Influent (PCI): 12 - 40 MGD
- Primary Clarifier Effluent to Trickling Filter Influent (PCT): 12 – 15 MGD
- Primary Clarifier Effluent to Aeration Cell #1 (PCE): 0 – 28 MGD
- Aerated Lagoon Effluent to Trickling Filter Influent (ALE): 3 – 5 MGD
- Trickling Filter Influent (TFI): 21 – 27 MGD
- Trickling Filter Effluent Recycle (TFER): 6 – 10 MGD
- Aerated Lagoon (Aeration Cell 1 & Aeration Cell 2) to Oxidation Pond/Polishing Pond: 8 MGD.

Outfall 100 Mixing Zone



Outfall 015 and mixing zones

(plan view, not to scale – Outfall 025 mixing zone is similar)



Appendix E — Technical Calculations

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: Ce = Effluent Concentration
Ca = 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).

Calculation of Water Quality-Based Effluent Limits:

Water quality-based effluent limits are calculated by the two-value wasteload allocation process as described on page 100 of the TSD (EPA, 1991) and shown below.

1. Calculate the acute wasteload allocation WLA_a by multiplying the acute criteria by the acute dilution factor and subtracting the background factor. Calculate the chronic wasteload allocation (WLA_c) by multiplying the chronic criteria by the chronic dilution factor and subtracting the background factor.

$$WLA_a = (\text{acute criteria} \times DF_a) - [(\text{background conc.} \times (DF_a - 1)]$$

$$WLA_c = (\text{chronic criteria} \times DF_c) - [(\text{background conc.} \times (DF_c - 1)]$$

where: DF_a = Acute Dilution Factor
DF_c = Chronic Dilution Factor

2. Calculate the long term averages (LTA_a and LTA_c) which will comply with the wasteload allocations WLA_a and WLA_c.

$LTA_a = WLA_a \times e^{[0.5\sigma^2 - z\sigma]}$

where: $\sigma^2 = \ln[CV^2 + 1]$

$z = 2.326$

CV = coefficient of variation = std. dev/mean

$LTA_c = WLA_c \times e^{[0.5\sigma^2 - z\sigma]}$

where: $\sigma^2 = \ln[(CV^2 \div 4) + 1]$

$z = 2.326$

3. Use the smallest LTA of the LTA_a or LTA_c to calculate the maximum daily effluent limit and the monthly average effluent limit.

MDL = Maximum Daily Limit

$MDL = LTA x e^{(Z\sigma - 0.5\sigma^2)}$

where: $\sigma^2 = \ln[CV^2 + 1]$

z = 2.326 (99th percentile occurrence)

LTA = Limiting long term average

AML = Average Monthly Limit

$AML = LTA x\ e^{(Z\sigma_n - 0.5\sigma_n^2)}$

where: $\sigma^2 = \ln[(CV^2 \div n) + 1]$

n = number of samples/month

z = 1.645 (95^{th} % occurrence probability)

LTA = Limiting long term average

Ecology used the limit calculation procedure described above to calculate NBOD+CBOD limits for outfall 015. Since the Snohomish River Estuary TMDL establishes a Maximum Daily Limit as the Waste Load Allocation, we used that limit to back-calculate the Long Term Average used to determine an appropriate Average Monthly Limit as follows:

NBOD+CBOD Limit Calculations				
1. Calculate Max Daily Limit based on TMDL Waste Load Allocations (WLAs)				
Ammonia WLA			1543 lbs/day	
CBOD5 WLA, lbs/day			2162 lbs/day	
NBOD Exchange Rate			2.1 lbs NBOD per lb of ammonia	
Equivalent NBOD+CBOD WLA			5402.3	lbs/day
			(Maximum Daily Limit)	
2. Calculate Long Term Average (LTA) from Maximum Daily Limit (MDL)				
	σ^2		0.065413139	
	z		2.326	(99th %tile occurrence)
	CV		0.26	
NBOD+CBOD LTA			3079.1	lbs/day
3. Calculate Average Monthly Limit (AML) from LTA				
	# of Samples		16 per month	
	z		1.645	(95th %tile occurrence)
	σ^2		0.0042161	
	CV		0.26	
NBOD+CBOD AML			3419.0	lbs/day

Ecology used the complete set of NBOD+CBOD data collected by the Everett WPCF during the previous permit term to calculate the coefficient of variation used in the above limit calculations. Since the average monthly limit calculated above is higher than the limit in the previous permit and the facility was capable of meeting the previous limit, Ecology will retain the previous limit in the proposed permit to prevent backsliding.

Calculation of Fecal Coliform at Chronic Zone, Outfall 100

INPUT	
Chronic Dilution Factor	696.0
Receiving Water Fecal Coliform, #/100 ml	1
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criterion, #/100 ml	*14*
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	**2**
Difference between mixed and ambient, #/100 ml	1

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.

Calculation of Fecal Coliform at Chronic Zone, Outfall 015

INPUT	
Chronic Dilution Factor	14.2
Receiving Water Fecal Coliform, #/100 ml	50
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criterion, #/100 ml	*200*
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	**75**
Difference between mixed and ambient, #/100 ml	25

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.

Calculation of Fecal Coliform at Chronic Zone, Outfall 025

INPUT	
Chronic Dilution Factor	15.6
Receiving Water Fecal Coliform, #/100 ml	50
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criterion, #/100 ml	*200*
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	**72**
Difference between mixed and ambient, #/100 ml	22

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.

Marine Un-ionized Ammonia Criteria Calculation, Outfall 100

Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from EPA 440/5-88-004. Revised 19-Oct-93.

INPUT	
1. Receiving Water Temperature, deg C (90th percentile):	12.1
2. Receiving Water pH, (90th percentile):	8.1
3. Receiving Water Salinity, g/kg (10th percentile):	28.6
4. Pressure, atm (EPA criteria assumes 1 atm):	1.0
5. Unionized ammonia criteria (mg un-ionized NH_3 per liter) from EPA 440/5-88-004:	
Acute:	0.233
Chronic:	0.035
OUTPUT	
Using mixed temp and pH at mixing zone boundaries?	No
1. Molal Ionic Strength (not valid if >0.85):	0.587
2. pKa8 at 25 deg C (Whitfield model "B"):	9.313
3. Percent of Total Ammonia Present as Unionized:	2.3%
4. Total Ammonia Criteria (mg/L as NH_3):	
Acute:	10.09
Chronic:	1.52
RESULTS	
Total Ammonia Criteria (mg/L as N)	
Acute:	**8.30**
Chronic:	**1.25**

Reasonable Potential Calculation, Outfall 100 (1 of 2)

Facility	Everett WPCF
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	156.0	696.0
Human Health Carcinogenic		696.0
Human Health Non-Carcinogenic		696.0

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	CHLORINE (Total Residual) 7782505	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	CADMIUM - 7440439 4M Hardness dependent	CHROMIUM(TRI) -16065831 5M Hardness dependent	CHROMIUM(HEX) 18540299	COPPER - 744058 6M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness
Effluent Data	# of Samples (n)		190	1985	24	24	4	24	8	24	24	23	24
	Coeff of Variation (Cv)		0.42	0.12	0.23	0.15	0.6	0.32	0.6	0.21	0.28	0.4	0.17
	Effluent Concentration, ug/L (Max. or 95th Percentile)		28,270	0.55		1	0.06		0.04	8.33	0.7	0.01158	2.97
	Calculated 50th percentile Effluent Conc. (when n>10)				0.6							6.14	2.25
Receiving Water Data	90th Percentile Conc., ug/L		0	0		0	0		0	0	0	0	0
	Geo Mean, ug/L				0							0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	8,297	13	-	69	42	-	1100	4.8	210	1.8	74
		Chronic	1,246	7.5	-	36	9.3	-	50	3.1	8.1	0.025	8.2
	WQ Criteria for Protection of Human Health, ug/L		-	-	90	-	-	-	-	-	-	0.15	100
	Metal Criteria Translator, decimal	Acute	-	-	-	1	0.994	-	-	0.83	0.951	0.85	0.99
		Chronic	-	-	-	-	0.994	-	-	0.83	0.951	-	0.99
	Carcinogen?		N	N	N	Y	N	N	N	N	N	N	N

Aquatic Life Reasonable Potential

			AMMONIA	CHLORINE	ANTIMONY	ARSENIC	CADMIUM	CHROMIUM(TRI)	CHROMIUM(HEX)	COPPER	LEAD	MERCURY	NICKEL
Effluent percentile value			0.950	0.950		0.950	0.950		0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.403	0.120		0.149	0.555		0.555	0.208	0.275	0.385	0.169
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.984	0.998		0.883	0.473		0.688	0.883	0.883	0.878	0.883
Multiplier			1.00	1.00		1.00	2.59		1.90	1.00	1.00	1.00	1.00
Max concentration (ug/L) at edge of…		Acute	181	0.004		0.006	0.001		0.000	0.044	0.004	0.000	0.019
		Chronic	41	0.001		0.001	0.000		0.000	0.010	0.001	0.000	0.004
Reasonable Potential? Limit Required?			**NO**	**NO**		**NO**	**NO**		**NO**	**NO**	**NO**	**NO**	**NO**

Human Health Reasonable Potential

		AMMONIA	CHLORINE	ANTIMONY	ARSENIC	CADMIUM	CHROMIUM(TRI)	CHROMIUM(HEX)	COPPER	LEAD	MERCURY	NICKEL
s	$s^2=\ln(CV^2+1)$			0.227042							0.38525	0.16879
Pn	Pn=(1-confidence level)1/n			0.883							0.878	0.883
Multiplier				0.763526							0.63852	0.81825
Dilution Factor				696							696	696
Max Conc. at edge of Chronic Zone, ug/L				0.000862							0.00882	0.00323
Reasonable Potential? Limit Required?				**NO**							**NO**	**NO**

Reasonable Potential Calculation, Outfall 100 (2 of 2)

Facility	Everett WPCF
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	156.0	696.0
Human Health Carcinogenic		696.0
Human Health Non-Carcinogenic		696.0

Pollutant, CAS No. & NPDES Application Ref. No.			**SILVER - 7740224 11M dependent on hardness.**	**THALLIUM 7440280 12M**	**SELENIUM 7782492 10M**	**ZINC- 7440666 13M hardness dependent**	**CHLOROFORM 67663 11V**	**CYANIDE 57125 14M**	**DIETHYL PHTHALATE 84662 24B**
Effluent Data	# of Samples (n)		6	2	1	24	1	9	3
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.18	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		0.08	0.26	0.9	42.02	0.27	33	0.85
	Calculated 50th percentile Effluent Conc. (when n>10)					34.1			
Receiving Water Data	90th Percentile Conc., ug/L		0		0	0		0	
	Geo Mean, ug/L			0	0	0	0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	1.9	-	290	90	-	1	-
		Chronic	-	-	71	81	-	1	-
	WQ Criteria for Protection of Human Health, ug/L		-	0.27	200	1000	600	100	200
	Metal Criteria Translator, decimal	Acute	0.85	-	-	0.946	-	-	-
		Chronic	-	-	-	0.946	-	-	-
	Carcinogen?		N	N	N	N	Y	N	N

Aquatic Life Reasonable Potential

		SILVER	THALLIUM	SELENIUM	ZINC	CHLOROFORM	CYANIDE	DIETHYL PHTHALATE
Effluent percentile value		0.950		0.950	0.950		0.950	
s	$s^2=\ln(CV^2+1)$	0.555		0.555	0.179		0.555	
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.607		0.050	0.883		0.717	
Multiplier		2.14		6.20	1.00		1.81	
Max concentration (ug/L) at edge of…	Acute	0.001		0.036	0.255		0.383	
	Chronic	0.000		0.008	0.057		0.086	
Reasonable Potential? Limit Required?		**NO**		**NO**	**NO**		**NO**	

Human Health Reasonable Potential

		SILVER	THALLIUM	SELENIUM	ZINC	CHLOROFORM	CYANIDE	DIETHYL PHTHALATE
s	$s^2=\ln(CV^2+1)$		0.55451	0.55451	0.17857	0.55451	0.55451	0.55451
Pn	Pn=(1-confidence level)1/n		0.224	0.050	0.883	0.050	0.717	0.368
Multiplier			1.5242	2.48953	0.8088	2.48953	0.72756	1.20486
Dilution Factor			696	696	696	696	696	696
Max Conc. at edge of Chronic Zone, ug/L			0.00057	0.00322	0.04899	9.7E-04	0.0345	0.00147
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Marine Temperature Reasonable Potential and Limit Calculation, Outfall 100

Based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines.

INPUT	
1. Chronic Dilution Factor at Mixing Zone Boundary	696.0
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	11.8 °C
3. 1DADMax Effluent Temperature (95th percentile)	22.5 °C
4. Aquatic Life Temperature WQ Criterion	16.0 °C
OUTPUT	
5. Temperature at Chronic Mixing Zone Boundary:	11.82 °C
6. Incremental Temperature Increase or decrease:	0.02 °C
7. Maximum Incremental Temperature Increase 12/(T-2)	1.22 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	13.02 °C
A. If ambient temp is warmer than WQ criterion	
9. Does temp fall within this warmer temp range?	NO
10. **If YES - Use TMDL-based or performance-based limit - Do Not use this spreadsheet**	---
B. If ambient temp is cooler than WQ criterion but within 12/(T_{amb}-2) of the criterion	
11. Does temp fall within this Incremental temp. range?	NO
12. Temp increase allowed at mixing zone boundary, if required:	---
C. If ambient temp is cooler than (WQ criterion - 12/(T_{amb}-2))	
13. Does temp fall within this Incremental temp. range?	YES
14. Temp increase allowed at mixing zone boundary, if required:	NO LIMIT
RESULTS	
15. Do any of the above cells show a temp increase?	**NO**
16. Temperature Limit if Required?	**NO LIMIT**

Marine Un-ionized Ammonia Criteria Calculation, Outfall 015 and 025

Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from EPA 440/5-88-004. Revised 19-Oct-93.

