Fact Sheet

**The U.S. Environmental Protection Agency (EPA)
Proposes to Reissue a National Pollutant Discharge Elimination System (NPDES)
Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act
(CWA) to:**

Sandy Point Wastewater Treatment Plant
Lummi Tribal Sewer and Water District (LTSWD)
4369 Germaine Road
Ferndale, WA 98248

Public Notice Start Date: June 16, 2021
Public Notice Expiration Date: August 2, 2021

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EPA Proposes to Reissue NPDES Permit
EPA proposes to reissue the NPDES permit for the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

State Certification
EPA is requesting that the Washington State Department of Ecology (Ecology) certify the permit under Section 401 of the Clean Water Act. Ecology will public notice EPA's request for certification pursuant to Section 401 of the Clean Water Act at:

https://apps.ecology.wa.gov/aquatics/notices/

Instructions for comments regarding the 401 certification will be included in Ecology's public notice.

Public Comment

Because of the COVID-19 virus, access to the Region 10 EPA building is limited. Therefore, we request that all comments on EPA's draft permit or requests for a public hearing be submitted via email to Sally Goodman (goodman.sally@epa.gov). If you are unable to submit comments via email, please call 206-553-0782. Persons wishing to comment on, or request a Public Hearing for, the draft permit for this facility may do so by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Water Division will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, EPA will address the comments and issue the permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days pursuant to 40 CFR 124.19.

Documents are Available for Review

The draft permits, fact sheet, and other information can be found online at: https://www.epa.gov/npdes-permits/washington-npdes-permits. Because of the COVID-19 virus and limited building access, EPA cannot make hard copies available for viewing at EPA offices.

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Acronyms

ACEC	Acute critical effluent concentration
AML	Average monthly limit
AWL	Average weekly limit
BMP	Best management practices
BOD_5	Five-day biochemical oxygen demand
BPJ	Best professional judgement
$CBOD_5$	Carbonaceous biochemical oxygen demand
CFR	Code of Federal Regulations
cfu	Colony forming unit
CV	Coefficient of variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FWS	U.S. Fish and Wildlife Service
MDL	Maximum daily limit
MGD	Million gallons per day
mg/l	Milligrams/liter
ml	Milliliter
MPN	Most probable number
N	Nitrogen
NH_3	Ammonia
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
POTW	Publicly owned treatment works
QAPP	Quality Assurance Project Plan
TAS	Treatment as a State
TIN	Total inorganic nitrogen
TKN	Total Kjeldahl Nitrogen

TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRC	Total Residual Chlorine
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total Suspended Solids
WAC	Washington Administrative Code
WET	Whole effluent toxicity
WLA	Wasteload allocation
WQLS	Water quality limited segment
WWTP	Wastewater treatment plant

I. Background Information

A. General Information

This fact sheet provides information on the draft NPDES permit for the following entity:

Table 1. General Facility Information

NPDES Permit #:	WA0025658
Applicant:	Sandy Point Wastewater Treatment Plant Lummi Tribal Sewer and Water District
Type of Ownership:	POTW
Physical Address:	4369 Germaine Road Ferndale, WA 98248
Mailing Address:	2156 Lummi View Drive Bellingham, WA 98226
Facility Contact:	Chip Anderson District Manager (360) 758-7167 chipa@ltswd.com
Operator Name:	Same as applicant
Receiving Water:	Strait of Georgia (marine waters), Washington
Outfall Location:	48°48'56" N 122°42'57" W

B. Permit History

The most recent NPDES permit for the Sandy Point Wastewater Treatment Plant (WWTP) was issued on November 22, 2011, became effective on December 1, 2011 (2011 Permit), and expired on November 30, 2016. A NPDES permit application for permit reissuance was submitted by the permittee on August 11, 2016. EPA determined that the application was timely and complete on October 31, 2016. Therefore, pursuant to 40 CFR 122.6, the permit has been administratively continued and remains in effect and enforceable.

C. Tribal Consultation

EPA consults with federally recognized tribal governments on a government-to-government basis when EPA actions and decisions may affect tribal interests. Meaningful tribal consultation is an integral component of the federal government's general trust relationship with federally recognized tribes. The federal government recognizes the right of each tribe to self-government, with sovereign powers over their members and their territory. Executive Order 13175 (November 2000), entitled "Consultation and Coordination with Indian Tribal Governments", requires federal agencies to have an accountable process to assure meaningful and timely input by tribal officials in the development of regulatory policies on matters that have tribal implications and to strengthen the government-to-government relationship with Indian tribes. In May 2011, EPA issued the "EPA Policy on Consultation and Coordination

with Indian Tribes" which established national guidelines and institutional controls for consultation.

The Sandy Point WWTP is located on the Lummi Reservation. Consistent with the Executive Order and EPA tribal consultation policies, EPA is coordinating with the Lummi Nation on this Permit Action and will invite formal tribal consultation.

II. Facility Information

A. Treatment Plant Description

The Sandy Point WWTP is an existing discharge. The WWTP treats domestic wastewater and discharges treated effluent to the Strait of Georgia.

Service Area

The Lummi Tribal Sewer and Water District owns and operates the Sandy Point WWTP located in Ferndale, WA. The collection system has no combined sewers. The facility serves a resident population of 2110. There are no major industries discharging to the facility.

Treatment Process

The design flow of the facility is 0.25 million gallons per day (MGD). The reported monthly average flows from the facility range from 0.0256 to 0.1985 MGD. The treatment process begins with a headworks facility including the influent flow meter, bar screen, comminutor, and aerated grit chamber. Grit collected in the aerated grit chamber is sent to a landfill. The primary clarifier allows settleable and floatable solids to be removed from the wastewater. In the pre-aeration basin, large amounts of air are entrained in the wastewater before flowing to one of the two rotating biological contactors (RBCs) that provide secondary treatment. Two secondary clarifiers provide settling of secondary sludge. Sludge from primary and secondary clarifiers is stabilized using aerobic digesters before land application at the tribal biosolids site or to a permitted off-Reservation site by a commercial biosolids transport and application company. Secondary effluent is disinfected with ultraviolet (UV) light. The UV system replaced a chlorine disinfection system during the 2011 permit term, in 2015. However, the facility maintains the ability to disinfect with chlorine in the event that there is an issue with the UV system. A schematic of the wastewater treatment process and piping plan, and a map showing the location of the treatment facility and discharge are included in Appendix A. Because the design flow is less than 1 MGD, the facility is considered a minor facility.

Outfall Description

The outfall (001) is located at 48° 48' 56" N, 122° 42' 57" W, 1458 feet from shore and 18.5 feet below the water surface (MLLW) in the Strait of Georgia (North Puget Sound). According to design drawings (Parametrix, October 1976, Appendix A), discharge is sent from the facility through an 8-inch buried pipe that ends in a "tee," 1.5 feet above the seafloor. The "tee" opens on two sides, with one port facing downslope (away from shore), and one facing upslope (toward shore). Each port is 4 inches in diameter. Information about the outfall is only available in the original design drawings, so the draft permit requires an outfall inspection and report (Section II.E of the draft permit).

Effluent Characterization

To characterize the effluent, EPA evaluated data submitted under the 2011 Permit and information provided in the permit application. The 2011 Permit requires the facility to submit monthly discharge monitoring reports (DMRs). The effluent characterization in Table 2 represents monthly data between December 2011 and June 2020 (except for March 2014 and June 2016, which are missing DMRs), unless otherwise noted.

Table 2. Effluent Characterization

Parameter		Units	Minimum	Maximum	95th Percentile
Flow	Monthly Average	MGD	0.016	0.199	0.174
Biochemical Oxygen Demand (BOD_5)	Monthly Average	mg/L	6	25	19
	Weekly Average	mg/L	5.4	271	31
	% Removal	%	56	97	81 (5th percentile)
Total Suspended Solids (TSS)	Monthly Average	mg/L	7	38	28
	Weekly Average	mg/L	10	80	41
	% Removal	%	15	97	74 (5th percentile)
Fecal Coliform Bacteria[1]	Monthly Average	cfu/100 mL	1	128	17
	Weekly Average	cfu/100 mL	1	6900	590
Total Residual Chlorine (TRC)[2]	Monthly Average	mg/L	0.01	0.19	0.141
	Daily Maximum	mg/L	0.07	1.1	0.952
pH	Instantaneous Minimum and Maximum	s.u.	6.26	8.56	8.29 (5th percentile of minimum = 6.4)
Total Ammonia (as N)[3]	Quarterly Maximum	mg/L	0.14	3.74	2.188
Nitrate plus Nitrite (as N)[3]	Quarterly Maximum	mg/L	17.6	44	44
Total Kjeldahl Nitrogen (TKN, as N)[3]	Quarterly Maximum	mg/L	0.9	6.21	5.85
Temperature[4]	Daily	°C	6.4	22.7	21.7
Dissolved Oxygen (DO)[4]	Daily	mg/L	0.1	11.0	3.22 (5th percentile)

1. Monthly and weekly averages for fecal coliform are measured as the geometric mean.
2. The facility completed its transition to UV disinfection in May 2015 and the last non-zero TRC measurement is in March 2015. Minimum and maximum TRC represent data collected through March 2015.
3. The current permit required nitrogen reporting quarterly for a single year. The data reported in this table represent monitoring from March 2015 – February 2016 (December 2014 – February 2016 for Total

Ammonia) and June 2017 and May 2020.
4. Temperature and DO monitoring were not required in the previous issuance of this permit, however the paper DMRs submitted between May 2012 and July 2016 included daily temperature and DO measurements.

Source: Discharge Monitoring Report (DMR) data (December 2011 – June 2020)

Compliance History

A summary of effluent exceedances is provided in Table 3. The most common effluent exceedance is TSS percent removal, which had 24 exceedances since December 2011. Other violations include average weekly BOD (2 instances), average monthly and weekly TSS (2 and 5 instances, respectively), average weekly fecal coliform (6 instances), and maximum daily total residual chlorine (TRC) (7 instances).

Table 3. Summary of Effluent Exceedances

Parameter	Statistical Base	Units	Number of Exceedances
BOD_5	Weekly Average	mg/L	2
BOD_5	Percent Removal	%	8
TSS	Monthly Average	mg/L	2
TSS	Weekly Average	mg/L	5
TSS	Percent Removal	%	24
Fecal Coliform Bacteria	Weekly Average[1]	cfu/100 mL	6
Total Residual Chlorine (TRC)	Daily Maximum	mg/L	7
1. Weekly average for fecal coliform refers to the geometric mean.			

(Accessed 9/8/2020 for period December 2011 – September 2020, https://echo.epa.gov/trends/loading-tool/reports/effluent-exceedances?permit_id=WA0025658&start_date=12/01/2011&end_date=09/30/2020)

Additional compliance information for this facility, including compliance with other environmental statutes, is available on Enforcement and Compliance History Online (ECHO). The ECHO web address for this facility is: https://echo.epa.gov/detailed-facility-report?fid=110009764371.

III. Receiving Water

In drafting permit conditions, EPA must analyze the effect of the facility's discharge on the receiving water. The details of that analysis are provided later in this Fact Sheet. This section summarizes characteristics of the receiving water that impact that analysis.

A. Receiving Water

The facility discharges to the Strait of Georgia (North Puget Sound) offshore from the City of Ferndale, WA. The discharge location is in marine waters.

B. Water Quality Standards

Overview

Section 301(b)(1)(C) of the Clean Water Act (CWA) requires the development of limitations in permits necessary to meet water quality standards. 40 CFR 122.4(d) requires that the conditions in NPDES permits ensure compliance with the water quality standards of all affected States. A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria and an anti-degradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve, such as drinking water supply, contact recreation, and aquatic life. The numeric and narrative water quality criteria are the criteria deemed necessary to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

This facility is located within the exterior boundaries of the Lummi Reservation and discharges to Washington State Waters in Puget Sound. The Lummi Tribe has Treatment as a State (TAS) for CWA purposes to administer a Water Quality Standards (WQS) program. However, because the facility discharges into Washington State Waters, Washington State WQS apply.

Designated Beneficial Uses

The receiving waters are the Strait of Georgia in North Puget Sound. In WAC 173-201A-612, the State designates that all marine waters in North Puget Sound west of 122° 39' W are protected for the following designated uses:

- Aquatic Life Uses: Extraordinary
- Shellfish Harvesting: All
- Recreational Uses: Primary Contact
- Miscellaneous Uses (aesthetics, boating, commerce/navigation, and wildlife habitat)

In WAC 173-201A-210, the Extraordinary Aquatic Life Use Designation is described as follows: *"Water quality of this use class shall markedly and uniformly exceed the requirements for all uses including, but not limited to, salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning."*

C. Water Quality

The water quality for the receiving water is summarized in Table 4. All the data were obtained from Ecology Monitoring Station GRG002[1] in the Georgia Strait about 10 miles west of the outfall and north of Patos Island. More detailed information on receiving water quality data is in Appendix B, Part B.

