

Fact Sheet for NPDES Permit WA0023744

Post Point WWTP

May 15, 2014

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the city of Bellingham's Post Point Wastewater Treatment Plant (Post Point).

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

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for Post Point, NPDES permit WA0023744, are available for public review and comment from insert May 15, 2014 until June 15, 2014. For more details on preparing and filing comments about these documents, please see *Appendix A – Public Involvement Information*.

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

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

Summary

The city of Bellingham operates an activated sludge wastewater treatment plant that discharges to Bellingham Bay. Ecology issued the previous permit for this facility on November 2, 2007, and modified it on December 18, 2007.

The proposed permit contains the same effluent limits for Total Suspended Solids, Fecal Coliform Bacteria, and pH as the permit modification issued in 2007. The frequency for fecal sampling has changed. Removal percentages and mass loading values for BOD/TSS have changed.

Table of Contents

<i>I.</i>	<i>Introduction.....</i>	<i>5</i>
<i>II.</i>	<i>Background Information.....</i>	<i>6</i>
A.	Facility description.....	8
	History	8
	Collection system status.....	9
	Treatment processes.....	10
	Solid wastes/residual solids	11
	Discharge outfall.....	12
B.	Description of the receiving water	13
C.	Wastewater influent characterization.....	13
D.	Wastewater effluent characterization	14
E.	Summary of compliance with previous permit issued November 2, 2007	14
F.	State environmental policy act (SEPA) compliance	15
<i>III.</i>	<i>Proposed Permit Limits.....</i>	<i>15</i>
A.	Design criteria	16
B.	Technology-based effluent limits	16
C.	Surface water quality-based effluent limits.....	18
	Numerical criteria for the protection of aquatic life and recreation.....	18
	Numerical criteria for the protection of human health.....	18
	Narrative criteria	18
	Antidegradation	18
	Water quality consideration for combined sewer overflows	19
	Mixing zones.....	20
D.	Designated uses and surface water quality criteria	24
E.	Water quality impairments.....	25
F.	Evaluation of surface water quality-based effluent limits for numeric criteria.....	25
	Reasonable potential analysis	29
G.	Human health.....	30
H.	Sediment quality.....	30
I.	Whole effluent toxicity.....	31
J.	Groundwater quality limits.....	33
K.	Comparison of effluent limits with the previous permit issued November 2, 2007.....	33
<i>IV.</i>	<i>Monitoring Requirements.....</i>	<i>33</i>
A.	Wastewater monitoring.....	34
B.	Lab accreditation	34

V. Other Permit Conditions.....	34
A. Reporting and record keeping	34
B. Prevention of facility overloading.....	35
C. Operation and maintenance.....	35
D. Pretreatment.....	36
Duty to enforce discharge prohibitions.....	36
Federal and state pretreatment program requirements	37
Routine identification and reporting of industrial users.....	37
Requirements for performing an industrial user survey.....	37
E. Solid wastes.....	38
F. Effluent mixing study	38
G. Combined sewer overflows.....	38
CSO reduction plan/long-term control plan and CSO reduction plan amendments	39
Nine minimum controls	39
CSO monitoring.....	40
Annual CSO report	40
Post-construction monitoring program	40
H. General conditions	41
VI. Permit Issuance Procedures	41
A. Permit modifications.....	41
B. Proposed permit issuance.....	41
VII. References for Text and Appendices	41
Appendix A--Public Involvement Information	43
Appendix B--Your Right to Appeal	44
Appendix C--Glossary	45
Appendix D--Technical Calculations.....	52
Appendix E—Plant Diagrams	61
Appendix F--Response to Comments	62
Table 1. General facility information.....	6
Table 2. Ambient background data.....	13
Table 3. Wastewater influent characterization.....	14
Table 4. Wastewater effluent characterization.....	14
Table 5. Permit submittals.....	15
Table 6. Design criteria for Post Point WWTP.....	16
Table 7. Technology-based limits.....	17
Table 8. Technology-based mass limits.....	17
Table 9. Marine aquatic life uses and associated criteria	24
Table 10. Recreational uses.....	24
Table 11. Dilution factors (DF) Outfall 001.....	26

Table 12. Dilutions factors (DF) Outfall 002.....	26
Table 13. Comparison of previous and proposed effluent limits.....	33
Figure 1. Facility location map.....	7
Figure 2. Dilution necessary to meet criteria at edge of mixing zone.....	29

I. Introduction

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

The following regulations apply to domestic wastewater NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC).
- Technical criteria for discharges from municipal wastewater treatment facilities (chapter 173-221 WAC).
- Water quality criteria for surface waters (chapter 173-201A WAC).
- Water quality criteria for groundwaters (chapter 173-200 WAC).
- Whole effluent toxicity testing and limits (chapter 173-205 WAC).
- Sediment management standards (chapter 173-204 WAC).
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC).

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

- Submission of plans and reports for construction and operation of combined sewer overflow reduction facilities (chapter 173-245 WAC).
- US EPA CSO control policy (59 FR 18688).

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

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

II. Background Information

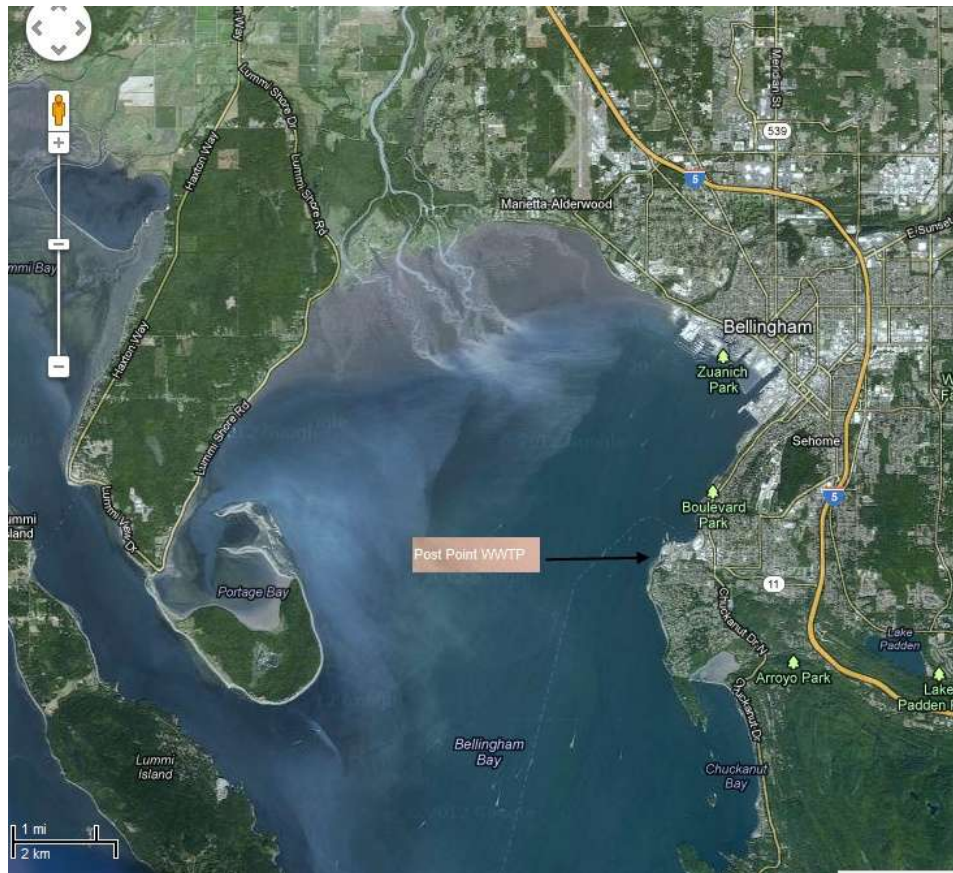
Table 1. General facility information

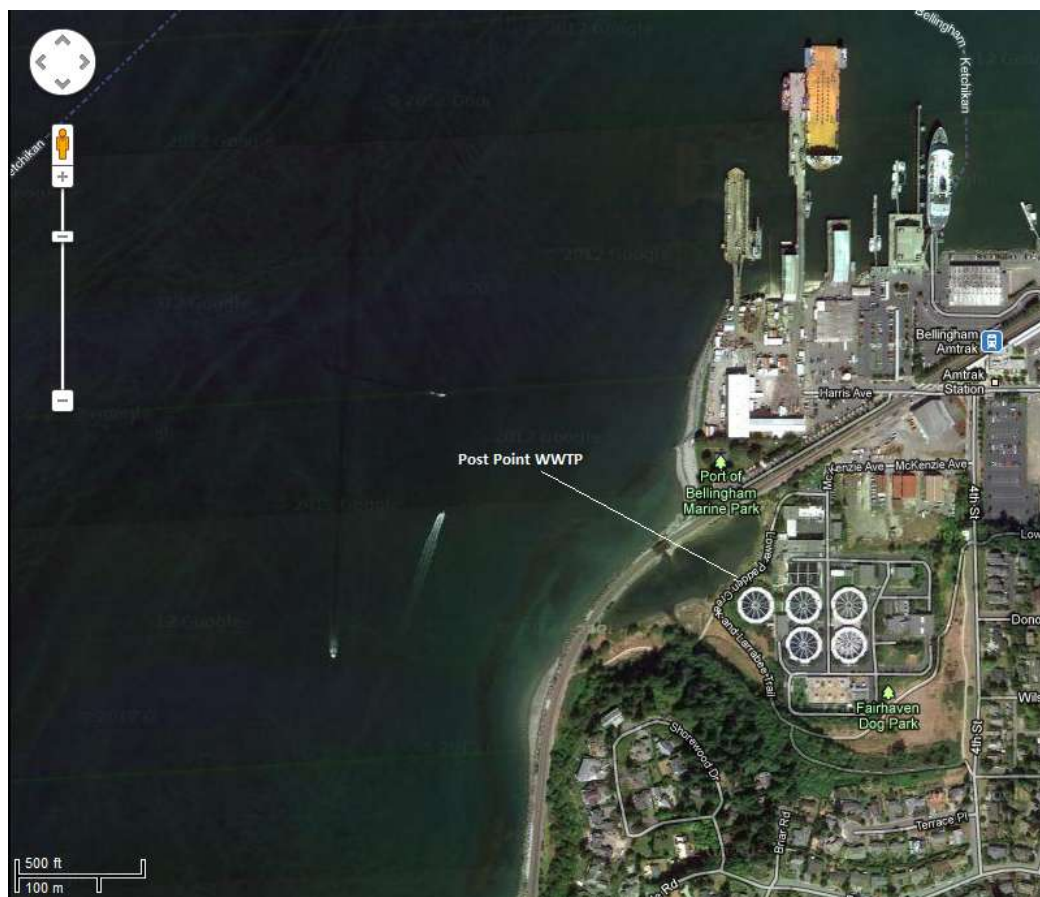
Facility Information	
Applicant	City of Bellingham
Facility Name and Address	Post Point Wastewater Treatment Plant 200 McKenzie Street Bellingham, WA 98225
Contact at Facility	Name: Larry Bateman Telephone #: 360-778-7852
Responsible Official	Name: Bob Banderra Title: Assistant Public Works Director Address: 2221 Pacific St. Bellingham, WA 98225 Telephone #: 360-778-7735 FAX #: 360-778-7701
Type of Treatment	Activated Sludge
Facility Location (NAD83/WGS84 reference datum)	Latitude: 48.7191 Longitude: -122.5231
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Bellingham Bay Outfall 001 Latitude: 48.7189 Longitude: -122.5247 Outfall 002 Latitude: 48.7203 Longitude: -122.5183 Outfall 003 Latitude: 48.75077 Longitude: -122.48978

Permit Status	
Issuance Date of Previous Permit	November 2, 2007
Application for Permit Renewal Submittal Date	May 15, 2012
Date of Ecology Acceptance of Application	May 10, 2012

Inspection Status	
Date of Last Sampling Inspection	1/13/2009
Date of Last Non-sampling Inspection Date	10/8/2012

Figure 1. Facility location map





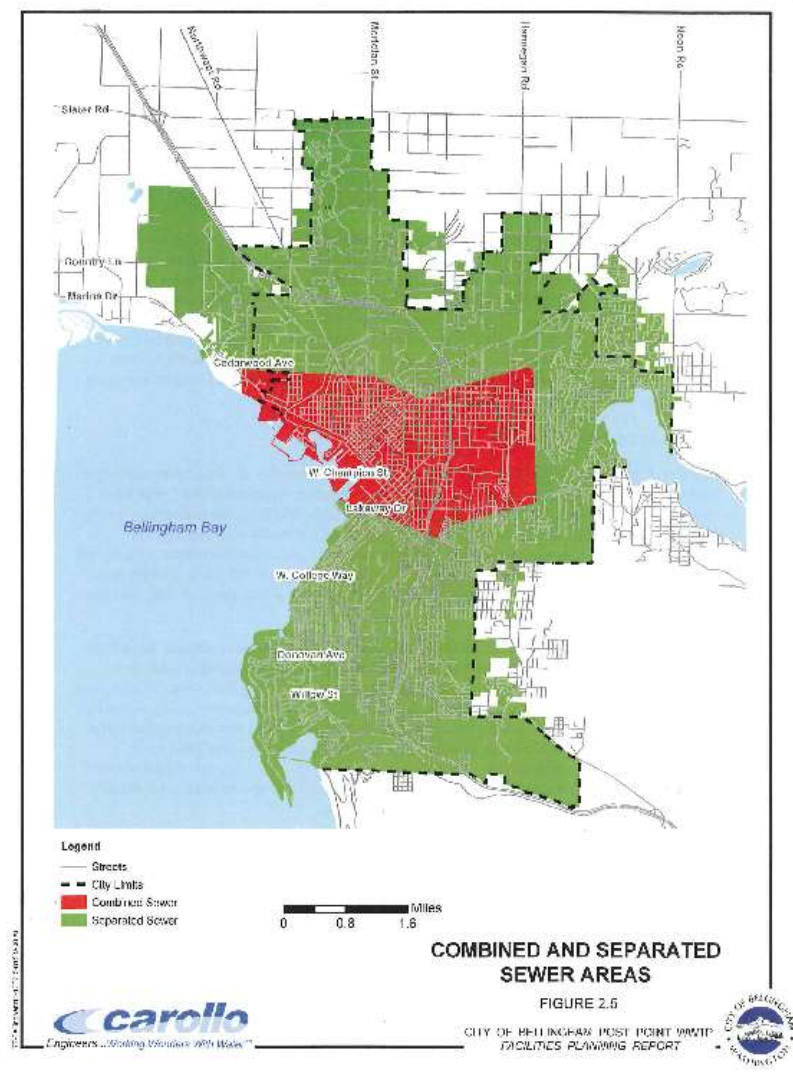
A. Facility description

History

The city of Bellingham built a wastewater plant at the mouth of Whatcom Creek in 1947 to provide primary treatment of the city's sewage. In 1960 the capacity of this treatment facility was expanded from 4.5 MGD to 11 MGD. The Post Point facility, which replaced the original plant at the mouth of Whatcom Creek, was built in 1974 and operated as a primary wastewater treatment facility with a capacity of 55 MGD.