INPUT	
1. Receiving Water Temperature, deg C (90th percentile):	17.8
2. Receiving Water pH, (90th percentile):	7.2
3. Receiving Water Salinity, g/kg (10th percentile):	8.0
4. Pressure, atm (EPA criteria assumes 1 atm):	1.0
5. Unionized ammonia criteria (mg un-ionized NH_3 per liter) from EPA 440/5-88-004:	
Acute:	0.233
Chronic:	0.035
OUTPUT	
Using mixed temp and pH at mixing zone boundaries?	No
1. Molal Ionic Strength (not valid if >0.85):	0.161
2. pKa8 at 25 deg C (Whitfield model "B"):	9.264
3. Percent of Total Ammonia Present as Unionized:	0.5%
4. Total Ammonia Criteria (mg/L as NH_3):	
Acute:	45.90
Chronic:	6.89
RESULTS	
Total Ammonia Criteria (mg/L as N)	
Acute:	**37.75**
Chronic:	**5.67**

Reasonable Potential Calculation, Outfall 015 (1 of 2)

Facility	Everett WPCF
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	6.4	14.2
Human Health Carcinogenic		14.2
Human Health Non-Carcinogenic		14.2

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	CHLORINE (Total Residual) 7782505	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	CADMIUM - 7440439 4M Hardness dependent	CHROMIUM(TRI) -16065831 5M Hardness dependent	CHROMIUM(HEX) 18540299	COPPER - 744058 6M Hardness dependent	CYANIDE 57125 14M	LEAD - 7439921 7M Dependent on hardness	MERCURY 7439976 8M
Effluent Data	# of Samples (n)		788	138	12	22	7	19	3	22	20	22	22
	Coeff of Variation (Cv)		0.28	0.64	0.6	0.52	0.6	0.6	0.6	0.6	1.05	0.8	0.84
	Effluent Concentration, ug/L (Max. or 95th Percentile)		32,100	47.05		3.1	0.49	5.1	0.11	12.13	9	5.56	0.02547
	Calculated 50th percentile Effluent Conc. (when n>10)				0.6					6.15	2.5		0.01225
Receiving Water Data	90th Percentile Conc., ug/L		14	0		0.8	0	0.35	0.35	1.18	0	0.191	0.0022
	Geo Mean, ug/L				0					0.83	0		0.002
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	37,747	13	-	69	42	-	1100	4.8	9.1	210	1.8
		Chronic	5,670	7.5	-	36	9.3	-	50	3.1	2.8	8.1	0.025
	WQ Criteria for Protection of Human Health, ug/L		-	-	90	-	-	-	-	-	100	-	0.15
	Metal Criteria Translator, decimal	Acute	-	-	-	1	0.994	-	-	0.83	-	0.951	0.85
		Chronic	-	-	-	-	0.994	-	-	0.83	-	0.951	-
	Carcinogen?		N	N	N	Y	N	N	N	N	N	N	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
s	$s^2=\ln(CV^2+1)$	0.275	0.586		0.489	0.555		0.555	0.555	0.862	0.703	0.731
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.996	0.979		0.873	0.652		0.368	0.873	0.861	0.873	0.873
Multiplier		1.00	1.00		1.00	2.01		3.00	1.00	1.62	1.00	1.00
Max concentration (ug/L) at edge of…	Acute	5,027	7.352		1.159	0.153		0.347	2.569	2.280	0.987	0.005
	Chronic	2,274	3.313		0.962	0.069		0.349	1.806	1.028	0.550	0.004
Reasonable Potential? Limit Required?		**NO**	**NO**		**NO**	**NO**		**NO**	**NO**	**NO**	**NO**	**NO**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$			0.55451						0.86205		0.7307
Pn	Pn=(1-confidence level)1/n			0.779						0.861		0.873
Multiplier				0.65281						0.39268		0.43499
Dilution Factor				14.2						14.2		14.2
Max Conc. at edge of Chronic Zone, ug/L				0.04225						0.17606		0.00272
Reasonable Potential? Limit Required?				**NO**						**NO**		**NO**

Reasonable Potential Calculation, Outfall 015 (2 of 2)

Facility	Everett WPCF
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	6.4	14.2
Human Health Carcinogenic		14.2
Human Health Non-Carcinogenic		14.2

Pollutant, CAS No. & NPDES Application Ref. No.			**NICKEL - 7440020 9M - Dependent on hardness**	**SILVER - 7740224 11M dependent on hardness.**	**THALLIUM 7440280 12M**	**ZINC- 7440666 13M hardness dependent**	**CHLOROFORM 67663 11V**	**DIETHYL PHTHALATE 84662 24B**	**TOLUENE 108883 25V**				
Effluent Data	# of Samples (n)		22	17	1	17	1	1	2				
	Coeff of Variation (Cv)		0.3	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)		3.99	1.6	0.09	54.5	0.31	0.24	4.19				
	Calculated 50th percentile Effluent Conc. (when n>10)		2.25			34.1							
Receiving Water Data	90th Percentile Conc., ug/L		0.54	0		5.45							
	Geo Mean, ug/L		0.36		0	2.7	0	0	0				
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	74	1.9	-	90	-	-	-				
		Chronic	8.2	-	-	81	-	-	-				
	WQ Criteria for Protection of Human Health, ug/L		100	-	0.27	1000	600	200	130				
	Metal Criteria Translator, decimal	Acute	0.99	0.85	-	0.946	-	-	-				
		Chronic	0.99	-	-	0.946	-	-	-				
	Carcinogen?		N	N	N	N	Y	N	N				

Aquatic Life Reasonable Potential

		NICKEL	SILVER	THALLIUM	ZINC	CHLOROFORM	DIETHYL PHTHALATE	TOLUENE
Effluent percentile value		0.950	0.950		0.950			
s	$s^2=\ln(CV^2+1)$	0.294	0.555		0.555			
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.873	0.838		0.838			
Multiplier		1.00	1.44		1.44			
Max concentration (ug/L) at edge of…	Acute	1.073	0.306		16.194			
	Chronic	0.780	0.162		10.292			
Reasonable Potential? Limit Required?		**NO**	**NO**		**NO**			

Human Health Reasonable Potential

		NICKEL	SILVER	THALLIUM	ZINC	CHLOROFORM	DIETHYL PHTHALATE	TOLUENE
s	$s^2=\ln(CV^2+1)$	0.29356		0.55451	0.55451	0.55451	0.55451	0.55451
Pn	Pn=(1-confidence level)1/n	0.873		0.050	0.838	0.050	0.050	0.224
Multiplier		0.71575		2.48953	0.57817	2.48953	2.48953	1.5242
Dilution Factor		14.2		14.2	14.2	14.2	14.2	14.2
Max Conc. at edge of Chronic Zone, ug/L		0.4931		0.01578	4.91127	5.4E-02	4.2E-02	0.44975
Reasonable Potential? Limit Required?		**NO**		**NO**	**NO**	**NO**	**NO**	**NO**

Marine Temperature Reasonable Potential and Limit Calculation, Outfall 015

Based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines.

INPUT	
1. Chronic Dilution Factor at Mixing Zone Boundary	26.7
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	19.1 °C
3. 1DADMax Effluent Temperature (95th percentile)	26.3 °C
4. Aquatic Life Temperature WQ Criterion	16.0 °C
OUTPUT	
5. Temperature at Chronic Mixing Zone Boundary:	19.37 °C
6. Incremental Temperature Increase or decrease:	0.27 °C
7. Maximum Incremental Temperature Increase 12/(T-2)	---
8. Maximum Allowable Temperature at Mixing Zone Boundary:	16.00 °C
A. If ambient temp is warmer than WQ criterion	
9. Does temp fall within this warmer temp range?	YES
10. **If YES - Use TMDL-based or performance-based limit - Do Not use this spreadsheet**	NO LIMIT
B. If ambient temp is cooler than WQ criterion but within $12/(T_{amb}-2)$ of the criterion	
11. Does temp fall within this Incremental temp. range?	---
12. Temp increase allowed at mixing zone boundary, if required:	---
C. If ambient temp is cooler than (WQ criterion - $12/(T_{amb}-2)$)	
13. Does temp fall within this Incremental temp. range?	---
14. Temp increase allowed at mixing zone boundary, if required:	---
RESULTS	
15. Do any of the above cells show a temp increase?	**NO**
16. Temperature Limit if Required?	**NO LIMIT**

Calculation of pH of a Mixture in Marine Water, Outfall 015

Based on the CO2SYS program (Lewis and Wallace, 1998), http://cdiac.esd.ornl.gov/oceans/co2rprt.html

INPUT	
1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	14.2
Depth at plume trapping level (m)	0.000
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	17.80
pH:	7.20
Salinity (psu):	8.00
Total alkalinity (meq/L)	0.57
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	24.00
pH:	8.80
Salinity (psu)	0.50
Total alkalinity (meq/L):	3.30
OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	18.24
Salinity (psu)	7.47
Density (kg/m^3)	1004
Alkalinity (mmol/kg-SW):	0.75
Total Inorganic Carbon (mmol/kg-SW):	1
pH at Mixing Zone Boundary:	**7.69**

Reasonable Potential Calculation, Outfall 025 (1 of 2)

Facility	Everett WPCF
Water Body Type	Marine

	Acute	Chronic
Aquatic Life	7.3	15.6
Human Health Carcinogenic		15.6
Human Health Non-Carcinoge		15.6

Pollutant, CAS No. & NPDES Application Ref. No.			**AMMONIA, Criteria as Total NH3**	**CHLORINE (Total Residual) 7782505**	**ARSENIC (dissolved) 7440382 2M**	**CADMIUM - 7440439 4M Hardness dependent**	**CHROMIUM(HEX) 18540299**	**COPPER - 744058 6M Hardness dependent**	**LEAD - 7439921 7M Dependent on hardness**	**MERCURY 7439976 8M**	**NICKEL - 7440020 9M - Dependent on hardness**
Effluent Data	# of Samples (n)		190	1985	24	4	8	24	24	23	24
	Coeff of Variation (Cv)		0.42	0.12	0.15	0.6	0.6	0.21	0.28	0.4	0.17
	Effluent Concentration, ug/L (Max. or 95th Percentile)		28,270	0.55	1	0.06	0.04	8.33	0.7	0.01158	2.97
	Calculated 50th percentile Effluent Conc. (when n>10)									6.14	2.25
Receiving Water Data	90th Percentile Conc., ug/L		14	0	0.8	0	0.35	1.18	0.191	0.0022	0.54
	Geo Mean, ug/L									0.002	0.36
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	37,747	13	69	42	1100	4.8	210	1.8	74
		Chronic	5,670	7.5	36	9.3	50	3.1	8.1	0.025	8.2
	WQ Criteria for Protection of Human Health, ug/L		-	-	-	-	-	-	-	0.15	100
	Metal Criteria Translator, decimal	Acute	-	-	1	0.994	-	0.83	0.951	0.85	0.99
		Chronic	-	-	-	0.994	-	0.83	0.951	-	0.99
	Carcinogen?		N	N	Y	N	N	N	N	N	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
s	$s^2=\ln(CV^2+1)$		0.403	0.120	0.149	0.555	0.555	0.208	0.275	0.385	0.169
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.984	0.998	0.883	0.473	0.688	0.883	0.883	0.878	0.883
Multiplier			1.00	1.00	1.00	2.59	1.90	1.00	1.00	1.00	1.00
Max concentration (ug/L) at edge of…		Acute	3,885	0.075	0.827	0.021	0.312	1.965	0.256	0.003	0.869
		Chronic	1,825	0.035	0.813	0.010	0.332	1.548	0.221	0.003	0.694
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Reasonable Potential Calculation, Outfall 025 (2 of 2)

Facility	Everett WPCF
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	7.3	15.6
Human Health Carcinogenic		15.6
Human Health Non-Carcinoge		15.6

Pollutant, CAS No. & NPDES Application Ref. No.			**SILVER - 7740224 11M dependent on hardness.**	**SELENIUM 7782492 10M**	**ZINC- 7440666 13M hardness dependent**	**CYANIDE 57125 14M**				
Effluent Data	# of Samples (n)		6	1	24	9				
	Coeff of Variation (Cv)		0.6	0.6	0.18	0.6				
	Effluent Concentration, ug/L (Max. or 95th Percentile)		0.08	0.9	42.02	33				
	Calculated 50th percentile Effluent Conc. (when n>10)				34.1					
Receiving Water Data	90th Percentile Conc., ug/L		0	0	5.45	0				
	Geo Mean, ug/L			0	2.7	0				
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	1.9	290	90	9.1				
		Chronic	-	71	81	2.8				
	WQ Criteria for Protection of Human Health, ug/L		-	200	1000	100				
	Metal Criteria Translator, decimal	Acute	0.85	-	0.946	-				
		Chronic	-	-	0.946	-				
	Carcinogen?		N	N	N	N				

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950	0.950				
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.179	0.555				
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.607	0.050	0.883	0.717				
Multiplier			2.14	6.20	1.00	1.81				
Max concentration (ug/L) at edge of…		Acute	0.020	0.764	10.149	8.188				
		Chronic	0.011	0.358	7.649	3.832				
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**YES**				

Marine Temperature Reasonable Potential and Limit Calculation, Outfall 025

Based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines.

INPUT	
1. Chronic Dilution Factor at Mixing Zone Boundary	15.6
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	17.8 °C
3. 1DADMax Effluent Temperature (95th percentile)	22.5 °C
4. Aquatic Life Temperature WQ Criterion	13.0 °C
OUTPUT	
5. Temperature at Chronic Mixing Zone Boundary:	18.10 °C
6. Incremental Temperature Increase or decrease:	0.30 °C
7. Maximum Incremental Temperature Increase 12/(T-2)	---
8. Maximum Allowable Temperature at Mixing Zone Boundary:	13.00 °C
A. If ambient temp is warmer than WQ criterion	
9. Does temp fall within this warmer temp range?	YES
10. **If YES - Use TMDL-based or performance-based limit - Do Not use this spreadsheet**	0.3
B. If ambient temp is cooler than WQ criterion but within 12/(T_{amb}-2) of the criterion	
11. Does temp fall within this Incremental temp. range?	---
12. Temp increase allowed at mixing zone boundary, if required:	---
C. If ambient temp is cooler than (WQ criterion - 12/(T_{amb}-2))	
13. Does temp fall within this Incremental temp. range?	---
14. Temp increase allowed at mixing zone boundary, if required:	---
RESULTS	
15. Do any of the above cells show a temp increase?	**YES**
16. Temperature Limit if Required?	**17.38 °C**

Calculation of pH of a Mixture in Marine Water, Outfall 025

Based on the CO2SYS program (Lewis and Wallace, 1998), http://cdiac.esd.ornl.gov/oceans/co2rprt.html

INPUT	
1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	15.6
Depth at plume trapping level (m)	0
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	17.80
pH:	7.20
Salinity (psu):	8.00
Total alkalinity (meq/L)	0.57
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	22.50
pH:	6.60
Salinity (psu)	0.50
Total alkalinity (meq/L):	1.76
OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	18.10
Salinity (psu)	7.52
Density (kg/m^3)	1004
Alkalinity (mmol/kg-SW):	0.64
Total Inorganic Carbon (mmol/kg-SW):	1
pH at Mixing Zone Boundary:	**7.01**

WET Test Results Summary for Everett WWTP (WA0024490)

Scheduled	Test Code	Collected	Start Date	Duration	Organism	Endpoint	NOEC	LOEC	Effluent Survival (100%)	Met Performance Standard?
2017 July	CDUD003	7/11/2017	7/11/2017	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	50%	100%	87.5%	Yes
2017 July	CDUD004	7/11/2017	7/11/2017	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	97.5%	Yes
2017 November	CDUD0093	11/10/2017	11/10/2017	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	Yes
2017 November	CDUD0092	11/10/2017	11/10/2017	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	Yes
2018 February	CDUD0182	2/14/2018	2/14/2018	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	100.0%	Yes
2018 February	CDUD0183	2/14/2018	2/14/2018	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	90.0%	Yes
2018 April	CDUD0246	4/25/2018	4/25/2018	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	Yes
2018 April	CDUD0247	4/25/2018	4/25/2018	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	Yes
2018 April	CDUD0319	7/18/2018	7/18/2018	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	50%	100%	77.5%	Yes
2018 April	CDUD0320	7/18/2018	7/18/2018	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	100.0%	Yes
2018 November	CDUD0392	11/7/2018	11/7/2018	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	Yes
2018 November	CDUD0391	11/7/2018	11/7/2018	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	Yes
2019 March	CDUD0430	3/6/2019	3/6/2019	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	95.0%	Yes
2019 March	CDUD0431	3/6/2019	3/6/2019	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	100.0%	Yes
2019 April	CDUD453	4/3/2019	4/3/2019	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	50%	100%	30.0%	No*
2019 April	CDUD454	4/3/2019	4/3/2019	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	60.0%	No*
2019 July	CDUD483	7/8/2019	7/9/2019	Chronic	*Americamysis bahia* Mysid Shrimp	7-Day Survival 7-Day Growth 7- Day Weight	30% 30% 30%	100% 100% >30%	N/A	Yes