[1] https://apps.ecology.wa.gov/eim/search/Detail/Detail.aspx?DetailType=Location&SystemStationId=100046794

Table 4. Receiving Water Quality Data

Parameter	Units	Mean	Maximum	Minimum	95th Percentile
Temperature	°C	9.33	19.59	5.58	11.30
pH	s.u.	7.65	8.65	7.14	7.96 (5th percentile = 7.35)
DO	mg/L	6.86	19.35	3.77	4.92 (5th percentile)
Total Ammonia (as N)	µg/L	7.70	49.73	0	21.80
Fecal Coliform	cfu/100 mL	1[1]	1	1	1
Salinity	ppt	30.04	32.04	14.18	31.03
1. Geometric mean					

D. Water Quality Limited Waters

Any waterbody for which the water quality does not meet, and/or is not expected to meet, the applicable WQS, is defined as a "water quality limited segment." Section 303(d) of the CWA requires states to develop a Total Maximum Daily Load (TMDL) management plan for water bodies determined to be water quality limited segments.

The Washington State Department of Ecology (Ecology) has listed and mapped impairments for all waterbodies on its Water Quality Assessment website and Water Quality Atlas[2]. Based on examination of the list and map, EPA has concluded that there are no 303(d) listings for the area immediately around the facility outfall in the Strait of Georgia, which falls into Water Resource Inventory Area (WRIA) 1 (Nooksack). Within the Lummi Reservation, there are also temperature (2020) and bacteria (1997) TMDLs for the Nooksack River. However, the river empties into Bellingham Bay and is not in the area of the discharge, and the TMDLs do not assign WLAs to the facility.

IV. Effluent Limitations and Monitoring

Table 5, below, presents the existing effluent limits and monitoring requirements in the current, administratively extended, permit (2011 Permit). Table 6 presents the proposed effluent limits and monitoring requirements in the draft permit.

The draft permit includes several changes to the effluent limitations and monitoring requirements, which are as follows:

- Continuous influent flow monitoring was added
- Weekly temperature monitoring was added.
- Monthly DO monitoring was added.
- Weekly enterococci bacteria monitoring was added.
- Limits and monitoring for TRC are conditioned on whether chlorination is used.

[2] https://apps.ecology.wa.gov/waterqualityatlas/wqa/map

- Monitoring requirements for nitrate plus nitrite, and TKN, and ammonia were increased from quarterly for one year to one time per month for the permit term.
- Monitoring was added for carbonaceous biochemical oxygen demand ($CBOD_5$), total organic carbon (TOC), and total inorganic nitrogen (TIN one time per month for the permit term.
- Calculated monthly average TIN and annual TIN (to date) were added.

Table 5. 2011 Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Max Daily Limit	Sample Location	Sample Frequency	Sample Type
Flow	MGD	--	--	--	Effluent	Continuous	Recording
Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	--	Influent and Effluent	1/week	24-hour composite
	lb/day[1]	63	94	--			
	% removal	≥85	--	--			
Total Suspended Solids (TSS)	mg/L	30	45	--	Influent and Effluent	1/week	24-hour composite
	lb/day[1]	63	94	--			
	% removal	≥85	--	--			
Fecal Coliform Bacteria[2]	cfu/ 100 mL	200	400	--	Effluent	1/week	Grab
Total Residual Chlorine (TRC)[3,4]	mg/L	0.23	--	0.65	Effluent	Daily	Grab
pH	std units	Between 6.0 and 9.0 at all times			Effluent	Daily	Grab
Total Ammonia[5]	mg/L N	--			Effluent	Quarterly (for one year)	24-hour composite
Nitrate plus Nitrite[5]	mg/L N	--			Effluent	Quarterly (for one year)	24-hour composite
Total Kjeldahl Nitrogen[5] (TKN)	mg/L N	--			Effluent	Quarterly (for one year)	24-hour composite
Effluent testing as required by Form 2A Part B.6[6]		--			See item I.B.10 of the 2011 permit		

1. Mass loading (lbs/day) = Concentration (mg/l) x flow (mgd) x 8.34 lbs-l/gallon-mg.

2. The monthly average and weekly average must be measured as a geometric mean. No more than 10 percent of samples used to calculate the monthly average can exceed 200/100 ml. See Section VI of the 2011 permit for a definition of geometric mean.

3. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Sections I.B.2. and III.G of the 2011 permit.

4. If the Permittee ceases to use chlorination as its disinfection method, it may apply to EPA to discontinue chlorine monitoring.

5. The duration of expanded nutrients monitoring is one year. The data is to be submitted to EPA within 60 days of completing the four quarters of expanded nutrients monitoring. The Permittee must space quarterly sampling events to ensure results reflect seasonal variations in effluent quality.

6. See NPDES application Form 2A (EPA Form 3510-2A, revised 1-99).

Table 6. Draft Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Max Daily Limit	Sample Location	Sample Frequency	Sample Type
Flow	MGD	--	--	--	Influent and Effluent	Continuous	Recording
Total monthly flow[1]	MG	--	--	--	Effluent	1/month	Calculated
Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	--	Influent and Effluent	1/week	24-hour composite
	lb/day	63	94	--			
	% removal	≥85	--	--		1/month	Calculated[2]
Total Suspended Solids (TSS)	mg/L	30	45	--	Influent and Effluent	1/week	24-hour composite
	lb/day	63	94	--			
	% removal	≥85	--	--		1/month	Calculated[2]
Fecal Coliform Bacteria[3]	cfu / 100 mL	200	400	--	Effluent	1/week	Grab
Enterococci Bacteria	cfu / 100 mL	--			Effluent	1/week	Grab
Total Residual Chlorine (TRC)[4,5]	mg/L	0.23	--	0.65	Effluent	Daily	Grab
pH	std units	Between 6.0 and 9.0 at all times			Effluent	Daily	Grab
Temperature	°C	--			Effluent	1/week	Grab
Dissolved Oxygen (DO)	mg/L	--			Effluent	1/month	Grab
Total Ammonia	mg/L N	--			Influent and Effluent	1/month	24-hour composite

Nitrate plus Nitrite	mg/L N	--	Influent and Effluent	1/month	24-hour composite
Total Kjeldahl Nitrogen (TKN)	mg/L N	--	Influent and Effluent	1/month	24-hour composite
$CBOD_5$	mg/L	--	Influent and Effluent	1/month	24-hour composite
Total Organic Carbon (TOC)	mg/L	--	Effluent	1/month	24-hour composite
Total Inorganic Nitrogen (TIN)[6]	mg/L N lb/day[7]	--	Effluent	1/month	Calculated
Average Monthly TIN[8]	lbs	--	Effluent	1/month	Calculated
Annual TIN, to date[9]	lbs	--	Effluent	1/month	Calculated
Effluent testing as required by Form 2A Tables A and B[10]		--	Effluent	1/year	--

1. Total monthly flow = sum of all daily flows for the reporting period.

2. The monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values (both as concentrations) for that month. Influent and effluent samples must be taken over approximately the same time period.

3. The monthly average and weekly average must be measured as a geometric mean. No more than 10 percent of samples used to calculate the monthly average can exceed 400 cfu/100 ml. See Part VI for a definition of the geometric mean.

4. The permittee has transitioned to a UV disinfection system but retains a chlorine limit in the event of failure of the UV system. Monitoring is only required if chlorine disinfection is used.

5. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Parts I.B.3 and III.G of the Permit.

6. TIN (mg/L N) = total ammonia (mg/L N) + nitrate plus nitrite (mg/L N).

7. Calculate mass concurrently with the respective concentration of a sample using the following formula: concentration (in mg/L) X daily flow (in MGD) X conversion factor (8/34) = lb/day.

8. Calculate the monthly average TIN load (lb as N) using the following equation: monthly average TIN load (lb as N) = ((Σ calculated TIN loads (lb/day N))/number of samples) X number of days in month.

9. Calculate the annual TIN, to date, using the following equation: annual TIN load (lb as N) = Σ (monthly average TIN loads, to date)

10. See NPDES application Form 2A (EPA Form 3510-2A, revised 3-2019) and I.B.8 of the permit. Frequency applies only to parameters not required elsewhere in the permit.

A. Basis for Effluent Limits

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits.

B. Pollutants of Concern

Pollutants of concern are those that either have technology-based limits or may need water quality-based limits. EPA identifies pollutants of concern for the discharge based on those which:

- Have a technology-based limit
- Have an assigned wasteload allocation (WLA) from a TMDL
- Had an effluent limit in the previous permit
- Are present in the effluent monitoring. Monitoring data are reported in the application and DMR and any special studies
- Are expected to be in the discharge based on the nature of the discharge

The wastewater treatment process for this facility includes both primary and secondary treatment, as well as disinfection with UV light. Pollutants expected in the discharge from a facility with this type of treatment, include:

- Five-day biochemical oxygen demand (BOD_5)
- Dissolved oxygen (DO)
- Total Suspended Solids (TSS)
- pH
- Temperature
- Fecal Coliform
- Enterococci Bacteria
- Total Residual Chlorine (TRC)
- Ammonia
- Nitrate plus Nitrite
- Total Kjeldahl Nitrogen (TKN)

C. Technology Based Effluent Limits

Federal Secondary Treatment Effluent Limits

The CWA requires POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," which POTWs were required to meet by July 1, 1977. The EPA has developed and promulgated "secondary treatment" effluent limitations, which are found in 40 CFR 133.102. These technology-based effluent

limits apply to certain municipal WWTPs and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table 8. For additional information and background refer to Part 5.1 Technology Based Effluent Limits for POTWs in the Permit Writers Manual.

Table 7. Secondary Treatment Effluent Limits

Parameter	30-day average	7-day average
BOD_5	30 mg/L	45 mg/L
TSS	30 mg/L	45 mg/L
Removal for BOD_5 and TSS (concentration)	85% (minimum)	--
pH	within the limits of 6.0 - 9.0 s.u.	
Source: 40 CFR 133.102		

Mass-Based Limits

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, except under certain conditions. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass-based limits are expressed in pounds per day and are calculated as follows:

Mass-based limit (lb/day) = concentration limit (mg/L) × design flow (mgd) × 8.34[3]

Since the design flow for this facility is 0.25 mgd, the technology-based mass limits for BOD_5 and TSS are calculated as follows:

Average Monthly Limit = 30 mg/L × 0.25 mgd × 8.34 = 63 lbs/day

Average Weekly Limit = 45 mg/L × 0.25 mgd × 8.34 = 94 lbs/day

State Technology-Based Effluent Limits – Fecal Coliform

The State of Washington has promulgated a technology-based treatment standard for fecal coliform in WAC 173-221-040(2): "*Fecal coliform limits shall not exceed a monthly geometric mean of 200 organisms/100 milliliters (mL), and a weekly geometric mean of 400 organisms per 100 mL.*"

D. Water Quality-Based Effluent Limits

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards. Discharges to State or Tribal waters must also comply with conditions imposed by the State or Tribe as part of its certification of NPDES

[3] 8.34 is a conversion factor with units (lb × L)/(mg × gal × 10^6)

permits under Section 401 of the CWA. 40 CFR 122.44(d)(1), which implements Section 301(b)(1)(C) of the CWA, requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality. Effluent limits must also meet the applicable water quality requirements of affected States other than the State in which the discharge originates, which may include downstream States (40 CFR 122.4(d), 122.44(d)(4), see also CWA Section 401(a)(2)).

The NPDES regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and, where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met and must be consistent with any available wasteload allocation for the discharge in an approved TMDL. If there are no approved TMDLs that specify wasteload allocations for this discharge, all of the water quality-based effluent limits are calculated directly from the applicable water quality standards.

Reasonable Potential Analysis and Need for Water Quality-Based Effluent Limits

EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (*TSD*) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit.

> In some cases, a dilution allowance or mixing zone is permitted. A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and within which certain water quality criteria may be exceeded (EPA, 2014). While the criteria may be exceeded within the mixing zone, the use and size of the mixing zone must be limited such that the waterbody as a whole will not be impaired, all designated uses are maintained, and acutely toxic conditions are prevented.

WAC 173-201A-400(7)(b)(ii) states that Puget Sound proper is considered to be entirely estuarine. Therefore, the Strait of Georgia is estuarine for purposes of determining mixing zone size. WAC 173-201A-400(7)(b)(i) defines the chronic mixing zone for estuarine receiving waters as 200 feet plus the depth of water over the outfall at mean lower low water (MLLW) in any horizontal direction. WAC 173-201A-400(8)(b) defines the acute mixing zone as ten percent of the distance established in (7)(b) (the chronic mixing zone distance). The outfall (001) discharges at a depth of 18.5 feet. Accordingly, the mixing zone is 218.5 feet for chronic criteria, and 21.9 feet from the outfall for acute criteria.

Conditions in previous versions of the permit were developed based on mixing zone modeling from 2003. However, during the draft permit development process, it was

determined that the outfall depth reported in the permit application, in previous permit applications, and in modeling, was incorrect. Accordingly, the modeling was updated using the CORMIX 12.0 mixing zone model (See Appendix E). The resulting dilution factors are as follows:

Chronic Mixing Zone dilution factor: 81
Acute Mixing Zone dilution factor: 39

As discussed in Part IV.B, the pollutants of concern in the discharge are BOD_5, DO, TSS, pH, temperature, fecal coliform, enterococci bacteria, TRC, ammonia, nitrate plus nitrite, and TKN. Each parameter is summarized below and calculations for reasonable potential and WQBELs are provided in Appendix D. The relevant water quality standards are shown in Table 8, below.

