Fact Sheet for NPDES Permit WA0022403

City of Snoqualmie Water Reclamation Facility

Public Notice of Draft date: January 24, 2020

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed combined National Pollutant Discharge Elimination System (NPDES) Reclaimed Water permit for the City of Snoqualmie Water Reclamation Facility (WRF). It complies Section 173-220-060 and Section 173-219-280 of the Washington Administrative Code (WAC), which require Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing a NPDES or Reclaimed Water permit. This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for the City of Snoqualmie WRF, NPDES permit WA0022403, are available for public review and comment from January 24, 2020, until February 24, 2020. For more details on preparing and filing comments about these documents, please see *Appendix A - Public Involvement Information*.

The City of Snoqualmie 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 G - Response to Comments,* and publish it when issuing the final NPDES permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

Summary

The City of Snoqualmie owns, operates and maintains an oxidation ditch wastewater treatment facility that provides conventional secondary wastewater treatment and biological nutrient removal. Following the oxidation ditch treatment process, the facility uses gravity sand filtration and UV disinfection to produce Class A Reclaimed Water for seasonal irrigation uses on the Club at Snoqualmie Ridge. Ecology issued the previous permit for this facility on April 29, 2014, and modified it on May 11, 2018.

The proposed permit changes the total ammonia average monthly effluent limit (August – October) from 21.9 lbs/day to 21.6 lbs/day. This change is due to effluent variability observed during the last permit cycle and it was computed using the coefficient of variance (CV). The proposed permit also changes the minimum pH limit from 6.3 to 6.5. The effluent limits for Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), Total Suspended Solids (TSS), temperature and fecal coliform bacteria are the same as the limits included in the previous permit. In 2017, the City upgraded its UV Disinfection system and chlorine addition to the reclaimed water is no longer required. Therefore, maximum daily chlorine limit has been removed.

Table of Contents

I. Introduction

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

The following regulations apply to domestic wastewater NPDES permits:

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

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.

In enacting the Reclaimed Water Use law, chapter 90.46 RCW, the Washington State Legislature found that it was in the best interest of present and future generations to encourage the use of reclaimed water in ways that protect the environment as well as the health and safety of all Washington citizens. The Legislature declared that the people of the state of Washington have a primary interest in the development of facilities to provide reclaimed water to replace potable water in nonpotable applications, to supplement existing surface and groundwater supplies, and to assist in meeting the future water requirements of the state. The law directed Ecology, in coordination with the Department of Health (DOH), to adopt rules for reclaimed water use. Ecology adopted the Reclaimed Water Rule, chapter 173-219 WAC, in January 2018.

RCW 90.46.220 and WAC 173-219-070 require any person proposing to generate any type of reclaimed water for a use regulated under the Reclaimed Water Use law to obtain a permit from either Ecology or DOH. The Reclaimed Water Rule designates the lead agency responsible for overseeing the engineering reviews and permitting of reclaimed water facilities based on the type of facility. Ecology is the lead agency when the source water for reclaimed water production is an effluent from a domestic wastewater treatment or water pollution control facility that would typically require a permit from Ecology for effluent disposal to surface water under WAC 173-220 or to groundwater under WAC 173-216. Reclaimed water facility owners must obtain a permit before they may distribute or use any reclaimed water.

All reclaimed water permits issued by Ecology must specify conditions requiring the facility to adequately and reliably treat its wastewater to a level appropriate for the approved beneficial uses of the water. In addition to meeting the water quality limits, the standards require specific treatment and disinfection requirements beyond those of most conventional wastewater treatment facilities. The standards also require automated alarms, redundancy of treatment units, emergency storage, stringent operator training requirements and public notification of reclaimed water use.

Under the NPDES and reclaimed water permit programs and in response to complete and accepted NPDES and reclaimed water permit applications, Ecology must prepare a draft permit and accompanying fact sheet, and make it 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 and WAC 173-219-110). (See *Appendix A-Public Involvement Information* for more detail about the public notice and comment procedures). After the public comment period ends, Ecology will summarize the responses to comments and any changes to the permit in *Appendix G*.