A consent decree issued in 1987 required Bellingham to upgrade the plant to meet secondary treatment standards by the beginning of 1994. In 1994 the plant began to operate as a high purity oxygen (HPO) activated sludge secondary treatment system. The plant was rerated via an Engineering Report submitted in 2004. Modifications to the plant during the permit cycle include a RAS return modification (2005), the addition of variable speed HPO mixers (2006), the installation of high-rate centrifuges (2010), and the transition to 7-day a week incineration operation (2011). In 2012 construction began to upgrade and expand secondary treatment including an external anaerobic basin, two additional activated sludge basins, an additional secondary clarifier, and replacement of the high purity oxygen delivery system with a diffused air system. Post Point is presently classified as a major facility by EPA.

Collection system status

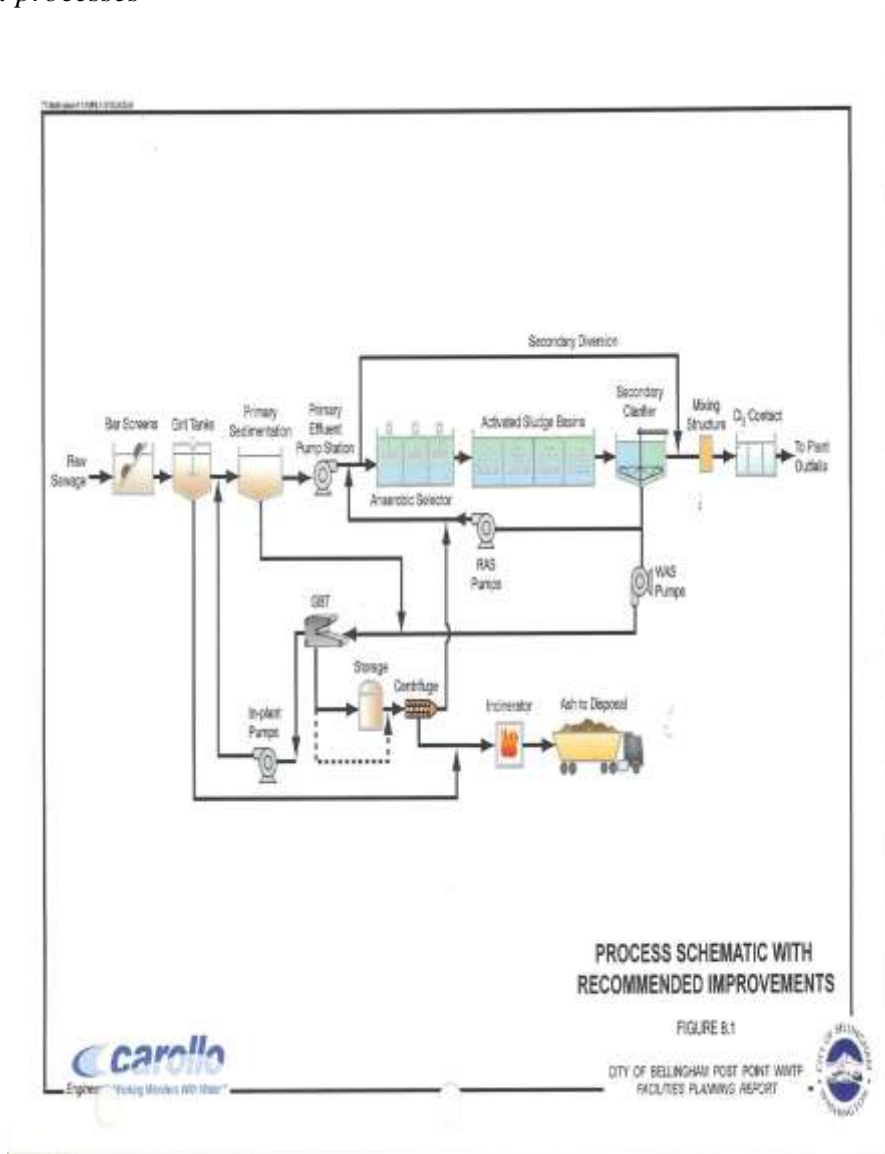


The wastewater collection system for the city of Bellingham consists of 315.2 miles of gravity-fed pipe and 4.6 miles of pressure-fed pipe. The majority of piping ranges from 8 inches (234.1 miles of pipe) to 12 inches (19.2 miles of pipe) though the total range of pipe diameters vary from 4 inches up to 60 inches. The city operates 25 pump stations that move wastewater to the Post Point facility. Each pump station is equipped with SCADA (Supervisory Control and Data Acquisition) system telemetry that notifies operators of pump station problems or power failures that can cause wastewater overflows. Backup power is available at all major lift stations.

Bellingham is described as a combined sewer system (CSO), one of 11 designated CSO municipalities in Washington, meaning that both sanitary sewer and storm sewer systems are combined in some sections of the city. CSO collection systems are usually the result of older portions of a city's collection system before waste water plants were built or required.

The map on page 11 shows the Bellingham city limits in green and the CSO portion in red. Although most of the flow from the combined area receives treatment at the Post Point plant, the system includes an overflow outfall at the base of C Street that allows untreated combined sewage to discharge to the bay during large storm events. City has recorded 2 overflow events from this outfall in the past 6 years. Bellingham estimates that three percent of their total collection system, based on total collection system piping, is combined. The City continues to separate sanitary and stormwater collections within the combined area as they are identified and as funding permits.

Treatment processes



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

The WWTP includes a septage receiving facility, three mechanically cleaned bar screens and two manually-cleaned bar screens, influent flow-paced sampling with flow measurement and five parshall flumes occurring after the screening. After screening, waste water flows to two grit chambers, where sand, grit and heavy particles fall out. Grit is continuously removed via a belt system and deposited into a bin for eventual removal to a landfill. Debris removed by the bar screens are also collected and sent to a landfill for disposal. Waste water then flows over a weir and on to one or both primary clarifiers where remaining settleable solids are removed.

All waste water entering the plant receives primary treatment. The City will complete plant upgrades in June 2014. The City added an external anaerobic selector basin in 2013 to improve sludge settleability in the secondary clarifiers. Two additional activated sludge basins will increase the total aerobic volume to 2.95 million gallons. Luminescent dissolved oxygen probes remotely monitor oxygen percentage within the sludge basins to improve process control. After biological stabilization, wastewater gravity flows through a flow splitter box to secondary clarifiers. The 2013 upgrade added a new clarifier, giving the plant a total of four secondary clarifiers.

The secondary process is designed to provide complete secondary treatment for flows up to 37 million gallons a day (MGD). During wet weather, flow from the primary clarifiers can exceed 37 MGD. To prevent wash-out of beneficial solids from the secondary process, plant operators can bypass excess primary-treated flow around the activated sludge basins and secondary clarifiers to prevent wash-out of biosolids and beneficial microbial communities. The diverted primary flow recombines with secondary treated effluent prior to disinfection.

All flow from the four secondary clarifiers and any blended primary flow are routed through a chlorine mixing chamber, then to a chlorine contact chamber for disinfection. Final effluent is dechlorinated with sodium bisulfite and then passes by a sonic flow meter for flow measurement prior to discharge through Outfall 001.

The city receives industrial wastewater flows from 12 permitted industries, which include seafood processors, boatyards, and oil companies. The plant is a Class IV facility requiring a Group IV operator in responsible charge and at least one Group III operator available during all shifts. There are 7 regular plant operators and 5 incinerator operators allowing the plant to operate 24 hours a day, 7 days a week.

Solid wastes/residual solids

Residual biosolids taken from the primary and secondary clarifiers are dewatered via two gravity belt thickeners. Solids may be stored during week-end production in three tanks with a total storage volume of 110,400 gallons. They are then dewatered further in one of three centrifuges before being sent to either of two incinerators for thermal destruction. Ash is removed at the bottom of the incinerator and sent to Roosevelt Landfill in eastern Washington. Post Point drains grit, rags, scum, and screenings and disposes this solid waste at the local landfill.

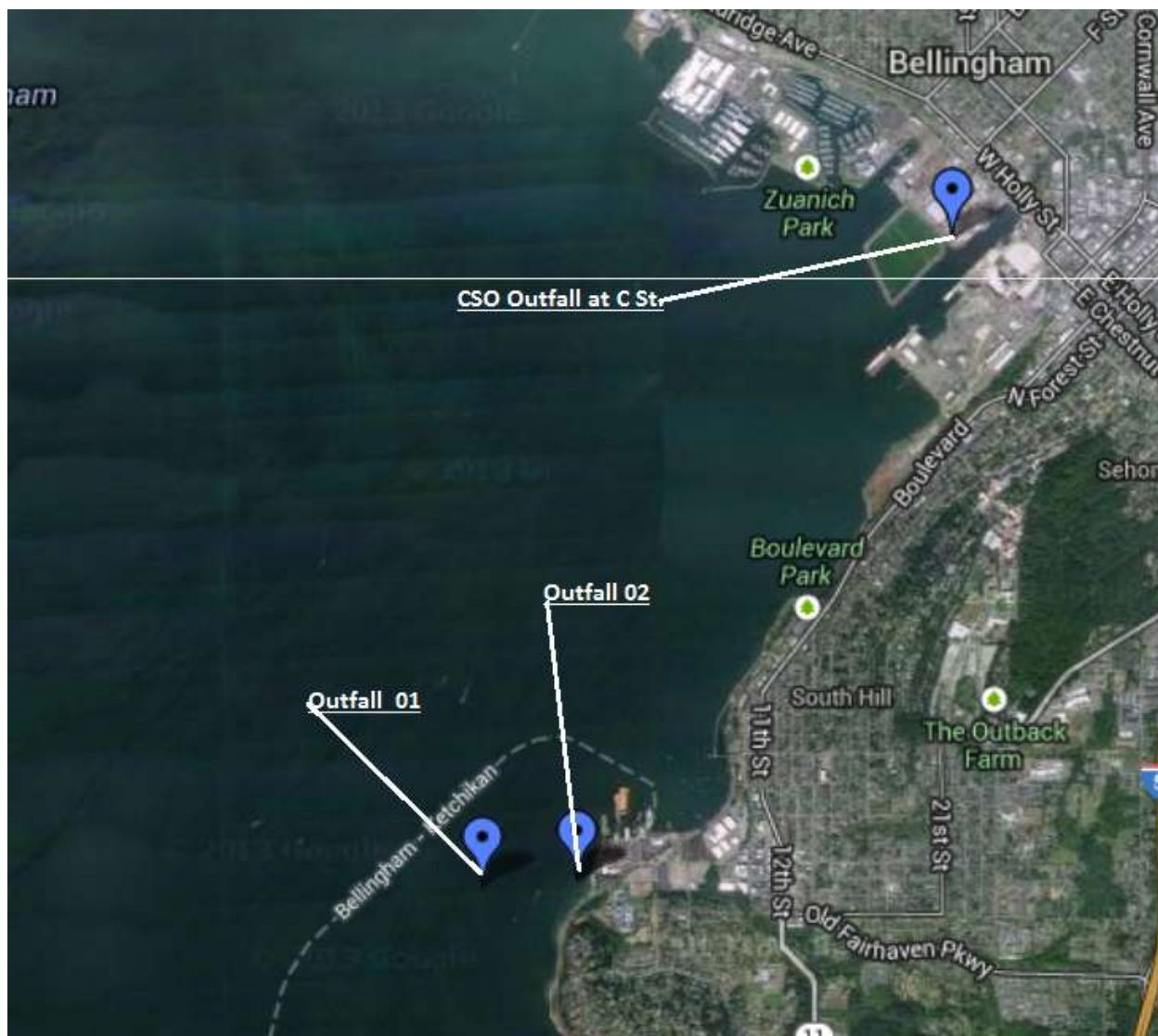
A facilities planning report done by Carollo Engineers in October 2011 provided recommendations for upgrading Post Point's solids handling. They propose that the facility:

- Increase dewatering capacity (in progress).