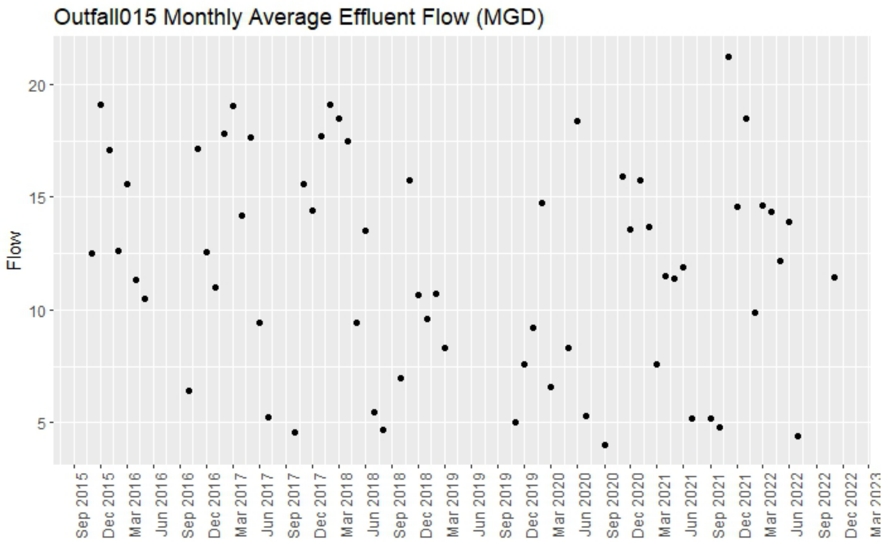
2019 July	CDUD482	7/8/2019	7/9/2019	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	97.5%	Yes
2019 July	CDUD484	7/8/2019	7/9/2019	Chronic	*Atherinops affinis* Topsmelt	7-Day Survival 7-Day Growth 7- Day Weight	30% 30% 30%	100% 100% >30%	N/A	Yes
2019 December	CDUD0595	12/4/2019	12/5/2019	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	100%	100.0%	Yes
2019 December	CDUD0593	12/4/2019	12/5/2019	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	50%	100%	35.0%	No*
2020 January	CDUD598	1/13/2020	1/14/2020	Chronic	*Americamysis bahia* Mysid Shrimp	7-Day Survival 7-Day Growth 7- Day Weight	30% 30% 100%	100% 100% >100%	N/A	Yes
2020 January	CDUD0596	1/13/2020	1/14/2020	Chronic	*Americamysis bahia* Mysid Shrimp	7-Day Survival 7-Day Growth 7- Day Weight	50% 15.6% 25%	100% 25% 50%	N/A	Yes
2020 January	CDUD0599	1/13/2020	1/14/2020	Chronic	*Atherinops affinis* Topsmelt	7-Day Survival 7-Day Growth 7- Day Weight	100% 100% 100%	>100% >100% >100%	N/A	Yes
2020 January	CDUD0597	1/13/2020	1/14/2020	Chronic	*Atherinops affinis* Topsmelt	7-Day Survival 7-Day Growth 7- Day Weight	50% 50% 50%	100% 100% >50%	N/A	Yes
2020 July	CDUD0653	7/6/2020	7/7/2020	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	100.0%	Yes
2020 July	CDUD0654	7/6/2020	7/7/2020	Chronic	*Americamysis bahia* Mysid Shrimp	7-Day Survival 7-Day Growth 7- Day Weight	50% 15.6% 15.6%	100% 25% 25%	N/A	Yes
2020 July	CDUD0655	7/6/2020	7/7/2020	Chronic	*Atherinops affinis* Topsmelt	7-Day Survival 7-Day Growth 7- Day Weight	50% 25% 50%	100% 50% >50%	N/A	Yes
2020 September	CDUD827	9/17/2020	9/18/2020	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	100.0%	Yes
2020 March	CDUD1141	3/11/2020	3/11/2020	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	100.0%	Yes
2020 March	CDUD1142	3/11/2020	3/11/2020	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	100.0%	Yes
2020 May	CDUD0825	5/27/2020	5/27/2020	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	50%	100%	10.0%	No*
2020 May	CDUD0826	5/27/2020	5/27/2020	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	Yes
2020 December	CDUD0828	12/9/2020	12/9/2020	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	Yes

2020 December	CDUD0828	12/9/2020	12/9/2020	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	**Yes**
2021 May	CDUD0832	4/14/2021	4/14/2021	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	**Yes**
2021 May	CDUD0833	4/14/2021	4/14/2021	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	**Yes**
2021 July	CDUD0834	7/7/2021	7/7/2021	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	95.0%	**Yes**
2021 July	CDUD0835	7/7/2021	7/7/2021	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	97.5%	**Yes**
2021 October	CDUD0836	10/19/2021	10/19/2021	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	50%	100%	35.0%	**No***
2021 October	CDUD0837	10/19/2021	10/19/2021	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	**Yes**
2022 February	CDUD0838	2/15/2022	2/15/2022	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	92.5%	**Yes**
2022 February	CDUD0839	2/15/2022	2/15/2022	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	97.5%	**Yes**
2022 May	CDUD1146	5/24/2022	5/25/2022	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	**Yes**
2022 May	CDUD1147	5/24/2022	5/25/2022	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	100%	>100%	100.0%	**Yes**
2022 July	CDUD1148	7/6/2022	7/6/2022	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	97.5%	**Yes**
2022 July	CDUD1149	7/6/2022	7/6/2022	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	100.0%	**Yes**
2022 November	CDUD1150	11/15/2022	11/16/2022	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	50%	100%	15.0%	**No***
2022 November	CDUD1151	11/15/2022	11/16/2022	Acute	*Daphnia pulex* Water Flea	48-Hour Survival	30%	100%	50.0%	**No***

LOEC = Lowest observed effect concentration. NOEC= No observed effect concentration. PMSD= Percent minimum significant difference.

*The acute test result showed less than 65% survival in 100% effluent. An acute WET limit is needed if the testing was for effluent characterization (WAC 173-205-050(2)(a)(ii)) or compliance monitoring (WAC 173-205-120(1)(a)). Another effluent characterization for acute WET (WAC 173-205-060(3)(a)) is needed if the testing was an end of permit term check (WAC 173-205-030(8)). Note: This does not necessarily mean that the asterisked test was out of compliance with the effluent limits set forth in the permit.

OUTFALL 015


Outfall015 Monthly Average Effluent Flow (MGD)
Flow
20
15
10
5
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
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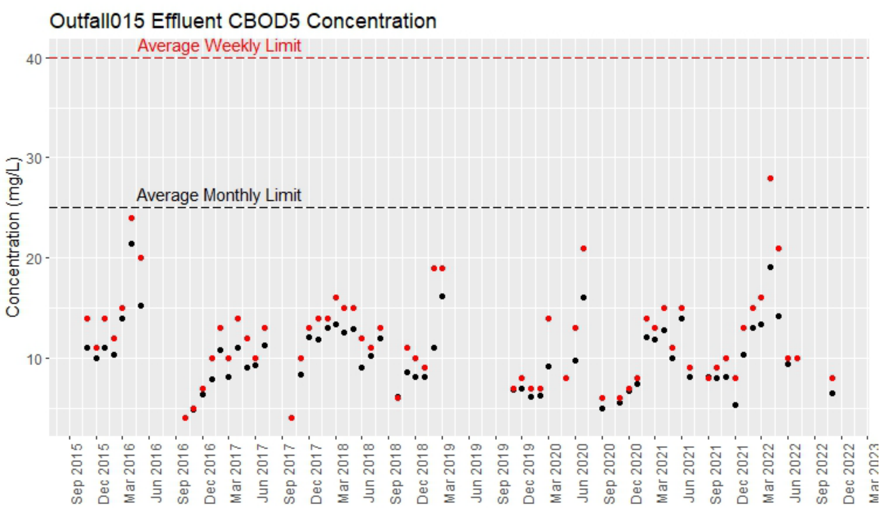
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023


Outfall015 Effluent CBOD5 Concentration
Average Weekly Limit
Average Monthly Limit
Concentration (mg/L)
40
30
20
10
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
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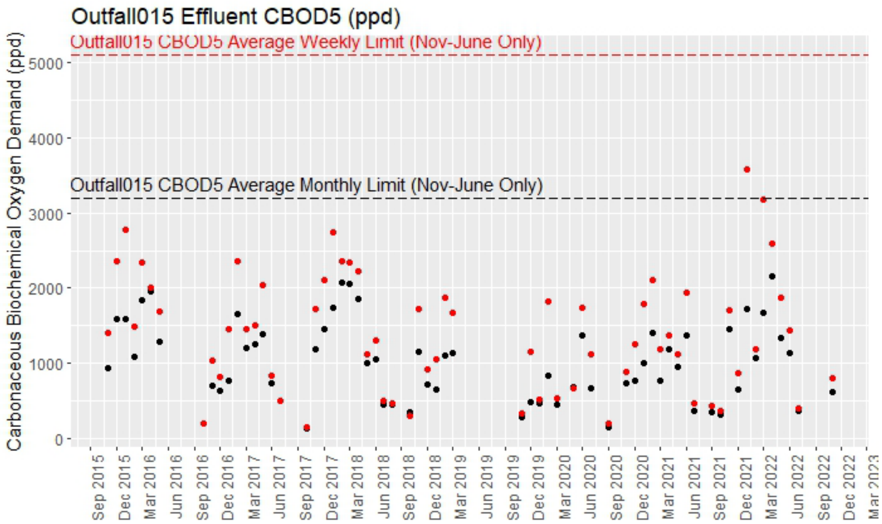
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023


Outfall015 Effluent CBOD5 (ppd)
Outfall015 CBOD5 Average Weekly Limit (Nov-June Only)
Outfall015 CBOD5 Average Monthly Limit (Nov-June Only)
Carbonaceous Biochemical Oxygen Demand (ppd)
0
1000
2000
3000
4000
5000
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
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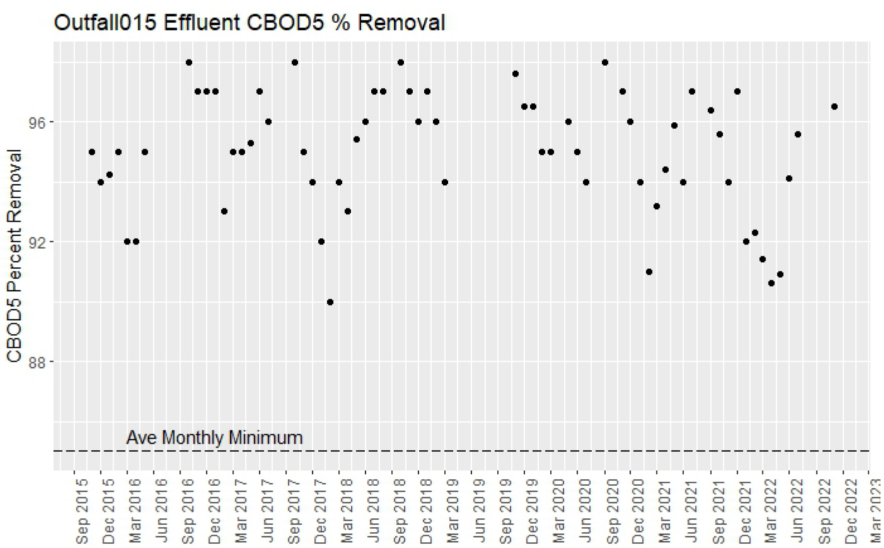
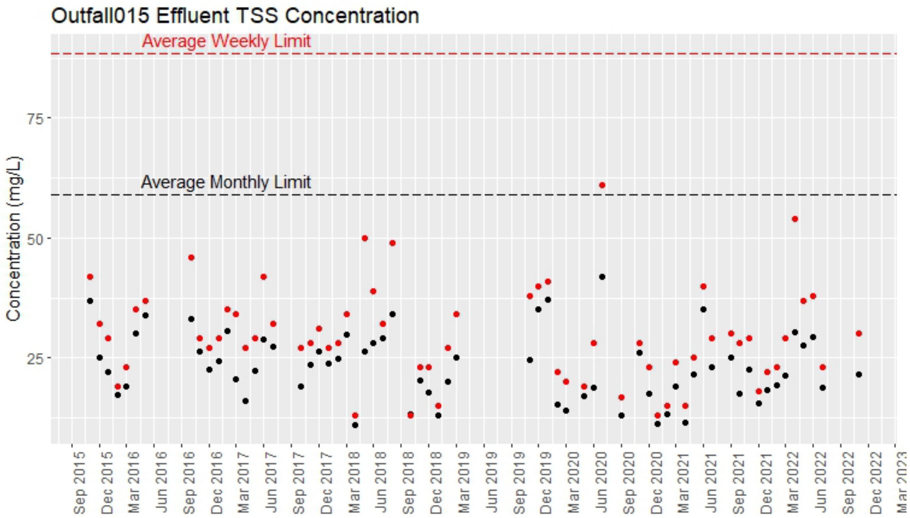
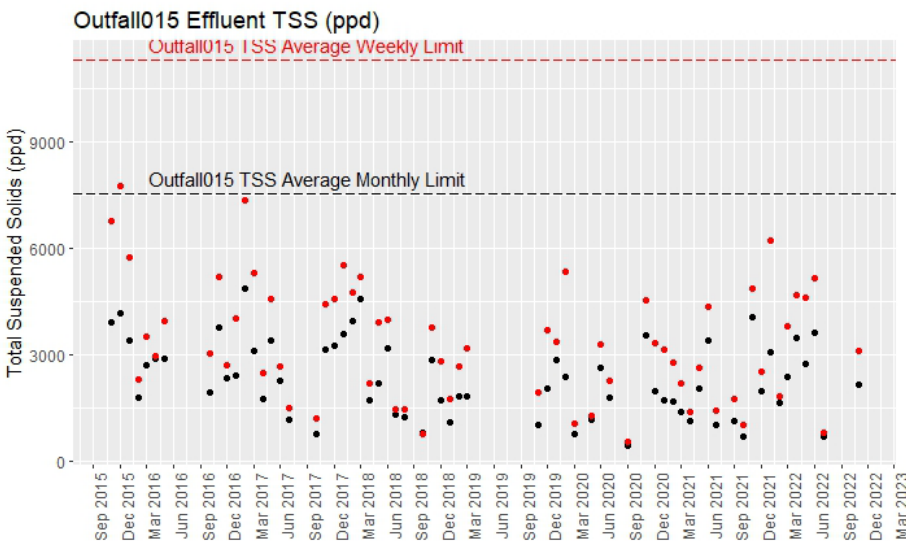
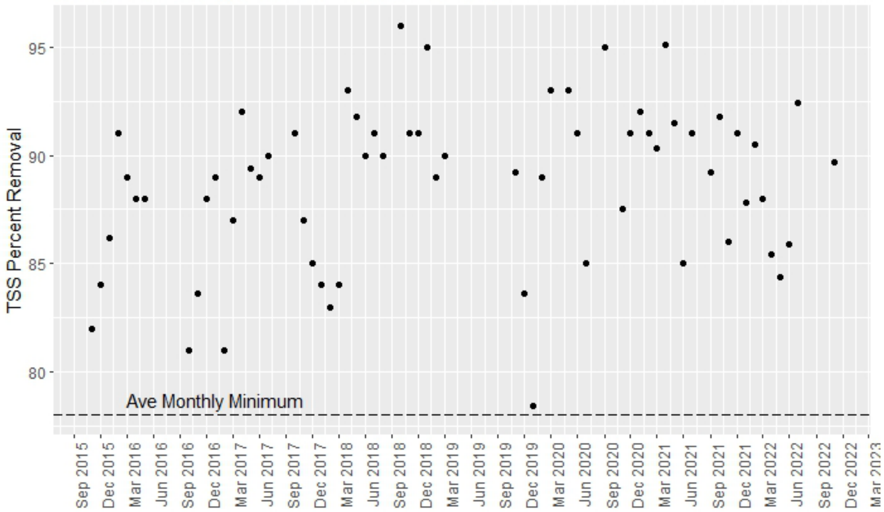
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023