Table 8. Applicable Water Quality Standards

Pollutant	Designated Use	Criteria
BOD_5	--	--
DO[1]	Aquatic Life Uses (Extraordinary)	Lowest 1-Day Min = 7.0 mg/L
TSS	--	--
pH[2]	Aquatic Life Uses (Extraordinary)	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.2 units
Temperature[3]	Aquatic Life Uses (Extraordinary)	Highest 1-Dmax = 13°C (55.4°F)
Fecal Coliform[4]	Shellfish Harvesting	Fecal coliform must not exceed a geometric mean value of 14 CFU or MPN per 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 CFU or MPN per 100 mL
Enterococci Bacteria[5]	Primary Contact Recreation	Enterococci organism levels within an averaging period must not exceed a geometric mean value of 30 CFU 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
Total Residual Chlorine (TRC)[6]	Aquatic Life Uses (Marine)	Acute: 13.0 µg/L (1-hour average concentration not to be exceeded more than once every three years on the average) Chronic: 7.5 µg/L (4-day average concentration not to be exceeded more than once every three years on the average)
Ammonia[6,7]	Aquatic Life Uses (Marine)	Acute: 0.233 mg/L (1-hour average concentration not to be exceeded more than once every three years on the average) Chronic: 0.035 mg/L (4-day average concentration not to be exceeded more than once every three years on the average)

Nitrate plus Nitrite	--	--
Total Kjeldahl Nitrogen (TKN)	--	--

1. WAC 173-201A-210(1)(d)
2. WAC 173-201A-210(1)(f)
3. WAC 173-201A-210(1)(c)
4. WAC 173-201A-210(2)(b)
5. WAC 173-201A-210(3)(b)
6. WAC 173-201A-240(5)(a)
7. The listed marine water criteria are based on un-ionized ammonia concentrations. Criteria concentrations based on total ammonia for marine water can be found in USEPA Ambient Water Quality Criteria for Ammonia (Saltwater)-1989, EPA440/ 5-88-004, April 1989.

BOD_5

There are no state water quality criteria for BOD_5, so the TBELs above are applied. Based on the DMR data, the 95th percentile average monthly and average weekly effluent BOD_5 during the last permit cycle were 19 mg/L and 31 mg/L, respectively. Both of these values fall within the limits of 30 mg/L and 45 mg/L respectively, so the TBELs are retained.

DO

The Washington water quality criteria for marine water of extraordinary quality for aquatic life establishes a one-day minimum of 7.0 mg/L for dissolved oxygen. When a water body's DO is lower than the criteria (or within 0.2 mg/L) due to natural conditions, then human actions considered cumulatively may not cause a decrease in DO of more than 0.2 mg/L (WAC 173-201A-210(1)(d)). The 2011 permit did not require DO monitoring, however the permittee submitted daily DO measurements in their paper DMRs for several years. EPA analyzed the receiving water data from GRG002 and found July through October are the months of lowest average ambient DO, so those months are considered the DO critical period in this permit. The 10th percentile ambient DO during the critical period is 4.83 mg/L. The 10th percentile effluent DO (daily) for the same period is 3.2 mg/L. EPA performed a reasonable potential analysis to determine whether the effluent has reasonable potential to cause DO levels below the WQS. The 10th percentile ambient DO falls well below the WQS, but EPA determined that effluent will not cause a decrease in DO of more than 0.2 mg/L, so WQBELs do not need to be established (See calculations in Appendix D, Part A). However, the permit does require DO monitoring and reporting in order to accurately assess reasonable potential during the next permit term.

TSS

There are no state water quality criteria for TSS, so the TBELs above are applied.

pH

The Washington criteria for extraordinary quality marine water for aquatic life specify that pH must be within the range of 7.0 to 8.5 standard units, with a human-caused variation within the above range of less than 0.2 units (WAC 173-201A-210(1)(f)). The 2011 permit

used the TBELs, allowing for a pH range of 6.0 to 9.0 standard units. In the DMR data received during the 2011 permit cycle, the facility reported effluent pH ranging from 6.26 to 8.56 standard units. Using the calculation developed by Lewis and Wallace (1998), EPA performed a reasonable potential analysis to assess whether the TBELs would ensure compliance with the WQS (See Appendix D, Part B). This analysis confirmed compliance with the WQS. Since there is no reasonable potential to exceed the WQS, the permit retains the TBELs for pH of 6.0 to 9.0 standard units.

Temperature

The Washington criteria for extraordinary quality marine water for aquatic life limit temperature to a 13.0°C (1-day maximum). When water temperature is warmer than the criteria (or within 0.3°C (0.54°F)) due to natural conditions, then human actions considered cumulatively may not cause the 7-day maximum to increase by more than 0.3°C (WAC 173-201A-210(1)(c)). For analysis purposes, water temperature data were divided into summer (May to September) and winter (October to April). The 90th percentile of ambient daily summer water temperature reported for at Ecology monitoring station GRG002 is 17.3°C and the 90th percentile winter temperature is 10.5°C. The 95th percentile of daily summer effluent temperature is 22.0°C and winter temperature is 17.6°C.

As shown in Appendix D, Part C, EPA conducted a reasonable potential analysis to determine whether there is reasonable potential to exceed the Washington WQS. The analysis concluded that in the summer, when ambient temperature is above the 13°C standard, the incremental temperature increase is 0.06°C, less than the 0.3°C limit. In the winter, ambient temperature is below 13°C, and the temperature at the chronic mixing zone boundary is predicted to be 10.64°C, below the standard. Therefore, no effluent limit for temperature is necessary. The 2011 permit did not require temperature monitoring; however, it was submitted in DMRs from 2012-2016. Given that summer ambient temperature is above the WQS, effluent temperature monitoring is proposed for the draft permit, for the purposes of continuing to analyze reasonable potential.

Fecal Coliform (Shellfish Harvesting)

The Washington water quality criteria for shellfish harvesting require that fecal coliform must not exceed a geometric mean value of 14 cfu/100 mL, and that no 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 exceed 43 cfu/100 mL (WAC 173-201A-210(2)(b)).

Based on the DMR data submitted during the 2011 permit term, the 95th percentile monthly average of effluent fecal coliform was 17 cfu/100 mL and weekly average was 590 cfu/100 mL. The 95th percentile receiving water fecal coliform concentration at GRG002 is 1 cfu/mL.

EPA conducted a reasonable potential analysis using the TBEL weekly geometric mean of 400 cfu/100 mL as the effluent fecal coliform, and the 95th percentile receiving water fecal coliform. Using these inputs, the analysis concluded that there is no reasonable potential to exceed the shellfish harvesting fecal coliform WQS (See Appendix D, Part D).

Enterococci Bacteria (Primary Contact Recreation)

On January 23, 2019, Ecology adopted amendments to Chapter 173-201A WAC to update fresh and marine WQS for the protection of water contact recreational uses in state waters. This included new bacterial indicators and numeric criteria based on enterococci bacteria instead of fecal coliform for marine waters. EPA approved the new numeric standards on April 30, 2019. As discussed in the previous section, fecal coliform remains the best indicator for waterbodies designated for shellfish harvesting, therefore fecal coliform limits and monitoring are included in the draft permit.

The WQS update included a transition period to phase out the fecal coliform criteria for primary contact recreation, which expired December 31, 2020. Accordingly, only the new enterococci bacteria criteria apply to marine waterbodies designated for primary contact recreation uses and are as follows: *Enterococci organism levels within an averaging period must not exceed a geometric mean value of 30 CFU 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* (WAC 173-201A-210(3)(b)).

Since it is a new standard, there are no enterococci monitoring data for the facility. Therefore, it is not possible to determine reasonable potential to exceed the enterococci criteria or to develop a correlation between fecal coliform and enterococci levels. In addition to fecal coliform, enterococci monitoring is required by the draft permit so that a reasonable potential analysis can be conducted and site-specific correlations can be developed during the reissuance process for this permit.

Total Residual Chlorine (TRC)

The 2011 permit applied WQBELs including an average monthly limit of 0.23 mg/L and a maximum daily limit of 0.65 mg/L of TRC in order to meet the acute water quality criteria of 13.0 µg/L and the chronic criteria of 7.5 µg/L (WAC 173-201A-240(5)(a)). However, the facility transitioned their disinfection process to a UV system in 2015, and effluent has not contained residual chlorine since that time. The permit retains the previous WQBELs for TRC, for the unlikely event that the UV system fails. However, monitoring is only required when chlorination is used.

Ammonia

The Washington State WQS specify criteria for all surface waters in terms of the toxic un-ionized form of ammonia (NH_3) (WAC 173-201A-240(5)(b)). Marine total ammonia criteria are based on a formula which relies on the pH, temperature, and salinity of the receiving water; the fraction of ammonia present as the un-ionized form increases with increasing pH and temperature and decreasing salinity (Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989, EPA440/5-88-004). Therefore, the criteria become more stringent as pH and temperature increase and salinity decreases. The calculated criteria for total ammonia (as

N) are: 8.50 mg/L (acute) and 1.28 mg/L (chronic) These calculations are described in Appendix D, Part E.

The 2011 permit required just one year of quarterly effluent total ammonia monitoring, however the permittee submitted 17 quarterly data points. The 95th percentile total ammonia concentration is 2.188 mg/L. For reasonable potential analysis, EPA used the 90th percentile receiving water concentration, as recommended by Ecology's Permit Calculations Spreadsheet. The 90th percentile total ammonia (as N) concentration at Ecology monitoring station GRG002 is 18.58 µg/L (0.01858 mg/L). The analysis showed that there is no reasonable potential to exceed the ammonia WQS. However, increased monitoring frequency and extended monitoring duration is proposed in order to generate more effluent data for evaluation during the next permit cycle.

Nitrate plus Nitrite and Total Kjeldahl Nitrogen (TKN)

On January 30, 2020, Ecology announced plans to develop a draft Puget Sound Nutrient General Permit (PSNGP), which will apply to nearly 70 domestic WWTPs. The permit will focus on limiting discharges of excess nutrients, which have been a significant contributor to low oxygen levels in Puget Sound. A pre-draft of the PSNGP was issued on January 27, 2021. The first term of the PSNGP will not include numerical limits, but instead will be focused on monitoring and treatment optimization. It includes action levels that trigger additional nutrient reduction actions by the covered facilities. A future study evaluating data collected during the first term will determine waste load allocations for these state regulated WWTPs.

The 2011 Permit required quarterly monitoring for nitrate plus nitrite and TKN for a single year. To align better with the goals of the PSNGP and to collect additional data to inform future permitting decisions, the draft permit proposes to increase the sampling frequency for both nitrate plus nitrite and TKN to monthly for the entire permit term. Additionally, action levels to trigger optimization efforts are not proposed during this permit term. During the next permit issuance process, EPA will evaluate if permit limits and potential nutrient reduction steps for these parameters are necessary

Other Nutrients

The draft permit includes monthly monitoring requirements for $CBOD_5$, TOC, and TIN, in order to more closely align with the PSNGP. The dataset collected will help to determine if permit limits are necessary in the future and provide a basis for potential nutrient reduction planning in the next permit.

E. Antibacksliding

Section 402(o) of the Clean Water Act and 40 CFR 122.44 (l) generally prohibit the renewal, reissuance or modification of an existing NPDES permit that contains effluent limits, permit conditions or standards that are less stringent than those established in the 2011 permit (i.e., anti-backsliding) but provides limited exceptions. For explanation of the antibacksliding

exceptions refer to Chapter 7 of the Permit Writers Manual *Final Effluent Limitations and Anti-backsliding*.

The proposed effluent limits in the draft Permit are the same or more stringent than the 2011 permit; therefore, the draft permit complies with the antibacksliding provisions and an antibacksliding analysis is not necessary.

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The draft permit also requires the permittee to perform effluent monitoring required by the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to EPA.

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using the EPA-approved test methods (generally found in 40 CFR 136) or as specified in the permit.

Monitoring Changes from 2011 Permit

Monitoring changes from the 2011 permit include: (1) conditional monitoring for TRC when chlorination is used at the facility; (2) reducing (conditional) TRC monitoring to weekly from daily; and (3) increasing the monitoring frequency for DO, total ammonia, nitrate plus nitrite, and TKN from quarterly for one year to monthly for the entire permit term (See Tables 5 and 6 above).

C. Surface Water Monitoring

The draft permit requires ambient monitoring for four parameters (Part I.C of the permit). The permittee must conduct monthly monitoring for temperature, pH, and salinity within Hale Passage from June through October (the critical season) each year for two consecutive years beginning in June 2022. This data will be used to calculate site-specific ammonia criteria and to conduct a reasonable potential analysis for ammonia during the next permit development process.

Surface water measurements must be in the Georgia Strait nearby, but outside of, the effluent mixing zone (which is approximately 218.5 feet in any direction from a point on the surface directly above the diffuser).

Table 9 summarizes the proposed surface water monitoring requirements for the draft permit. Surface water monitoring results must be submitted with the DMR.

Table 9. Surface Water Monitoring in Draft Permit

Parameter	Units	Monitoring Frequency	Sample Type
Temperature	°C	1/month, June to October for two consecutive years	Grab
pH	s.u.	1/month, June to October for two consecutive years	Grab
Salinity	ppt	1/month, June to October for two consecutive years	Grab

VI. Other Permit Conditions

A. Quality Assurance Project Plan

The facility is required to update the Quality Assurance Project Plan (QAPP) within 180 days of the effective date of the final permit. The QAPP must consist of standard operating procedures that the permittee must follow for collecting, handling, storing, shipping, and analyzing samples, and data reporting. The plan must be retained onsite and be made available to EPA upon request.