- Gravity belt stress testing (2010 to 2011).
- Solids thickening assessment (2011 to 2015).
- Transition to 7-day a week operation (2011).
- Develop a fats, oil, and grease (FOG) program (2011).

Data from the testing and assessment will make solids handling more efficient and cost effective.

Discharge outfall



The facility discharges secondary treated and disinfected effluent to Bellingham Bay primarily through Outfall 001 and on rare occasion via Outfall 002. Outfall 001 extends 2,375 feet from the processing building to the terminus of a multi-port diffuser. The diffuser is 425 feet long. The mid-point of the diffuser is at a depth of 76 feet below mean lower low water elevation (MLLW).

The facility uses a second outfall, designated Outfall 002, to discharge treated effluent when plant flows exceed the outfall 001 capacity of 70 MGD. This outfall was utilized over 3 storm events in the last 6-year permit cycle with a total flow of 222,150 gallons. When the disinfected effluent in the outfall 001 wet well reaches the capacity level, it flows over stop-logs into the outfall 002 diversion pipe. Flow is monitored by a flow meter that alerts operators the alternative outfall is being used. The outfall extends offshore 275 feet from the end of Harris Street, terminating at a single port outfall located at a depth of 41 feet MLLW. The City periodically discharges treated and disinfected secondary effluent through this outfall during dry weather to flush the pipe and diffuser.

A third combined sewer overflow outfall at the end of “C” Street in an old portion of Bellingham is only used during significant rain events that cause both stormwater collection systems and sewage collection systems to combine and overflow. Only Outfall 003 meets the definition of a combined sewer overflow (CSO) as it is comprised of both untreated sanitary sewer and storm sewer waters (Appendix B).

An inspection of outfall 002 during the last permit cycle found a break in the outfall pipe near the shoreline. Results of this inspection lead to the design of a new outfall alignment and pipe. Compliance with Washington’s State Environmental Policy Act (SEPA) process was consistent with the Act.

B. Description of the receiving water

Post Point discharges to Bellingham Bay. Other nearby point source outfalls include: Harris Avenue Shipyard, All Marine Shipyard, Puglia Shipyard, and Landings at Colony Shipyard. Significant nearby non-point sources of pollutants include stormwater runoff from Bellingham streets.

The ambient background data used for this permit includes the following from (Ecology ambient site BL009):

Table 2. Ambient background data

Parameter	Value Used
Temperature (highest annual 1-DADMax)	11.97° C
pH (Maximum / Minimum)	8.2/7.2 standard units
Dissolved Oxygen	3.2 mg/L
Ammonium	0.105 mg/L
Fecal Coliform	1/100 mL dry weather 220/100 mL (storm related)
Salinity	28.68 Practical Salinity Units (PSU)

C. Wastewater influent characterization

Post Point reported the concentration of influent pollutants in discharge monitoring reports. The influent wastewater is characterized for the period between April 2008 and August 2013 as follows:

Table 3. Wastewater influent characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD ₅)	mg/L	65	219	604
Biochemical Oxygen Demand (BOD ₅)	lbs/day	65	20283	47,402
Total Suspended Solids (TSS)	mg/L	65	247	760
Total Suspended Solids (TSS)	lbs/day	65	23873	101,005
Flow	MGD	65	12.5	70.3

D. Wastewater effluent characterization

Post Point reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from April 2008 to August 2013. The wastewater effluent is characterized as follows:

Table 4. Wastewater effluent characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD ₅)	mg/L	65	10	12
Biochemical Oxygen Demand (BOD ₅)	lbs/day	65	1001	1371
Total Suspended Solids (TSS)	mg/L	65	6.9	9.3
Total Suspended Solids (TSS)	lbs/day	65	720	1105
Parameter	Units	# of Samples	Average Value	Weekly Average Value
Chlorine Residual	µg/L	65	24	120
Chlorine Residual	lbs/day	65	2.4	17

Parameter	Units	# of Samples	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliforms	#/100 mL	59	2	110

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH	Standard units	59	6.3	7.5

E. Summary of compliance with previous permit issued November 2, 2007

The previous permit placed effluent limits on BOD, TSS, fecal coliform bacteria, pH, and total residual chlorine.

Post Point has significantly complied with the effluent limits and permit conditions throughout the duration of the permit issued on November 2, 2007. Two flow violations occurred when the monthly average influent flow exceeded the plant's design capacity of 20 MGD, one in January 2009 (21.87 MGD) and the other in January 2011. Both violations

occurred before the facility was upgraded. Ecology assessed compliance based on its review of the facility's information in Ecology's Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on inspections. Post Point won permit compliance awards in 2010, 2011, and 2012 for 100% compliance with their permit.

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

Table 5. Permit submittals

Permit Required Reports	Permit Section	Submittal Frequency	First Due Date	Last Due Date	
Acute Toxicity Characterization	S10C	Quarterly	03/15/2008	11/15/2012	11/19/2012
Combined Sewer Overflow Report	S11B	Annual	07/01/2008	11/15/2012	05/29/2012
Combined Sewer Overflow Reduction Plan Amendment	S11C	Once/Permit	08/30/2012	11/15/2012	05/29/2012
Outfall Evaluation	S13	Once/Permit	10/30/2008	11/15/2012	12/18/2008
Signatory Requirements - G1	S3	Once/Permit	01/08/2010		01/12/2012
Infiltration And Inflow Evaluation	S4E	Once/Permit	11/30/2012	11/15/2012	10/07/2011
Wasteload Assessment	S4F	Annual	03/15/2009	11/15/2012	03/12/2012
Application for Permit Renewal	S8	Once/Permit	05/15/2012	11/15/2012	05/08/2012
Spill Prevention Plan	S9	Once/Permit	11/01/2009	11/15/2012	11/10/2009

F. State environmental policy act (SEPA) compliance

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

III. Proposed Permit Limits

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

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

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington.

Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

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

A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for the expanded Post Point treatment plant in the facilities planning report entitled, "Post Point Wastewater Treatment Plant Improvements," dated October 2011 and prepared by Carollo Engineers. The table below includes design criteria from the referenced report.

Table 6. Design criteria for Post Point WWTP

Parameter	Design Quantity
Maximum Month Design Flow (MMDF)	34.3 MGD
Monthly Average Flow	21.7 MGD
Flow at which Bypass of Secondary Treatment Occurs	37 MGD
Peak Instantaneous Design Flow (PIDF)	72 MGD
BOD ₅ Loading for Maximum Month	39,800 lb/day
TSS Loading for Maximum Month	45,500 lb/day

B. Technology-based effluent limits

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

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

Table 8 below identifies technology-based limits for pH, fecal coliform, BOD₅, and TSS, as listed in chapter 173-221 WAC. Section III.F of b this fact sheet describes the potential for water quality-based limits.

Table 7. Technology-based limits

Parameter	Average Monthly Limit	Average Weekly Limit
BOD ₅ (concentration)	30 mg/L	45 mg/L
BOD ₅ (concentration)	In addition, the BOD ₅ effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	
TSS (concentration)	30 mg/L	45 mg/L
TSS(concentration)	In addition, the TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	
Parameter	Average Monthly	Maximum Daily
Chlorine	0.198 mg/L	0.429 mg/L

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

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

The existing permit has an average monthly chlorine limit of 0.198 mg/L and the facility is able to comply with it. The proposed permit includes the same limit.

Chlorine limits of 0.033 mg/L (average monthly) and 0.048 mg/L (maximum) are in place for Outfall #002 to ensure appropriate disinfection of the effluent during maintenance flushing of this outfall.

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

$$\text{Mass Limit} = \text{CL} \times \text{DF} \times \text{CF}$$

$$\text{where: } 30 \times 34.3 \times 8.34$$

$$\text{CL} = \text{Technology-based concentration limits listed in the above table}$$

$$\text{DF} = \text{Maximum Monthly Average Design flow (MGD)}$$

$$\text{CF} = \text{Conversion factor of 8.34}$$

$$30 \times 34.3 \times 8.34 = 8581.86 \text{ (BOD)} \quad 45 \times 34.3 \times 8.34 = 12872.79$$

Table 8. Technology-based mass limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD ₅ Monthly Average	30	8582
BOD ₅ Weekly Average	45	12873
TSS Monthly Average	30	8582
TSS Weekly Average	45	12873

C. Surface water quality-based effluent limits

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

Numerical criteria for the protection of aquatic life and recreation

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

Numerical criteria for the protection of human health

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

Narrative criteria

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

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

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

Antidegradation

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

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.

- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

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

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

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

Facility specific requirements--Ecology determined that this facility must meet Tier II requirements. A Tier II analysis focuses on evaluating feasible alternatives that would eliminate or significantly reduce the level of degradation. The analysis also includes a review of the benefits and costs associated with the lowering of water quality. New discharges and facility expansions are prohibited from lowering water quality without providing overriding public benefits.

The facility's upgrades to its aeration basins and the addition of a clarifier will ensure continued compliance with the City's permit. Effluent water quality will not be degraded or lowered. Here is a link to permit required documents. The document is entitled, "Tier II Analysis."

<https://fortress.wa.gov/ecy/wqreports/public/f?p=110:302:5806267094349302::NO:RP::>

Water quality consideration for combined sewer overflows

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

Mixing zones

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

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

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii)]. Mixing zones in estuaries cannot exceed 200 feet plus the depth of water over the diffuser at mean lower low water (MLLW). The diffuser for outfall 001 is 76 feet deep at MLLW so the mixing zone radius around each diffuser port is 276 feet. The length of the diffuser is 425 feet. The length of the chronic mixing zone is 977 feet ($276 + 425 + 276 = 977$) and the width is 522 feet ($276 + 276 = 522$). The acute mixing zone is 480 feet long ($27.6 + 27.6 = 55$). Since the diffuser for outfall 002 is 41 feet at MLLW and only has a single port the chronic mixing zone has a 241 foot radius and the acute mixing zone has a 24 foot radius.

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

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent is 10% and the receiving water is 90% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

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

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

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

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

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

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

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

Ecology has determined that the treatment provided at Post Point WWTP meets the requirements of AKART (see “Technology-based limits”).

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the water body’s critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters. Ecology’s

Permit Writer's Manual describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at: <https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html>.

4. Supporting information must clearly indicate the mixing zone would not:

- Have a reasonable potential to cause the loss of sensitive or important habitat.
- Substantially interfere with the existing or characteristic uses.
- Result in damage to the ecosystem.
- Adversely affect public health.

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

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

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

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

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics, and the discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met. A reasonable potential analysis is included in Appendix D. Recently Post Point was upgraded and several design criteria have changed. This being the case a new mixing zone analysis will need to be performed.

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

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

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

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone changes. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

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

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

7. Maximum size of mixing zone.

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

8. Acute mixing zone.

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

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

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

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

- **Comply with size restrictions.**

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

9. Overlap of mixing zones.

This mixing zone does not overlap another mixing zone.

D. Designated uses and surface water quality criteria

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

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

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

Table 9. Marine aquatic life uses and associated criteria

Excellent Quality	
Temperature Criteria – Highest 1D MAX	16°C (60.8°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	6.0 mg/L When a water body's DO is lower than the criteria and that condition is due to natural conditions, then human actions considered cumulatively may not cause the DO of that water body to decrease more than 0.2 mg/L.
Turbidity Criteria	<ul style="list-style-type: none"> • 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH Criteria	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

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

The recreational uses for this receiving water are identified below.

Table 10. Recreational uses

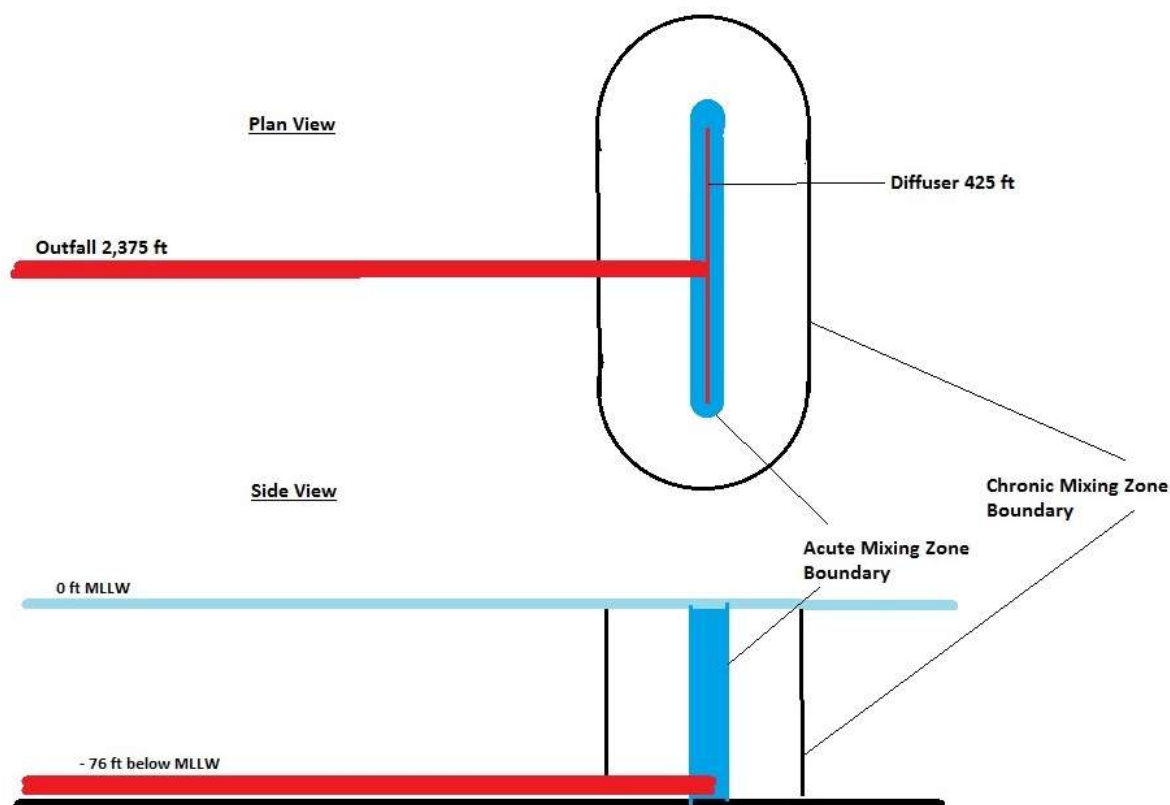
Recreational Use	Criteria
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies /100 mL.