Outfall015 Effluent CBOD5 % Removal
CBOD5 Percent Removal
88
92
96
Ave Monthly Minimum
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023

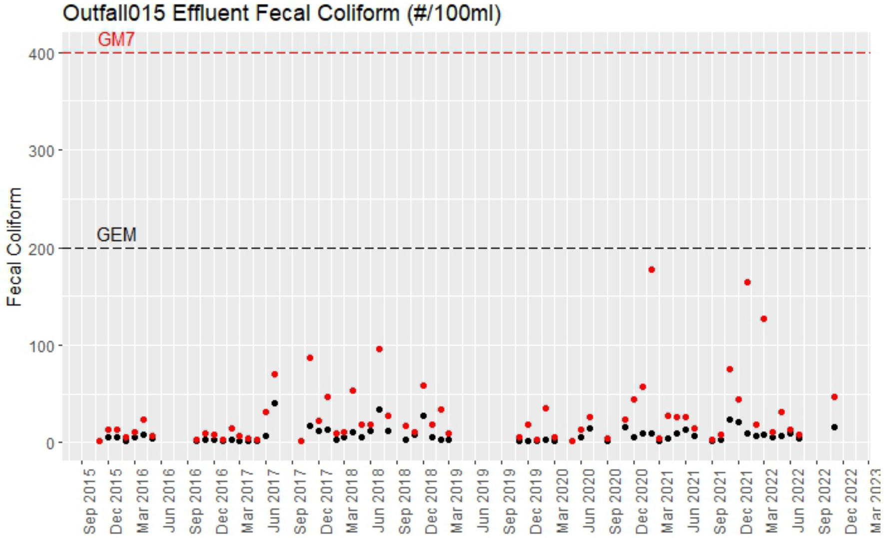

Outfall015 Effluent TSS Concentration
Average Weekly Limit
Average Monthly Limit
Concentration (mg/L)
75
50
25
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023

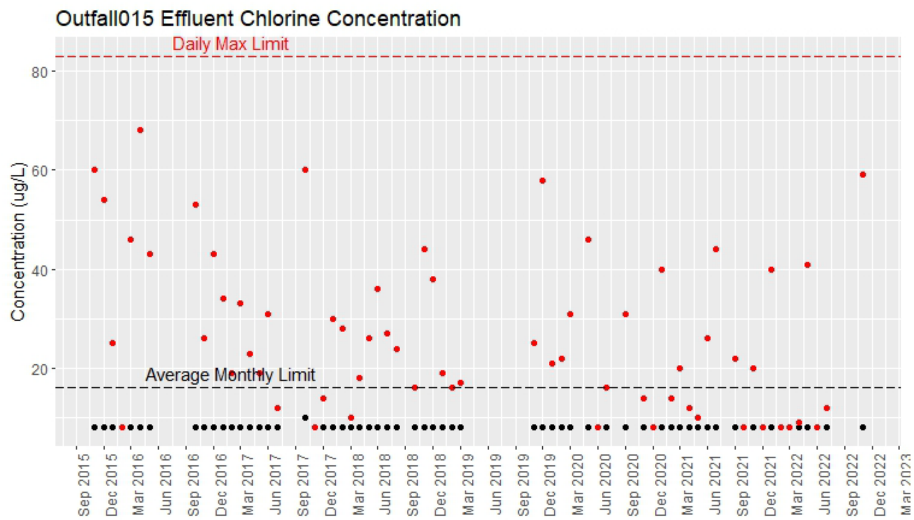

Outfall015 Effluent TSS (ppd)
Outfall015 TSS Average Weekly Limit
Outfall015 TSS Average Monthly Limit
Total Suspended Solids (ppd)
9000
6000
3000
0
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023

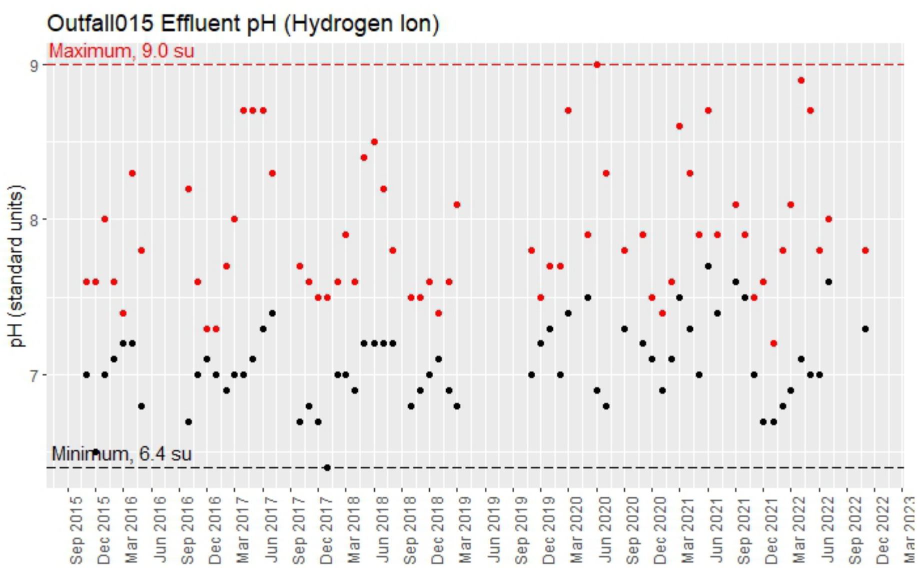
Outfall015 Average Monthly TSS % Removal

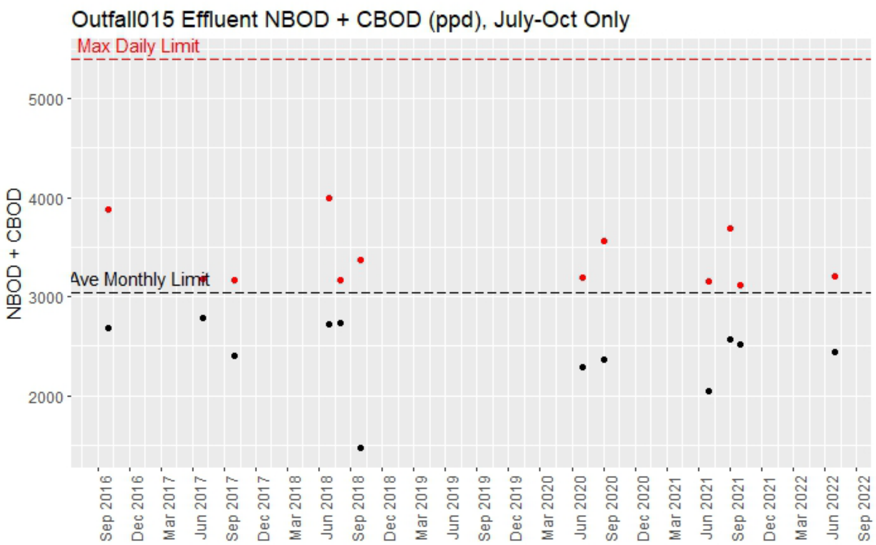


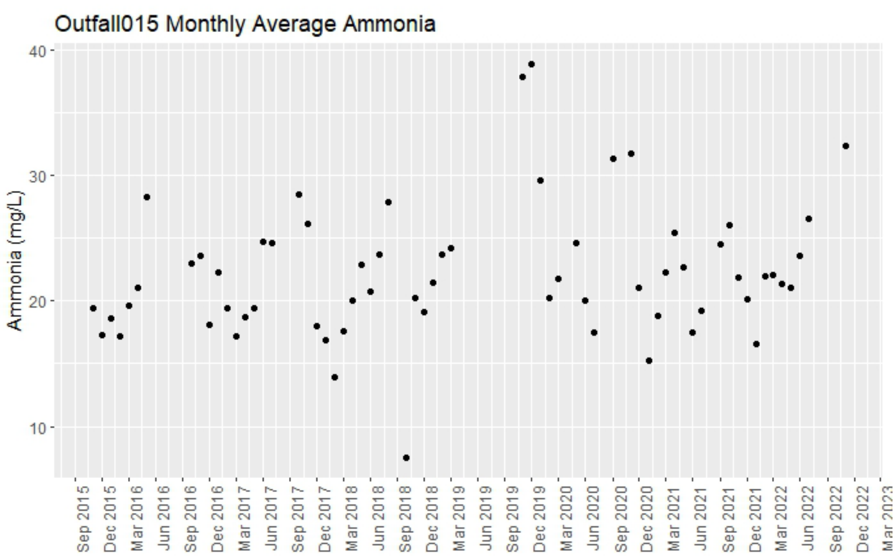
Outfall015 Effluent Fecal Coliform (#/100ml)

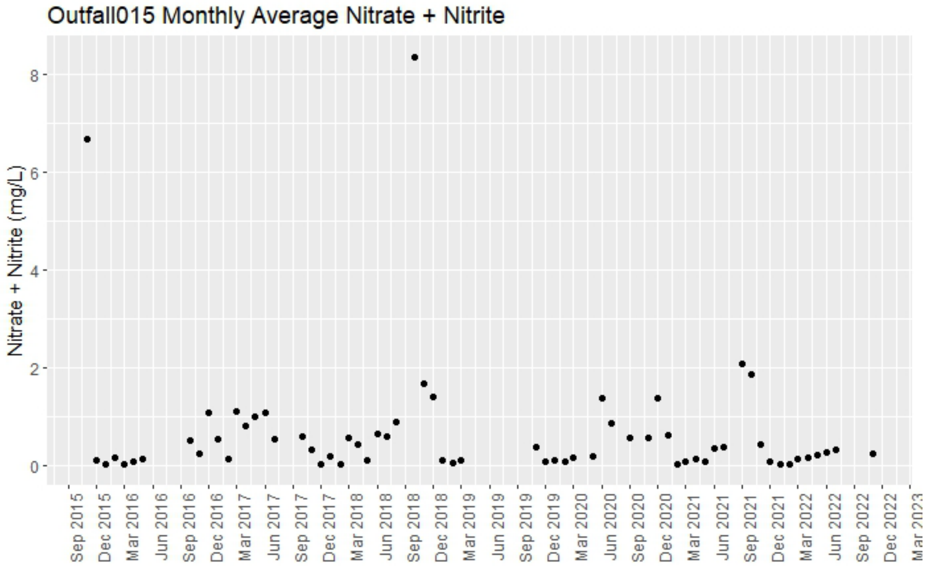


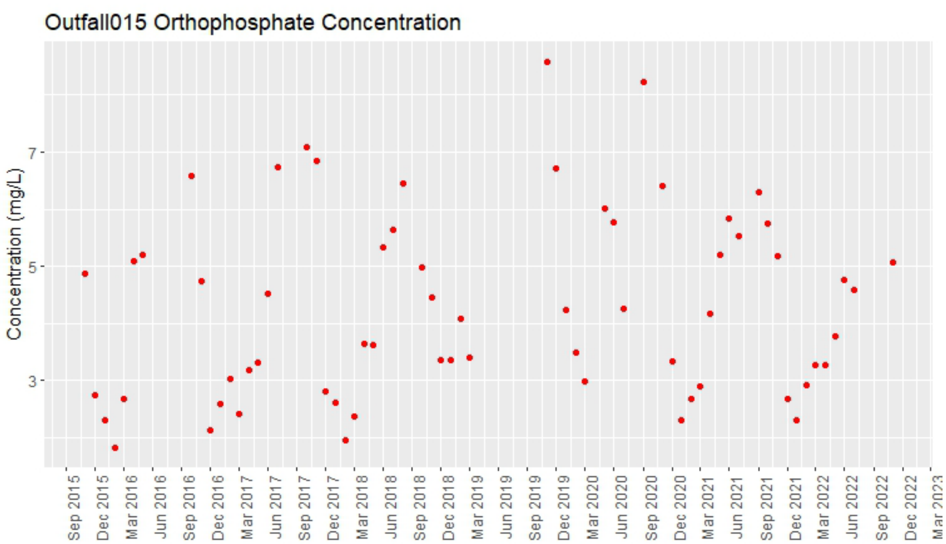

Outfall015 Effluent Chlorine Concentration
Daily Max Limit
Average Monthly Limit
Concentration (ug/L)
80
60
40
20
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023

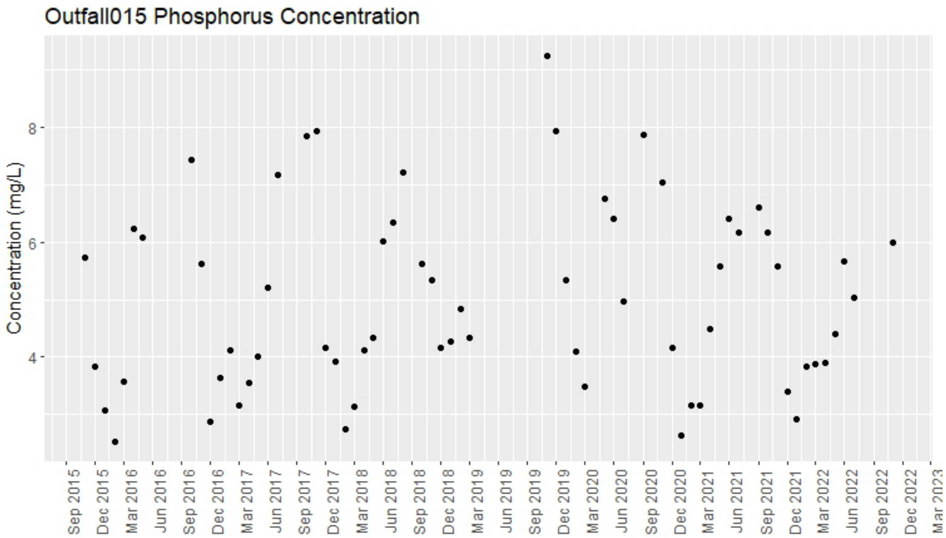

Outfall015 Effluent pH (Hydrogen Ion)
Maximum, 9.0 su
Minimum, 6.4 su
pH (standard units)
9
8
7
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023


Outfall015 Effluent NBOD + CBOD (ppd), July-Oct Only
Max Daily Limit
Ave Monthly Limit
NBOD + CBOD
5000
4000
3000
2000
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022