II. Background Information

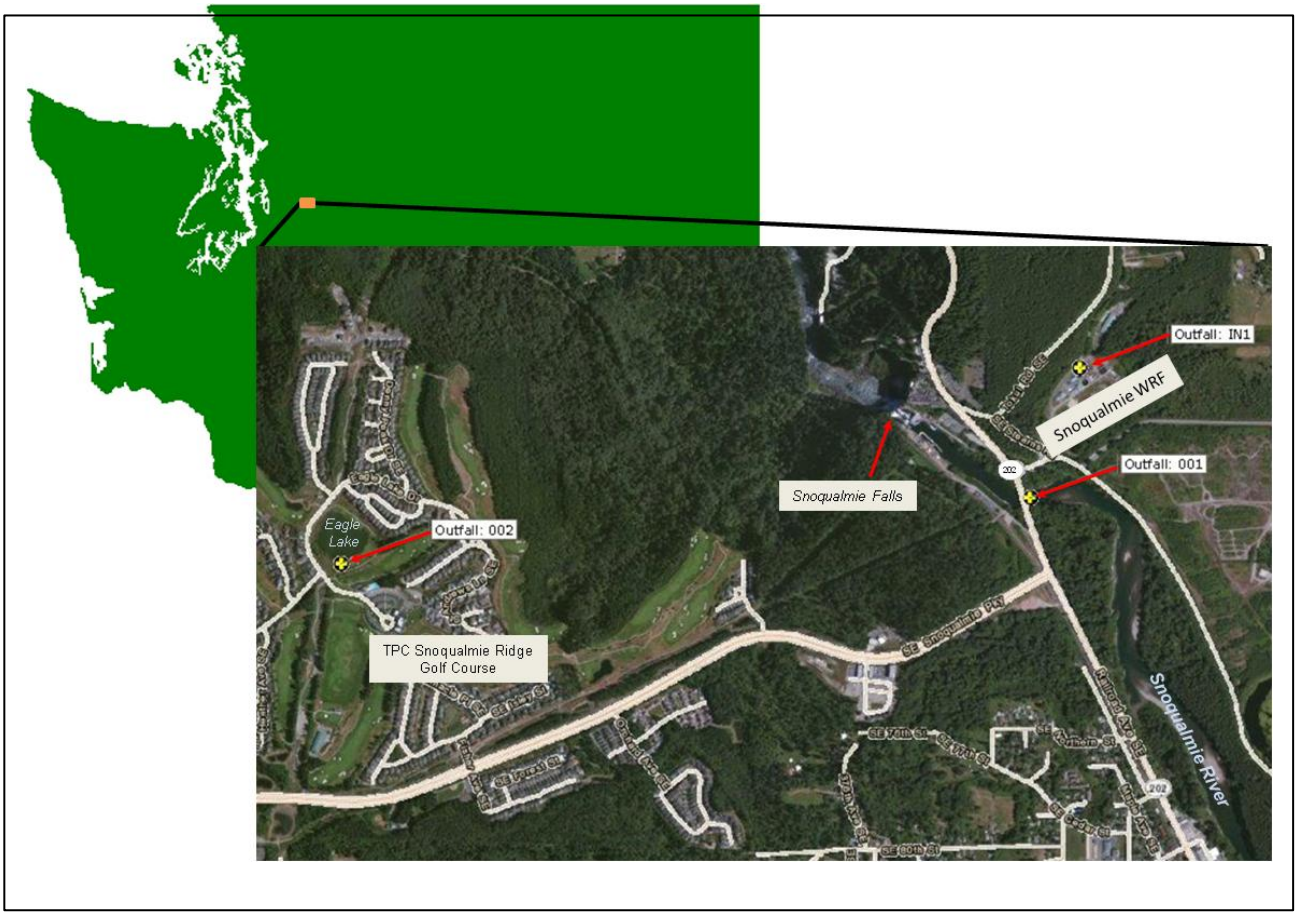
Table 1. General Facility Information

Facility Information	
Applicant	City of Snoqualmie
Facility Name and Address	City of Snoqualmie WRF 38190 SE Sterns Road Snoqualmie, WA 98065
Contact at Facility	Name: Thomas Holmes Title: Wastewater Superintendent Telephone #: (425) 888-4153
Responsible Official	Name: Matthew Larson Title: Mayor Address: 38624 SE River Street Snoqualmie, WA 98065 Telephone #: (425) 888-5307
Type of Treatment	Oxidation Ditch followed by gravity sand filtration
Highest class of reclaimed water produced:	Class A
Approved beneficial uses:	Seasonal landscape irrigation
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.54091 Longitude: -121.83140
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Snoqualmie River, approximately ¼ mile above Snoqualmie Falls Latitude: 47.53916 Longitude: -121.83222
Reclaimed Water Storage Location (Outfall 002)	Eagle Lake (9th Hole Pond) at the Snoqualmie Ridge Golf Course Latitude: 47.53722 Longitude: -121.86250

Permit Status	
Issuance Date of Previous Permit	April 29, 2014
Application for Permit Renewal Submittal Date	October 1, 2018
Date of Ecology Acceptance of Application	November 6, 2018

Inspection Status	
Date of Last Non-sampling Inspection Date	July 17, 2019

Figure 1. Facility Location Map



A. Facility description

History

The City of Snoqualmie (City) constructed their first wastewater treatment plant, a 6.7-acre facultative lagoon system, in 1967. The treatment system remained unchanged for more than 20 years until anticipated growth required a substantial facility upgrade. In the early 1990s the City started planning for a new facility to accommodate projected population increases that would result with planned development of the Snoqualmie Ridge area. In addition to expanding treatment capacity for increasing population, the City's planning effort examined strategies to reduce pollutant loadings to the Snoqualmie River that Ecology identified as contributors to water quality impairments in the river. As part of the City's planning effort, Ecology approved a general sewer plan in 1992 and a wastewater facilities engineering report in 1995, which recommended construction of new wastewater treatment facilities, including improvements for production of Class A reclaimed water and a force main pipeline for delivery of reclaimed water for summer golf course reuse.

The City completed construction of a new advanced treatment facility in 1997. The new facility consisted of a single oxidation ditch, two secondary clarifiers, and a UV disinfection system. The new facility also included sand filtration, chlorination and pumping systems necessary to produce and distribute Class A reclaimed water. The plant expansion project converted the old treatment lagoons into sludge stabilization and storage. The City completed a second phase of expansion in 2002 with the addition of a second oxidation ditch and more UV light banks.

In 2017, the City completed the Ultraviolet (UV) disinfection system upgrades and installed a new standby generator system. The new open-channel UV disinfection system has two channels, three UV reactor banks per channel and a total of 324 lamps. The 1,500 kW generator has the capability to accommodate existing and future electrical loads at the facility. In 2018, the City completed other items of the WRF Improvement Phase 1 project, including the raw wastewater pump station upgrades, and air gap system and non-potable water system improvements.

In June 2019, the City completed the WRF Improvements Phase 2 project. Major improvements related to this phase include replacement of the existing grit classifier and the air lift grit removal system, replacement of anaerobic zone mixers, construction of a three cell aerobic digester, upgrades to the WAS pump station, and a new Solids Handing Building. The project also included the addition of odor control systems for the headworks and solids handling facilities.

The City of Snoqualmie WRF primarily serves residential customers and light commercial establishments within the City's incorporated limits. Customers contributing significant flows to the facility include the Snoqualmie Casino, Snoqualmie Valley Hospital, and the Department of Social and Health Service's (DSHS) Echo Glen Children's Center. The City of Snoqualmie WRF also receives flows from two industrial discharges that require pretreatment permits from Ecology.

Collection system status

The collection system comprises of seventeen pump stations, 43 miles of gravity sewers and 6.8 miles of force mains. Additionally, the collection system includes three private pump stations. One is owned by DSHS and serves the Echo Glenn Children's Center, the second is a small pump station owned by Puget Sound Energy that serves restroom facilities at Snoqualmie Falls, and the third is located at the Weyerhaeuser mill site. Most of the City's collection system conveys sewage to the Kimball Creek lift station, which pumps the sewage across the river to the WRF. A small portion of the city's collection system on the north side of the river flows by gravity directly to the treatment plant. Flows from the Salish Lodge, the old Weyerhaeuser Mill Site, the Snoqualmie Falls Visitor Center, and from the City's Water Treatment Plant discharge to the In-Plant lift station at the WRF.

The City renovated Lift Station #3 (Riverview Park) and #4 (Meadowbrook) between 2009 and 2010. Renovations included raising the lift station structures above the 100-yr flood elevation. City staff also completed a series of repair projects at the Kimball Creek lift station, which included replacing a damaged volute and impeller on one of the pumps and installing third pump to increase the station's pumping capacity and to improve redundancy.

The WRF's Supervisory Control and Data Acquisition (SCADA) system uses remote telemetry to monitor operations at all lift stations. The SCADA system logs all alarms and uses an auto-dialer system to alert an on-call operator to problems. All but two lift stations have dedicated generators for emergency back-up power. The two stations without dedicated generators are "Honey Farm" and Lift Station #2 (Pickering Court). Both stations have the ability to connect to a portable generator. The City maintains an inventory of spare lift station pumps at the treatment plant and the plant's mechanic repairs/refurbishes pumps and motors on site when needed.