B. Operation and Maintenance Plan

The permit requires the facility to properly operate and maintain all facilities and system of treatment and control. Proper operation and maintenance are essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop and implement an operation and maintenance plan for the facility within 180 days of the effective date of the final permit. The plan must be retained onsite and be made available to EPA upon request.

C. Sanitary Sewer Overflows and Proper Operation and Maintenance of the Collection System

SSOs are not authorized under this permit. The permit contains language to address SSO reporting and public notice and operation and maintenance of the collection system. The permit requires that the permittee identify SSO occurrences and their causes. In addition, the permit establishes reporting, record keeping and third-party notification of SSOs. Finally, the permit requires proper operation and maintenance of the collection system.

The following specific permit conditions apply:

Immediate Reporting – The permittee is required to notify EPA of an SSO within 24 hours of the time the permittee becomes aware of the overflow. (See 40 CFR 122.41(l)(6))

Written Reports – The permittee is required to provide EPA a written report within five days of the time it became aware of any overflow that is subject to the immediate reporting provision. (See 40 CFR 122.41(l)(6)(i)).

Third Party Notice – The permit requires that the permittee establish a process to notify specified third parties of SSOs that may endanger health due to a likelihood of human exposure; or unanticipated bypass and upset that exceeds any effluent limitation in the permit or that may endanger health due to a likelihood of human exposure. The permittee is required to develop, in consultation with appropriate authorities at the local, county, tribal and/or state level, a plan that describes how, under various overflow (and unanticipated bypass and upset) scenarios, the public, as well as other entities, would be notified of overflows that may endanger health. The plan should identify all overflows that would be reported and to whom, and the specific information that would be reported. The plan should include a description of lines of communication and the identities of responsible officials. (See 40 CFR 122.41(l)(6)).

Record Keeping – The permittee is required to keep records of SSOs. The permittee must retain the reports submitted to EPA and other appropriate reports that could include work orders associated with investigation of system problems related to a SSO, that describes the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO. (See 40 CFR 122.41(j)).

Proper Operation and Maintenance – The permit requires proper operation and maintenance of the collection system. (See 40 CFR 122.41(d) and (e)). SSOs may be indicative of improper operation and maintenance of the collection system. The permittee may consider the development and implementation of a capacity, management, operation and maintenance (CMOM) program.

The permittee may refer to the Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (EPA 305-B-05-002). This guide identifies some of the criteria used by EPA inspectors to evaluate a collection system's management, operation and maintenance program activities. Owners/operators can review their own systems against the checklist (Chapter 3) to reduce the occurrence of sewer overflows and improve or maintain compliance.

D. Environmental Justice

As part of the permit development process, EPA Region 10 conducted a screening analysis to determine whether this permit action could affect overburdened communities. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. EPA used a nationally consistent geospatial tool that contains demographic and environmental data for the United States at the Census block group level. This tool is used to identify permits for which enhanced outreach may be warranted.

The facility is located within 1 mile of a Census block group that is potentially overburdened. The high index for the wastewater discharge indicator is largely attributed to demographics, and specifically a high minority population. The minority population in this area are members of the Lummi Nation. EPA is engaging with the tribe during the permit development process and invites government-to-government consultation. In addition, the service area for the WWTP includes the area of concern, so the permit action benefits the tribal community. Given the small size of the facility, there is no indication that reissuance of this permit would trigger and environmental justice concerns.

Regardless of whether a facility is located near a potentially overburdened community, EPA encourages permittees to review (and to consider adopting, where appropriate) Promising Practices for Permit Applicants Seeking EPA-Issued Permits: Ways To Engage Neighboring Communities (see https://www.federalregister.gov/d/2013-10945). Examples of promising practices include: thinking ahead about community's characteristics and the effects of the permit on the community, engaging the right community leaders, providing progress or status reports, inviting members of the community for tours of the facility, providing informational materials translated into different languages, setting up a hotline for community members to voice concerns or request information, follow up, etc.

For more information, please visit https://www.epa.gov/environmentaljustice and Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

E. Design Criteria

The permit includes design criteria requirements. This provision requires the permittee to compare influent flow and BOD_5 and TSS loading to the facility's design flow and BOD_5 and TSS loading and prepare a facility plan for maintaining compliance with NPDES permit effluent limits when the flow or loading exceeds 85% of the design criteria values for any two months in a twelve-month period. The average monthly flow at the WWTP never exceeded 85% of the design flow during the permit term. The design criteria for influent BOD_5 and TSS loading is 400 lbs/day. BOD_5 influent loading exceeded 85% of this value five times during the 2011 permit term, including two months in a row on two occasions. TSS influent loading exceeded 85% of this value seven times during the 2011 permit term, including two months in a row on one occasion. The 2011 permit required development of a plan only if flow or loading exceeded 85% of design criteria on average over a 12-month period, so no plan was prepared during the last permit cycle.

F. Pretreatment Requirements

The permittee does not have an approved state pretreatment program per 40 CFR 403.10, thus, EPA is the Approval Authority for this WWTP. Since Sandy Point WWTP does not have an approved POTW pretreatment program per 40 CFR 403.8, EPA is also the Control Authority of industrial users that might introduce pollutants into the facility.

Background on the pretreatment program may be found at Introduction to the National Pretreatment Program (EPA, 2011).

G. Outfall Inspection Requirements

The 2011 permit and previous versions of this permit specify the outfall depth as 44 ft below MLLW. However, design drawings made by Parametrix in 1976 show that the top of the outfall is 18.5 feet below MLLW and the seafloor is at a depth of 20 feet. The draft permit reflects this change in the understanding of the depth. However, given that the only knowledge of the outfall is from the design drawings, the draft permit requires that the permittee conduct an inspection to confirm shape, size, orientation, and position of the outfall within the permit term. See Section II.E of the permit for details about the inspection and required report.

H. Standard Permit Provisions

Sections III, IV and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

I. Electronic Submission of Discharge Monitoring Reports

The draft permit requires that the permittee submit DMR data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application.

EPA currently conducts free training on the use of NetDMR. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: https://netdmr.zendesk.com/hc/en-us. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

VII. Sludge (Biosolids) Requirements

EPA Region 10 separates wastewater and sludge permitting. EPA has authority under the CWA to issue separate sludge-only permits for the purposes of regulating biosolids. EPA may issue a sludge-only permit to the facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at the facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State's biosolids program. The Part 503 regulations are self-implementing, which means that facilities must comply with them whether or not a permit has been issued.

VIII. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), together referred to as the Services, if their actions could beneficially or adversely affect any threatened or endangered species. EPA has developed a BE that evaluates impacts to threatened and endangered species and critical habitat located within the vicinity of the discharge. EPA will complete consultation with the Services prior to taking final action on the draft permit.

B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires the EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH). EPA has included an EFH assessment in the BE and will complete consultation with NOAA prior to taking final action on the draft permit.

C. State Certification

Section 401 of the CWA requires the EPA to seek State certification before issuing a final permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards, or treatment standards established pursuant to any State law or regulation. The Lummi Tribe has TAS for purposes of the CWA, however the discharge is into Washington State waters, so the State is the certifying authority.

EPA will seek State certification and include any resulting permit conditions (if applicable) in the final documents.

D. Antidegradation

EPA has completed an antidegradation review in Appendix D (Part F) and finds that it is consistent with the State's WQS and the State's antidegradation implementation procedures. Comments on the 401-certification including the antidegradation review can be submitted to Ecology as set forth above (see State Certification on Page 1 of this Fact Sheet).

E. Permit Expiration

The permit will expire five years from the effective date.

IX. References

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Appendix A. Facility Information

Figure A.1. Location Map – Sandy Point WWTP

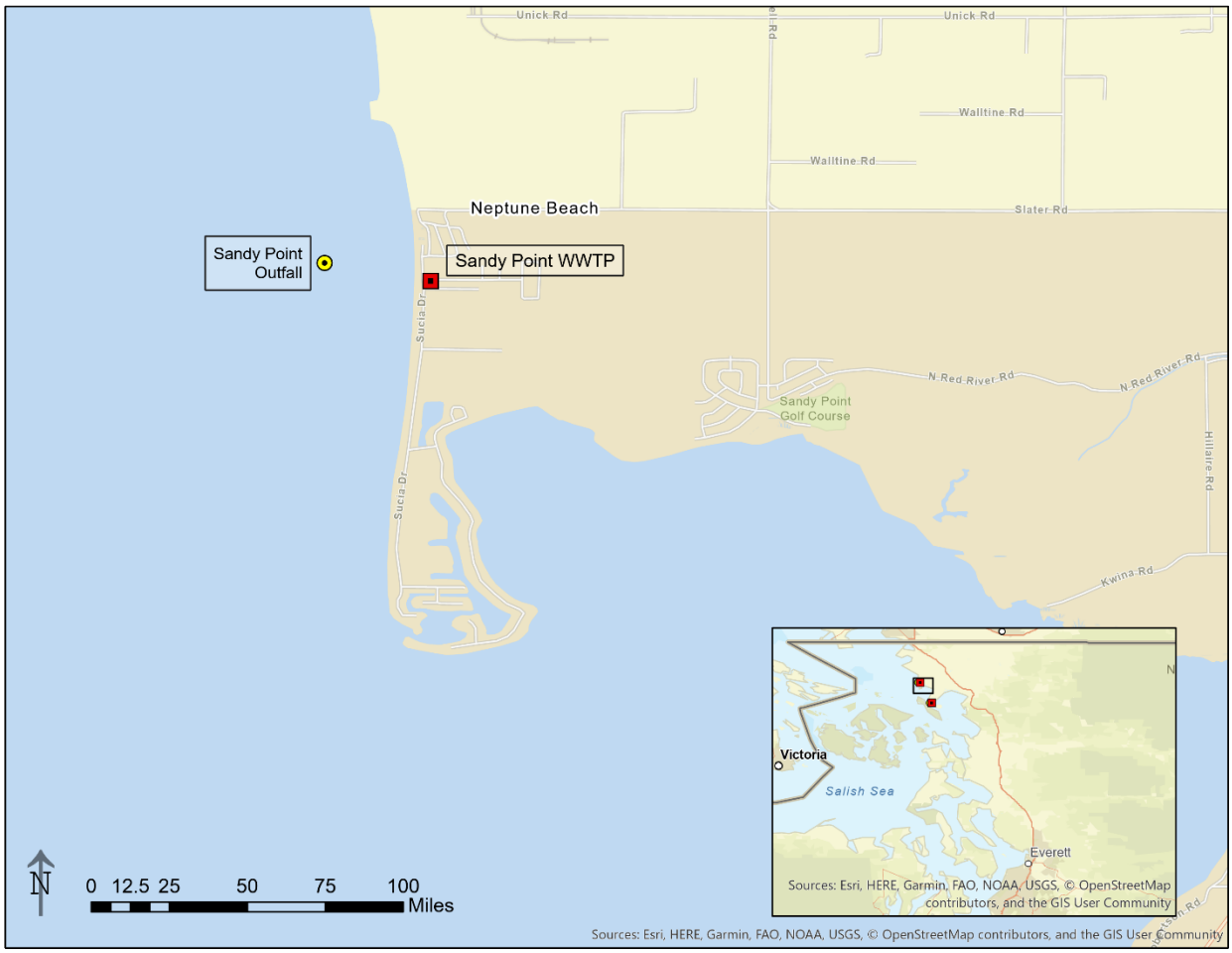
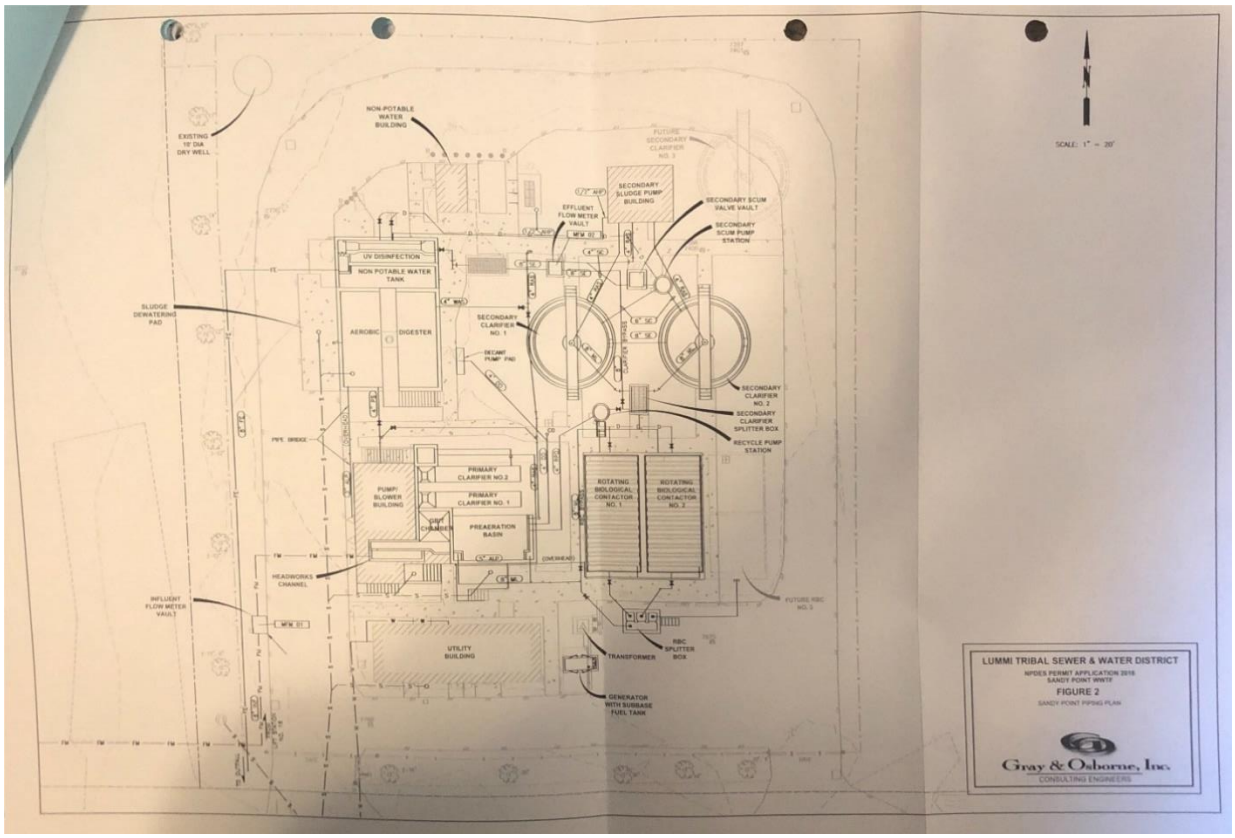