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

E. Water quality impairments

Ecology has documented seasonal low dissolved oxygen in portions of Bellingham Bay. At this time Ecology does not believe that effluent from Post Point is responsible. Ecology has not documented any other water quality impairments in the receiving water in the vicinity of the outfall. Portions of inner Bellingham Bay are listed on the current 303(d) list and is impaired for , mercury, phenol, PCB's, zinc, arsenic, lead, wood waste, and copper. A clean-up action plan has been written and the work is phased for completion. Ecology completed a Total Maximum Daily Load (TMDL) Analysis in December 2001.

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



Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biochemical oxygen demand (BOD₅) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

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

The diffuser at Outfall 001 is 2,375 feet long with a diameter of 60 inches. The diffuser has a total of 35, 6 inch diameter ports. The distance between ports is 12 feet. The diffuser depth is 68 to 84 feet. The mean lower low water (MLLW) depth is 76 feet. Ecology obtained this information from the Dilution Ratio Study Report submitted in January 1993. The study used the steady-state mathematical model UDKHDEN.

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

The total horizontal distance of the chronic mixing zone is 977 feet long and 552 feet wide. The mixing zone extends from the top of the discharge ports to the water surface.

Acute Mixing Zone--WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone. The acute mixing zone for Outfall 001 is 480 feet long and 55 feet wide.

The engineering firm CH2M Hill determined in their 1993 report the dilution factors that occur within these zones at the critical condition using a steady-state mathematical model. The dilution factors are listed below.

Table 11. Dilution factors (DF) Outfall 001

Criteria	Acute	Chronic
Aquatic Life	33	70
Human Health, Carcinogen		70
Human Health, Non-carcinogen		70

Hart Crowser performed a mixing zone analysis in March, 2007 when it designed the replacement outfall for outfall 002. Modeling was conducted using CORMIX and UM3 using both summer and winter water column profiles. The dilution factors for outfall are listed below:

Table 12. Dilution factors (DF) Outfall 002

Criteria	Acute	Chronic
Aquatic Life	4.7	14.7
Human Health, Carcinogen		14.7
Human Health, Non-carcinogen		14.7

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

Dissolved Oxygen--BOD₅ and Ammonia Effects--Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The 5-day Biochemical Oxygen Demand (BOD₅) of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand potential in the receiving water.

Ecology modeled the impact of BOD₅ on the receiving water at critical condition and with the technology-based effluent limit for BOD₅ described under "Technology-based effluent limits" above. The calculations to determine dissolved oxygen impacts are shown in *Appendix D*.

Ecology predicted no violation of the surface water quality standards for dissolved oxygen due to the impacts of biochemical oxygen demand (BOD₅) under critical conditions. Therefore, the proposed permit contains the technology-based effluent limit for BOD₅. The permit also does not contain a limit on ammonia based on dissolved oxygen impacts (ammonia toxicity is examined elsewhere in this fact sheet).

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

Fecal Coliform--Ecology modeled the numbers of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a chronic dilution factor of 70.

Using the 90th percentile value for fecal coliform, modeling predicts no violation of the water quality criterion for fecal coliform. Therefore, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria. The facility easily complies with the technology-based limits for fecal coliform bacteria.

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

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

The following toxic pollutants are present in the discharge: chlorine, ammonia, arsenic, copper, lead, mercury, nickel, selenium, zinc, cyanide. Ecology conducted a reasonable potential analysis (See *Appendix D*) on these parameters to determine whether it would require effluent limits in this permit.

The chlorine limit in the existing permit was found to be protective and since Post Point had no violations during the past permit term the limits have been continued. Chlorine discharged from **outfall 002** has no reasonable potential to pollute during extreme weather events since the outfall is normally only used during effluent flows above 40 MGD and marine tides are high. Outfall 002 is also exercised for less than an hour on a quarterly basis for maintenance. Maintenance flows are not to be initiated when chlorine exceeds a total residual of **0.03 mg/l** and the flow must halt if residual chlorine reaches **0.04 mg/L**. Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature, pH, and salinity of the receiving marine water. To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient station BL009 and Ecology spreadsheet tools.

Valid ambient background data were available for ammonium. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

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

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

- Annual summer maximum threshold criteria (June 15 to September 15)
- Incremental warming restrictions
- Protections against acute effects

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

- Annual summer maximum and supplementary spawning/rearing criteria

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

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

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

- Incremental warming criteria

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

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

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

When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25%

or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- Protections for temperature acute effects

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

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

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

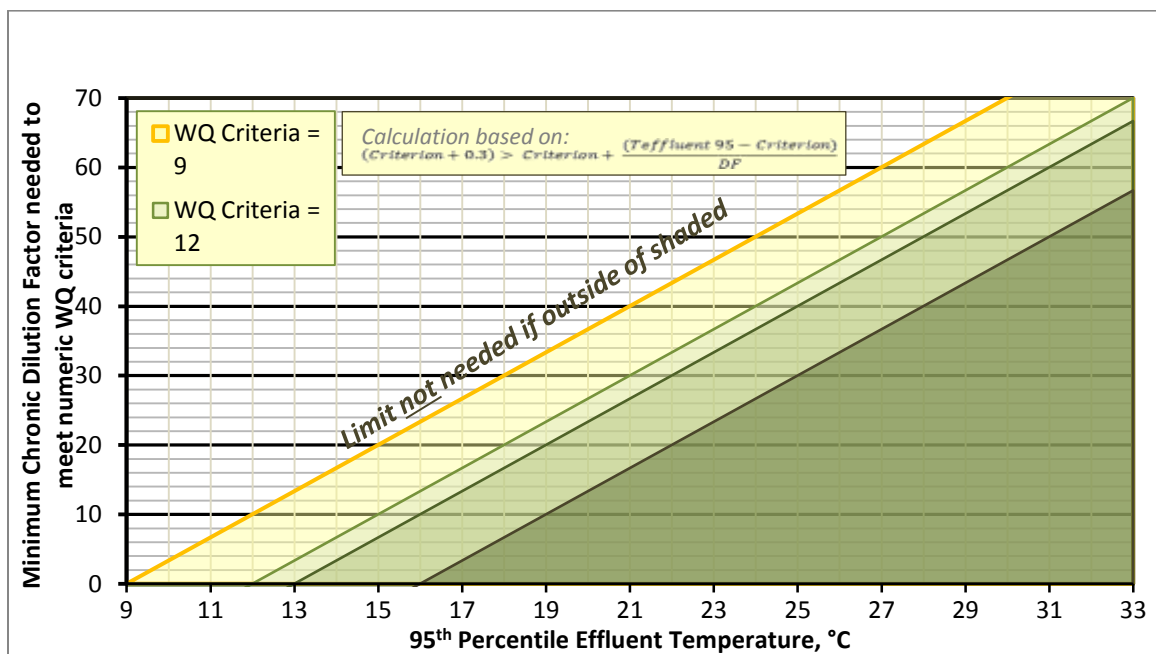
Reasonable potential analysis

Annual summer maximum, and incremental warming criteria: Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum, and the incremental warming criteria at the edge of the chronic mixing zone during critical conditions. No reasonable potential exists to exceed the temperature criterion where:

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

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

Figure 2. Dilution necessary to meet criteria at edge of mixing zone



$$(13.0 + 0.3) > (13.0 + (24.2 - 13.0)/70).$$

$$13.3 > 13.16$$

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

Annual summer maximum, and incremental warming criteria: Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum, and the incremental warming criteria (See temperature calculations in *Appendix D*).

The discharge is only allowed to warm the water by a defined increment when the background (ambient) temperature is cooler or warmer than the assigned threshold criterion. Ecology allows warming increments only when they do not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

The incremental increase for this discharge is within the allowable amount. Therefore, the proposed permit does not include a temperature limit.

Instantaneous lethality to passing fish: Near-field dilution analysis demonstrates that the plume temperature is less than 33°C two seconds after discharge. Ecology calculated the plume temperature two seconds after discharge using the equations shown in *Appendix D*. The results demonstrate there is no reasonable potential for instantaneous lethality to passing fish.

G. Human health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the effluent may contain chemicals of concern for human health, based on the facility's status as an EPA major discharger and, data indicating the discharge contains regulated chemicals.

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* to make a reasonable potential determination. The following organic chemicals were evaluated: phenol, toluene, 2,4-dinitrophenol, chloroform, methyl bromide, methyl chloride, Bis(2-ethylhexyl)phthalate, and 1,4 dichlorobenzene. The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, and an effluent limit is not needed.

H. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website. <http://www.ecy.wa.gov/programs/tcp/smu/sediment.html>

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the sediment management standards. The Permittee conducted a comprehensive sediment quality survey

in 2001 that showed elevated values for sulfides in the sediments in the general area of the facility's outfall though no particular pattern was evident when sample results were viewed in conjunction with sample locations. It was, however, determined that the study Bellingham performed was inadequate because it did not take into consideration that the Harris Street outfall was broken and not discharging at the end of the outfall pipe but rather that it was discharging at the break about halfway along its length. An independent investigation was conducted by the Department of Ecology in 2004 and it found no particular source of sulfides. A second independent study was conducted by Ecology and again no particular source was evident. Bellingham Bay currently has a cleanup action plan being developed by Ecology's Toxic Cleanup Program due in part from past industrial practices. Ecology could not determine the potential for this discharge to cause a violation of sediment quality standards. If in the future Ecology determines a potential for violation of the sediment quality standards, Ecology may issue an order requiring Post Point to demonstrate either:

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

I. Whole effluent toxicity

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

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

Laboratories accredited by Ecology for WET testing know how to use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate an NOEC, LC50, EC50, IC25, etc. Ecology gives all accredited labs the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*

(<https://fortress.wa.gov/ecy/publications/SummaryPages/9580.html>), which is referenced in the permit. Ecology recommends that Post Point send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

WET testing conducted during the previous permit term showed the facility's effluent has no reasonable potential to cause chronic toxicity in the receiving water. However, several quarterly WET tests did not attain the required 80% survival. The facility will continue to have an acute WET limit. The proposed permit will not include a chronic WET limit; however the facility must retest the effluent before submitting an application for permit renewal. In addition, if the facility makes process or material changes which, in Ecology's opinion, increase the potential for chronic effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization. The Post Point facility may demonstrate to Ecology that effluent chronic toxicity has not increased by performing additional WET testing and/or chemical analyses after the process or material changes have been made. Ecology recommends that the Permittee check with it first to make sure that Ecology will consider the demonstration adequate to support a decision to not require an additional effluent characterization.

WET tests taken on 3/18/2009, 9/16/2009, 6/15/2011, 9/19/2012, and 6/12/2013 did not comply with WET requirements. Testing during the previous permit term showed the facility's effluent does have a reasonable potential to cause acute toxicity in the receiving water. The proposed permit will include an acute toxicity limit. Sampling will be reduced to bi-annually. **The effluent limit for acute toxicity is: No acute toxicity detected in a test sample representing the acute critical effluent concentration (ACEC).** The acute critical effluent concentration (ACEC) is the concentration of effluent at the boundary of the acute mixing zone during critical conditions. The ACEC for outfall 001 equals 3% effluent. The ACEC for outfall 002 equals 27% effluent.

These tests from the previous permit term showed the facility's effluent failed to meet the whole effluent toxicity performance standard in WAC 173-205-020 of at least 65% survival in 100% effluent. WAC 173-205-120(1)(a) would allow removal of the facility's acute WET limit if all of the acute tests in the previous permit term had met the performance standard. The acute test failures are thought to be due to the ammonia concentration in 100% sample. Ecology recommends instructing the testing laboratory to use carbon dioxide in test chambers during testing to prevent artifactual ammonia toxicity due to pH rise. The use of carbon dioxide in this way can reduce mortalities and perhaps allow meeting the acute performance standard and removal of the acute WET limit when a new permit is written at the end of the next permit term.

WET testing conducted during the previous permit term showed the facility's effluent has no reasonable potential to cause chronic toxicity in the receiving water. The proposed permit will not include a chronic WET limit, however the facility must retest the effluent before submitting an application for permit renewal. In addition, if the facility makes process or material changes which, in Ecology's opinion, increase the potential for chronic effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization. The Post Point facility may demonstrate to Ecology that effluent chronic toxicity has not increased by performing additional WET testing and/or chemical analyses after the process or material changes have been made. Ecology recommends that the Permittee check with us first to make sure that Ecology will consider the demonstration adequate to support a decision to not require an additional effluent characterization.