The City submitted an evaluation of inflow and infiltration (I&I) in November 2012. The evaluation used plant flow, water usage, and rainfall data from 2007 to 2010 to estimate I&I in the system. While the study identified that the older portions of the collection system in the historic Snoqualmie City core has I&I rates approximately 14 times higher than newer section in the Snoqualmie Ridge area, the overall rates of I&I are not above the level EPA considers "excessive". The Snoqualmie WRF presently has sufficient treatment capacity to treat excess flow caused by I&I and the City has not reported any sanitary sewer overflows that can be attributed to I&I.

In conclusion, the results of the evaluation determined that the estimated infiltration and inflow rates into the collection system are not excessive. Presently, the City is drafting an updated general sewer plan that will discuss the current status of I/I in the service area.

Treatment processes

Raw sewage from Kimball Creek and In-Plant pump stations are pumped to the headworks for flow measurement, screening and influent sampling. The 10 MGD headworks consist of a 6-mm perforated plate mechanical screen, two in-series manual bar screens in the bypass channel (1.5-inch and 3/8-inch) and a Parshall flume equipped with ultrasonic sensor for influent flow measurements. The manual bar screens are readily available during any emergency, maintenance of the fine screen, and when influent flow exceeds the capacity of the fine screen. Screened wastewater flows by gravity to a vortex grit chamber for grit removal.

Degritted wastewater flows to two identical oxidation ditches. Return activated sludge and influent flow are combined in a flow control structure and then split between the two oxidation ditches. Each ditch consists of an anaerobic zone, an anoxic zone and an aerobic zone. The anaerobic zone has two chambers and each chamber is equipped with a mechanical mixer. The anoxic zone is also furnished with a mixer. The aeration zone is equipped with a vertical shaft aerator/mixer, an diverter weir that allows nitrate-rich mixed liquor to be recycled to the anoxic zone to support denitritication, and DO and ORP probes for treatment process control. Oxidation ditch system has a SRT of approximately 14 days and a mixed liquor concentration of 2,500 mg/L. Phosphorus and nitrogen are monitored in the influent and effluent of the ditches.

Effluent from the oxidation ditches flows to a mixed liquor control structure outfitted with slide gates that distribute the flows evenly between two 70-foot circular secondary clarifiers for solids removal. Each clarifier has two rake arms with solids removal pipes, effluent weir and scum removal mechanisms. Wasted activated sludge (WAS) is collected in a sump, and then pumped to the sludge thickening process in the new Solids Handling Building.

Secondary clarifier effluent flows to the secondary effluent control structure that directs and manages the flow either to the UV disinfection system or to the reclaimed water sand filters. This control structure has a V-notched weir, an ultrasonic sensor for flow measurement and an injection pipe for polymer and alum addition. During wet weather months, effluent flow from the secondary clarifiers are directed to a Trojan UV disinfection system with two channels and an average annual flow capacity of about 10 MGD per channel at 67.5 percent UVT. Each channel houses three banks, each bank has nine modules and each module has 6 lamps. Disinfected effluent is then discharge into the Snoqualmie River via outfall 001.

During dry weather months, secondary clarifier effluent is sent to three rectangular sand filters to produce Class A reclaimed water for irrigation purposes. Scour air is supplied by low pressure blowers to fluidize the filter media and facilitate the flow of effluent through the media. Two extra blowers and a traveling head backwashing system are used for backwashing purpose. Backwash water is collected in a trough and sent to the In-Plant pump station. Turbidity is monitored upstream and downstream of the sand filters. Effluent from the sand filters flows to the UV disinfection system prior to pumping to the at the Snoqualmie Ridge Golf Course.

Appendix E includes a schematic diagram showing the existing treatment process flow.

You can find basic information describing wastewater treatment processes included in a booklet at the Water Environment Federation website at:

https://www.wef.org/resources/for-the-public/public-information/

Reclaimed water production process

The Snoqualmie WRF produces Class A reclaimed water for irrigation uses during the dry weather season, from June through October. During reclaimed water production, overflow from the secondary clarifiers is collected at the secondary diversion structure and routed through a flash mixer for polymer addition then through rapid sand filtration beds. Filtered underflow is then routed to the UV disinfection system for disinfection before flowing to the effluent wet well. From the wet well, Class A product water is pumped approximately one mile to the Eagle Lake storage reservoir at the Golf Club at Snoqualmie Ridge.

After the installation of the new UV disinfection system, chlorination is no longer required to meet the State's current design standards for complete disinfection of reclaimed water with UV light. Therefore, the City has discommissioned its chlorine disinfection system and will not use it as a backup to the new UV disinfection system.

Production of Class A reclaimed water at the Snoqualmie WRF is limited by the capacity of the rapid sand filtration system. Based on the *Wastewater Treatment Plant Phase 2 Contract Drawings*, which were approved by Ecology in 2002, the design flow for the sand filters is 1.56 million gallons per day (MGD) for the maximum monthly average.

Operator certification

Washington State law requires operators of municipal wastewater treatment plants to be certified at a level appropriate for the type and size of the facility. Guidance in Ecology's *Permit Writer's Manual* and WAC 173-230 classify activated sludge facilities treating between 1 and 10 million gallons of wastewater per day as a Group III facility. In addition, facilities providing tertiary treatment of flows less than 5 million gallons per day are classified as Group III facilities; reclaimed water production qualifies as tertiary treatment. Based on these guidelines, Ecology

considers the Snoqualmie WRF to be a Group III facility. As such, the operator in responsible charge must, at a minimum, be rated as a Group III operator. An operator certified for at least a Group II facility must be in charge of each scheduled shift at the facility.

Reclaimed water distribution and use area

The City's WRF delivers Class A reclaimed water to the Eagle Lake storage reservoir at the Snoqualmie Ridge Golf Course. Water delivered to the storage reservoir has two distinct allotted withdrawals. The City's agreement with the Snoqualmie Ridge golf course allocates a daily average use of 730,000 gallons per day (gpd) of water (maximum of 857,000 gpd on dry days). The City retains an allotment of 570,000 gpd. The golf course uses its allotment exclusively for irrigation of up to 180 acres of land at the golf course (125 acres during extreme hot periods). The City divides its allocation among various users in an 85 acre area.

In 2019, the City decided to discontinue the transmission of reclaimed water for irrigation of athletic fields at Snoqualmie Community Park, plants in the Snoqualmie Parkway median strip and landscape planters around businesses along Snoqualmie Parkway. Instead, the City will connect its irrigation customers to the City's potable water supply. The City will reconfigure the layout of the site piping to connect potable water through an approved backflow assembly, directly to the irrigation system. The City will cut and cap the piping associated with the municipal irrigation pump station to decommission the pump station for the time being. A reduced pressure backflow assembly (RPBA) will be installed to prevent a cross-connection with the potable distribution. System hydraulics, pipe sizing, City irrigation system controls, and the connection location will be determined during the design phase of this project. The City anticipates to complete this project by May 2021.