Figure A.2. Schematic Diagrams - Sandy Point WWTP



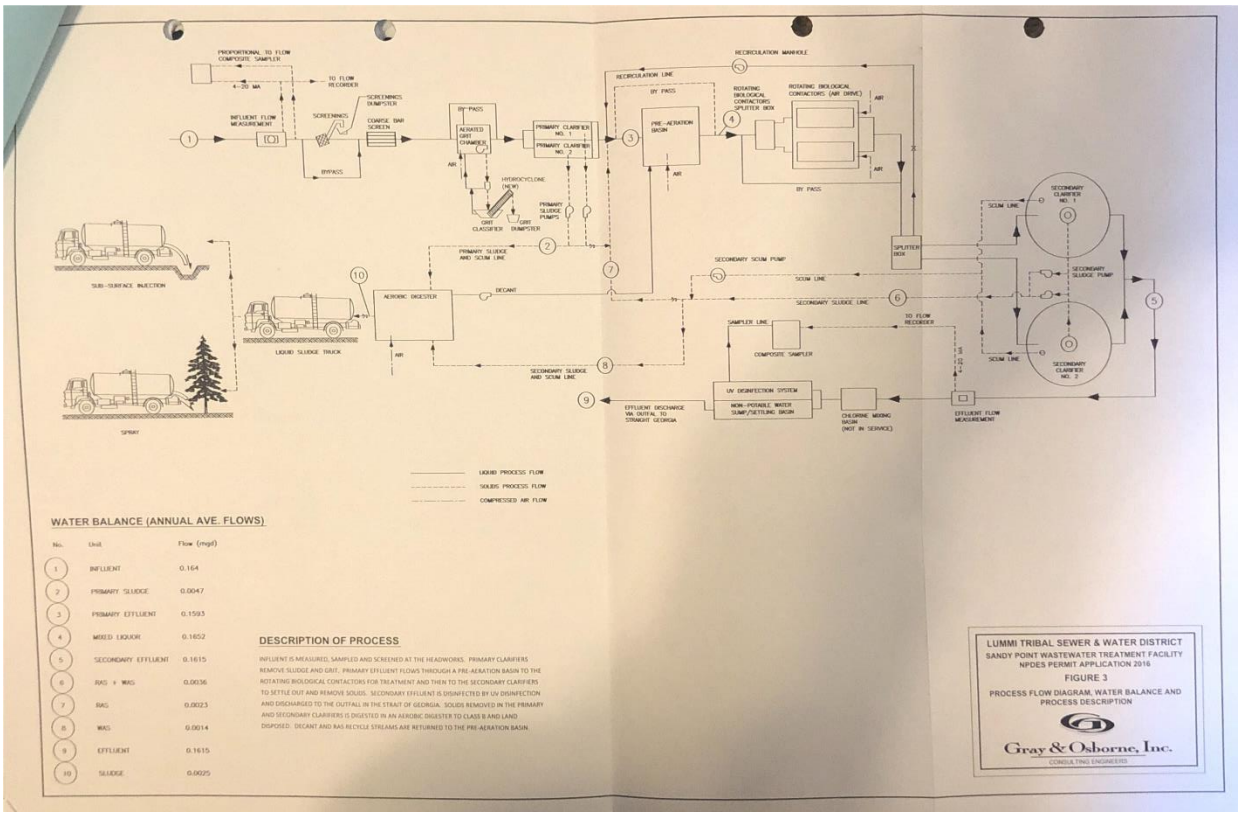
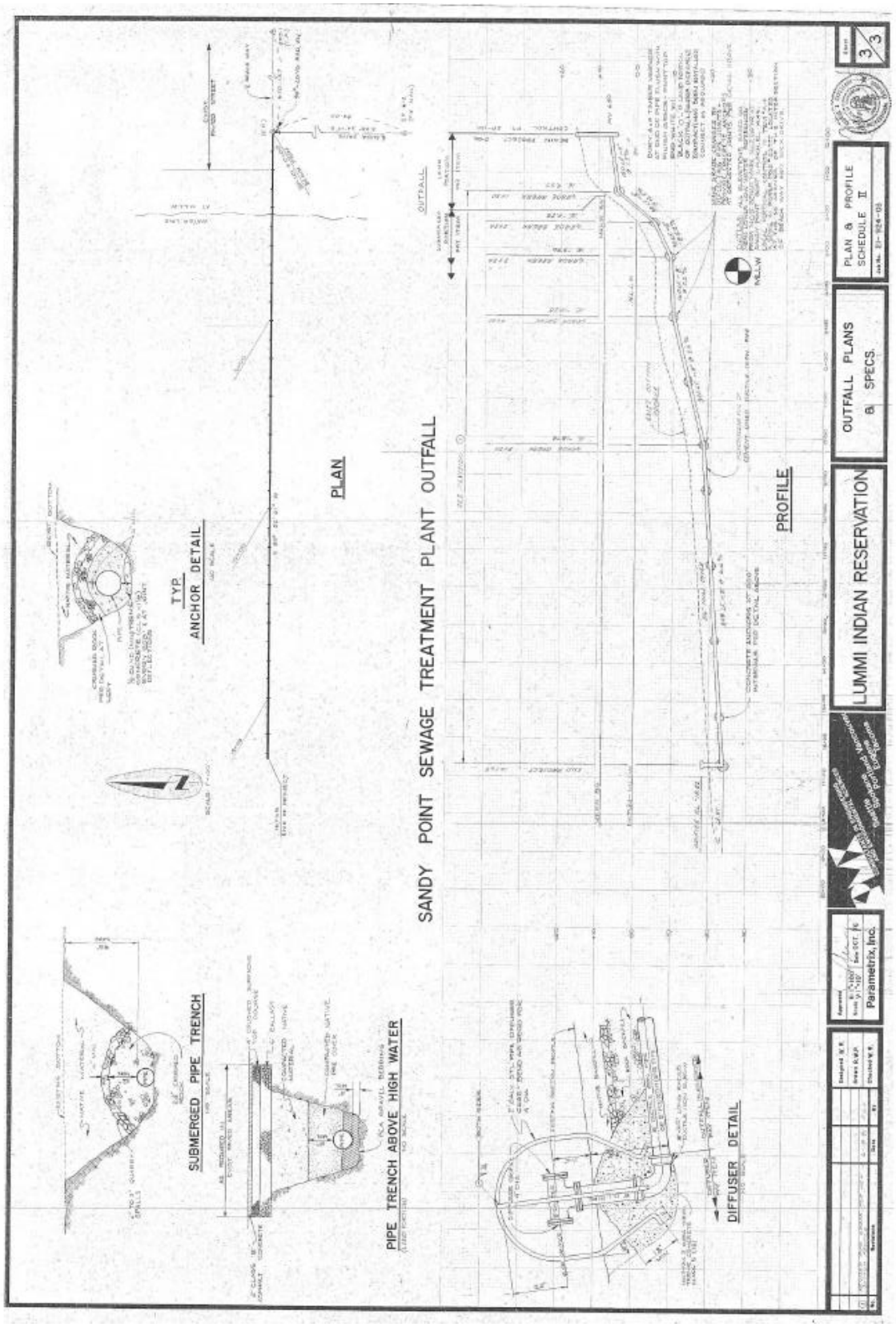


Figure A.3. Outfall Diagram (Parametrix, 1976)



Appendix B. Water Quality Data

A. Treatment Plant Effluent Data (DMR)

BOD_5

Date	Monthly Average (mg/L)	Weekly Average (mg/L)	Percent Removal (Monthly Average)
12/31/2011	8	16	96
01/31/2012	8	10	96
02/29/2012	7	9	94
03/31/2012	18	29	88
04/30/2012	16	5.4	88
05/31/2012	17	271	92
06/30/2012	10	13	95
07/31/2012	13	16	94
08/31/2012	14	14	95
09/30/2012	9	13	96
10/31/2012	14	15	92
11/30/2012	9	12	88
12/31/2012	12	23	82
01/31/2013	13	26	56
02/28/2013	15	42	63
03/31/2013	7	9	94
04/30/2013	7	8	95
05/31/2013	9	10	96
06/30/2013	11	13	94
07/31/2013	17	25	91
08/31/2013	11	12	95
09/30/2013	10	11	96
10/31/2013	8	10	95
11/30/2013	14	23	88
12/31/2013	10	12	96
01/31/2014	9	12	97
02/28/2014	12	18	90
03/31/2014			
04/30/2014	12	15	92
05/31/2014	12	14	91
06/30/2014	10	13	95
07/31/2014	10	12	96
08/31/2014	11	15	95
09/30/2014	11	15	94
10/31/2014	11	12	93
11/30/2014	17	24	90
12/31/2014	18	21	89
01/31/2015	14	21	88
02/28/2015	20	22	87
03/31/2015	24	45	84
04/30/2015	10	12	95
05/31/2015	12	17	95
06/30/2015	9	14	94
07/31/2015	8	11	96
08/31/2015	12	12	96
09/30/2015	9	12	96

10/31/2015	12	13	94
11/30/2015	15	17	90
12/31/2015	13	15	91
01/31/2016	13	17	90
02/29/2016	12	17	79
03/31/2016	14	17	89
04/30/2016	19	30	86
05/31/2016	17	30	89
06/30/2016			
07/31/2016	18	31	91
08/31/2016	12	14	95
09/30/2016	10	10	95
10/31/2016	14	19	90
11/30/2016	13	16	89
12/31/2016	12	19	89
01/31/2017	15	18	91
02/28/2017	17	18	91
03/31/2017	14	17	90
04/30/2017	14	16	89
05/31/2017	14	16	93
06/30/2017	16	17	92
07/31/2017	14	24	90
08/31/2017	11	12	96
09/30/2017	11	12	96
10/31/2017	13	16	94
11/30/2017	18	25	89
12/31/2017	14	22	81
01/31/2018	18	20	90
02/28/2018	25	29.7	85
03/31/2018	23	32	81
04/30/2018	15	19	91
05/31/2018	13	15	96
06/30/2018	14	16	94
07/31/2018	12	18	94
08/31/2018	11	13	95
09/30/2018	13	16	96
10/31/2018	11	15	94
11/30/2018	9	10	95
12/31/2018	11	12	91
01/31/2019	13	27	77
02/28/2019	6	8	94
03/31/2019	8	10	95
04/30/2019	8	9	95
05/31/2019	8	8	97
06/30/2019	7	9	96
07/31/2019	9	13	95
08/31/2019	13	18	96
09/30/2019	9	10	96
10/31/2019	8	13	95
11/30/2019	10	10	94
12/31/2019	13	18	95
01/31/2020	11	17	85
02/29/2020	12	16	90

03/31/2020	11	14	93
04/30/2020	8	10	97
05/31/2020	19	40	92
06/30/2020	12	19	94
Mean	12.5	19.28	91.44
Minimum	6	5.4	56
Maximum	25	271	97
95th Percentile	19	31	96
5th Percentile	8	9	81

TSS

Date	Monthly Average (mg/L)	Weekly Average (mg/L)	Percent Removal (Monthly Average)
12/31/2011	9	14	89
01/31/2012	11	14	87
02/29/2012	12	16	90
03/31/2012	18	33	84
04/30/2012	28	80	80
05/31/2012	17	25	90
06/30/2012	11	16	91
07/31/2012	10	16	85
08/31/2012	8	14	93
09/30/2012	9	11	92
10/31/2012	7	12	91
11/30/2012	11	18	82
12/31/2012	18	36	72
01/31/2013	14	39	15
02/28/2013	10	26	88
03/31/2013	8	12	91
04/30/2013	7	10	81
05/31/2013	8	10	91
06/30/2013	9	17	88
07/31/2013	12	17	88
08/31/2013	11	16	93
09/30/2013	9	12	94
10/31/2013	9	11	92
11/30/2013	9	12	93
12/31/2013	11	16	95
01/31/2014	8	15	97
02/28/2014	11	13	84
03/31/2014			
04/30/2014	12	14	91
05/31/2014	11	16	88
06/30/2014	10	13	94
07/31/2014	11	16	87
08/31/2014	12	12	90
09/30/2014	7	10	91
10/31/2014	9	11	90
11/30/2014	17	22	74
12/31/2014	22	29	81
01/31/2015	23	33	55
02/28/2015	28	41	77