Compliance with an acute toxicity limit is measured by an acute toxicity test comparing test organism survival in the ACEC (using a sample of effluent diluted to equal the ACEC) to survival in nontoxic control water. Post Point is in compliance with the acute toxicity limit if there is no statistically significant difference in test organism survival between the ACEC sample and the control sample.

J. Groundwater quality limits

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

Post Point does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

K. Comparison of effluent limits with the previous permit issued on November 2, 2007

Table 13. Comparison of previous and proposed effluent limits

Parameter	Basis of Limit	Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
		Average Monthly	Average Weekly	Average Monthly	Average Weekly
Biochemical Oxygen Demand (5-day)	Technology	30	45	30	45
Total Suspended Solids	Technology	30	45	30	45

Parameter		Monthly Geometric Mean Limit	Weekly Geometric Mean Limit	Monthly Geometric Mean Limit	Weekly Geometric Mean Limit
Fecal Coliform Bacteria	Technology	200	400	200	400

Parameter		Limit	Limit
pH	Technology	6 - 9	6 - 9

Parameter		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Chlorine (total residual) for 001		0.198	0.429	0.198	0.429
Chlorine (total residual) for 001				0.033	0.048

IV. Monitoring Requirements

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

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in

certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

A. Wastewater monitoring

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

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

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Biosolids monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

B. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at this facility for: BOD₅, TSS, Fecal coliform bacteria, turbidity, chlorine, pH, ammonia, dissolved oxygen, and orthophosphate.

Parameter Name	Analyte Code	Method Description
BOD ₅	B-01	SM 5210
TSS	D-97	SM2540
Turbidity	B-01	SM 2130
Chlorine	G-00	SM 4500-Cl
pH	B-00	SM 4500-H+
Ammonia	D-97	SM 4500-NH3
Dissolved oxygen	G-01	SM 4500-O
Total Phosphorus		SM 4500-P
Orthophosphate	E-99	SM 4500-P

Parameter Name	Analyte Code	Method Description
Fecal Coliform bacteria	D (m-FC)-97	SM 9222

V. Other Permit Conditions

A. Reporting and record keeping

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

B. Prevention of facility overloading

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

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

Special Condition S.4 restricts the amount of flow.

If a municipality intends to apply for Ecology-administered funding for the design or construction of a facility project, the plan must meet the standard of a “Facility Plan”, as defined in WAC 173-98-030. A complete “Facility Plan” includes all elements of an “Engineering Report” along with State Environmental Review Process (SERP) documentation to demonstrate compliance with 40 CFR 35.3140 and 40 CFR 35.3145, and a cost effectiveness analysis as required by WAC 173-98-730. The municipality should contact Ecology’s regional office as early as practical before planning a project that may include Ecology-administered funding.

C. Operation and maintenance

The proposed permit contains Special Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, and chapters 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that Post Point takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment.

Significant portions of the collection system are nearly 100 years old, were constructed using techniques such as concrete pipes with oakum packing and/or have numerous manholes, which were not installed using modern materials. Ecology expects leaks are present in the collection system due to its age, materials used, and, construction methods for its installation. Therefore, the proposed permit requires the City of Bellingham to characterize the collection system for the presence of leaks by providing the following information:

- Volume of the annual average and peak daily flow under worst conditions (inflow or infiltration) attributed to leaks.

Good references to aid in these tasks include:

- Section C1-7 (Assessment of Structural Condition and Infiltration/Inflow) of the Washington State Department of Ecology, *Criteria for Sewage Works Design* (Orange Book), 2008.
- American Society of Civil Engineers and Water Environment Federation Manual of Practice FD-6, *Existing Sewer Evaluation and Rehabilitation*.

- U.S. Environmental Protection Agency, *Handbook for Sewer System Infrastructure Analysis and Rehabilitation*, EPA/625/6-91/030, 1991.
- Washington State Department of Transportation, *Standard Specifications for Road, Bridge, and Municipal Construction*, 2002.

Following characterization of the leaks, Ecology may require corrective actions by issuing an administrative order following review of the assessment.

D. Pretreatment

Duty to enforce discharge prohibitions

This provision prohibits the publicly owned treatment works (POTW) from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

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

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

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

Federal and state pretreatment program requirements

Ecology administers the Pretreatment Program under the terms of the addendum to the “Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10” (1986) and 40 CFR, part 403. Under this delegation of authority, Ecology issues wastewater discharge permits for significant industrial users (SIUs) discharging to POTWs which have not been delegated authority to issue wastewater discharge permits. Ecology must approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i) and(iii)].

Industrial dischargers must obtain a permit from Ecology before discharging waste to the Post Point WWTP [WAC 173-216-110(5)]. Industries discharging wastewater that is similar in character to domestic wastewater do not require a permit.

Routine identification and reporting of industrial users

The permit requires non-delegated POTWs to take “continuous, routine measures to identify all existing, new, and proposed significant industrial users (SIUs) and potential significant industrial users (PSIUs)” discharging to their sewer system. Examples of such routine measures include regular review of water and sewer billing records, business license and building permit applications, advertisements, and personal reconnaissance. System maintenance personnel should be trained on what to look for so they can identify and report new industrial dischargers in the course of performing their jobs. The POTW may not allow SIUs to discharge prior to receiving a permit, and must notify all industrial dischargers (significant or not) in writing of their responsibility to apply for a State Waste Discharge Permit. The POTW must send a copy of this notification to Ecology.

Requirements for performing an industrial user survey

This POTW has the potential to serve significant industrial or commercial users and must conduct an industrial user (IU) survey. The purpose of the IU Survey is to identify all facilities that may be subject to pretreatment standards or requirements so that Ecology can take appropriate measures to control these discharges. The POTW should identify each such user, and require them to apply for a permit before allowing their discharge to the POTW to commence. For SIUs, the POTW must require they actually are issued a permit prior to accepting their discharge. The steps the POTW must document in their IU Survey submittal include:

1. The POTW must develop a master list of businesses that may be subject to pretreatment standards and requirements and show their disposition. This list must be based on several sources of information including business licenses, and water and sewer billing records.
2. The POTW must canvas all the potential sources, having them either complete a survey form or ruling them out by confirming they only generate domestic wastewater.
3. The POTW must develop a list of the SIUs and potential SIUs in all areas served by the POTW. The list must contain sufficient information on each to allow Ecology to decide which discharges merit further controls such as a state waste discharge permit.

Ecology describes the information needed in IU Survey submittals to allow Ecology to make permitting decision in the manual “Performing an Industrial User Survey”. Properly completing an Industrial User Survey helps Ecology control discharges that may otherwise harm the POTW including its collection system, processes, and receiving waters. Where surveys are incomplete, Ecology may take such enforcement as appropriate and/or require the POTW to develop a fully delegated pretreatment program.

The proposed permit requires Post Point to conduct an industrial user survey to determine the extent of compliance of all industrial users of the sanitary sewer and wastewater treatment facility with federal pretreatment regulations [40 CFR Part 403 and Sections 307(b) and 308 of the Clean Water Act)], with state regulations (chapter 90.48 RCW and chapter 173-216 WAC), and with local ordinances.

You can find more information about the industrial users that contribute flows to the wastewater treatment plant at the City of Bellingham’s website available at:

<http://www.cob.org/services/utilities/waste-water-treatment.aspx>

E. Solid wastes

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

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

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

F. Effluent mixing study

The proposed permit requires Post Point to more accurately determine the mixing characteristics of the discharge (Special Condition S.9). The design criteria for the effluent flow for the maximum month has changed from 20 MGD to 34 MGD and is significant enough to warrant the study. The effluent mixing study must model the characteristics of the discharge under conditions specified in the permit to assess whether the receiving water quality is protected outside the mixing zone boundary.

G. Combined sewer overflows

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

CSO reduction plan/long-term control plan and CSO reduction plan amendments

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

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

Mentioned previously the Post Point wastewater plant completed a major upgrade in 2014 allowing more wastewater volume to be treated. This results in less wastewater bypassing secondary treatment. In the collection system the city of Bellingham identified needs for a broad inflow and infiltration reduction in its 2009 Comprehensive Sewer Plan. A pilot project entitled, “the Central Basin Project,” was launched in 2012. Twenty city blocks had side sewer connections replaced as well as sewer mains and manhole repairs. The City is funding CSO separation on private properties in the Central Business District and Sunnyland neighborhood see <http://www.cob.org/government/departments/pw/projects/cornwall-cso-improvements-eu-0161.aspx> and <http://www.cob.org/government/departments/pw/projects/central-basin-sewer-eu-0154.aspx>

Historic CSO Events from Outfall 003

DATE	Volume	TSS loading (lbs)	TSS ave. mg/L	Cause
12/13/2001	0.1 MGD	93		Extreme rain event
10/16/2003	2.3 MGD	1667	53	Extreme rain event
11/24/2003	3.2 MGD			Extreme rain event
11/24/2004	3 MGD	1368	52.3	Extreme rain event
C-street overflow weir raised 12/2005				
1/6/2009	9 MGD	2554	24	Extreme rain event

Nine minimum controls

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

The nine minimum controls include:

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

CSO monitoring

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

Annual CSO report

The City must submit annual reports according to the requirements of WAC 173-245-090(1). This report: (a) details the past year's frequency and volume of combined sewage discharge from each CSO site, (b) explains the previous year's CSO reduction accomplishments, and (c) lists the projects planned for the next year. The report must indicate whether a CSO site has increased over the baseline annual condition. If an increase has occurred, the Permittee must propose a project and/or schedule to reduce that site below its baseline conditions. The report must document implementation of the nine minimum controls, and wet weather operation (flow blending) at the treatment plant.

The City must also assess in its annual reports whether the authorized CSO outfall meet the state standard of one untreated discharge per year per CSO. Assessment may be based on a long-term average which is currently defined as a 5-year averaging period.

Post-construction monitoring program

The federal CSO control policy (59 FR 18688) requires post-construction monitoring to verify implemented CSO control strategies comply with water quality standards. Post-construction monitoring applies to any CSO outfall that is controlled to meet the "greatest reasonable reduction" of combined sewer overflows, as defined in chapter 173-245 WAC.

Implementation requires development of a monitoring plan and completion of a data report that documents compliance. The proposed permit requires the City to develop and submit to Ecology a post-construction monitoring plan by June 1, 2015. The permit also requires the City to implement the monitoring plan and to report monitoring data by October 1, 2018.

EPA guidance on post-construction monitoring plans is available at the following web location: http://cfpub.epa.gov/npdes/home.cfm?program_id=5

H. General conditions

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

VI. Permit Issuance Procedures

A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary, to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

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

B. Proposed permit issuance

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. References for Text and Appendices

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. USEPA Office of Water, Washington, D.C.

1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

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Tsivoglou, E.C., and J.R. Wallace.

1972. *Characterization of Stream Restoration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

December 2011. *Permit Writer's Manual*. Publication Number 92-109
(<https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html>)

Laws and Regulations (<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information

(<http://www.ecy.wa.gov/programs/wq/permits/guidance.html>)

Water Pollution Control Federation.

1976. *Chlorination of Wastewater*.

Wright, R.M., and A.J. McDonnell.

1979. *In-stream Deoxygenation Rate Prediction*. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

Appendix A--Public Involvement Information

Ecology proposes to reissue this permit to Post Point WWTP. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Draft on May 15, 2014, in the *Bellingham Herald* to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

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

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting*, which is available on our website at

<https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html>.

You may obtain further information from Ecology by telephone, 360.715.5208, or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Or

Bellingham Field Office
1440 10th Street, Suite 102
Bellingham, WA 99225-7028

The primary author of this permit and fact sheet is Mark Henderson.

Appendix B --Your Right to Appeal

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

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

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

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

ADDRESS AND LOCATION INFORMATION

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

Appendix C--Glossary

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

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

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

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

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

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

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

Annual average design flow (AADF) -- The average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit -- The average of the measured values obtained over a calendar months time taking into account zero discharge days.

Average monthly discharge limit -- The average of the measured values obtained over a calendar month's time.

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

Best management practices (BMPs) -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Maximum week design flow (MWDF) -- The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection level (MDL) -- See Method Detection Level.

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

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

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

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

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

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

Peak instantaneous design flow (PIDF) -- The maximum anticipated instantaneous flow.

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

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

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day; or
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level (QL) -- Also known as Minimum Level of Quantitation (ML) -- The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and

cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to $(1, 2, \text{ or } 5) \times 10^n$, where n is an integer (64 FR 30417).

ALSO GIVEN AS:

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

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

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

Significant industrial user (SIU) --

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

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

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

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

Soil scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility

are possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5, 3, or 1 year(s), respectively, of professional experience working in the area of agronomy, crops, or soils.

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

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

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

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

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

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

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

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

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

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

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

Appendix D--Technical Calculations

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at <http://www.ecy.wa.gov/programs/eap/pwsread/pwsread.html>.

Simple Mixing:

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

$$MC = [EC + (AC \times DF)] / (1 + DF)$$

where:

EC = Effluent Concentration

AC = Ambient Concentration

DF = Dilution Factor

Reasonable Potential Analysis:

The spreadsheets REASPOT.XLS, and LIMIT.XLS in Ecology's TSDCALC Workbook determine reasonable potential (to violate the aquatic life water quality standards) and calculate effluent limits. The spreadsheet HUMAN-H.XLS determines reasonable potential and calculates effluent limits for human health pollutants. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets are taken directly from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b).