According to the reclaimed water permit application, advisory signs are posted near the storage reservoir and at irrigation locations to alert the public of the use of reclaimed water. All distribution systems components (pipes, valves and outlets) are color-coded with purple paint and city employees receive training on the appropriate use of reclaimed water.

Authorized beneficial uses

The City has identified the following beneficial uses:

1. Seasonal irrigation at the Snoqualmie Ridge Golf Club, LLC with a maximum allocation of 0.57 MGD.

Water rights protection

Chapter 90.46.120 RCW states that the owner of a wastewater treatment facility producing reclaimed water under a reclaimed water permit has the exclusive rights to that water. That right is tempered, however, by chapter 90.46.130 RCW, which states that the use of reclaimed water must not impair any existing water rights downstream of any freshwater discharge points of the facilities unless compensation or mitigation is agreed upon by the holder of the affected water right. Ecology cannot issue a reclaimed water permit unless the permit applicant demonstrates compliance with water rights protection.

Per "*2019 Wastewater Treatment and Water Reclamation Facility Impairment Analysis"* written by RH2 Consulting and verbal communication with the Department of Ecology Water Resources Program, the City will maintain the authorized reclaimed water production limit of 1.56 MGD in the proposed permit cycle. Therefore, the production of reclaimed water will cause water rights impairment.

Discharge outfall

The Snoqualmie WRF discharges secondary treated and disinfected effluent through a 36" outfall into the Snoqualmie River at a location approximately 1,700 feet upstream of the Snoqualmie Falls. The line is buried to a location approximately 15 feet offshore, then extends uncovered another 15 feet to its terminus. The pipe is anchored to the river bottom with "H" piling and chains.

The outfall was last inspected September 26, 2018, by Global Diving and Salvage. The inspection report revealed that the pipe, joints, and anchor are serviceable and intact with no visible signs of damage. The outlet pipe was flowing free and unobstructed with no signs of sediment accumulation. The inspection also revealed that the H pilings, wire rope, shackles were intact and working as designed.

Solid wastes/Residual solids

Screenings, rags and grit are dewatered, compacted and then discharged to a dumpster. Screenings are transported by a screenings screw conveyor to the dumpster located adjacent to the headworks. Grit is pumped through a grit classifier prior to being discharged to the dumpster.

In 2019, the City completed Phase 2 Improvements Project, which included the construction of a New Solids Handling Facility – sludge thickening, aerobic digestion and dewatering. Waste activated sludge (WAS) is pumped by three rotary lobe pumps to a new rotary drum thickener (RDT) with design capacity of 125 gpm and 325 lbs/hr mass loading. The RDT can run either semi-continuously or continuously and help the City to manage the loads to the new aerobic digestion system. After thickening, TWAS is pumped to three aerobic digesters in series for stabilization. Each digester has a capacity of 250,000 gallons, contains a top mixer in the center of the reactor and coarse air diffusers at the bottom. Digesters are operated at 20 degree Celsius and a minimum 40-day SRT. Scum collected in the secondary clarifiers is also pumped to the aerobic digesters. Stabilized solids are then pumped by a rotary lobe feed pump to two dewatering units. The dewatering system can achieve approximately 21 percent solids concentration with polymer addition and dewatered solids are loaded to a truck located in the new loadout area. Odorous air is removed from the solids handling facility and digesters and treated with an in-ground biofilter.

Currently, the City is conducting biosolids testing with assistance from Amber Corfman (Ecology Biosolids Coordinator) to determine if the new solids handling facilities can reliably produce Class B biosolids. It is expected that during initial operation there may be some biosolids loads that do not meet the Class B biosolids standards and, therefore; solids must be hauled to a landfill. Per written communication from Ecology Biosolids Coordinator to the Mr. Thomas Holmes (Wastewater Superintendent), the City has

permission of disposal of biosolids that do not meet Class B Biosolids standards on emergency basis until November 30, 2019. Currently, the solids are hauled by Tenelco to permitted sites.

B. Description of the receiving water

The Snoqualmie WRF discharges treated effluent to the main stem of the Snoqualmie River approximately one-quarter mile above the Snoqualmie Falls. Other nearby point source outfalls include the City of North Bend WWTP, which discharges into the South Fork of the Snoqualmie River approximately five miles above the Snoqualmie WRF outfall. Ecology has also issued a General Upland Fish Hatchery permit to authorize the discharge of water from hatchery operations at the Washington Department of Fish and Wildlife's Tokul Creek Hatchery, located approximately one mile downriver from the Snoqualmie WRF. In addition to the point sources noted above, the Snoqualmie River receives urban runoff from the cities of Snoqualmie and North Bend, as well runoff from agricultural, sand & gravel mining, and construction activities throughout the Snoqualmie Valley area.

Ecology used its water quality monitoring station #07D130, located approximately 1.5 miles above the WRF outfall at the Meadowbrook bridge, as the primary source for ambient background conditions for this discharge. Table 2 summarizes data for conventional parameters collected between January 2003 and August 2018. Metals data are from six sampling events that occurred between October 2008 and August 2009 and temperature data are taken from continuous monitoring conducted by Ecology in 2006 in connection with the Snoqualmie River Temperature TMDL.

Table 2. Ambient Background Data

Parameter	Value Used
Temperature (highest annual 7-DADMax) (90th percentile)	20.7° C
pH (Maximum / Minimum)	8.3 / 6.2 standard units (s.u.)
pH (90th percentile)	7.6 s.u.
Dissolved Oxygen (10th percentile)	9.5 mg/L
Total Ammonia-N (90th percentile)	0.03 mg/L
Fecal Coliform (90th percentile)	49 /100 mL
Fecal Coliform (Geometric Mean)	9.3 /100 mL
Turbidity (90th percentile / Average)	14 / 6 NTU
Hardness (Maximum / Average)	24.9 / 12.9 mg/L as CaCO3
TSS (90th percentile / Average)	28 / 12.6 mg/L
Arsenic (90th percentile)	1.51 µg/L
Cadmium (90th percentile)	0.1 µg/L
Chromium (90th percentile)	2.2 µg/L
Copper (90th percentile / geometric mean)	2.7 / 0.9 µg/L
Lead (90th percentile)	0.42 µg/L
Mercury (90th percentile / geometric mean)	0.0036 / 0.0024 µg/L
Nickel (90th percentile / geometric mean)	2.2 / 0.4 µg/L
Silver (90th percentile)	0.1 µg/L
Zinc (90th percentile)	6.1 µg/L