03/31/2015	32	46	79
04/30/2015	15	20	93
05/31/2015	14	20	91
06/30/2015	19	26	86
07/31/2015	11	15	95
08/31/2015	14	19	94
09/30/2015	14	18	94
10/31/2015	17	24.8	85
11/30/2015	22	17	83
12/31/2015	13	18	88
01/31/2016	10	16	88
02/29/2016	14	21	84
03/31/2016	13	16	88
04/30/2016	12	15	87
05/31/2016	14	16	90
06/30/2016			
07/31/2016	15	20	83
08/31/2016	12	12	92
09/30/2016	12	14	92
10/31/2016	20	24	86
11/30/2016	16	22.2	85
12/31/2016	13	26	81
01/31/2017	20	29	86
02/28/2017	22	24.9	85
03/31/2017	18	21	87
04/30/2017	13	18	85
05/31/2017	19	22	83
06/30/2017	22	29	85
07/31/2017	20	22	91
08/31/2017	15	19	92
09/30/2017	13	15	93
10/31/2017	16	23	74
11/30/2017	22	27.8	90
12/31/2017	22	56	53
01/31/2018	28	43.5	81
02/28/2018	38	44	88
03/31/2018	30	37.5	83
04/30/2018	17	22	90
05/31/2018	13	18	94
06/30/2018	20	22	93
07/31/2018	17	27	93
08/31/2018	14	25	93
09/30/2018	13	22	90
10/31/2018	17	29	88
11/30/2018	10	14	93
12/31/2018	14	17	92
01/31/2019	10	13	90
02/28/2019	7	11	90
03/31/2019	7	10	95
04/30/2019	8	10	95
05/31/2019	8	11	96
06/30/2019	7	11	96
07/31/2019	10	14	90

08/31/2019	19	25	92
09/30/2019	12	16	93
10/31/2019	12	21	93
11/30/2019	14	19	90
12/31/2019	20	27	90
01/31/2020	16	24	77
02/29/2020	18	22	83
03/31/2020	16	20	90
04/30/2020	11	14	94
05/31/2020	21	34	89
06/30/2020	19	26	85
Mean	14.62	21.09	87.01
Minimum	7	10	15
Maximum	38	80	97
95th Percentile	28	41	95
5th Percentile	7	11	74

Fecal Coliform

Date	Monthly Geometric Mean (cfu/100 mL)	Weekly Geometric Mean (cfu/100 mL)	Date	Monthly Geometric Mean (cfu/100 mL)	Weekly Geometric Mean (cfu/100 mL)
12/31/2011	4	17	04/30/2016	6	27
01/31/2012	32	2	05/31/2016	6	31
02/29/2012	4	28	06/30/2016		
03/31/2012	128	600	07/31/2016	7	49
04/30/2012	13	221	08/31/2016	13	44
05/31/2012	3	37	09/30/2016	5	21
06/30/2012	5	116	10/31/2016	2	7
07/31/2012	2	3	11/30/2016	2	7
08/31/2012	1	7	12/31/2016	4	17
09/30/2012	2	2	01/31/2017	1	2
10/31/2012	6	2000	02/28/2017	3	12
11/30/2012	3	13	03/31/2017	3	34
12/31/2012	1	2	04/30/2017	2	7
01/31/2013	4	80	05/31/2017	7	1100
02/28/2013	1	1	06/30/2017	2	8
03/31/2013	1	1	07/31/2017	4	41
04/30/2013	2	19	08/31/2017	1	2
05/31/2013	2	29	09/30/2017	2	5
06/30/2013	2	13	10/31/2017	1	1
07/31/2013	1	3	11/30/2017	1	1
08/31/2013	4	200	12/31/2017	1	1
09/30/2013	2	6	01/31/2018	1	1
10/31/2013	3	12	02/28/2018	1	2
11/30/2013	4	22	03/31/2018	1	1
12/31/2013	2	13	04/30/2018	7	30
01/31/2014	1	3	05/31/2018	2	9
02/28/2014	1	1	06/30/2018	16	27
03/31/2014			07/31/2018	7	52
04/30/2014	3	33	08/31/2018	11	590
05/31/2014	3	20	09/30/2018	21	300

06/30/2014	18	6900	10/31/2018	4	19
07/31/2014	2	14	11/30/2018	2	14
08/31/2014	1	4	12/31/2018	4	101
09/30/2014	1	1	01/31/2019	5	180
10/31/2014	2	32	02/28/2019	3	90
11/30/2014	15	840	03/31/2019	14	56
12/31/2014	6	27	04/30/2019	4	22
01/31/2015	2	4	05/31/2019	7	123
02/28/2015	1	4	06/30/2019	1	1
03/31/2015	3	22	07/31/2019	2	4
04/30/2015	8	164	08/31/2019	7	55
05/31/2015	5	31	09/30/2019	6	9
06/30/2015	6	40	10/31/2019	2	17
07/31/2015	17	260	11/30/2019	4	16
08/31/2015	2	4	12/31/2019	7	105
09/30/2015	2	4	01/31/2020	3	10
10/31/2015	2	4	02/29/2020	4	245
11/30/2015	9	24	03/31/2020	2	4
12/31/2015	15	104	04/30/2020	2	16
01/31/2016	1	4	05/31/2020	6	66
02/29/2016	7	15	06/30/2020	6	83
03/31/2016	20	173			
			Mean	6.14	156.87
			Minimum	1	1
			Maximum	128	6900
			95th Percentile	17	590
			5th Percentile	1	1

pH

Date	Instantaneous Maximum	Instantaneous Minimum	Date	Instantaneous Maximum	Instantaneous Minimum
12/31/2011	7.16	6.75	04/30/2016	7.26	7.06
01/31/2012	7.39	6.76	05/31/2016	7.36	7.14
02/29/2012	7.11	6.3	06/30/2016		
03/31/2012	7.5	6.4	07/31/2016	7.58	7.21
04/30/2012	7.3	6.4	08/31/2016	7.41	7.2
05/31/2012	7.6	6.9	09/30/2016	7.36	7.09
06/30/2012	7.4	6.4	10/31/2016	8.07	7.12
07/31/2012	7.4	6.5	11/30/2016	7.99	7.19
08/31/2012	7.3	7	12/31/2016	7.52	6.9
09/30/2012	7.3	6.7	01/31/2017	7.43	6.88
10/31/2012	7.5	6.9	02/28/2017	7.42	6.76
11/30/2012	7.4	6.6	03/31/2017	7.62	6.95
12/31/2012	7.28	6.56	04/30/2017	7.54	6.9
01/31/2013	7.32	6.26	05/31/2017	7.76	7.09
02/28/2013	7.5	6.8	06/30/2017	7.9	6.99
03/31/2013	7.4	6.5	07/31/2017	7.64	7.19
04/30/2013	7.3	6.7	08/31/2017	8.08	7.1
05/31/2013	7.28	6.58	09/30/2017	7.29	7.1
06/30/2013	7.2	6.4	10/31/2017	7.57	6.97
07/31/2013	7.33	6.52	11/30/2017	7.7	7.07
08/31/2013	7.7	6.95	12/31/2017	7.46	7.18

09/30/2013	7.85	7.54	01/31/2018	7.4	7.14
10/31/2013	8.15	7.43	02/28/2018	8.2	6.96
11/30/2013	7.9	6.9	03/31/2018	7.96	6.86
12/31/2013	7.27	7.08	04/30/2018	7.56	6.8
01/31/2014	7.37	7.05	05/31/2018	8.29	6.98
02/28/2014	7	7	06/30/2018	8.17	7.28
03/31/2014			07/31/2018	7.85	7.16
04/30/2014	8	7	08/31/2018	7.42	7.11
05/31/2014	7	7	09/30/2018	7.54	7.27
06/30/2014	8	7	10/31/2018	7.45	6.94
07/31/2014	7.86	7.1	11/30/2018	7.95	7
08/31/2014	7.47	6.99	12/31/2018	7.35	6.88
09/30/2014	7.61	7.14	01/31/2019	7.34	7.02
10/31/2014	8.03	7.24	02/28/2019	7.45	7.12
11/30/2014	8.1	7.16	03/31/2019	7.43	7.06
12/31/2014	8.56	6.75	04/30/2019	7.3	6.95
01/31/2015	7.7	7	05/31/2019	8.29	6.98
02/28/2015	8.18	6.93	06/30/2019	7.31	6.99
03/31/2015	8.36	6.7	07/31/2019	7.4	7.02
04/30/2015	7.59	6.98	08/31/2019	7.38	7.05
05/31/2015	7.9	7.38	09/30/2019	7.49	7.05
06/30/2015	7.93	7.22	10/31/2019	7.45	7.22
07/31/2015	7.32	7.08	11/30/2019	8.29	6.98
08/31/2015	7.43	7.02	12/31/2019	7.39	7.06
09/30/2015	7.52	7.13	01/31/2020	7.92	7.08
10/31/2015	7.46	7.24	02/29/2020	7.95	7.55
11/30/2015	7.39	7.01	03/31/2020	7.92	7.55
12/31/2015	7.32	7.08	04/30/2020	8.43	7.14
01/31/2016	7.32	7.01	05/31/2020	7.57	7.15
02/29/2016	7.47	7.06	06/30/2020	7.89	7.16
03/31/2016	7.38	7.06			
			Mean	7.61	6.98
			Minimum	7	6.26
			Maximum	8.56	7.55
			95th Percentile	8.29	7.28
			5th Percentile	7.26	6.4

Temperature

Monthly data and a summary of daily data are below.

Date	**Monthly Maximum (°C)**	**Date**	**Monthly Maximum (°C)**
12/31/2011		05/31/2014	19.2
01/31/2012	11.7	06/30/2014	19.8
02/29/2012	11.1	07/31/2014	22
03/31/2012	11.7	08/31/2014	22.7
04/30/2012	14.9	09/30/2014	21.2
05/31/2012	17.3	10/31/2014	18.8
06/30/2012	18.9	11/30/2014	15.6
07/31/2012	21	12/31/2014	12.9
08/31/2012	21.7	01/31/2015	11.5
09/30/2012	20.3	02/28/2015	12.7

10/31/2012	18.4	03/31/2015	14.6
11/30/2012	15.4	04/30/2015	15.7
12/31/2012	12.7	05/31/2015	19.5
01/31/2013	12.5	06/30/2015	22.2
02/28/2013	10.9	07/31/2015	22.5
03/31/2013	12.7	08/31/2015	22.5
04/30/2013	15.3	09/30/2015	22.2
05/31/2013	17.6	10/31/2015	19.2
06/30/2013	20.2	11/30/2015	16.2
07/31/2013	22.2	12/31/2015	13.6
08/31/2013	22.1	01/31/2016	12.3
09/30/2013	21.2	02/29/2016	12.5
10/31/2013	18.6	03/31/2016	13.8
11/30/2013	15.8	04/30/2016	16.3
12/31/2013	12.5	05/31/2016	18.1
01/31/2014	11.1	06/30/2016	
02/28/2014	10.1	07/31/2016	22.4
03/31/2014		08/31/2016	22.7
04/30/2014	14.2	09/30/2016	21.7
		ANNUAL	
		Mean	17.02
		Minimum	10.1
		Maximum	22.7
		95th Percentile	22.5
		5th Percentile	11.1
		MAY - SEPTEMBER	
		Mean	20.83
		Minimum	17.3
		Maximum	22.7
		95th Percentile	22.67
		5th Percentile	17.68
		OCTOBER – APRIL	
		Mean	14.04
		Minimum	10.1
		Maximum	19.2
		95th Percentile	18.7
		5th Percentile	11

	Daily (°C)
ANNUAL	
Mean	15.9
Minimum	6.4
Maximum	22.7
95th Percentile	21.7
5th Percentile	10
MAY - SEPTEMBER	
Mean	19.5
Minimum	12.5
Maximum	22.7
95th Percentile	22
5th Percentile	15.91
OCTOBER – APRIL	
Mean	12.8

Minimum	6.4
Maximum	19.2
95th Percentile	17.6
5th Percentile	9.6

Dissolved Oxygen (DO)

Monthly data and a summary of daily data are below.