Fact Sheet for NPDES Permit WA0023744
Post Point WWTP
Page 53 of 71

**** Cyanide criteria is different for parts of Puget Sound, see notes on WQCriteria tab (on CN row) and enter appropriate values in cells below. ****

Instructions

Reasonable Potential Calculation

Facility	Bellingham Post Point
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	33	70
Human Health Carcinogenic		70
Human Health Non-Carcinogenic		70

Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH3	TOLUENE 108883 25V	2,4-DINITROPHENOL 51285 5A	CHLOROFORM 67663 11V	METHYL BROMIDE 74839 20V	METHYL CHLORIDE 74873 21V	PHENOL 108952 10A	CHLORINE (Total Residual) 7782505	ARSENIC (dissolved) 7440382 2M	CHROMIUM(HEX) 18540299	COPPER - 744058 6M Hardness dependent
Effluent Data	# of Samples (n)	6	5	5	5	5	5	5	365	5	5	5
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	27,600	3.5	4.5	5.1	0.8	1.4	0.034	50	1	4.3	7
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L	90										
	Geo Mean, ug/L											
Water Quality Criteria	Aquatic Life Criteria, Acute	6,696	-	-	-	-	-	-	13	69	1100	4.8
	Chronic	1,006	-	-	-	-	-	-	7.5	36	50	3.1
	WQ Criteria for Protection of Human Health, ug/L	-	200000	14000	470	4000	-	5E+06	-	-	-	-
	Metal Criteria, Acute	-	-	-	-	-	-	-	-	1	0.993	0.83
	Translator, decimal, Chronic	-	-	-	-	-	-	-	-	-	0.993	0.83
	Carcinogen?	N	N	N	Y	N	-	N	N	Y	N	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950
s	$s^2 = \ln(CV^2 + 1)$	0.555	0.555	0.555	0.555	0.555
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.607	0.992	0.549	0.549	0.549
Multiplier		2.14	1.00	2.32	2.32	2.32
Max concentration (ug/L) at edge of...	Acute	1,878	1.515	0.070	0.301	0.409
	Chronic	933	0.714	0.033	0.142	0.193
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO

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

Human Health Reasonable Potential

s	$s^2 = \ln(CV^2 + 1)$	0.55451	0.5545	0.55451	0.554513	0.5545
Pn	$Pn = (1 - \text{confidence level})/n$	0.549	0.549	0.549	0.549	0.549
Multiplier		0.93363	0.9336	0.93363	0.933632	0.9336
Dilution Factor		70	70	70	70	70
Max Conc. at edge of Chronic Zone, ug/L		0.04668	0.06	0.06802	0.01067	4.5E-04
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO

# of Compliance Samples Expected per month	
Average Monthly Effluent Limit, ug/L	
Maximum Daily Effluent Limit, ug/L	

Comments/Notes:

References: WAC 173-201A,

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

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Fact Sheet for NPDES Permit WA0023744
Post Point WWTP
Page 54 of 71

Reasonable Potential Calculation

Facility	Bellingham Post Point
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	33	70
Human Health Carcinogenic		70
Human Health Non-Carcinogenic		70

Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH ₃	TOLUENE 108853 25V	2,4-DINITROPHENOL 51285 9A	CHLOROFORM 67663 1TV	METHYL BROMIDE 74839 20V	METHYL CHLORIDE 74873 21V	PHENOL 108952 10A	CHLORINE (Total Residual) 7723-52-5	Arsenic (dissolved) 7440-38-2 2M	Chromium(HEX) 18540-299	Copper - 7440-50-8 Hardness Dependent
# of Samples (n)	6	5	5	5	5	5	5	5	365	5	5	5
Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Effluent Concentration, ug/L (Max. or 95th Percentile)	27,000	3.5	4.5	5.1	0.8	1.4	0.034	50	1	4.3	7	
Calculated 50th percentile Effluent Conc. (when no=10)												
90th Percentile Conc., ug/L	90											
Geo Mean, ug/L												
Aquatic Life Criteria, Acute	6,696	-	-	-	-	-	-	13	69	1100	4.8	
ug/L Chronic	1,006	-	-	-	-	-	-	7.5	36	50	3.1	
IWQ Criteria for Protection of Human Health, ug/L		200000	14000	470	4000		4600000					
Metal Criteria, Acute	-	-	-	-	-	-	-	-	1	0.993	0.83	
Translator, decimal Chronic	-	-	-	-	-	-	-	-	-	0.993	0.83	
Carcinogen?	N	N	N	Y	N	-	N	N	Y	N	N	

Aquatic Life Reasonable Potential

Effluent percentile value	0.950	0.950	0.950	0.950	0.950
s	$s^2 = \ln(C/V^2 + 1)$	0.555	0.555	0.555	0.555
pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.607	0.992	0.549	0.549
Multiplier		2.14	1.00	2.32	2.32
Max concentration (ug/L) at edge of...	Acute	1.878	1.515	0.070	0.301
	Chronic	933	0.714	0.033	0.142
Reasonable Potential? Limit Required?	NO	NO	NO	NO	NO

# of Compliance Samples Expected per month	
LTA Coeff. Var. (CV), decimal	
Permit Limit Coeff. Var. (CV), decimal	
Permit Load Allocation, ug/L	Acute
	Chronic
Living Term Averages, ug/L	Acute
	Chronic
Smoking LTA, ug/L	
Letal Translocator or 1?	
Average Monthly Limit (AML), ug/L	
Maximum Daily Limit (MDL), ug/L	

Human Health Reasonable Potential

s	$s^2 = \sigma^2(CV^2 + 1)$	0.5545	0.5545	0.55451	0.554513	0.55451303
Pn	Pn=(1-confidence level)/n	0.549	0.549	0.549	0.549	0.549
Multiplier		0.9336	0.9336	0.93363	0.93362	0.93363226
Dilution Factor		70	70	70	70	70
MaxConc. at edge of Chronic Zone, ug/L		0.0467	0.06	0.06802	0.01067	4.5E-04
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO

# of Compliance Samples Expected per month	
Average Monthly Effluent Limit, ug/L	
Maximum Daily Effluent limit, ug/L	

Comments/Notes:

References: WAC 173-201A.

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

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Reasonable Potential Calculation - Page 2

Facility	Post Point Outfall 001
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	33	70
Human Health Carcinogenic		70
Human Health Non-Carcinogenic		0

Pollutant, CAS No. & NPDES Application Ref. No.		LEAD - 7439921 7M Dependent on hardness	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	SELENIUM 7782492 10M hardness dependent	ZINC - 7440066 13M hardness dependent	CYANIDE 57125 14M	BIS(2-ETHYLHEXYL) PHTHALATE 117817 15B	1,4-DICHLOROBENZENE 106467 22B	CHLORINE (Total Residue) 7782505		
	# of Samples (n)	5	5	5	5	5	6	5	4	60		
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Effluent Data	Effluent Concentration, ug/L (Max. or 95th Percentile)	0.8	0.3	3	4.9	40	64	2.6	0.6	120		
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L									90		
	Geo Mean, ug/L											
Water Quality Criteria	Aquatic Life Criteria, Acute	210	1.8	74	290	90	9.1	-	-	13		
	Chronic	8.1	0.025	8.2	71	81	9.1	-	-	7.5		
	WQ Criteria for Protection of Human Health, ug/L	-	0.15	4600	4200	-	220000	5.9	2600	-		
	Metal Criteria, Acute	0.951	0.85	0.99	-	0.946	-	-	-	-		
	Translator, decimal Chronic	0.951	-	0.99	-	0.946	-	-	-	-		
	Carcinogen?	N	N	N	N	N	N	Y	N	N		
		N	N	N	N	N	N	Y	N	N		

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950	0.950	0.950
$s^2 = \ln(CV^2 + 1)$		0.555	0.555	0.555	0.555	0.555	0.555	0.555
$P_{int} = (1 - \text{confidence level})^{1/n}$		0.549	0.549	0.549	0.549	0.549	0.549	0.549
Multiplier		2.32	2.32	2.32	2.32	2.32	2.14	1.00
Max concentration (ug/L) at edge of...	Acute	0.054	0.018	0.209	0.345	2.665	4.154	90.909
	Chronic	0.025	0.010	0.099	0.163	1.256	1.958	90.429
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO	NO	YES

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		0.6
Permit Limit Coeff. Var. (CV), decimal		0.6
Waste Load Allocations, ug/L	Acute	--
	Chronic	--
Long Term Averages, ug/L	Acute	--
	Chronic	--
Limiting LTA, ug/L		-786.97496
Netal Translator or 1?		1.00
Average Monthly Limit (AML), ug/L		#DIV/0!
Maximum Daily Limit (MDL), ug/L		2451.0

Human Health Reasonable Potential

S	S ²⁺ as (CV ⁴⁺)	0.555	0.5545	0.5545	0.5545	0.5545	0.55454513029
Pn	Pn=(1-confidence level)/n	0.549	0.549	0.549	0.607	0.549	0.473
Multiplier		0.934	0.9336	0.936	0.8603	0.9336	1.038458657
Dilution Factor		70	70	70	70	70	70
Max Conc. at edge of Chronic Zone, ug/L		0.004	0.04	0.0654	7.9E-01	3.5E-02	0.008901074
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO	NO

# of Compliance Samples Expected per month	
Average Monthly Effluent Limit, ug/L	
Maximum Daily Effluent Limit, ug/L	

Comments/Notes:

References: WAC 173-201A,

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

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Reasonable Potential Calculation

Facility	Post Point Outfall 002
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	4	15
Human Health Carcinogenic		15
Human Health Non-Carcinogenic		15

Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH3	LEAD - 7439921 7M Dependent on hardness	NICKEL - 7440020 9M - Dependent on hardness	SELENIUM 7782492 10M	ZINC- 7440666 13M hardness dependent		CYANIDE 57125 14M	BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	1,4 DICHLOROBENZENE 106467 22B	CHLORINE (Total Residual) 7782505	
<u>Effluent Data</u>	# of Samples (n)	5	5	5	5	5		6	5	4	60	
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)											
	Calculated 50th percentile Effluent Conc. (when n>10)											
	90th Percentile Conc., ug/L											
<u>Receiving Water Data</u>	Geo Mean, ug/L											
<u>Water Quality Criteria</u>	Aquatic Life Criteria, Acute ug/L	6,696	210	74	290	90		1	-	-	13	
	Chronic ug/L	1,006	8.1	8.2	71	81		1	-	-	7.5	
	WQ Criteria for Protection of Human Health, ug/L	-	-	4600	4200	-		220000	5.9	2600	-	
	Metal Criteria Acute	-	0.951	0.99	-	0.946		-	-	-	-	
	Translator, decimal Chronic	-	0.951	0.99	-	0.946		-	-	-	-	
	Carcinogen?	N	N	N	N	N		N	Y	N	N	

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2 = \ln(CV^2 + 1)$	0.555	0.555	0.555	0.555	0.555	0.555	0.555
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.549	0.549	0.549	0.549	0.549	0.607	0.951
Multiplier		2.32	2.32	2.32	2.32	2.32	2.14	1.00
Max concentration (ug/L) at edge of...	Acute	0	0.000	0.000	0.000	0.000	0.000	0.000
	Chronic	0	0.000	0.000	0.000	0.000	0.000	0.000
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO	NO	NO

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

Human Health Reasonable Potential

s	$s^2 = \ln(CV^2 + 1)$	0.55451	0.55451	0.5545	0.554513	0.55451
Pn	$Pn = (1 - \text{confidence level}) / n$	0.549	0.549	0.607	0.549	0.473
Multiplier		0.93363	0.93363	0.8603	0.9336323	1.03846
Dilution Factor		15	15	15	15	15
Max Conc. at edge of Chronic Zone, ug/L		0	0	0.0E+00	0	0
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO

Number of Compliance Samples Expected per month	
Average Monthly Effluent Limit, ug/L	
Maximum Daily Effluent Limit, ug/L	

Comments/Notes:

References: WAC 173-201A,

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

[illegible]

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	70
Receiving Water Fecal Coliform, #/100 ml	5
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criteria, #/100 ml	14
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	10.64
Difference between mixed and ambient, #/100 ml	6

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

Calculation of Dissolved Oxygen at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	70
Receiving Water DO Concentration, mg/L	8.8
Effluent DO Concentration, mg/L	10.7
Effluent Immediate DO Demand (IDOD), mg/L	
Surface Water Criteria, mg/L	7
OUTPUT	
DO at Mixing Zone Boundary, mg/L	8.83
DO decrease caused by effluent at chronic boundary, mg/L	-0.03

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

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

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-

INPUT	
1. Receiving Water Temperature, deg C (90th percentile):	12.0
2. Receiving Water pH, (90th percentile):	8.2
3. Receiving Water Salinity, g/kg (10th percentile):	28.7
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):	0.589
2. pKa8 at 25 deg C (Whitfield model "B"):	9.313
3. Percent of Total Ammonia Present as Unionized:	2.9%
4. Total Ammonia Criteria (mg/L as NH ₃):	
Acute:	8.14
Chronic:	1.22
RESULTS	
Total Ammonia Criteria (mg/L as <u>N</u>)	
Acute:	6.70
Chronic:	1.01