C. Wastewater influent characterization

The Snoqualmie WRF monitors influent flow and waste loading to verify actual loading does not exceed approved design capacity. Table 3 summarizes facility loadings as reported on discharge monitoring reports (DMRs) from May 2014 through October 2018. The influent wastewater is characterized as follows:

Table 3. Wastewater Influent Characterization

Parameter	Units	Average of Average Monthly Values	Maximum of Average Monthly Values
Flow	MGD	1.2	1.8
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	mg/L	298.7	506.8
Biochemical Oxygen Demand (BOD_5)	mg/L	355.2	590.7
Biochemical Oxygen Demand (BOD_5)	lbs/day	3,122	4,985
Total Suspended Solids (TSS)	mg/L	289.4	379.8
Total Suspended Solids (TSS)	lbs/day	2,511	3,490

D. Wastewater effluent characterization

Snoqualmie WRF 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 May 2014 through October 2018. The wastewater effluent is characterized as follows:

Table 4. Wastewater Effluent Characterization

Parameter	Units	Average of Average Monthly Values	Maximum of Average Monthly Values
Flow	MGD	0.82	1.62
$CBOD_5$	mg/L	2.3	5.6
$CBOD_5$	lbs/day	18	65
TSS	mg/L	3.6	9.5
TSS	lbs/day	29	107
Ammonia	mg/L	0.66	8.67
Ammonia	lbs/day	6.3	81.2
Ortho-phosphate	mg/L	0.66	1.73
Ortho-phosphate	lbs/day	4.0	19.8
Temperature (7DAD-Max)	^oC	18.6	23.0
Temperature (Daily Max)	^oC	18.8	23.2

Parameter	Units	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliforms	cfu / 100 mL	1.0	3.0

Parameter	Units	Minimum Value	Maximum Value
pH	standard units	6.63	7.48

Table 5 summarizes expanded testing for conventional, non-conventional, and priority pollutants, as reported by the Snoqualmie WRF in the permit application.

Table 5. Expanded Effluent Characterization

Parameter	Units	Average Values	Maximum Values
Dissolved Oxygen	mg/L	7.1	8.2
Total Kjeldahl Nitrogen	mg/L	1.4	3.0
Nitrate + Nitrite	mg/L	3.8	6.7
Oil and grease	mg/L	3.1	3.8
Alkalinity (as $CaCO_3$)	mg/L	61.5	99
Total Phosphorus	mg/L	0.45	2.3
Total Dissolved Solids	mg/L	270	360
Hardness (as $CaCO_3$)	mg/L	86	120
Antimony	ug/L	1.17	2.55
Arsenic	ug/L	3.46	7.61
Berylium	ug/L	-	0.03
Cadmium	ug/L	0.03	0.06
Chromium	ug/L	0.26	0.63
Copper	ug/L	7.44	12.4
Lead	ug/L	1.17	4.26
Mercury	ug/L	1.76	3.26
Nickel	ug/L	3.54	12.5
Selenium	ug/L	1.11	3.15
Zinc	ug/L	101	305
Cyanide	ug/L	-	17
Total Phenolic Compounds	ug/L	0.02	0.04
Toluene	ug/L	-	2.9
Bis(2-ethylhexyl)phthalate	ug/L	-	0.3

E. Summary of compliance with previous permit issued on April 21, 2014, and modified on May 11, 2018

The previous permit placed effluent limits on $CBOD_5$, TSS, fecal coliform, pH, ammonia, temperature and on total residual chlorine when used as back-up disinfectant for discharges to the river. The permit also included limits on Class A Reclaimed Water produced by the Snoqualmie WRF. The Reclaimed Water Conditions placed additional limits on flow, turbidity, dissolved oxygen, coagulant, total nitrogen, total coliform, and residual chlorine.

The Snoqualmie WRF has not consistently complied with the limits and other conditions governing discharges to the Snoqualmie River throughout the duration of the permit. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections. Table 6 summarizes violations of the NPDES discharge limits reported by the facility during the past permit cycle.

Table 6. Violations/Triggers of the NPDES Permit

Date	Parameter	Units	Reported Value	Permit Limit	Violation/Trigger
May - 16	BOD_5	lbs/day	4,985.5	5,220	Permit Trigger (85% design)
November - 16	Fecal Coliforms	Incorrect sampling frequency			Permit Violation
November - 16	BOD_5	lbs/day	4,918.4	5,220	Permit Trigger (85% design)
January - 17	Late DMR submittal				Permit Violation
June - 17	$CBOD_5$	Analysis not complete			Permit Violation
June - 17	TSS	Analysis not complete			Permit Violation
July - 17	pH	s.u.	5.23	6.3	Permit Violation
July - 17	pH	s.u.	5.23	6.3	Permit Violation
July - 17	pH	s.u.	5.8	6.3	Permit Violation

The Snoqualmie WRF also did not consistently comply with permit limits associated with reclaimed water production. Table 7 summarizes reclaimed water production limit violations reported during the permit term.

Table 7. Reclaimed Water Limits Violations

Date	Parameter	Units	Reported Value	Permit Limit	Violation/Trigger
August - 16	Total Coliforms	MPN/100 mL	60.9	23	Permit Violation
June - 17	Total Nitrogen	Analysis not complete			Permit Violation
June - 17	Total Coliforms	MPN/100 mL	200.5	23	Permit Violation
August - 17	Total Coliforms	MPN/100 mL	4.2	2.2	Permit Violation

F. Water rights impairment analysis

As the generator of reclaimed water, RCW 90.46.120 gives the Snoqualmie WRF exclusive right to any water produced through the facility's reclamation process. However the diversion of reclaimed water from a surface water discharge must not adversely impact other water users downstream. RCW 90.46.130 prohibits facilities that reclaim water from impairing existing downstream water rights without compensation or mitigation. Based on information supplied in the Reclaimed Water Permit Application, the diversion of reclaimed water produced at the City of Snoqualmie WRF does not impair downstream water rights.

G. State environmental policy act (SEPA) compliance

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

III. Proposed Permit Limits

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

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

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not

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

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

A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria listed in Table 8 in the *2002 Wastewater Treatment Plant Phase 2 Contract Drawings* prepared by Tetra Tech/KCM.

Table 8. Design Criteria for the City of Snoqualmie WRF

Parameter	Design Quantity
Maximum Month Design Flow (MMDF)	2.15 MGD
BOD_5 Loading for Maximum Month	5,220 lb/day
TSS Loading for Maximum Month	5,220 lb/day
Reclaimed Water Production MMDF	1.56 MGD

B. Technology-based effluent limits

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

The table below identifies technology-based limits for pH, fecal coliform, $CBOD_5$, and TSS, as listed in chapter 173-221 WAC. Section III.F of this fact sheet describes the potential for water quality-based limits.