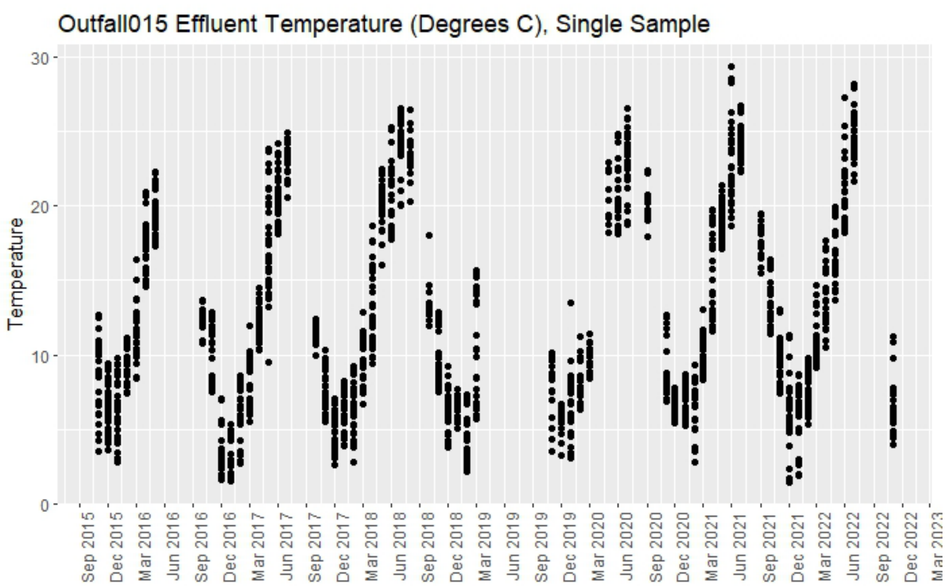

Outfall015 Monthly Average Ammonia
Ammonia (mg/L)
40
30
20
10
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023


Outfall015 Monthly Average Nitrate + Nitrite
Nitrate + Nitrite (mg/L)
0
2
4
6
8
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023

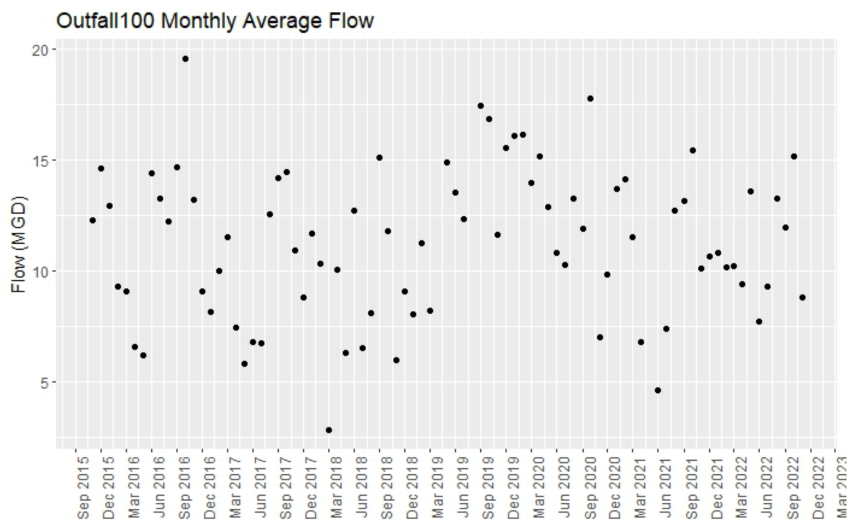

Outfall015 Orthophosphate Concentration
Concentration (mg/L)
3
5
7
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023



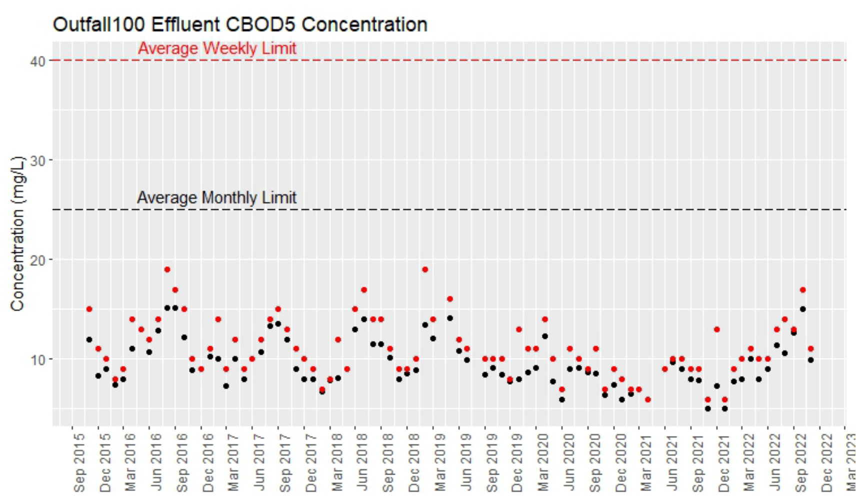
Note: Outfall 015 Phosphorus Concentration above refers to Total Phosphorus.

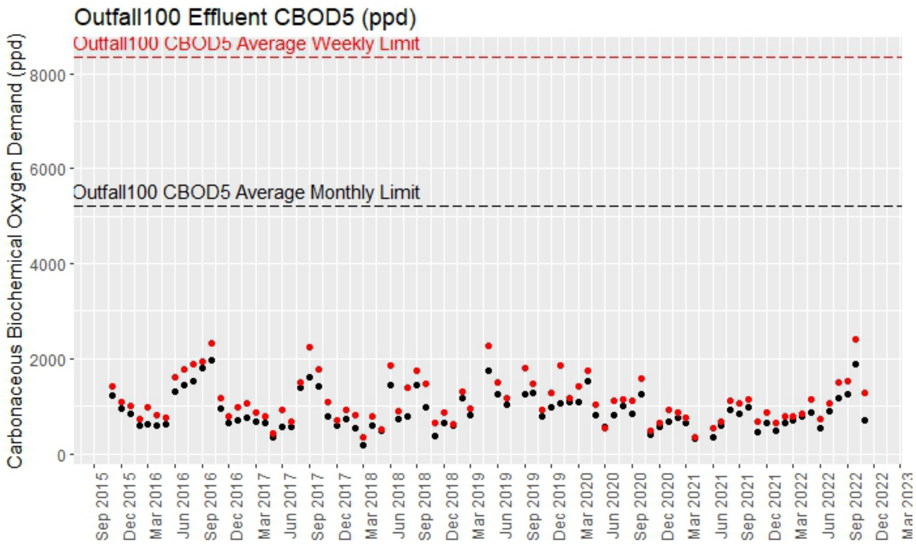


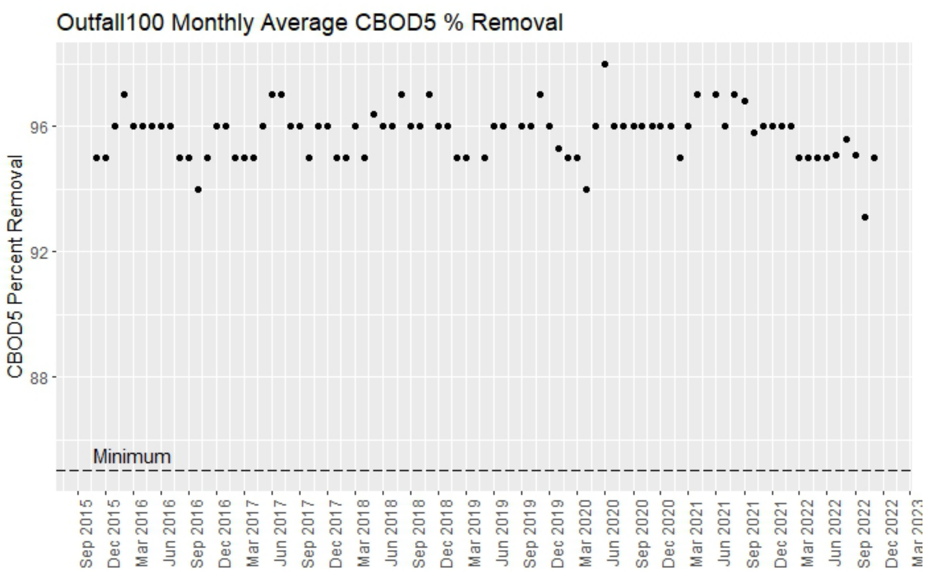
OUTFALL 100

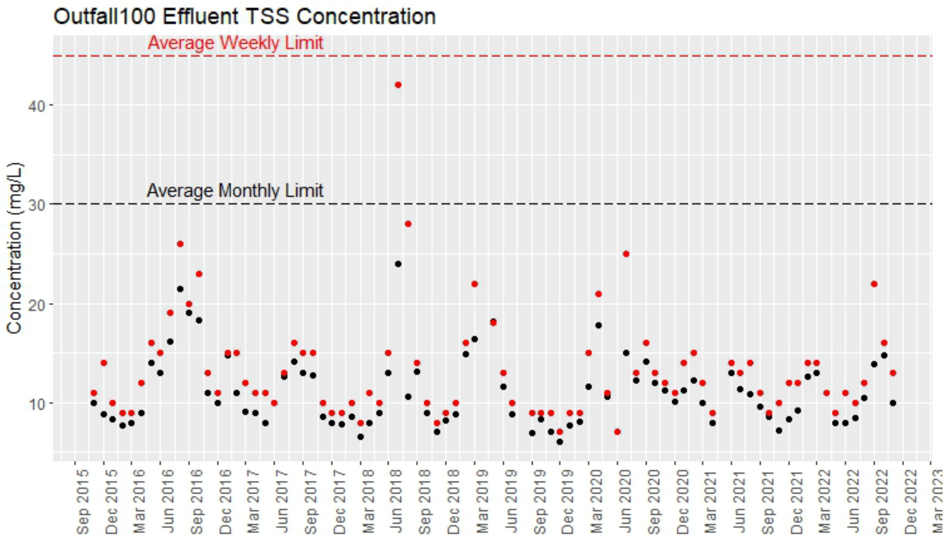


OUTFALL 100




Outfall100 Effluent CBOD5 (ppd)
Outfall100 CBOD5 Average Weekly Limit
Outfall100 CBOD5 Average Monthly Limit
Carbonaceous Biochemical Oxygen Demand (ppd)
0
2000
4000
6000
8000
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023


Outfall100 Monthly Average CBOD5 % Removal
CBOD5 Percent Removal
88
92
96
Minimum
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Mar 2020
Jun 2020
Sep 2020
Dec 2020
Mar 2021
Jun 2021
Sep 2021
Dec 2021
Mar 2022
Jun 2022
Sep 2022
Dec 2022
Mar 2023


Outfall100 Effluent TSS Concentration
Average Weekly Limit
Average Monthly Limit
Concentration (mg/L)
40
30
20
10
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
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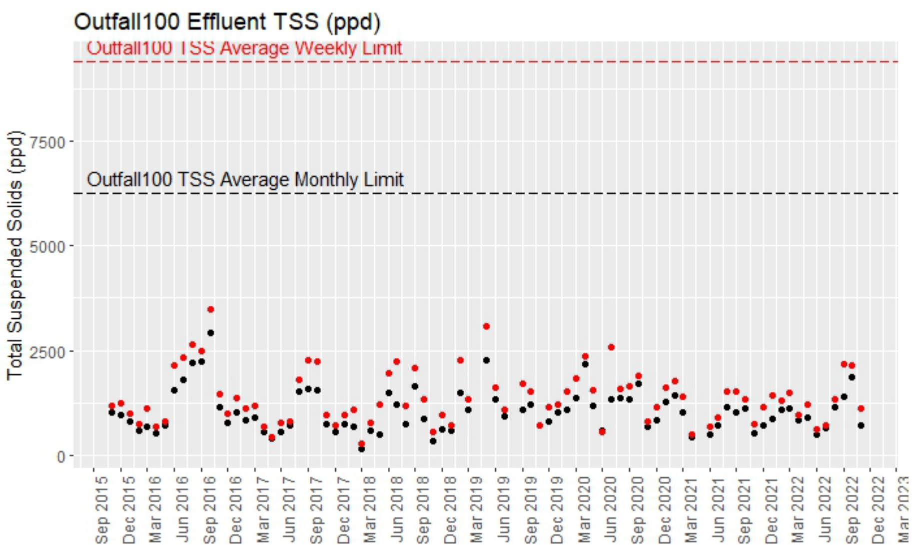
Outfall100 Effluent TSS (ppd)
Outfall100 TSS Average Weekly Limit
Outfall100 TSS Average Monthly Limit
Total Suspended Solids (ppd)
7500
5000
2500
0
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
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Dec 2017
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Jun 2018
Sep 2018
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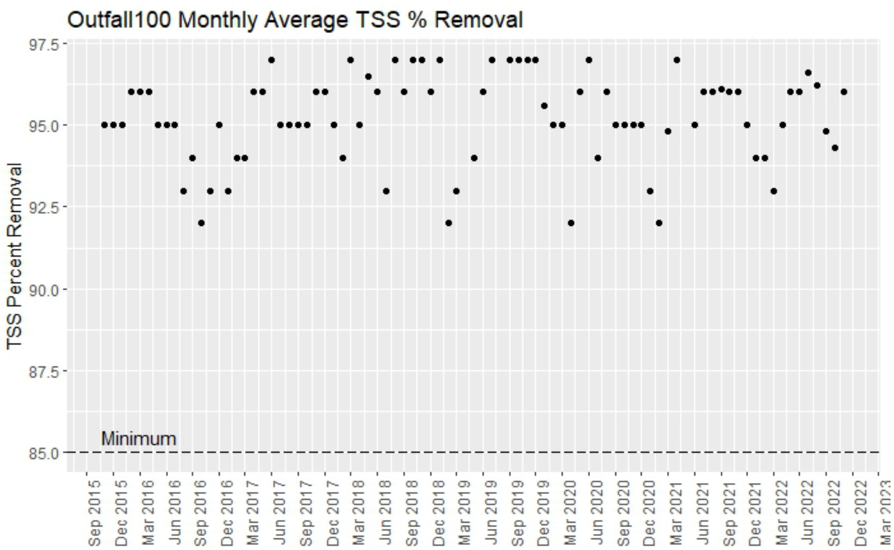
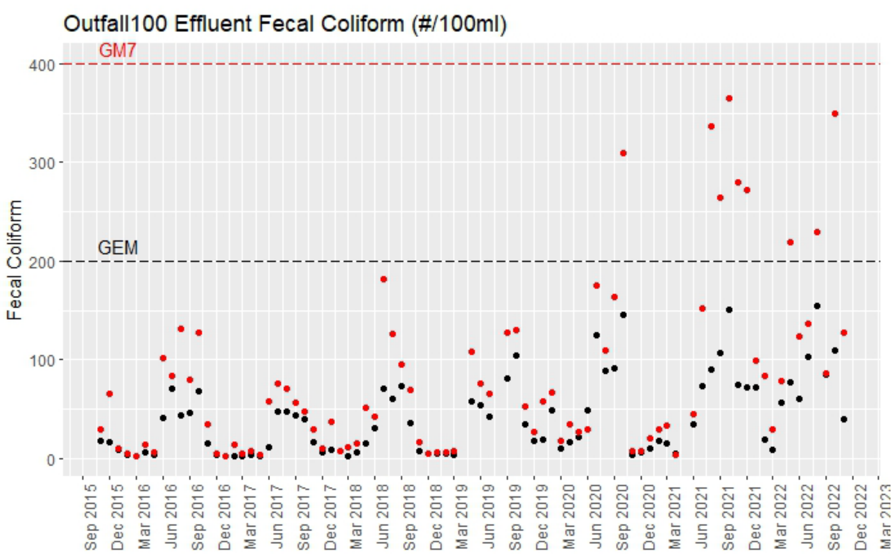
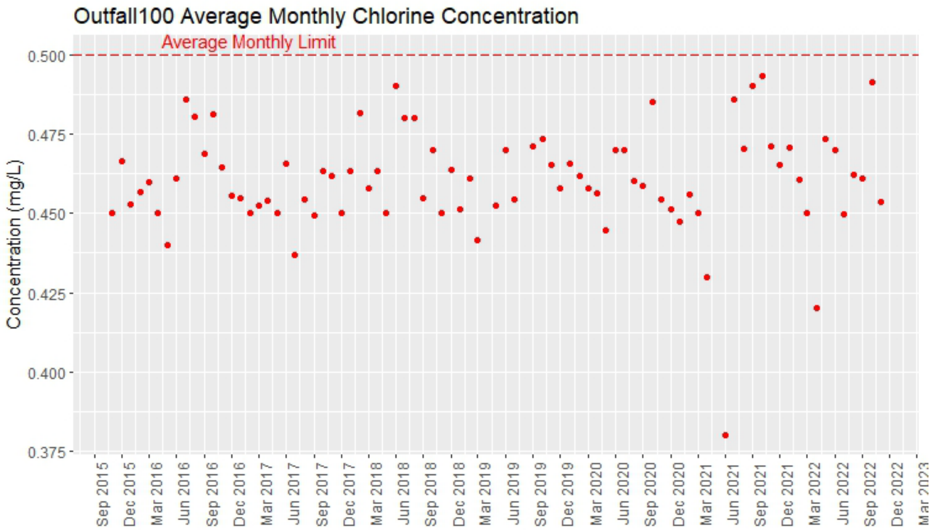