INPUT	May-Sep	Oct-Apr
1. Chronic Dilution Factor at Mixing Zone Boundary	70	70
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	14.4 °C	11.3 °C
3. 1DADMax Effluent Temperature (95th percentile)	24.2 °C	16.3 °C
4. Aquatic Life Temperature WQ Criterion	13.0 °C	13.0 °C
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	14.56 °C	11.37 °C
6. Incremental Temperature Increase or decrease:	0.14 °C	0.07 °C
7. Incremental Temperature Increase $12/(T-2)$ if $T \leq \text{crit}$:	---	1.29 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	14.72 °C	12.59 °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 $12/(T_{\text{amb}}-2)$ 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 $12/(T_{\text{amb}}-2)$ 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 - $12/(T_{\text{amb}}-2)$)		
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

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	70
Depth at plume trapping level (m)	5.000
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	11.97
pH:	8.20
Salinity (psu):	28.70
Total alkalinity (meq/L)	2050.00
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	24.20
pH:	7.50
Salinity (psu)	12.00
Total alkalinity (meq/L):	75.90
<div>Calculate</div>	
OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	12.14
Salinity (psu)	28.46
Density (kg/m ³)	1022
Alkalinity (mmol/kg-SW):	1979.22
Total Inorganic Carbon (mmol/kg-SW):	1839
pH at Mixing Zone Boundary:	8.20

Calculation of Water Quality-Based Effluent Limits:

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

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

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

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

where: DF_a = Acute Dilution Factor

DF_c = Chronic Dilution Factor

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

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

where:

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

$$z = 2.326$$

CV = coefficient of variation = std. dev./mean

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

where:

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

$$z = 2.326$$

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

Maximum Daily Limit = MDL

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

where:

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

$$z = 2.326 \text{ (99th percentile occurrence)}$$

LTA = Limiting long term average

Average Monthly Limit = AML

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

where:

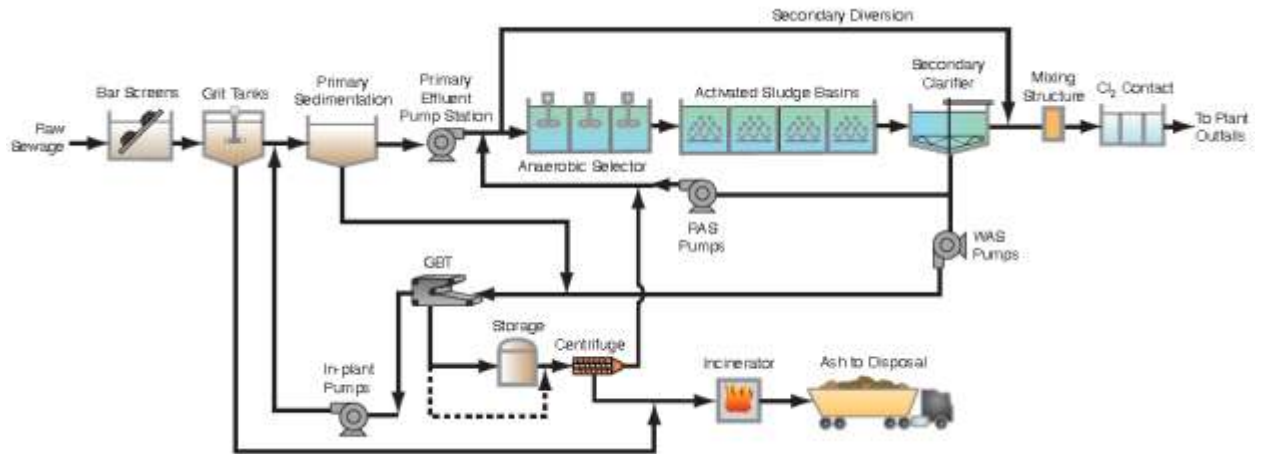
$$\sigma^2 = \ln[(CV^2 \div n) + 1]$$

n = number of samples/month

$$z = 1.645 \text{ (95th \% occurrence probability)}$$

LTA = Limiting long term average

Appendix E—Plant Diagrams



Appendix F--Response to Comments

Permittee Comments

For error and omissions check of draft permit WA0023744

- General: While it is likely just a placeholder, the date indicated (June 2012) is over 7 months off!
- Page 3 of 46 Is there any significance to the subsection text that appears in bold?
- Page 4 of 46 S14 Alpha-numeric section identifiers needs to be fixed "S15.A" should read S14.A and S_.G should read S14.B.
- Page 6 of 46 The alpha numeric numbering is inaccurate and needs to be corrected both in the index and in the text of the permit.
- "S99.A" should be S9.A
"S100.C" should be S10.C
"S100.D" should be S10.D
"S1.A" should be S13.A
- Page 7 of 46 The alpha numeric numbering is inaccurate and needs to be corrected both in the index and in the text of the permit.
- "S1.C" should be S13.C
"S1.D" should be S13.D
"S1.E" should be S13.E
"S1.A" should be S14.A
Though not included in the index "S1.G." should be corrected to S14.B and included in the index with other similar subsections.
- General comment on pages 6 and 7 of 46. The Department of Ecology (ECY) must understand the budgetary restrictions that public agencies operate under. Please consider that the City of Bellingham has a biannual budgetary process wherein projects that require funding need to be identified up to 2 years in advance to allow for project funding. We would appreciate consideration of this fact when selecting First Submittal Dates for those permit items that will require funding above and beyond what has been required in the prior permit. An estimate for an Effluent Mixing Report came in at up to \$100,000.
- Page 6 of 46 The previous permit set a limit for acute whole effluent toxicity (WET) and the Permittee met the limit. Please explain the rationale for asking for an additional 20 distinct test for acute toxicity. The tests submitted with the current permit application continue to show no toxicity at the ACEC level and there appears to be no justification for continuing this requirement for additional acute testing.
- Is it necessary to include a specific month for items that need to be conducted quarterly (i.e. Acute Toxicity Characterization Data)? For items that have a frequency of quarterly, "Every 3 months with months not consecutive" should be sufficient. Or, please follow the language in subscript h. on page 13 of 46.

Putting a specific month in each quarter puts the permittee in a disadvantage if routine problems occur in shipping (sample not arriving to lab to time to meet short holding time requirements) or lab quality control (test needs to be resampled by permittee and rerun by lab). As it is now, bioassay samples are being driven by Bellingham staff to the contract lab to avoid persistent problems getting a wastewater sample to the contract lab within 36 hours. This type of expense and effort could be avoided if we were not tied to a specific month indicated in the current permit.

Similarly, the acute toxicity reports (condition S13.C.) should be due to ECY 60 days after the testing occurs and not tied to a specific month and day. Tying a permittee to a specific date for a condition that they cannot control (the arrival of a report from a third party lab) is wrong. Similarly, if conditions not under the permittees control (shipping to the 3rd party lab and 3rd party lab problems) delay the ability to get the testing done by the date specified than why should the permittee be subject to violation?

Page 8 of 46 Why did the seasonal effluent limitations (Winter and Summer effluent limitation per S1. Of current permit) not get carried into this permit renewal?

Page 9 of 46 Effluent Limits for Outfall #002

Please examine Table 1 to understand the minimal usage of Outfall #002, a non-continuous discharge, at the Post Point Wastewater Treatment Plant:

Table 1. Outfall #002 (Alternate Outfall) Use 2009 to 2013

Date of Use	Outfall Duration (mins)	Total Flow through Outfall #002 (gal)
2008 Total	0	0
1/7/2009	18	4,200
1/8/2009	6	1,000
11/17/2009	84	121,000
2009 Total	108	126,200
2010 Total	102	96,000
(1 event 12/12/2010)		
2011 Total	0	0
2012 Total	0	0
2013 Total	0	0
Total for 5-Year Period	210 total minutes	222,200 total gallons

(2008 to 2013)	(3.5 hrs total)	
----------------	-----------------	--

Realize the same effluent that is going out Outfall 002 is also going out of Outfall 001 and being sampled via the composite sampler on outfall 001. This flow has always been included in the City's compliance reporting.

We are at an absolute loss on how we are to collect a 24 hour composite sample for an outfall that was only used 4 times (3 times if using the "per event" definition per Permit Writer's Manual) in the last 6-year permit cycle with an average use those few times it is being utilized of less than a half hour. This is setting the City up for an untenable position which now has violation potential.

There exists no technology with the ability to predict the future as to allow us to program a sufficient sample volume to meet the flow-paced requirement and to accommodate all of the required testing on this outfall. In example, it is estimated that 11.6 liters would be necessary to meet the volume sufficient for the analyte list established in draft permit S.1.A and S.1.B (acute bioassay = 10 liter, BOD = 0.5 liter, TSS/TRC/pH = 0.5 liter, fecal coliform = 0.1 liter, excess for duplicates/spillage/pre-rinse/processing into cubitainer = 0.5 liter). With the range of time in use for the alternate outfall over the past 6-year period from 0.1 hr to 1.7 hrs, programming a pacing to meet permit limitations for all events would be impossible.

Table 2 below illustrates the problem stated above using an estimated sample pacing interval that one would logically select in an attempt to collect sufficient volume to meet the required analysis (11.6 L minimum) and meet the representative flow-paced requirement detailed in S2.C. meet unknown flow volumes but attempt to get a representative sample as detailed in period of record. One would logically pace the sample to collect 1 -200 ml sample every minute and with this setting, the resulting sample volume is detailed below in Table 2.

Table 2. Illustration of Sample Volume from flow-pacing automated sample on Outfall #002

Flow Regime Example in gallons (from 2009- 2013 record)	Corresponding event time of Outfall #002 Use (total time of event in mins)	Sample Pacing @ 400 mls per minute # samples collected	Amount that would be collected at prescribed settings (liter)	Notes on Volume Collected
4,200	18	18	3.6	INSUFFICIENT
1,000	6	6	1.2	INSUFFICIENT
121,000	84	84	16.8	OK
96,000	102	102	20.4	OVERFILLED CONTAINER (back aspirated) = INVALID

				SAMPLE
--	--	--	--	---------------

Three of the events above would result in a permit violation due to the inability to collect either a sufficient volume to process the required number of analytes required, and one sample would be invalid due to the size limitation on the sample carboy (20 L with an actual capacity closer to 18 L) and the automated samplers anti-spill feature which aspirates any volume above the fill tube out of the carboy - concentrating the sample and making it non-representative. The example above is utilizing flows from the period of record and it is just as likely that other use of the Outfall #002 will not be similar to the 4 instances observed from 2008 to 2013.

It is also important that the permit manager understand that the instances of use of the alternate outfall are ones which have the Operator on duty very involved in operating the water, wastewater and city infrastructure systems to prevent permit violation, property damage, sewage overflow, and public hazards. As one can see, outfall #002 is only used under very high rain conditions, two of the instances above from declared flood emergency events. At the time of these events, the Operator is inundated with emergency calls and working to prevent flooding of roadways, public and private property, optimizing the collection system to retain sewer flows, operating dam systems to minimize risk, power outage response to critical processes and stations, and generally responding /reacting to issues of greater public interest. To expect an Operator to take time away from this emergency response condition to assess whether flow is optimized in an automated sampler (assuming they could even get to the site in time in the instance of the 6 and 18 minute event) and to collect and process samples with no holding time (pH, Cl₂) is unreasonable and appears to guarantee the City of Bellingham will be in violation. Realize too that the bioassay lab is closed 2 days of the week.

Table 2 details the 4-time use of this system over the past 6 year period. The total flow from this outfall for the 6 year period from 2008 to 2013 is 222,200 gallons. Weighed against the over 27,375,000,000 gallons discharged from the treatment plant for the same time period one can see this represents a miniscule fraction (0.0008%) of the discharge from the treatment plant. Also, please explain how the summary statistics are to be performed as detailed in S.1. in instances such as those observed when the system is used on average of less than once a year? Average weekly, average monthly and monthly and weekly geometric means are not meant for a discharge that only occurs on less than an annual basis. Please see post from EPA Manual below.

From page 8-6 of EPAs Permit Writer's Manual EPA-833-K-10-001 (September 2010):

Frequency of the discharge. *The monitoring frequency for a wastewater discharged in batches infrequently should differ from that for a continuous discharge of highly concentrated wastewater or a wastewater containing a pollutant that is found infrequently and at very low concentrations. The production schedule of the facility (e.g., seasonal, daily), the plant washdown schedule, and other similar factors should be considered.*

Number of monthly samples used in developing effluent limitations. *When establishing monitoring frequency, the permit writer should consider the number of monthly samples used in developing average*

monthly WQBELs. If the discharger monitors less frequently than the monthly monitoring frequency assumed when developing applicable effluent guidelines or in calculating a WQBEL, it could be more difficult for the discharger to comply with its average monthly effluent limitations. For example, if an average monthly limitation is established assuming a monitoring frequency of four times per month (i.e., the limit is the expected average of four samples taken during a month), a discharger taking only one sample per month would statistically have a greater chance of exceeding its average monthly limit than if it sampled at least four times per month.

One final note, please be aware that the outfall #002 does not contain "stormwater from the industrial areas of the Fairhaven District in Bellingham" as is stated in the Fact Sheet for permit WA 002374-4. This was the case before this outfall was replaced, but in its new configuration, this outfall contains only treated wastewater.

Page 9 of 46 What is the rationale for the Total Residual Chlorine levels being 0.033 mg/l average and 0.048 mg/L weekly max (as if we have enough data to calculate this!) on outfall #002? This does not appear to be congruent with the dilution factor from this outfall.