Table 9. Technology-based Limits

Parameter	Average Monthly Limit	Average Weekly Limit
$CBOD_5$ (concentration)	25 mg/L	40 mg/L
$CBOD_5$ (concentration)	In addition, the $CBOD_5$ effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	
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	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 City has decommissioned its chlorine disinfection system and will no longer use chlorine as a backup alternative for disinfection. In 2017, the City replaced its old UV disinfection system with a new UV disinfection system that can reliably meet Class A reclaimed water standards and provide automation for improved operations and maintenance. The City also installed an uninterruptible power supply (UPS) system that provides emergency power to the new UV disinfection system whenever the input power source fails. If the reclaimed water disinfection requirements are not met, the facility can either turn on the redundant UV disinfection banks and channels or divert the effluent to the secondary effluent outfall at the Snoqualmie River. Therefore, the proposed permit does not include chlorine limits.

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 $CBOD_5$ and Total Suspended Solids as follows:

Mass Limit = CL x DF x CF

where:

CL = Technology-based concentration limits listed in the above table

DF = Maximum Monthly Average Design flow (MGD)

CF = Conversion factor of 8.34

Table 10. Technology-based Mass Limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
$CBOD_5$ Monthly Average	25	448
$CBOD_5$ Weekly Average	40	717
TSS Monthly Average	30	538
TSS Weekly Average	45	807

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

In 1992, U.S. EPA published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State in its National Toxics Rule (40 CFR (EPA, 1992). Ecology submitted a standards revision for 192 new human health criteria for 97 pollutants to EPA on August 1, 2016. In accordance with requirements of CWA section 303(c)(2)(B), EPA finalized 144 new and revised Washington specific human health criteria for priority pollutants, to apply to waters under Washington's jurisdiction. EPA approved 45 human health criteria as submitted by Washington. The EPA took no action on Ecology submitted criteria for arsenic, dioxin, and thallium. The existing criteria for these three pollutants as adopted in the National Toxics Rule (40 CFR 131.36) remain in effect.

These newly adopted criteria, located in WAC 173-201A-240, 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--This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards. Ecology has developed and EPA has approved plans to correct impairments for the following parameters: Ammonia-Nitrogen (as a nutrient), BOD, fecal coliform, and temperature. Tier I requires the Snoqualmie WRF to comply with waste load allocations in the approved plan.

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

Mixing zones

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

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

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

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most

critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

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

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

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

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- A one-in-one-million cancer risk for carcinogenic chemicals.

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

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 the City of Snoqualmie WRF 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'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/documents/92109.pdf

Table 11. Critical Conditions Used to Model the Discharge

Critical Condition	Value
The seven-day-average low river flow with a recurrence interval of ten years (7Q10)	346 cfs
The thirty-day low river flow with a recurrence interval of five years (30Q5) [1]	484 cfs
Harmonic Mean Flow [2]	1038 cfs
River depth at the 7Q10 period	10.5 feet
Estimated river width at the 7Q10 period [3]	170 feet
Estimated river slope[3]	.000129
Maximum average monthly effluent flow for chronic and human health non-carcinogen	1.62 MGD
Maximum daily flow for acute mixing zone	3.92 MGD
Annual average flow for human health carcinogen	0.92 MGD
[1] *30Q5 flow estimated as 1.4 times the 7Q10 flow.* [2] *Harmonic mean flow estimated as three times the 7Q10 flow.* [3] *River width and slope estimated based on aerial photo interpretation and topographic map measurements.*	

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.

Because this is a domestic wastewater discharge, the effluent contains fecal coliform bacteria. Ecology developed the water quality criteria for fecal coliforms (discussed below) to assure that people swimming (primary contact recreation) in water meeting the criteria would not develop gastro enteric illnesses. Ecology has authorized a mixing zone for this discharge; however, the discharge is subject to a performance-based effluent limit of 100 colony forming units/100mL. This means the effluent meets the water quality criteria at the point of discharge and doesn't need dilution to meet the water quality criteria.

Starting on January 1, 2021, the recreational water quality criteria for bacteria will change to *E. coli* for freshwater. In addition, all waterbodies will become designated for primary contact recreation. No change to the indicator will occur during this permit cycle as a site-specific correlation between fecal coliform and the *E.coli* needs developing. Ecology will reevaluate bacteria limits for this discharge during the next permit development period.

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

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

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

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

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. 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 volume fraction of the chronic mixing zone at the ten year low flow.

- **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 based on the presence of, or the intent to provide protection for the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The Aquatic Life Uses for this receiving water are identified below.

Table 12. Freshwater Aquatic Life Uses and Associated Criteria

Core Summer Salmonid Habitat	
Temperature Criteria – Highest 7-DAD MAX	16°C (60.8°F)
Dissolved Oxygen Criteria	9.5 mg/L
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Total Dissolved Gas Criteria	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.
pH Criteria	The pH must measure within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units.

- The *recreational uses* for this receiving water are identified below.

Table 13. Recreational Uses and Associated Criteria

Recreational Use	**Criteria**
Primary Contact Recreation (expires 12/31/2020	Fecal coliform organism levels must not exceed a geometric mean value of 100 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 200 colonies /100 mL.
Primary Contact Recreation (effective 1/1/2021)	*E. coli* organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per100 mL.

- The *water supply uses* are domestic, agricultural, industrial, and stock watering.
- The *miscellaneous freshwater uses* are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

E. Water quality impairments

Ecology conducted water quality assessments of the Snoqualmie River in 1989-91 that identified impairments existed within the basin. The *Snoqualmie River Total Maximum Daily Load Study* (#94-71) published in May 1994 recommended waste load allocations necessary to correct impairments due to nutrient loading and high fecal coliform bacteria levels. Ecology also published the *Snoqualmie River Basin Temperature Total Maximum Daily Load: Water Quality Improvement Report and Implementation Plan* (#11-10-041) in 2011 to address temperature impairments in the system. The studies included waste load allocations for temperature, $CBOD_5$, ammonia, and fecal coliform. Additional study of dissolved oxygen levels is needed in the lower South Fork Snoqualmie to determine whether soluble reactive phosphorus limits are necessary.

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

Ecology must consider the narrative criteria described in WAC 173-201A-160 when it determines permit limits and conditions. Narrative water quality criteria limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health.

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

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

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

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biochemical oxygen demand (BOD_5) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

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

Outfall 001 consists of a 36-inch diameter open-ended pipe that discharges immediately upstream of the Railroad Avenue (Hwy 202) Bridge at a location approximately 30 feet from the north bank of the Snoqualmie River. The outfall pipe terminates at a depth of 10.5 feet at 7Q10 flow. Ecology carried out a preliminary dilution modeling effort of the outfall using river channel dimensions estimated from maps and aerial photos. This effort determined that dilution obtained through modeling would be less restrictive than using percent of river flow based calculations listed in regulations. Therefore, this permit limits the authorized mixing zones to the size and dilution ratios listed in WAC 173-201A-400, as discussed below. Figure 2 depicts the approximate size and location of the authorized mixing zone.