Date	Monthly Maximum (mg/L)	Date	Monthly Maximum (mg/L)
04/30/2012	11	07/31/2014	6.54
05/31/2012	8.3	08/31/2014	6.62
06/30/2012	7.1	09/30/2014	5.9
07/31/2012	6.3	10/31/2014	7.4
08/31/2012	9.6	11/30/2014	7.66
09/30/2012	4.9	12/31/2014	9.22
10/31/2012	7.9	01/31/2015	10.04
11/30/2012	8.1	02/28/2015	8.49
12/31/2012	10.3	03/31/2015	9.3
01/31/2013	10.3	04/30/2015	7.72
02/28/2013	9.7	05/31/2015	6.91
03/31/2013	9.7	06/30/2015	6.27
04/30/2013	8.5	07/31/2015	5.49
05/31/2013	8.1	08/31/2015	5.02
06/30/2013	7.3	09/30/2015	5.49
07/31/2013	6.1	10/31/2015	5.78
08/31/2013	6.11	11/30/2015	7.28
09/30/2013	5.73	12/31/2015	8.21
10/31/2013	6.77	01/31/2016	8.23
11/30/2013	9.08	02/29/2016	9.3
12/31/2013	8.61	03/31/2016	8.48
01/31/2014	8.37	04/30/2016	7.95
02/28/2014	9.09	05/31/2016	6.79
03/31/2014		06/30/2016	
04/30/2014	8.06	07/31/2016	6.53
05/31/2014	7.51	08/31/2016	4.81
06/30/2014	6.53	09/30/2016	5.39
		Mean	7.61
		Minimum	4.81
		Maximum	11
		95th Percentile	10.16
		5th Percentile	5.22

	Daily (mg/L)
Mean	6
Minimum	0.1
Maximum	11
95th Percentile	8.94
5th Percentile	3.22

Total Ammonia (as N)

Date	Quarterly Maximum (mg/L)	Date	Quarterly Maximum (mg/L)
02/28/2015	0.73	08/31/2018	0.23
05/31/2015	0.14	11/30/2018	0.6
08/31/2015	1	02/28/2019	0.16
11/30/2015	0.51	05/31/2019	1.24
02/29/2016	0.64	08/31/2019	0.32
08/31/2017	1.8	11/30/2019	0.18
11/30/2017	0.71	02/29/2020	0.35
02/28/2018	0.26	05/31/2020	0.39
05/31/2018	3.74		
		Mean	0.76
		Minimum	0.14
		Maximum	3.74
		95th Percentile	2.19
		5th Percentile	0.16

Nitrate plus Nitrite (as N)

Date	Quarterly Maximum (mg/L)	Date	Quarterly Maximum (mg/L)
05/31/2015	29.7	08/31/2018	41
08/31/2015	38	11/30/2018	44
11/30/2015	23.3	02/28/2019	24.4
02/29/2016	17.6	05/31/2019	33.2
08/31/2017	33.3	08/31/2019	44
11/30/2017	23.98	11/30/2019	32.3
02/28/2018	25.4	02/29/2020	23.6
05/31/2018	28.4	05/31/2020	26.4
		Mean	30.54
		Minimum	17.6
		Maximum	44
		95th Percentile	44
		5th Percentile	21.88

Total Kjeldahl Nitrogen (TKN, as N)

Date	Quarterly Maximum (mg/L)	Date	Quarterly Maximum (mg/L)
05/31/2015	1.6	08/31/2018	3.54
08/31/2015	0.9	11/30/2018	4.77
11/30/2015	1.6	02/28/2019	3.41
02/29/2016	1.9	05/31/2019	3.73
08/31/2017	4.85	08/31/2019	3.07
11/30/2017	3.27	11/30/2019	2.82
02/28/2018	5.73	02/29/2020	3
05/31/2018	6.21	05/31/2020	3.33
		Mean	3.36
		Minimum	0.9
		Maximum	6.21

		95th Percentile	5.85
		5th Percentile	1.43

B. Receiving Water Data

Temperature

From Ecology monitoring station GRG002. There are 46,843 measurements taken throughout the water column between 1/24/95 and 12/4/13. These data are summarized below.

Annual

Mean	9.33 °C
Maximum	19.59 °C
Minimum	5.58 °C
90th Percentile	10.77 °C
95th Percentile	11.30 °C

May – September

Mean	10.03 °C
Maximum	19.59 °C
Minimum	8.20 °C
90th Percentile	11.30 °C
90th Percentile (1-DADMax)	17.25 °C
95th Percentile	11.82 °C

October – April

Mean	8.69 °C
Maximum	14.33 °C
Minimum	5.58 °C
90th Percentile	9.95 °C
90th Percentile (1-DADMax)	10.55 °C
95th Percentile	10.17 °C

Dissolved Oxygen (DO)

From Ecology monitoring station GRG002. There are 46,005 measurements taken throughout the water column between 1/24/95 and 12/4/13. These data are summarized below.

Annual

Mean	6.86 mg/L
Maximum	19.35 mg/L
Minimum	3.77 mg/L
10th Percentile	5.14 mg/L

5th Percentile	4.92 mg/L

July – October

Mean	5.66 mg/L
Maximum	13.71 mg/L
Minimum	3.77 mg/L
10th Percentile	4.83 mg/L
5th Percentile	4.50 mg/L

pH

From Ecology monitoring station GRG002. There are 31,201 measurements taken throughout the water column between 1/24/95 and 12/4/13. These data are summarized below.

Annual

Mean	7.65 s.u.
Maximum	8.65 s.u.
Minimum	7.14 s.u.
90th Percentile	7.90 s.u.
95th Percentile	7.96 s.u.
5th Percentile	7.35 s.u.

May – September

Mean	7.68 s.u.
Maximum	8.65 s.u.
Minimum	7.24 s.u.
90th Percentile	7.92 s.u.
95th Percentile	8.07 s.u.
5th Percentile	7.38 s.u.

Total Ammonia (as N)

From Ecology monitoring station GRG002. There are 459 measurements taken throughout the water column between 3/11/1999 and 11/13/19. These data are summarized below.

Annual

Mean	7.70 µg/L
Maximum	49.73 µg/L
Minimum	0 µg/L
90th Percentile	18.58 µg/L
95th Percentile	21.80 µg/L

Fecal Coliform

From Ecology monitoring station GRG002. There are 75 measurements taken throughout the water column between 4/12/1999 and 5/11/11. Ecology stopped measuring fecal coliform after 2011. These data are summarized below.

Annual

Mean	1 cfu/100 mL
Maximum	1 cfu/100 mL
Minimum	1 cfu/100 mL
90th Percentile	1 cfu/100 mL
95th Percentile	1 cfu/100 mL

Salinity

From Ecology monitoring station GRG002. There are 46113 measurements taken throughout the water column between 1/24/1995 and 12/4/13. These data are summarized below.

Annual

Mean	30.04 ppt
Maximum	32.04 ppt
Minimum	14.18 ppt
10th Percentile	29.22 ppt

May – September

Mean	30.00 ppt
Maximum	31.76 ppt
Minimum	14.18 ppt
10th Percentile	28.93 ppt

Appendix C. Reasonable Potential and Water Quality Based Effluent Limit Formulas

Part A of this appendix explains the process EPA used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of Washington's federally approved WQS. Part B explains the process for calculation WQBELs.

A. Reasonable Potential Analysis

EPA uses the process described in the Technical Support Document for Water Quality-based Toxics Control (EPA, 1991) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a WQBEL must be included in the permit.

Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, EPA's Technical Support Document for Water Quality-based Toxics Controls (TSD, 1991) recommends using the maximum projected effluent concentration (Ce) in the mass balance calculation. To determine the maximum projected effluent concentration (Ce) EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV for each pollutant parameter has been calculated, the reasonable potential multiplier (RPM) used to derive the maximum projected effluent concentration (Ce) can be calculated using the following equations:

First, the percentile represented by the highest reported concentration is calculated.

$$p_n = (1 - \text{confidence level})^{1/n} \qquad \text{Equation 1}$$

where,

p_n = the percentile represented by the highest reported concentration

n = the number of samples

confidence level = 99% = 0.99

and

$$RPM = \frac{C_{99}}{C_{P_n}} = \frac{e^{Z_{99} \times \sigma - 0.5 \times \sigma^2}}{e^{Z_{P_n} \times \sigma - 0.5 \times \sigma^2}} \quad \text{Equation 2}$$

Where,

σ^2	=	$\ln(CV^2 + 1)$
Z_{99}	=	2.326 (z-score for the 99th percentile)
Z_{Pn}	=	z-score for the P_n percentile (inverse of the normal cumulative distribution function at a given percentile)
CV	=	coefficient of variation (standard deviation ÷ mean)

The maximum projected effluent concentration is determined by simply multiplying the maximum reported effluent concentration by the RPM:

$$C_e = (RPM) \times (MRC) \quad \text{Equation 3}$$

where MRC = Maximum Reported Concentration

Maximum Projected Effluent Concentration at the Edge of the Mixing Zone

Once the maximum projected effluent concentration is calculated, the maximum projected effluent concentration at the edge of the acute and chronic mixing zones is calculated using the model-derived dilution factors (See Section IV.D) and Ecology's Permit Calculations Spreadsheet.

Reasonable Potential

The discharge has reasonable potential to cause or contribute to an exceedance of water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant.

Appendix D. Reasonable Potential and Water Quality Based Effluent Limit Calculations

A. Reasonable Potential Calculation for DO

The Washington water quality criteria for Extraordinary quality marine water specify that DO must not fall below 7.0 mg/L. If a water body's DO is lower than the criteria (or within 0.2 mg/L) due to natural conditions, then human actions considered cumulatively may not cause a decrease in DO of more than 0.2 mg/L (WAC 173-201A-210(1)(d)).

In their Permit Calculations Spreadsheet, Ecology recommends using the 10th percentile receiving water concentration during the critical season when calculating reasonable potential. July through October is the period of lowest DO concentration at the monitoring station GRG002, so the 10th percentile during these months is used. The 10th percentile effluent DO during these months is also used in the analysis. While the spreadsheet results say that there is reasonable potential to violate DO WQS because the concentration at the mixing zone boundary falls below 7.0 mg/L (4.81 mg/L), the DO decrease caused by effluent is just 0.02 mg/L, less than the allowable decrease of 0.2 mg/L since the ambient DO is below 7.0 mg/L. Thus, there is no reasonable potential to violate the WQS for DO.

Calculation of Dissolved Oxygen at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	81.0
Receiving Water DO Concentration, mg/L	4.83
Effluent DO Concentration, mg/L	3.18
Effluent Immediate DO Demand (IDOD), mg/L	
Surface Water Criteria, mg/L	7
OUTPUT	
DO at Mixing Zone Boundary, mg/L	**4.81**
DO decrease caused by effluent at chronic boundary, mg/L	**0.02**

Conclusion: At design flow, the discharge has a reasonable potential to violate water quality standards for dissolved oxygen.

References: EPA/600/6-85/002b and EPA/430/9-82-011

B. Reasonable Potential Calculation for pH

The Washington water quality criterion for Extraordinary quality marine water specifies a pH range of 7.0 to 8.5 standard units, with human-caused variation within the above range of less than 0.5 units (WAC 173-201A-210(1)(f)).

Maximum pH

Reasonable potential was analyzed using the maximum permitted pH of 9.0 s.u., 95th percentile temperature of effluent, salinity and alkalinity of effluent from calculations in the

previous fact sheet (those parameters were not reported in the latest application or permit term), and the 95th percentile receiving water pH, temperature, salinity, and alkalinity. The calculation shows that Washington WQS would be met at the edge of the mixing zone at 7.97 s.u.

Calculation of pH of a Mixture in Marine Water

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	81.0
Depth at plume trapping level (m)	0.000
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	11.30
pH:	7.96
Salinity (psu):	31.03
Total alkalinity (meq/L)	4.31
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	21.70
pH:	9.00
Salinity (psu)	0.50
Total alkalinity (meq/L):	2.22
4. CLICK THE 'Calculate" BUTTON TO UPDATE OUTPUT RESULTS -->	Calculate
OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	11.43
Salinity (psu)	30.65
Density (kg/m^3)	1023
Alkalinity (mmol/kg-SW):	4.18
Total Inorganic Carbon (mmol/kg-SW):	4
pH at Mixing Zone Boundary:	**7.97**

Minimum pH

Reasonable potential was analyzed using the minimum permitted pH of 6.0 s.u., 95th percentile temperature of effluent, salinity and alkalinity of effluent from calculations in the previous fact sheet (those parameters were not reported in the latest application or permit term), and the 5th percentile receiving water pH and alkalinity and 95th percentile temperature

and salinity. The calculation shows that Washington WQS would be met at the edge of the mixing zone at 7.30 s.u.

Calculation of pH of a Mixture in Marine Water

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	81.0
Depth at plume trapping level (m)	0.000
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	11.30
pH:	7.35
Salinity (psu):	31.03
Total alkalinity (meq/L)	3.71
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	21.70
pH:	6.00
Salinity (psu)	0.50
Total alkalinity (meq/L):	2.22
4. CLICK THE 'Calculate" BUTTON TO UPDATE OUTPUT RESULTS -->	Calculate
OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	11.40
Salinity (psu)	30.74
Density (kg/m^3)	1023
Alkalinity (mmol/kg-SW):	3.61
Total Inorganic Carbon (mmol/kg-SW):	4
pH at Mixing Zone Boundary:	**7.30**

C. Reasonable Potential Calculation for Temperature

In WAC 173-201A-210(1)(c), the Washington water quality criteria limit the ambient water temperature to 13.0ºC (1-day Maximum) for Extraordinary Quality marine water; when natural conditions exceed 13.0 ºC, no temperature increases will be allowed which will raise the receiving water temperature by greater than 0.3º C.