Page 11 of 46 Table S2.A. The permittee has 2 flow metering devices - one at the influent and one at the effluent channel. To optimize accuracy in flow reporting, the flow meter which corresponds more closely to the observed flow regime observed will be utilized. To limit the flow reporting to the wastewater influent S2.(1) will mean that the meter which has less accuracy at flows less than 20 mgd will need to be utilized for flow reporting and all the corresponding calculations that are derived from this value.

What is the rationale for increasing the fecal coliform minimum sampling frequency from 5/7 to daily? What do permittees do with a 7/7 frequency on this test if an upset happens with the sample analysis (holding time exceedence, lab error, over estimate on sample volume, sterility breach, etc.) which would exclude the ability to get a valid result every day which meets the specifications in 40 CFR 136 or the latest edition of Standard Methods?

Page 12 of 46 Requiring a grab sample for chlorine from the alternate outfall is another situation that will likely expose the city to a violation due to the situation described above wherein the alternate outfall is often only in use for a short duration during a time when the person on shift is inundated with issues of grave importance. In the example of half of the outfall #002 use during the last permit cycle, one was for 6 minutes and the other 18 minutes. Both of these instances of limited use occurred during afterhours where there was only one person on shift who was simultaneously working to operate the water, wastewater and city infrastructure systems to prevent permit violation, property damage, sewage overflow, and public hazards in flooding conditions. With the requirement for a grab sample from Outfall #002, this individual would then be required to leave the central control station (and afterhours emergency call station) to go out into the plant to collect a chlorine sample and analyze it with the realization that the flow is likely to be brief and missing the sample collection would result in immediate permit violation. Chlorine (total residual) has a holding time of 15

minutes/STAT to produce a valid result per Standard Methods, 22nd ed. So this collected sample would also requires immediate analysis upon collection.

Please be aware that the same effluent that is being discharged from outfall 001 is what would also be discharged from outfall 002. As such, this effluent is being monitored for chlorine continuously via a chlorine analyzer just prior to dechlorination and also following dechlorination, and that grab samples are being collected and reported on outfall 001 at regular intervals throughout the day. The effluent is also being collected in flow-proportioned intervals from outfall 001 and composited for analysis of all parameters detailed in Section S1 of the City of Bellingham's NPDES permit.

The wrong sections of the permit are listed for Units and Specification for Acute and Chronic Toxicity Testing of the Final Effluent in part (3) of the table. Condition S13. should be the reference for specific testing requirements for the Acute test, and S14 should be the reference for the Chronic test.

Why is section (4) titled CSO Related Secondary Treatment Bypass? This is not a combined sewer overflow. The Environmental Protection Agency defines a combined sewer overflow as a discharge that contains not only stormwater but also untreated human and industrial waste. This flow does not contain untreated waste. No portion of the discharge is untreated. This is a partial bypass of the Secondary portion of the treatment plant by some of the plant flow, to preserve the biologic portion of the treatment process to allow full treatment of flows of 40 mgd and less. Flow-Related Secondary Treatment Bypass or wet weather secondary bypass would be more appropriate.

The superscripts listed under part (4) of this table (i), (j), and (k) do not correspond to the parameter being superscripted.

I am not clear what the permit condition under superscript (g) means for ammonia. It states: Monthly means once every calendar month during alternate weeks. I would think that monthly is self-evident and did not need this "alternate week" designation.

It appears that the superscript with cyanide (i) is not placed appropriately.

Page 13 of 46 The letter j is superscripted but is not included in the table of definitions.

Page 16 of 46 Item 6 Why would a laboratory that is accredited by the state of Washington need to include documentation of accreditation on the parameter along with the sample results, QA/QC and COC information? Is this information also submitted electronically with the analytical result and supporting documentation?

Page 17 of 46 Item 10 appears to require paper copies to be sent to the ECY offices along with the new electronic notification that is required to occur? Is that correct or is the paper notification in lieu of electronic notification if electronic reporting did not occur?

Page 20 of 46 The values in S4 are incorrect

Max Month Design	34.3 MGD	28.4 MGD	34.3 (w/ CEPT)
BOD5 Inf Loading	38,800 #/day	33,000 #/dy	39,800 "

TSS Inf Loading ~~45,500~~ #/day 47,000 #/dy 47.000 "

Page 21 of 46 S4.E. Why has the requirement for the infiltration and inflow evaluation been increased to annually? In the existing permit this evaluation has been required once per permit cycle. An annual reporting interval will take resources away from I/I reduction efforts in an attempt to measure/report to Ecology any measureable I/I and increases of such annually. We believe money that would be spent on 4 to 5 additional annual reports would be better spent on actually reducing I/I through our ongoing programs.

Page 27 of 46 S6.C.1. Appears to confer Control Authority status to the permittee of which it does not possess. Item 1. Should be removed and/or the citation of 90.48 RCW should be removed. Suggested language:

1. Establish a process for ~~authorizing~~ identifying non-domestic wastewater discharges that ensures all SIUs in all tributary areas ~~meet the applicable~~ are identified sufficient to allow Ecology to issue a state waste discharge permit (SWDP) requirements in accordance with chapter 90.48 RCW and chapter 173-216 WAC.

S6.C. 2. contains an incorrect CFR reference: 40 CFR 403.3~~(t)(i)(ii)(v)(1)~~

Page 28 of 46 Item S6.C.6. is not possible for this permittee unless Ecology includes the requirement for inclusion of the City of Bellingham in all permit submittals of SIUs in its collection system. We question the utility of redundancy in permitted submittal for SIUs in light of the new electronic data submittal process at ECY.

Page 29 of 46 S9.1. When considering what date to require the mixing study for Outfall #001, please remember that, like your Agency, we operate under strict budgetary procedures. The city of Bellingham will need to have sufficient time to allow a project of this magnitude to have funding sources determined and allocated. Our budgeting for expenses of this nature can be two years in advance depending on where we are in the biennial budget cycle.

Page 30 of 46 S9.B. 4. Please understand that the statement: "Ecology may issue an administrative order to require a reduction of pollutants or modify this permit to impose effluent limits to meet the water quality standards" without giving the assurance of a timeframe in which this permittee may work to resolve any potential violation situation is alarming to a wastewater plant. Unlike a processing facility, we have very limited ability to control the influent volume and content for items that may be detected but derive from common household products or plumbing materials that are approved for use by Washington consumers or by legacy compounds.

The complexity of chemical interactions, environmental fate and degradation is evidenced in the determination that PCBs are found and persist in treatment plant effluents despite the fact that the manufacturing, processing, distribution, and use in the US has been banned since 1979.¹ There are current no "new" sources of PCB and as such, contamination is thought to be a "legacy", derived from historic sources. The source control work for this class of compounds was performed in the U.S. 30 years ago, though the persistence of this compound is evident.

If an exceedence of the 173-201A WAC water quality criterion was observed from the one mixing zone study it would be prudent to verify the extent of the problem with additional analysis. Furthermore it needs to be indicated that sufficient time will be given to the permittee to work to resolve the pollutant through a complex process which would likely be multifaceted and include any number of treatment and source control actions. In the instance of legacy compounds synthetic chemical remediation treatment processes may be one of the few options to our POTW as a means of treating these compounds and, as you would imagine, one that would require time.

Page 33 of 46 S100.D. Should read S10.D.

Items c. and d. seem to imply that construction will be conducted on the city of Bellingham CSO outfall. These should be removed. CSO outfall construction is not a planned project -in fact, work was completed on this outfall in 2006. This major upgrade of the city's collection system has resulted in only one CSO at the outfall since, and that was during emergency declared flood conditions.

Page 34 of 46 S.10.E. No construction of the CSO Outfall is anticipated. Work was performed on this outfall and the major lift station that it feeds in 2006. Item e. needs to be removed along with c. and d. on the prior page.

Page 34 of 46 S.11.2. There appears to be a misunderstanding of what a bypass of the secondary system is. It is not a CSO. It is a wet weather bypass - where a portion of peak wet-weather flows is treated and piped around secondary treatment units, treated using other methods and blended with fully-treated wastewater before discharge. As such, this flow does not belong on a CSO Report (detailed in S11.2.) which details the release of untreated wastewater and stormwater in the collection system.

Page 34 of 46 Please revise all subsection titles in S13.

Requiring an acute toxicity test from wastewater leaving Outfall #002 is highly likely to cause a violation due to the very sporadic use and limited duration of flows from this outfall. Please refer to the discussion and table on pages 2-4. There also exists some logistical issues with this requirement. Outfall #002 was used for only 3 storm events over the past 6 years. These events are rarely predictable as there are other factors such as tides that can exert an effect. If outfall #002 happened to be used, and assuming that sufficient sample volume happened to be able to be collected (10 L minimum volume required for acute testing), there still exists the very real issue of coordinating with the accredited lab for the required analysis. There is only a 36 hour holding time for bioassay samples, and to be able to perform the testing, the bioassay lab needs to have the appropriate test species readily available at the correct age. There are only 2 accredited bioassay labs in the state of Washington and these labs are not open 24 hours a day, 7 days a week. Additionally, bioassay labs have real limitations on the availability of the test organisms necessary for the analysis (*Atherinops affinis* and *Americamysis bahia*) in that the supplier of test organisms is not able to ship test species on Sundays or Mondays.

The current bioassay requirement in the City of Bellingham's permit is easily met as these analyses are contracted in advance and the dates of analysis set weeks to months in advance. Even then, problems can occur with promptness of shipping

and with the analysis in the lab. The bioassay test is not one that can easily accommodate unplanned, unscheduled sample events as would be necessary as the draft permit is written for Outfall #002.

The City of Bellingham has conducted 26 individual acute toxicity tests on Outfall #001 as a condition of its current permit. Since all testing was performed and all reports were submitted as specified in permit WA0023744, and more importantly, since no toxicity was observed at the ACEC, why are over 20 additional acute tests being required in this revised permit?

1. Washington State Dept. of Ecology and Herrera Environmental Consultants, Inc (December 2010). Control of Toxic Chemicals in Puget Sound Phase 3: Loadings from POTW Discharge of Treated Wastewater. Publication No. 10-10-057.

Public Comment

The only comments Ecology received were from Bellingham Public Works and are as follows:

City of Bellingham Comments and Ecology Responses

City of Bellingham Department of Public Works Operations Division

Comments on draft permit WA0023744

Page 5 of 50 Permit Report Submittal Table item S4. E. We question the necessity for the increase in the interval to submit a formal Infiltration and Inflow Evaluation from 1 a permit cycle to 2. As you realize, changes to an assessment of the amount of I/I that can be cost effectively removed, and assessments of excessive I/I would not change significantly in a 2 year planning horizon and resources spent performing this additional assessment in the permit term would be better spent at I/I reduction efforts.

Ecology Response:

Ecology concurs with the city. The permit requirement will be changed to one I&I evaluation for the permit cycle.

Permit Report Submittal Table item S5.G. We are in the process of working with the Post Point Wastewater Plant upgrade project engineering firm and are expecting an updated Operations and Maintenance Manual to reflect the newly added unit processes by July 2015. We ask that the specific date for this permit requirement synch with the expected delivery of this O&M Manual update.

Ecology Response:

Ecology was not aware of the city and their consultant's time line to finalize updates to Post Point's O&M manual. Ecology will change the date to reflect the city's time line.

Page 14 of 50 Item 9. We want to verify that the Department of Ecology (ECY) is expecting monthly submittal reports electronically and not also by paper to the regional

office as this item may be understood to imply. We will make this assumption unless guided otherwise by ECY staff.

Ecology Response:

Permit condition S3.A(9) directs the city to submit discharge monitoring reports online. If the city is required to submit other reports (e.g. an effluent mixing plan report), it may do so electronically or using a paper copy.

Page 30 of 50 Items c. - e. We do not believe these sections apply to this permittee as no construction has been performed on the controlled CSO outfall since 2006 when the outfall was improved to successfully reduce CSO events. Since the last "construction" was 9 years ago, this permittee would have no way to establish baseline conditions to assess the effectiveness of this project nor is it reasonable to ask for monitoring, a plan and a report from a project that was performed so many years past. The Project Lead of this improvement project has not been an employee of the City of Bellingham for over 5 years.

Ecology's Response:

The post construction monitoring plan is a federal requirement that the city must comply with. The city likely has the information in several documents such as; the engineering report for raising the weir at "C" Street, and the CSO monitoring plan. The information needs to be combined into one document. Ecology finds it difficult to believe that knowledge of the project and engineering data was not retained by the city after the project lead left the city.

Page 31 of 50 Item S12.A. It is our belief that the calculated ACEC for the outfall 002 is incorrect. Our calculations show a value of 6.8% versus the ECY's value of 27%.

Ecology Response:

Ecology used the mixing zone ratios found in the city's engineering report entitled, "Alternative Outfall Replacement Project Post Point Wastewater Treatment Plant," prepared by Hart Crowser, Inc. and WorleyParsons Komex IN March 16, 2007. The values were found in Appendix C on page 12 of the report prepared by WorleyParsons Komex. The report was approved by Ecology on March 28, 2007. Ecology is not aware of any other mixing analysis for Outfall 002.

Page 35 of 50 Item 7. It is our belief that the calculated value for the CCEC is incorrect. The worse-case scenario design peak hour flow (60 mg) with 0 current and maximum stratification showed a chronic mixing zone boundary condition of 70:1 which we believe should translate to a CCEC of 1.43% not the 14% described in this section. The chronic effluent concentration is not typically found to be higher than that established for the acute concentration (3%).

Ecology Response:

The city is correct. The decimal point was misplaced and should read 1.4%. Ecology will correct the value in the final permit.