Outfall100 Monthly Average TSS % Removal
TSS Percent Removal
Minimum


Outfall100 Effluent Fecal Coliform (#/100ml)
GM7
GEM
Fecal Coliform


Outfall100 Average Monthly Chlorine Concentration
Average Monthly Limit
Concentration (mg/L)
0.500
0.475
0.450
0.425
0.400
0.375
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
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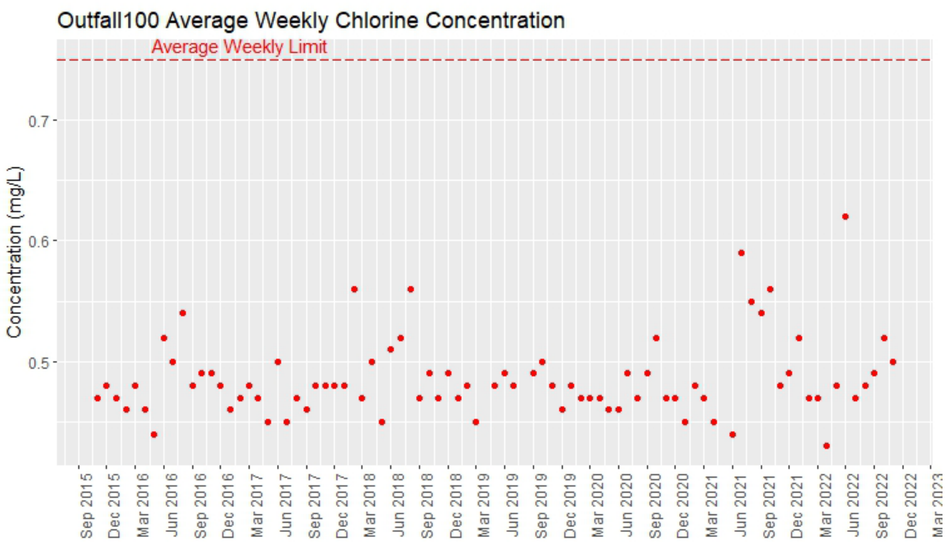
Outfall100 Average Weekly Chlorine Concentration
Average Weekly Limit
Concentration (mg/L)
0.7
0.6
0.5
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
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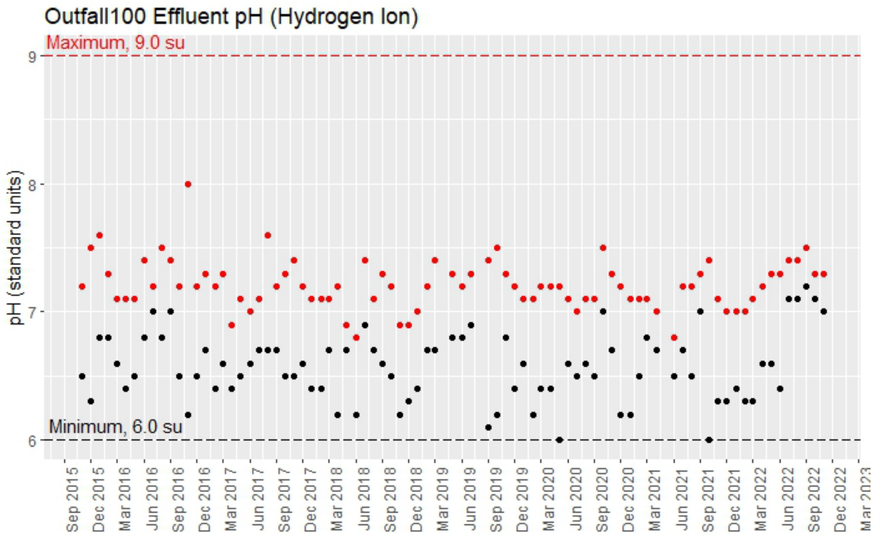
Outfall100 Effluent pH (Hydrogen Ion)
Maximum, 9.0 su
Minimum, 6.0 su
pH (standard units)
9
8
7
6
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
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Dec 2022
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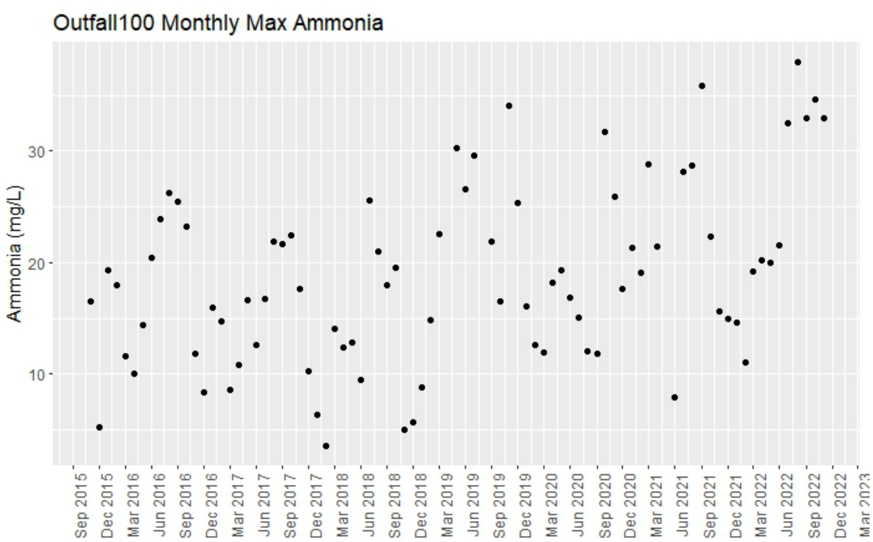
Outfall100 Monthly Max Ammonia
Ammonia (mg/L)
30
20
10
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
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Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
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Jun 2022
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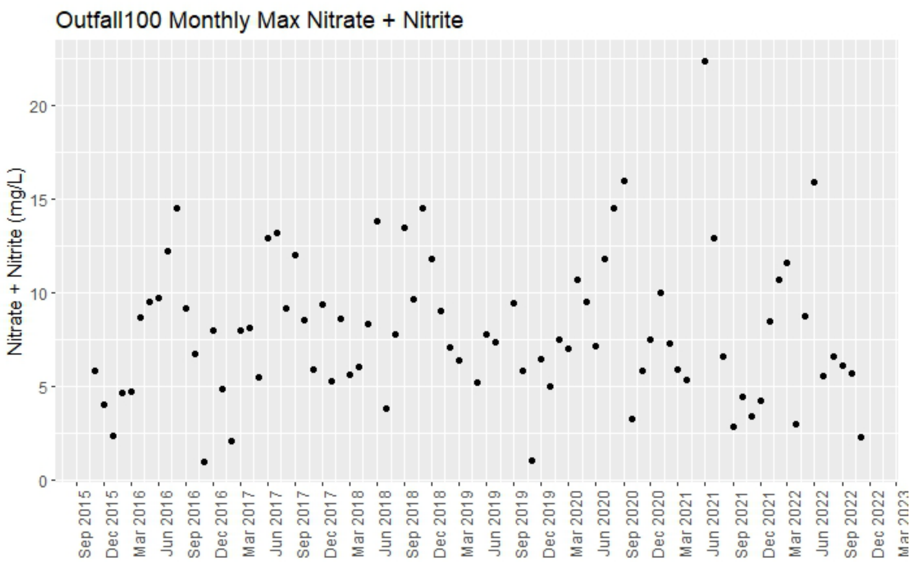
Outfall100 Monthly Max Nitrate + Nitrite
Nitrate + Nitrite (mg/L)
0
5
10
15
20
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
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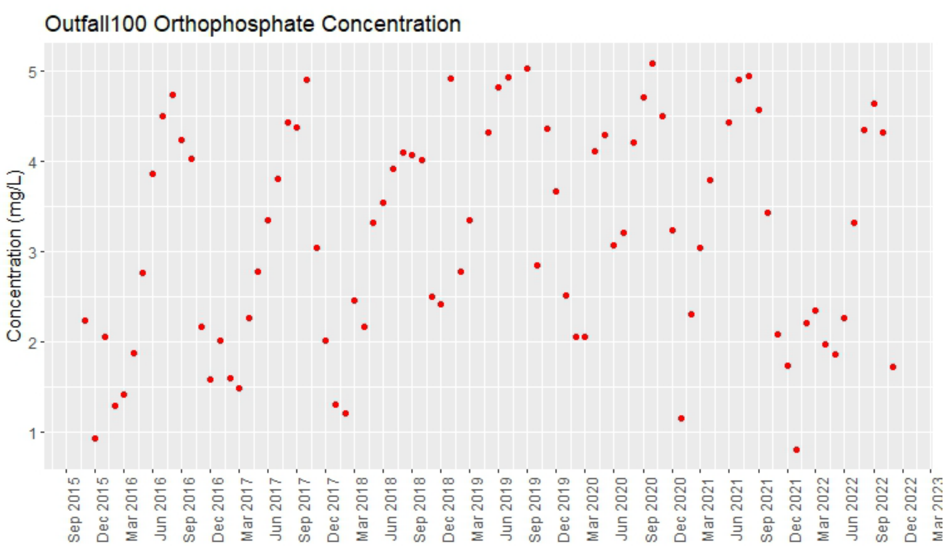
Outfall100 Orthophosphate Concentration
Concentration (mg/L)
1
2
3
4
5
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
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Mar 2017
Jun 2017
Sep 2017
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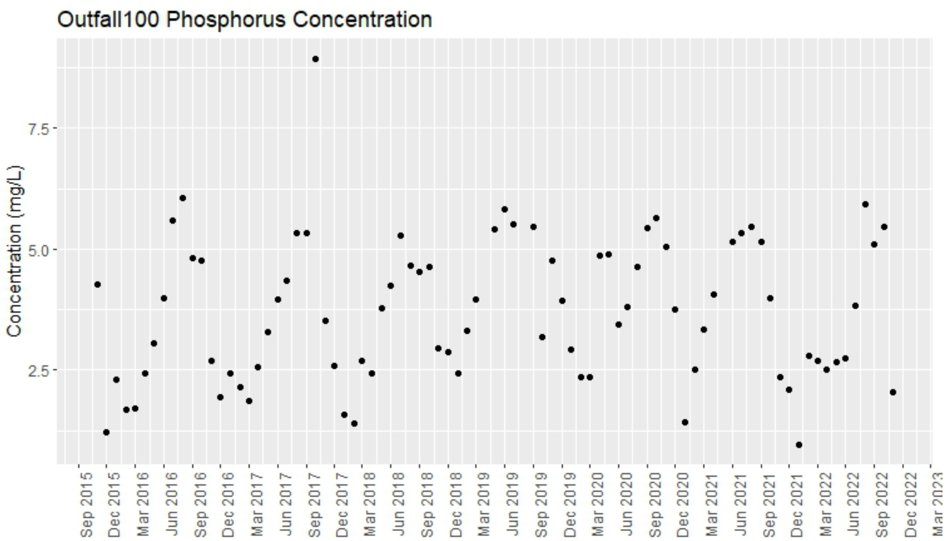
Outfall100 Phosphorus Concentration
Concentration (mg/L)
7.5
5.0
2.5
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
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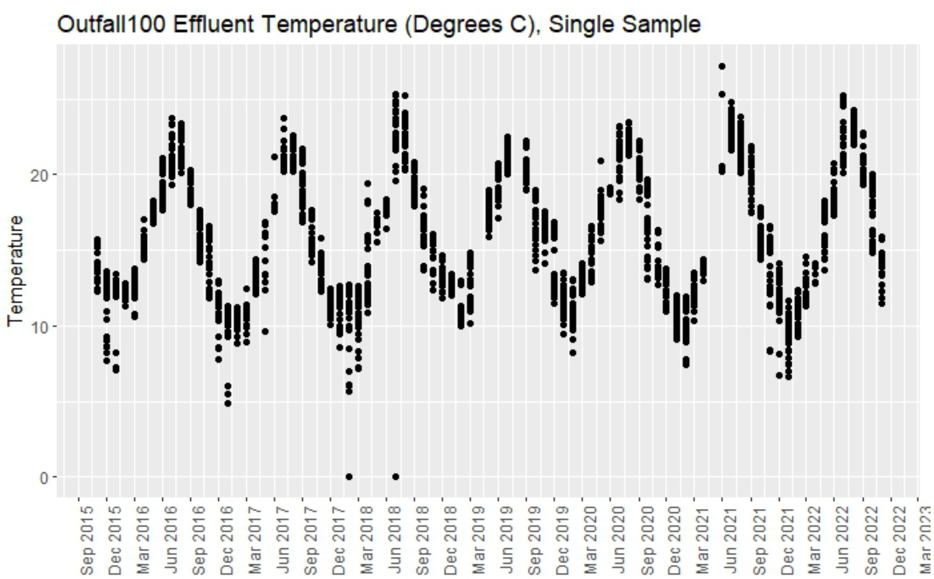
Outfall100 Effluent Temperature (Degrees C), Single Sample
Temperature
20
10
0
Sep 2015
Dec 2015
Mar 2016
Jun 2016
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Dec 2016
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Jun 2017
Sep 2017
Dec 2017
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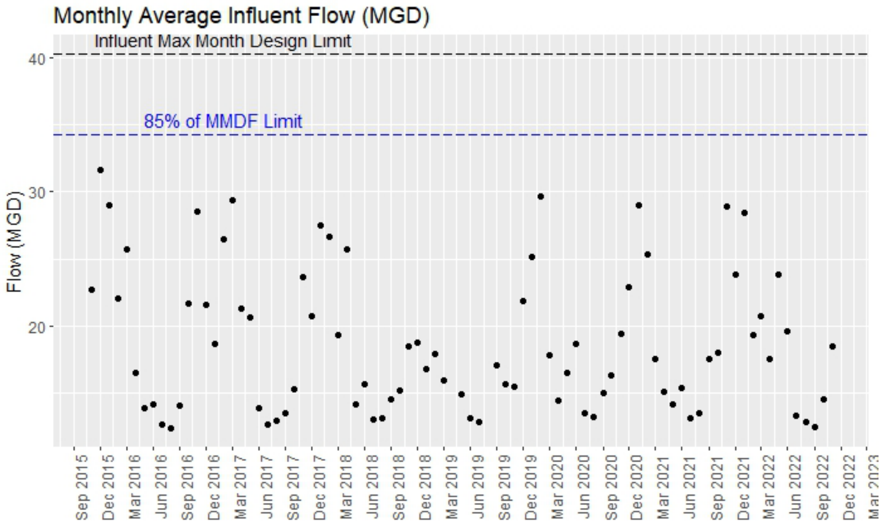
INFLUENT