Figure 2. Approximate Mixing Zones

Chronic Mixing Zone -- WAC 173-201A-400(7)(a) specifies that mixing zones must not extend in a downstream direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports or extend upstream for a distance of over 100 feet, not utilize greater than **25%** of the flow, and not occupy greater than **25%** of the width of the water body. Given these constraints, the proposed permit authorizes a chronic mixing zone with a maximum width of 42.5 feet, and that extends a maximum of 310.5 feet downstream and 100 feet upstream from the end of the pipe. The discharge must comply with water quality standards for chronic aquatic life criteria along with carcinogen and non-carcinogen human health criteria at the edge of this mixing zone. Ecology will restrict maximum chronic dilution based on mixing the effluent with 25% of the 7Q10 flow.

Acute Mixing Zone -- WAC 173-201A-400(8)(a) specifies that in rivers and streams a zone where acute toxics criteria may be exceeded must not extend beyond 10% of the distance towards the upstream and downstream boundaries of the chronic zone, not use greater than **2.5%** of the flow and not occupy greater than **25%** of the width of the water body Given these constraints, the proposed permit authorizes an acute mixing zone with a maximum width of 42.5 feet, and that extends a maximum of 31.0 feet downstream and 10.0 feet upstream from the end of the pipe. The discharge must comply with water quality standards for acute aquatic life criteria at the edge of this mixing zone. Ecology will restrict maximum acute dilution based on mixing the effluent with 2.5% of the 7Q10 flow.

Dilution Factors -- Ecology determined the dilution factors associated with the authorized mixing zones based on simple mixing of the effluent with the percentage of the river flow at the critical conditions noted above. Ecology uses the maximum dilution listed in Table 14 below to evaluate the impacts the discharge may have on downstream water quality and to determine whether the proposed permit requires water quality-based limits for dissolved

oxygen deficiency, nutrients, pH, fecal coliform, chlorine, ammonia, metals, other toxics, and temperature. 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.

Dilution factors are slightly different from the ones established in the previous permit cycle because Ecology used updated flow conditions reported by the City in the last five years. These flow conditions reflect very well the current operating conditions at the City of Snoqualmie WRF.

Table 14. Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	2.4	35.5
Human Health, Carcinogen		183.3
Human Health, Non-carcinogen		49.3

Ecology determined the impacts of dissolved oxygen deficiency, nutrients, pH, fecal coliform, 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--BOD_5 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 (BOD_5) of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand potential in the receiving water.

The *1994 Snoqualmie River Total Maximum Daily Load Study* established waste load allocations (WLAs) for $CBOD_5$ and ammonia for discharges occurring during the August – October critical season. Waste load allocations for the Snoqualmie WRF are:

- 206 lbs/day $CBOD_5$
- 68.7 lbs/day Ammonia (as N)

The WLA listed above are the maximum daily limits (MDL) for those parameters. According to federal NPDES regulations, all permit limits must be expressed as both average monthly and maximum daily limits. The average monthly limit (AML) is calculated according to the method in EPA's Technical Support Document for Water Quality-based Toxics Control (1991). See Appendix D for detailed calculations. The AML calculation is affected by effluent variability and number of samples per month. Ecology calculated the average monthly limit based on 12 sampling events per month (3 per week) for $CBOD_5$ and 4 sampling events per month (1 per week) for ammonia. The calculated coefficients of variation (CV) used are 0.81 and 2.51 for $CBOD_5$ and ammonia, respectively. Average monthly limits (AML) for the proposed permit are:

- 51.6 lbs/day $CBOD_5$
- 21.6 lbs/day Ammonia (as N)

The proposed permit will include water quality-based mass limits for $CBOD_5$ and total ammonia during the critical season and technology-based mass limits for $CBOD_5$ only during the non-critical season. $CBOD_5$ concentration limits apply throughout the year.

pH -- Ecology modeled the impact of the effluent pH on the receiving water using the calculations from EPA, 1988, and the chronic dilution factor of 35.5. Ecology used ambient values in Table 2 for this analysis along with the extremes of the technology-based limits (pH of 6.0 and 9.0). Ecology also assumed discharge temperature and alkalinity in Tables 4 and 5 remain constant throughout the pH range.

Ecology predicts no violation of the pH criteria under critical conditions at the upper boundary of pH 9.0. However, the incremental pH change at the lower end of the range (pH 6.0) exceeds the allowable change of 0.2 standard units. The discharge will not exceed the incremental change restriction when pH is above 6.5. Therefore, the proposed permit will limit pH to the range of 6.5 to 9.0. See Appendix D for further details on the model outputs.

Fecal Coliform -- The 1994 *Snoqualmie River Total Maximum Daily Load Study* examined the need for waste load allocations for fecal coliform bacteria. The report concluded that wastewater treatment plants within the system represented a minor contribution to the overall loading when the plants comply with technology-based limits for fecal coliform. Although the study included a numeric waste load allocation of 2.5×10^{10} CFU/day for the Snoqualmie facility, Ecology has routinely enforced the technology-based limits described in Part III.B of this fact sheet as the required controls necessary to comply with the TMDL.

To confirm that technology-based limits remain sufficient to protect water quality downstream of the discharge, Ecology modeled the numbers of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml, an ambient concentration of 49 organisms per100 ml and a dilution factor of 35.5. As shown in Appendix E, the calculation predicts that the discharge will increase fecal coliform levels by 10 organisms per 100 ml at the edge of the chronic mixing zone to a level of 59 organisms per 100 ml. Since this remains less than the water quality standard of 100 organisms per 100 ml, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria.

During this permit term, the water quality fecal coliform bacteria criterion will change from fecal coliform to E. coli. Dual indicator monitoring will be a part of this permit so that a site-specific correlation can be developed during the permit cycle. Ecology will use this data to assess the reasonable potential to exceed the applicable water quality criterion in the next iteration of this permit.

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: ammonia, arsenic, berylium, cadmium, chromium (hexavalent), copper, lead, mercury, nickel, selenium, zinc and cyanide. Ecology conducted a reasonable potential analysis (See Appendix D) on these parameters to determine whether it would require effluent limits in this permit.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature, pH, and salinity of the receiving marine water. To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient station # 07D130 and Ecology spreadsheet tools.