Reasonable potential is calculated separately for summer (May – September) and winter (October – April). The ambient summer temperature exceeds 13.0°C, however the reasonable potential calculation shows that incremental temperature increase is just 0.06°C, which is less than the allowable WQS of 0.3°C. In the winter months, the reasonable potential calculation shows that the temperature at the mixing zone boundary is 10.64°C, less than the WQS. Therefore, the discharge has no reasonable potential to violate WQS for temperature, and no effluent limit for temperature is required.

Marine Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines. The Water Quality temperature guidance document may be found at: http://www.ecy.wa.gov/biblio/0610100.html

INPUT	May-Sep	Oct-Apr
1. Chronic Dilution Factor at Mixing Zone Boundary	81.0	81.0
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	17.25 °C	10.55 °C
3. 1DADMax Effluent Temperature (95th percentile)	22.0 °C	17.6 °C
4. Aquatic Life Temperature WQ Criterion	13.0 °C	13.0 °C
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	17.31 °C	10.64 °C
6. Incremental Temperature Increase or decrease:	0.06 °C	0.09 °C
7. Incremental Temperature Increase 12/(T-2) if T≤ crit:	---	1.40 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	17.55 °C	11.95 °C
A. If ambient temp is warmer than WQ criterion		
9. Does temp fall within this warmer temp range?	YES	NO
10. Temp increase allowed at mixing zone boundary, if required:	NO LIMIT	---
B. If ambient temp is cooler than WQ criterion but within $12/(T_{amb}-2)$ and within 0.3 °C 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-0.3) but within $12/(T_{amb}-2)$ of the criterion		
13. Does temp fall within this Incremental temp. range?	---	NO
14. Temp increase allowed at mixing zone boundary, if required:	---	---
D. If ambient temp is cooler than (WQ criterion - $12/(T_{amb}-2)$)		
15. Does temp fall within this Incremental temp. range?	---	YES
16. Temp increase allowed at mixing zone boundary, if required:	---	NO LIMIT
RESULTS		
17. Do any of the above cells show a temp increase?	**NO**	**NO**
18. Temperature Limit if Required?	**NO LIMIT**	**NO LIMIT**

D. Reasonable Potential Calculation for Fecal Coliform

The Washington water quality standards for shellfish harvesting specify that fecal coliform must not exceed a geometric mean value of 14 cfu/100 mL, and no 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 may exceed 43 cfu/100 mL (WAC 173-201A-210(2)(b)).

EPA used the 90th percentile receiving water fecal coliform concentration, and the TBEL weekly geometric mean of 400 cfu/100 mL to calculate reasonable potential to exceed the criteria of 14 cfu/100 mL. Based on these calculations, there is not reasonable potential to exceed the WQS.

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	81.0
Receiving Water Fecal Coliform, #/100 ml	1
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criteria, #/100 ml	*14*
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	**6**
Difference between mixed and ambient, #/100 ml	5

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

E. Reasonable Potential Calculation for Ammonia

The Washington State WQS specify criteria for all surface waters in terms of the toxic un-ionized form of ammonia (NH_3) (WAC 173-201A-240(5)(b)). Marine total ammonia criteria are based on a formula which relies on the pH, temperature, and salinity of the receiving water; the fraction of ammonia present as the un-ionized form increases with increasing pH and temperature and decreasing salinity (Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989, EPA440/5-88-004). Therefore, the criteria become more stringent as pH and temperature increase and salinity decreases.

As specified in Ecology's Permit Calculations Spreadsheet, EPA used the 90th percentile receiving water temperature (1-DADMax) and pH, and 10th percentile and salinity during the critical season to calculate total ammonia criteria. The calculated criteria for total ammonia (as N) are: 8.50 mg/L (acute) and 1.28 mg/L (chronic).

Marine Un-ionized Ammonia Criteria Calculation

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):	17.3
2. Receiving Water pH, (90th percentile):	7.9
3. Receiving Water Salinity, g/kg (10th percentile):	28.9
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):	0.594
2. pKa8 at 25 deg C (Whitfield model "B"):	9.314
3. Percent of Total Ammonia Present as Unionized:	2.3%
4. Total Ammonia Criteria (mg/L as NH_3):	
Acute:	10.33
Chronic:	1.55
RESULTS	
Total Ammonia Criteria (mg/L as N)	
Acute:	**8.50**
Chronic:	**1.28**

The 2011 permit required just one year of quarterly effluent total ammonia monitoring, however the permittee submitted 17 quarterly data points. For reasonable potential analysis, EPA used the 95th percentile effluent concentration and 90th percentile receiving water concentration, as recommended in Ecology's Permit Calculations Spreadsheet. The analysis showed that there is no reasonable potential to exceed the ammonia WQS.

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3
Effluent Data	# of Samples (n)		17
	Coeff of Variation (Cv)		1.15
	Effluent Concentration, ug/L (Max. or 95th Percentile)		2,188
	Calculated 50th percentile Effluent Conc. (when n>10)		
Receiving Water Data	90th Percentile Conc., ug/L		18.58
	Geo Mean, ug/L		
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	8,499
		Chronic	1,277
	WQ Criteria for Protection of Human Health, ug/L		-
	Metal Criteria Translator, decimal	Acute	-
		Chronic	-
	Carcinogen?		N

Aquatic Life Reasonable Potential			
Effluent percentile value			0.950
s	$s^2=\ln(CV^2+1)$		0.920
Pn	$Pn=(1-\text{confidence level})^{1/n}$		0.838
Multiplier			1.83
Max concentration (ug/L) at edge of...		Acute	121
		Chronic	68
Reasonable Potential? Limit Required?			**NO**

F. Antidegradation Analysis

The purpose of Washington's antidegradation policy (WAC 173-201A-300 to 330) is to:

(a) Restore and maintain the highest possible quality of the surface waters of Washington;

(b) Describe situations under which water quality may be lowered from its current condition;

(c) Apply to human activities that are likely to have an impact on the water quality of a surface water;

(d) Ensure that all human activities that are 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); and

(e) Apply three levels of protection for surface waters of the state, as generally described below:

(i) Tier I is used to ensure existing and designated uses are maintained and protected and applies to all waters and all sources of pollution.

(ii) Tier II is used to ensure 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.

(iii) Tier III is used to prevent the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A Tier II analysis is necessary when all three of the following conditions are met:

1. The facility is planning a new or expanded action.
2. Ecology regulates or authorizes the action.
3. 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:

1. 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.
2. 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 WQS.
3. Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in State WQS.

All the effluent limits in the Draft Permit are as stringent as the 2011 permit, and beneficial uses will not be impaired by the facility. The facility meets Tier I requirements and does not trigger the conditions that require a further Tier II analysis. The analysis described demonstrates that the draft permit conditions will protect existing and designated uses of the receiving water. Therefore, the Draft Permit meets Ecology’s Antidegradation policy.

Appendix E. Mixing Zone Modeling

EPA performed dilution analysis for discharge from the Sandy Point WWTP to the Strait of Georgia. EPA applied the CORMIX 12.0 mixing zone model to estimate the minimum dilution to be expected at the boundaries of mixing zones sized according to criteria in the Washington water quality standards. Dilution analysis on the same discharge was previously performed in 2003; however, it was determined that the outfall depth used in the Sandy Point analysis (reported in the NPDES permit application), was incorrect by a significant factor. The previous depth used was 44 feet, while the actual depth is 18.5 feet, according to design drawings. Additionally, the 2003 analysis modeled the discharge from two 8" diameter ports, while the outfall actually consists of two 4" diameter ports. Accordingly, this analysis improves upon previous work.

A. Discharge Characteristics

The actual characteristics of the discharge are as follows. Simplifications made in the model are described in later sections.

Diffuser alignment:	Perpendicular to shoreline
Diffuser dimensions:	2 ports (aligned perpendicular to shore, facing horizontally in opposite directions, one upslope and one downslope), each 4" in diameter, 25" apart
Diffuser location:	1.5' above the bottom 18.5' below MLLW 1458' from shore
Effluent design flow:	0.25 mgd

B. CORMIX Inputs

Parameters are entered in the Effluent, Ambient, Discharge, and Mixing Zone tabs of the CORMIX user interface. The parameters used and simplifications made for the model are described below.

Effluent

Discharge Concentration: 100%

> Discharge concentration excess (of a conservative pollutant) was specified at 100%. Since a specific pollutant is not being modeled, this value was chosen for its simplicity.

Flow Rate: 0.25 MGD (chronic), 0.443 MGD (acute)

> Based on guidance in the Ecology Permit Writer's Manual, the chronic flow value is the facility design flow and the acute flow value is the maximum daily flow during the last three years of data (July 2017-June 2020).

Effluent Temperature (Fresh): 15.9°C

This is the mean of maximum monthly temperature in DMRs.

Ambient

Average Depth: 18.5 ft

Depth at Discharge: 18.5 ft

Wind Speed: 8.16 knots

Average from March 2020 – March 2021 at NOAA meteorological station Cherry Point South Dock. The CORMIX default wind speed if ambient conditions are unknown is 2 m/s (3.89 knots). Changing wind speed to this value had virtually no effect on results.

Bounded/Unbounded: Unbounded, since the outfall is far from both shores

Velocity: Steady velocity

Based on guidance in the Ecology Permit Writer's Manual, mixing is simulated with three different velocities, the 10^{th}, 50^{th}, and 90^{th} percentile velocities from a nearby station. One month of data (July 2017; this is when the site-specific station was active) were downloaded from NOAA's website for station PUG1725 in the Strait of Georgia between Cherry Point and Sandy Point. Data collected at a depth of 19.5 ft were selected (as near to the outfall depth as possible). Analysis showed that the predominant direction of the currents was about 350 degrees and 150 degrees (true), which was approximated to flow parallel to shore in both directions (N and S, here). Dilution is the same for both flow directions, so just one was modeled.

Probability	Current velocity (cm/s)	Direction
10^{th} percentile	5.7	S
50^{th} percentile	19.4	S
90^{th} percentile	46.1	S

Darcy-Weisbach f: 0.025 (estuary example in CORMIX user manual used this value for f)

Ambient Density (for stratified, non-fresh water): Type A (linear density) stratification, 1018.43 kg/m^3 (at surface); 1022.68 kg/m^3 (at bottom)

A salinity profile was sampled near the Gooseberry Point outfall on April 11, 2001 (Meriwether 2001). This profile was used in the 2003 modeling and more recent characterization or characterization nearer to the Sandy Point outfall are not available. The profile was characterized by 4 samples, at 0.5, 4, 10, and 30 feet. CORMIX does not have a stratification option that allows for four different measurements, so a linear density profile was selected with the 0.5-foot measurements representing the surface and the 30-foot measurements representing the bottom. CORMIX computes the density from the temperature and salinity of the water.

Depth (ft)	Temperature (C)	Salinity (ppt)
0.5 (surface)	7.9	23.7
30 (bottom)	8.3	29.2

Discharge

CORMIX allows for modeling of single port or multiport outfalls. However, multiport outfalls must have three or more ports. EPA modeled the two-port outfall as a single port, facing upslope toward the shore. This is conservative since the two plumes are merged immediately.

Nearest bank (to outfall when looking downstream): left (when ambient current is S)

Distance to the nearest bank: 1458 feet

Vertical Angle (theta): 10 degrees (the single port is modeled in the direction of the upslope side of the outfall)

Horizontal Angle (sigma, the angle measured counterclockwise from the ambient current direction to the plane projection of the port center line): 90 degrees (when the ambient current is S)

Port Diameter: 0.1437 m

A port with this diameter has the same area as two ports with 4-inch diameter

Port Ht. Above Channel Bottom: 1.5 feet

Mixing Zone

Concentration for the WQ Standard (Excess): 10%

The mixing zone was specified for non-toxic effluent with a WQ standard. Since the modeling goal is only to find dilution at certain points and not to model a specific pollutant, these specifications do not affect the results.

Distance: 218.5 feet (66.6 m, chronic); 21.85 feet (6.66 m, acute)

The mixing zone specified is a distance since the Washington WQS define mixing zone by distance from the outfall.

Region of Interest: 1500 feet

Output Steps per Module: 40

C. Results

The modeling results for each tidal velocity and both chronic and acute mixing zones are shown below for the facility. For each mixing zone type, the scenario with the smallest resulting dilution factor (DF) was chosen.

Mixing Zone x (m)	Effluent Flow Rate (MGD)	Tidal Velocity (m/s)	Direction	Horiz. Angle (sigma)	Nearest Bank	DF at Mixing Zone	Dilution Type[1]	DF_F[2]
66.6	0.25	0.057	S	90	left	80.90	bulk	**80.90**
66.6	0.25	0.194	S	90	left	143.20	bulk	143.20
66.6	0.25	0.461	S	90	left	180.40	bulk	180.40
6.66	0.443	0.057	S	90	left	40.80	bulk	40.80
6.66	0.443	0.194	S	90	left	35.80	centerline	60.86
6.66	0.443	0.461	S	90	left	23.10	centerline	**39.27**

1. Depending on the location of the mixing zone boundary in relation to the plume, CORMIX calculates dilution factor based on plume centerline (peak) concentration (C) or flux-average plume concentration (F) at the edge of the mixing zone.
2. Ecology requires that for tidal areas, dilution factor should be based on the flux-average plume concentration. The Ecology Permit Writers Manual gives a relationship between both types: $DF_F = 1.7DF_C$

The dilution factors for Sandy Point are as follows:

Chronic: 81

Acute: 39