Monthly Average Influent Flow (MGD)
Influent Max Month Design Limit
85% of MMDF Limit
Flow (MGD)
40
30
20
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
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Sep 2017
Dec 2017
Mar 2018
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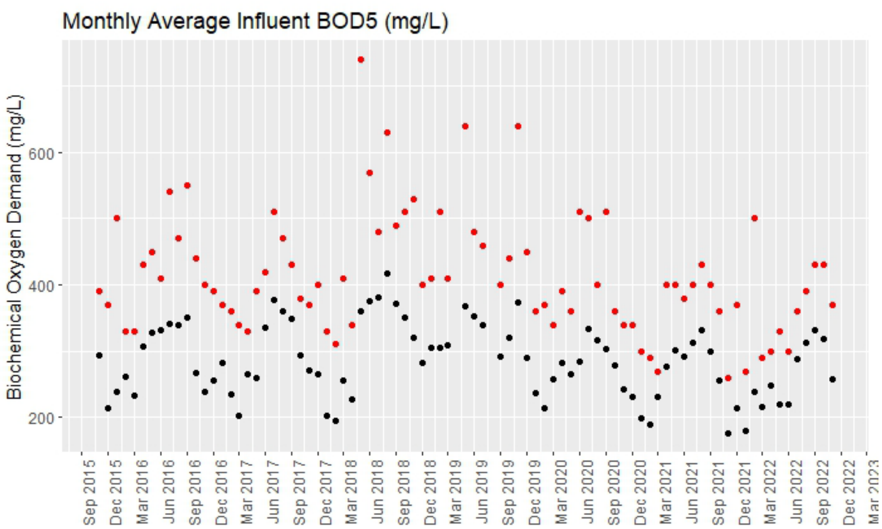
Monthly Average Influent BOD5 (mg/L)
Biochemical Oxygen Demand (mg/L)
600
400
200
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
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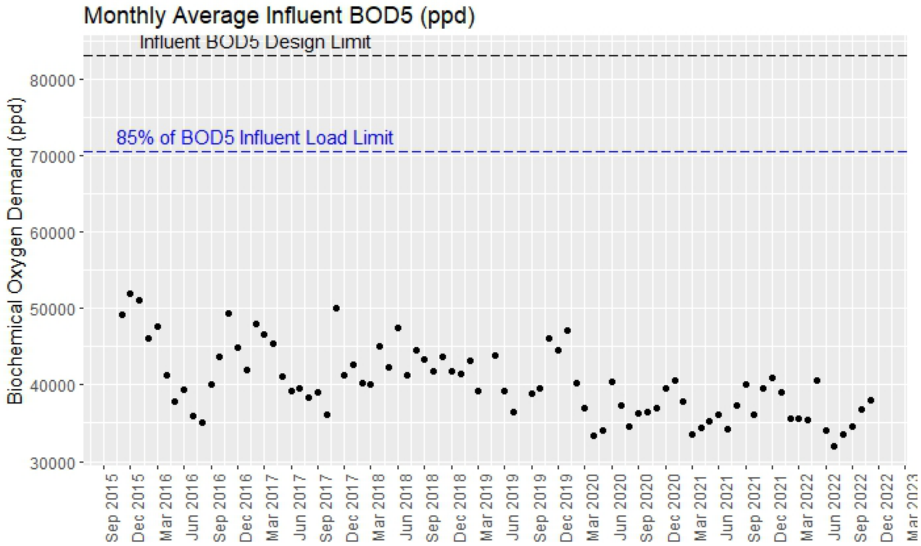
Monthly Average Influent BOD5 (ppd)
Influent BOD5 Design Limit
85% of BOD5 Influent Load Limit
Biochemical Oxygen Demand (ppd)
80000
70000
60000
50000
40000
30000
Sep 2015
Dec 2015
Mar 2016
Jun 2016
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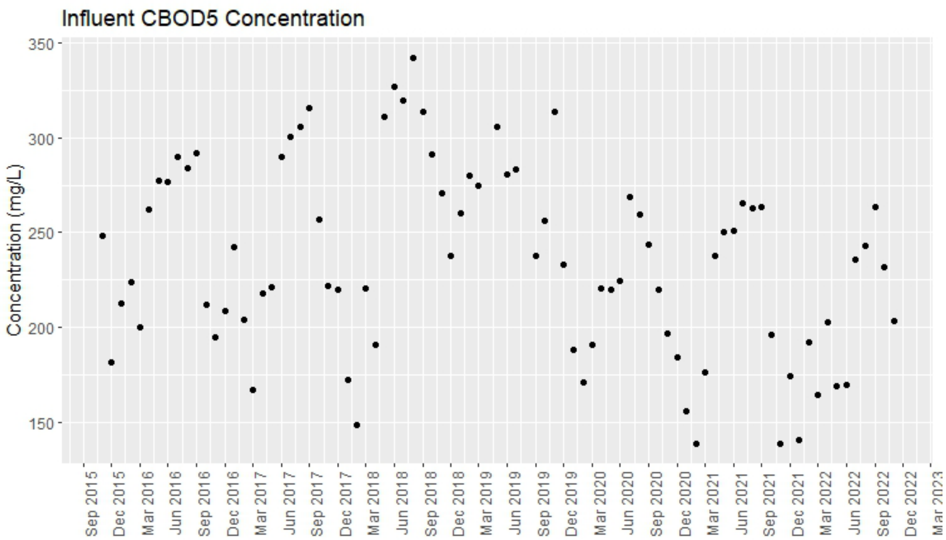
Influent CBOD5 Concentration
Concentration (mg/L)
350
300
250
200
150
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
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Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
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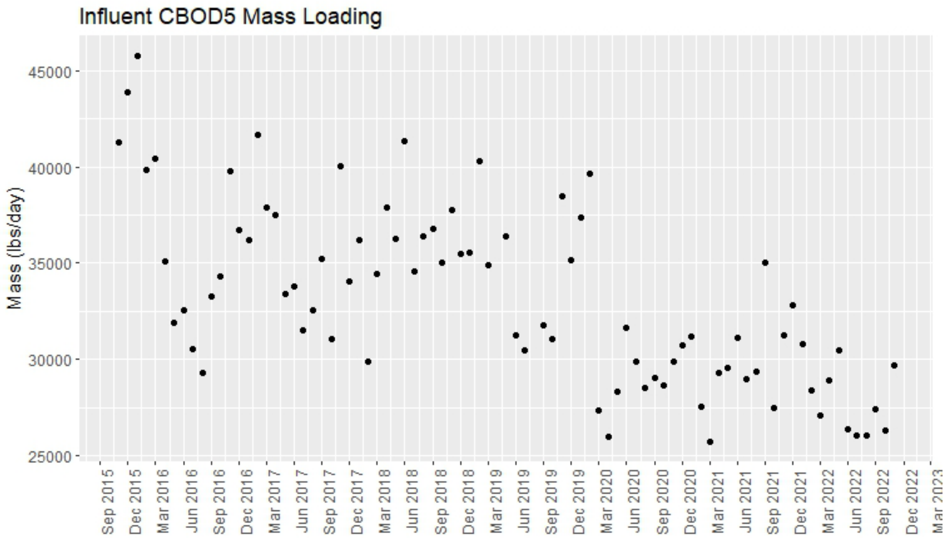
Influent CBOD5 Mass Loading
Mass (lbs/day)
45000
40000
35000
30000
25000
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
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Dec 2022
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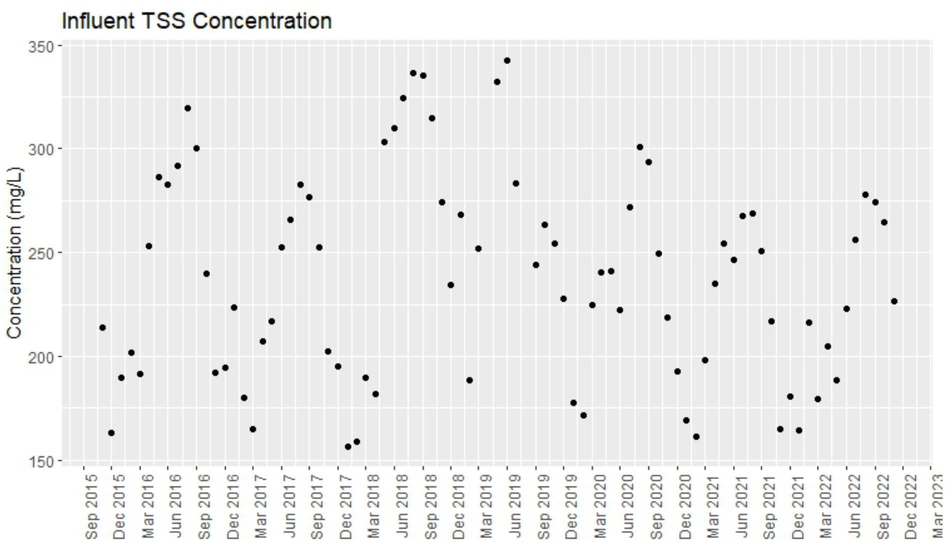
Influent TSS Concentration
Concentration (mg/L)
350
300
250
200
150
Sep 2015
Dec 2015
Mar 2016
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Sep 2017
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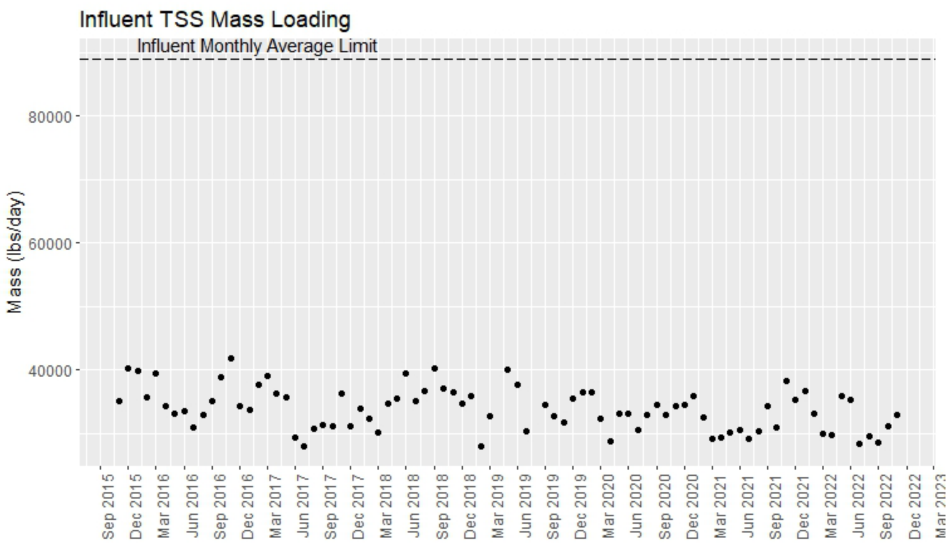

TABLE E1. EFFLUENT DATA FOR OUTFALL 015 – CONVENTIONALS							
Parameter	Maximum Daily Discharge		Average Daily Discharge			Analytical Method	ML or MDL
	Value	Units	Value	Units	Number of Samples		
Biochemical oxygen demand $CBOD_5$	45	mg/L	11	mg/L	979	SM5210-B	3 mg/L
Fecal coliform	3700	cfu/100 mL	26	cfu/100 mL	828	SM9222-D-mFC	1 cfu/100
Design flow rate	42.9	MG	12.1	MG	1159		
pH (minimum)	6.4	SU					
pH (maximum)	8.8	SU					
Temperature (winter)							
Temperature (summer)							
Total suspended solids (TSS)	218	mg/L	27	mg/L	1075	SM2540-D	4 mg/L

TABLE E2. EFFLUENT DATA FOR OUTFALL 015							
Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method	ML or MDL
	Value	Units	Value	Units	Number of Samples		
Ammonia (as N)	42.9	mg/L	21.5	mg/L	313	EPA 350.1	0.004 mg/L
Chlorine (total residual, TRC)	68	µg/L	<8	µg/L	1163	SM4500-Cl-G	8 µg/L

Dissolved oxygen	18.6	mg/L	6.0	mg/L	1163	1002-8-2009	0.0 mg/L
Nitrate/nitrite	12.6	mg/L	2.27	mg/L	61	EPA 353.2	0.002 mg/L
Kjeldahl nitrogen	47.8	mg/L	24.8	mg/L	61	SM4500-NorgD	0.050 mg/L
Oil and grease	<6	mg/L	<6	mg/L	15	EPA 1664B	5 mg/L
Phosphorus	9.25	mg/L	5.51	mg/L	61	EPA 365.1	0.002 mg/L
Total dissolved solids	660	mg/L	374	mg/L	5	SM2540-C	10 mg/L

TABLE E3. EFFLUENT DATA FOR OUTFALL 015 – EXPANDED EFFLUENT TESTING

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method	ML or MDL
	Value	Units	Value	Units	Number of Samples		
Metals, Cyanide, and Total Phenols							
Hardness (as $CaCO_3$)	90.4	mg/L	68	mg/L	5	EPA 200.7	0.75 mg/L
Antimony, total recoverable	1	µg/L	0.65	µg/L	16	EPA 200.8	0.3 µg/L
Arsenic, total recoverable	4.8	µg/L	1.6	µg/L	41	EPA 200.8	0.75 µg/L
Beryllium, total recoverable	<0.1	µg/L	<0.1	µg/L	16	EPA 200.8	0.75 µg/L
Cadmium, total recoverable	0.29	µg/L	0.06	µg/L	41	EPA 200.8	0.05 µg/L
Chromium, total recoverable	3.7	µg/L	1.2	µg/L	41	EPA 200.8	0.2 µg/L
Copper, total recoverable	14.8	µg/L	6.6	µg/L	41	EPA 200.8	0.4 µg/L
Lead, total recoverable	8.7	µg/L	2.5	µg/L	41	EPA 200.8	0.1 µg/L
Mercury, total recoverable	68.5	ng/L	14.7	ng/L	42	EPA 1631 E	0.5 ng/L
Nickel, total recoverable	4.3	µg/L	2.7	µg/L	41	EPA 200.8	0.1 µg/L
Selenium, total recoverable	0.5	µg/L	<0.5	µg/L	16	EPA 200.8	0.5 µg/L
Silver, total recoverable	1.1	µg/L	0.23	µg/L	41	EPA 200.8	0.04 µg/L
Thallium, total recoverable	0.09	µg/L	<0.09	µg/L	16	EPA 200.8	0.09 µg/L
Zinc, total recoverable	30.6	µg/L	15.8	µg/L	41	EPA 200.8	0.5 µg/L
Cyanide	20	µg/L	<5	µg/L	16	EPA 9014	5 µg/L
Total phenolic compounds	114	µg/L	<40	µg/L	15	EPA 420.1	40 µg/L
Volatile Organic Compounds							
Acrolein	<5	µg/L	<5	µg/L	5	EPA 624	5 µg/L

Acrylonitrile	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Benzene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Bromoform	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Carbon tetrachloride	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Chlorobenzene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Chlorodibromomethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Chloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
2-chloroethylvinyl ether	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Chloroform	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Dichlorobromomethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,1-dichloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,2-dichloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
trans-1,2-dichloroethylene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,1-dichloroethylene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,2-dichloropropane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,3-dichloropropylene	<2	µg/L	<2	µg/L	5	EPA 624	2 µg/L
Ethylbenzene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Methyl bromide	<5	µg/L	<5	µg/L	5	EPA 624	5 µg/L
Methyl chloride	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Methylene chloride	<5	µg/L	<5	µg/L	5	EPA 624	5 µg/L
1,1,2,2-tetrachloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Tetrachloroethylene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Toluene	4.19	µg/L	1.41	µg/L	5	EPA 624	1 µg/L
1,1,1-trichloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,1,2-trichloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Trichloroethylene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Vinyl chloride	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Acid-Extractable Compounds							
p-chloro-m-cresol	<0.25	µg/L	<0.25	µg/L	5	EPA 625	0.25 µg/L
2-chlorophenol	<0.25	µg/L	<0.25	µg/L	5	EPA 625	0.25 µg/L
2,4-dichlorophenol	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L

2,4-dimethylphenol	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
4,6-dinitro-o-cresol	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
2,4-dinitrophenol	<0.75	µg/L	<0.75	µg/L	5	EPA 625	0.75 µg/L
2-nitrophenol	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
4-nitrophenol	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
Pentachlorophenol	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Phenol	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
2,4,6-trichlorophenol	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
Base-Neutral Compounds							
Acenaphthene	<0.05	µg/L	<0.05	µg/L	5	EPA 625	0.05 µg/L
Acenaphthylene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Anthracene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Benzidine	<7.5	µg/L	<7.5	µg/L	4	EPA 625	0.75 µg/L
Benzo(a)anthracene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Benzo(a)pyrene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
3,4-benzofluoranthene	<0.2	µg/L	<0.2	µg/L	5	EPA 625	0.2 µg/L
Benzo(ghi)perylene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Benzo(k)fluoranthene	<0.2	µg/L	<0.2	µg/L	5	EPA 625	0.2 µg/L
Bis (2-chloroethoxy) methane	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Bis (2-chloroethyl) ether	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Bis (2-chloroisopropyl) ether	<0.25	µg/L	<0.25	µg/L	3	EPA 625	0.25 µg/L
Bis (2-ethylhexyl) phthalate	19.8	µg/L	6.8	µg/L	5	EPA 625	0.13 µg/L
4-bromophenyl phenyl ether	<0.05	µg/L	<0.05	µg/L	5	EPA 625	0.05 µg/L
Butyl benzyl phthalate	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
2-chloronaphthalene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
4-chlorophenyl phenyl ether	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Chrysene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
di-n-butyl phthalate	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
di-n-octyl phthalate	<0.075	µg/L	**<0.075**	µg/L	5	EPA 625	0.075 µg/L

Dibenzo(a,h)anthracene	<0.2	µg/L	<0.2	µg/L	5	EPA 625	0.2 µg/L
1,2-dichlorobenzene	<1	µg/L	<1	µg/L	5	EPA 625	1 µg/L
1,3-dichlorobenzene	<1	µg/L	<1	µg/L	5	EPA 625	1 µg/L
1,4-dichlorobenzene	<1	µg/L	<1	µg/L	5	EPA 625	1 µg/L
3,3-dichlorobenzidine	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
Diethyl phthalate	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Dimethyl phthalate	<0.05	µg/L	<0.05	µg/L	5	EPA 625	0.05 µg/L
2,4-dinitrotoluene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
2,6-dinitrotoluene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
1,2-diphenylhydrazine	<0.25	µg/L	<0.25	µg/L	3	EPA 625	0.25 µg/L
Fluoranthene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Fluorene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Hexachlorobenzene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Hexachlorobutadiene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Hexachlorocyclo-pentadiene	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
Hexachloroethane	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Indeno(1,2,3-cd) pyrene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Isophorone	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Naphthalene	<0.2	µg/L	<0.2	µg/L	5	EPA 625	0.2 µg/L
Nitrobenzene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
N-nitrosodi-n-propylamine	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
N-nitrosodimethylamine	<0.5	µg/L	<0.5	µg/L	4	EPA 625	0.5 µg/L
N-nitrosodiphenylamine	<0.25	µg/L	<0.25	µg/L	5	EPA 625	0.25 µg/L
Phenanthrene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Pyrene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
1,2,4-trichlorobenzene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L

TABLE E4. EFFLUENT DATA FOR OUTFALL 100 – CONVENTIONALS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method	ML or MDL
	Value	Units	Value	Units	Number of Samples		
Biochemical oxygen demand $CBOD_5$	28	mg/L	10	mg/L	1322	SM5210-B	3 mg/L

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Fecal coliform	18000	cfu/100 mL	77	cfu/100 mL	1105	SM9222-D-mFC	1 cfu/100
Design flow rate	29.4	MG	12.4	MG	1549		
pH (minimum)	6.1	SU					
pH (maximum)	8.0	SU					
Temperature (winter)							
Temperature (summer)							
Total suspended solids (TSS)	58	mg/L	12	mg/L	1440	SM2540-D	4 mg/L

TABLE E5. EFFLUENT DATA FOR OUTFALL 100

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method	ML or MDL
	Value	Units	Value	Units	Number of Samples		
Ammonia (as N)	34.1	mg/L	18.9	mg/L	108	EPA 350.1	0.004 mg/L
Chlorine (total residual, TRC)	0.83	mg/L	0.46	mg/L	1551	SM4500-Cl-G	0.04 mg/L
Dissolved oxygen	9.9	mg/L	6.1	mg/L	1551	1002-8-2009	0.75 mg/L
Nitrate/nitrite	17	mg/L	7.4	mg/L	108	EPA 353.2	0.002 mg/L
Kjeldahl nitrogen	38.6	mg/L	22.8	mg/L	107	SM4500-NorgD	0.050 mg/L
Oil and grease	<5	mg/L	<5	mg/L	19	EPA 1664B	5 mg/L
Phosphorus	8.94	mg/L	4.1	mg/L	107	EPA 365.1	0.002 mg/L
Total dissolved solids	360	mg/L	290	mg/L	6	SM2540-C	10 mg/L

TABLE E6. EFFLUENT DATA FOR OUTFALL 100 – EXPANDED EFFLUENT TESTING

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method	ML or MDL
	Value	Units	Value	Units	Number of Samples		
Metals, Cyanide, and Total Phenols							
Hardness (as $CaCO_3$)	83.1	mg/L	72.7	mg/L	5	EPA 200.7	0.75 mg/L
Antimony, total recoverable	0.9	µg/L	0.6	µg/L	20	EPA 200.8	0.3 µg/L
Arsenic, total recoverable	1.3	µg/L	0.9	µg/L	56	EPA 200.8	0.75 µg/L
Beryllium, total recoverable	<0.1	µg/L	<0.1	µg/L	19	EPA 200.8	0.75 µg/L
Cadmium, total recoverable	0.1	µg/L	<0.05	µg/L	56	EPA 200.8	0.05 µg/L
Chromium, total recoverable	1.4	µg/L	0.6	µg/L	56	EPA 200.8	0.2 µg/L
Copper, total recoverable	9.8	µg/L	6.8	µg/L	56	EPA 200.8	0.4 µg/L
Lead, total recoverable	0.9	µg/L	0.4	µg/L	56	EPA 200.8	0.75 µg/L
Mercury, total recoverable	31	ng/L	4.3	ng/L	57	EPA 1631 E	0.5 ng/L
Nickel, total recoverable	3.4	µg/L	2.3	µg/L	56	EPA 200.8	0.75 µg/L
Selenium, total recoverable	0.9	µg/L	<0.5	µg/L	20	EPA 200.8	0.5 µg/L
Silver, total recoverable	0.1	µg/L	<0.04	µg/L	56	EPA 200.8	0.04 µg/L
Thallium, total recoverable	0.26	µg/L	<0.09	µg/L	20	EPA 200.8	0.09 µg/L

Zinc, total recoverable	44	µg/L	33	µg/L	56	EPA 200.8	0.5 µg/L
Cyanide	33	µg/L	<5	µg/L	19	EPA 9014	5 µg/L
Total phenolic compounds	150	µg/L	<40	µg/L	18	EPA 420.1	40 µg/L
Volatile Organic Compounds							
Acrolein	<5	µg/L	<5	µg/L	5	EPA 624	5 µg/L
Acrylonitrile	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Benzene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Bromoform	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Carbon tetrachloride	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Chlorobenzene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Chlorodibromomethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Chloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
2-chloroethylvinyl ether	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Chloroform	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Dichlorobromomethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,1-dichloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,2-dichloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
trans-1,2-dichloroethylene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,1-dichloroethylene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,2-dichloropropane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,3-dichloropropylene	<2	µg/L	<2	µg/L	5	EPA 624	2 µg/L
Ethylbenzene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Methyl bromide	<5	µg/L	<5	µg/L	5	EPA 624	5 µg/L
Methyl chloride	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Methylene chloride	<5	µg/L	<5	µg/L	5	EPA 624	5 µg/L
1,1,2,2-tetrachloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Tetrachloroethylene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Toluene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,1,1-trichloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
1,1,2-trichloroethane	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Trichloroethylene	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L
Vinyl chloride	<1	µg/L	<1	µg/L	5	EPA 624	1 µg/L

Acid-Extractable Compounds							
p-chloro-m-cresol	<0.25	µg/L	<0.25	µg/L	5	EPA 625	0.25 µg/L
2-chlorophenol	<0.25	µg/L	<0.25	µg/L	5	EPA 625	0.25 µg/L
2,4-dichlorophenol	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
2,4-dimethylphenol	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
4,6-dinitro-o-cresol	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
2,4-dinitrophenol	<0.75	µg/L	<0.75	µg/L	5	EPA 625	0.75 µg/L
2-nitrophenol	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
4-nitrophenol	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
Pentachlorophenol	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Phenol	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
2,4,6-trichlorophenol	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
Base-Neutral Compounds							
Acenaphthene	<0.05	µg/L	<0.05	µg/L	5	EPA 625	0.05 µg/L
Acenaphthylene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Anthracene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Benzidine	<7.5	µg/L	<7.5	µg/L	4	EPA 625	0.75 µg/L
Benzo(a)anthracene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Benzo(a)pyrene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
3,4-benzofluoranthene	<0.2	µg/L	<0.2	µg/L	5	EPA 625	0.2 µg/L
Benzo(ghi)perylene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Benzo(k)fluoranthene	<0.2	µg/L	<0.2	µg/L	5	EPA 625	0.2 µg/L
Bis (2-chloroethoxy) methane	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Bis (2-chloroethyl) ether	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Bis (2-chloroisopropyl) ether	<0.25	µg/L	<0.25	µg/L	3	EPA 625	0.25 µg/L
Bis (2-ethylhexyl) phthalate	12	µg/L	2.6	µg/L	5	EPA 625	0.13 µg/L
4-bromophenyl phenyl ether	<0.05	µg/L	<0.05	µg/L	5	EPA 625	0.05 µg/L
Butyl benzyl phthalate	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
2-chloronaphthalene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
4-chlorophenyl phenyl ether	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Chrysene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L

di-n-butyl phthalate	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
di-n-octyl phthalate	<0.075	µg/L	**<0.075**	µg/L	5	EPA 625	0.075 µg/L
Dibenzo(a,h)anthracene	<0.2	µg/L	<0.2	µg/L	5	EPA 625	0.2 µg/L
1,2-dichlorobenzene	<1	µg/L	<1	µg/L	5	EPA 625	1 µg/L
1,3-dichlorobenzene	<1	µg/L	<1	µg/L	5	EPA 625	1 µg/L
1,4-dichlorobenzene	<1	µg/L	<1	µg/L	5	EPA 625	1 µg/L
3,3-dichlorobenzidine	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
Diethyl phthalate	0.72	µg/L	0.17	µg/L	5	EPA 625	0.13 µg/L
Dimethyl phthalate	<0.05	µg/L	<0.05	µg/L	5	EPA 625	0.05 µg/L
2,4-dinitrotoluene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
2,6-dinitrotoluene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
1,2-diphenylhydrazine	<0.25	µg/L	<0.25	µg/L	3	EPA 625	0.25 µg/L
Fluoranthene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Fluorene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Hexachlorobenzene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Hexachlorobutadiene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Hexachlorocyclo-pentadiene	<0.5	µg/L	<0.5	µg/L	5	EPA 625	0.5 µg/L
Hexachloroethane	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Indeno(1,2,3-cd)pyrene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Isophorone	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
Naphthalene	<0.2	µg/L	<0.2	µg/L	5	EPA 625	0.2 µg/L
Nitrobenzene	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
N-nitrosodi-n-propylamine	<0.13	µg/L	<0.13	µg/L	5	EPA 625	0.13 µg/L
N-nitrosodimethylamine	<0.5	µg/L	<0.5	µg/L	4	EPA 625	0.5 µg/L
N-nitrosodiphenylamine	<0.25	µg/L	<0.25	µg/L	5	EPA 625	0.25 µg/L
Phenanthrene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
Pyrene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L
1,2,4-trichlorobenzene	<0.075	µg/L	<0.075	µg/L	5	EPA 625	0.075 µg/L

TSS performance-based limits

	Outfall 015 Monthly Average TSS Concentrations (mg/L)															
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
January	…	21	21	22	30	29	32	27	22	24	24	13	37	11	18	22
February	…	30	38	32	35	27	30	36	17	31	25	20	15	13	19	19
March	26	46	22	39	38	24	21	25	19	21	30	25	14	19	21	…
April	25	20	18	14	27	22	15	27	30	16	11			12	30	…
May	31	32	38	21	20	57	17	31	34	22	26		17	21	28	…
June	46	57	41	37	35	42	27	54		29	28		19	35	29	…
July	32	59	39	44	36	38	34			27	29		42	23	19	…
August	51	46	41	29	21	19	39	121			34					…
September	52	45	20	21	32	5	69	66					13	25		…
October	41	45	7	13	17	4	38	41	33	19	13			18		…
November	38	28	26	25	23	28	24	37	26	23	20	25	26	23	22	…
December	25	21	30	22	21	38	33	25	23	26	18	35	18	16	37	…
95th Percentile:	*51*															
Empty Cell = No Discharge																
Highlighted = Would exceed limit of 51 mg/L																

	Outfall 015 Monthly Average TSS percent removal (%)															
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
January	…	91	89	88	87	84	85	86	86	89	84	95	78	92	88	86
February	…	89	83	86	83	87	85	81	91	81	83	89	89	91	91	91
March	90	82	91	79	78	88	99	88	89	87	84	90	93	90	88	…
April	89	92	92	93	88	90	93	88	88	92	93			95	85	…
May	87	87	85	91	91	78	92	89	88	89	92		93	92	84	…
June	84	80	81	85	84	84	90	82		89	90		91	85	86	…
July	89	78	86	90	85	86	87			90	91		85	91	92	…
August	84	83	86	90	93	94	85				90					…
September	86	84	92	94	90	98	74						95	89		…
October	86	82	98	96	93	99	82		81	91	96			92		…
November	85	85	89	89	87	89	87	82	84	87	91	89	88	86	90	…
December	90	91	84	92	85	85	80	84	88	85	91	84	91	91	78	…
5th Percentile:	*80%*															
Highlighted = Would not meet minimum removal of 80%																

Appendix F — Response to Comments

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