No valid ambient background data were available for antimony, beryllium, cyanide, selenium, phenols, toluene and bis(2-ethylhexyl) phthalate. Ecology used zero for background. Ambient data was also not available for hexavalent chromium, however data was available for total chromium. Since total chromium includes hexavalent chromium, Ecology used the ambient concentration of total chromium as a "worst case" concentration of hexavalent chromium in the reasonable potential analysis. Valid ambient background data were available for the remaining pollutants.

Ecology determined that pollutants listed 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)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Protections against acute effects

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

- Annual summer maximum and supplementary spawning/rearing criteria

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

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

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

- Incremental warming criteria

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

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

  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: Due to documented temperature impairments in the Snoqualmie River basin, Ecology completed The *Snoqualmie River Basin Temperature Total Maximum Daily Load: Water Quality Improvement Report and Implementation Plan* in 2011. This plan established strategies and waste load allocations necessary to restore river temperatures to levels consistent with approved standards for summer maximum, supplemental spawning (in areas with supplemental temperature criteria), and incremental warming. The plan includes a temperature waste load allocation of 24.7° C for discharges from the Snoqualmie WRF to the Snoqualmie River during the period of June 1st through September 30th. Ecology will incorporate this allocation into the proposed permit as a seasonal daily temperature limit.

Protection against acute effects: A discharge does not pose a reasonable potential to risk acute effects when it meets the following conditions:

- Effluent temperature must not exceed 33°C or cause ambient temperature to exceed 33°C two seconds after discharge.
- Does not increase ambient temperature more than 0.3°C when receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.
- Does not cause temperature to warm more than 0.3°C above 17.5°C at locations where eggs are incubating.

The wastewater effluent characterization in Table 4 of this fact sheet shows that discharges from the Snoqualmie WRF do not approach 33°C. In addition, ambient data in Table 2 shows that the river temperature does not approach a 7DADMax temperature of 22°C and the facility does not discharge into an area in which eggs are incubating. Therefore, the proposed permit does not require a limit to protect against acute effects since the discharge complies with the acute criteria listed above.

H. Human health

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

Washington's water quality standards include numeric human health-based criteria that Ecology must consider when writing NPDES permits. In accordance with the requirements of CWA section 303(c)(2)(B), EPA has finalized 144 new and revised Washington-specific human health criteria for priority toxic pollutants, to apply to waters under Washington's jurisdiction, and has approved 45 new human health criteria submitted by Washington. For arsenic, dioxin, and thallium, the existing criteria from the National Toxics Rule (40 CFR 131.36) remain in effect.

Ecology determined the effluent contains chemicals of concern for human health, based on data or information reported in priority pollutant testing that indicate regulated chemicals occur in the discharge. A list of the pollutants of concern for human health includes antimony, arsenic, chloroform, cyanide, mercury, nickel, zinc, mercury, selenium, and phenols, bis(2-ethylhexyl)phthalate and toluene.

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* to make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards for antimony, arsenic, chloroform, cyanide, nickel, zinc, selenium, mercury, phenols, bis(2-ethylhexyl)phthalate and toluene. Effluent limits are not needed for the pollutants listed above. Ecology will reevaluate this discharge for impacts to human health at the next permit reissuance.

I. Sediment quality

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

Ecology has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

Through a review of the discharger characteristics and of the effluent characteristics, and no visible signs of sediment accumulation in the vicinity of outfall #001, Ecology determined that this discharge has no reasonable potential to violate the sediment management standards.

J. Whole effluent toxicity

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

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

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

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water acute or chronic toxicity. The proposed permit will not include an acute or chronic WET limit. The Snoqualmie WRF must retest the effluent before submitting an application for permit renewal. Summary of WET testing results can be found in *Appendix F*.

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

If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased.

K. Groundwater quality limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100). The Snoqualmie WRF does not discharge wastewater to the ground. Although the facility produces and distributes Class A reclaimed water for irrigation purposes, the reclaimed water conditions in the proposed permit do not allow for the use of the water in any way that will impact groundwater. Therefore the proposed permit does not require numeric limits to protect groundwater.

L. Comparison of effluent limits with the previous permit issued on April 29, 2014, and modified on May 11, 2018

Table 15. Comparison of Previous and Proposed Effluent Limits

		Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
$CBOD_5$ Concentration Limits	Technology	25 mg/L 85% Removal	40 mg/L	25 mg/L 85% Removal	40 mg/L
$CBOD_5$ Mass Limits ***Effective Nov.-July Only***	Technology	448 lbs/day	717 lbs/day	448 lbs/day	717 lbs/day
TSS	Technology	30 mg/L 538 lbs/day 85% Removal	45 mg/L 807 lbs/day	30 mg/L 538 lbs/day 85% Removal	45 mg/L 807 lbs/day

Parameter		**Monthly Geometric Mean Limit**	**Weekly Geometric Mean Limit**	**Monthly Geometric Mean Limit**	**Weekly Geometric Mean Limit**
Fecal Coliform Bacteria	Technology	200/100 ml	400/100 ml	200/100 ml	400/100 ml

Parameter		**Limit**	**Limit**
pH	Technology	Within the range of 6.3 to 9.0	Within the range of 6.5 to 9.0

Parameter		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Total Residual Chlorine	Water Quality	20 µg/L	52 µg/L	-	-
Parameter		**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
$CBOD_5$, Seasonal mass limit ***Effective Aug-Oct. Only***	Water Quality	51.6 lbs/day	206 lbs/day	51.6 lbs/day	206 lbs/day
Total Ammonia (as N), Seasonal mass limit ***Effective July-Oct. Only***	Water Quality	21.9 lbs/day	68.7 lbs/day	21.6 lbs/day	68.7 lbs/day
Temperature, 7DADMAX ***Effective June-Sept. Only***	Water Quality	N/A	24.7° C	N/A	24.7° C

Change to the total ammonia average monthly effluent limit (August – October) from 21.9 lbs/day to 21.6 lbs/day is due to effluent variability observed during the last permit cycle and it was computed using the coefficient of variance (CV). The $CBOD_5$ mass average monthly effluent limit was computed using the same methology. However, the revised limit is less stringent than the $CBOD_5$ mass limit proposed in the previous permit, which constitutes backsliding. Therefore, Ecology will retain the most stringent $CBOD_5$ mass average monthly effluent limit in the proposed permit. A summary of both limits computation is presented in Appendix D.

The City has decommissioned its chlorine disinfection system and has installed a new UV system equipment that functions as the primary method of disinfection. Therefore, the old residual chlorine limits are no longer applicable.

IV. Proposed Reclaimed Water Limits

The Reclaimed Water Use law, Chapter 90.46 RCW requires reclaimed water generators to adequately and reliably treat reclaimed water prior to distribution and beneficial use. Chapter 173-219-270 WAC requires Ecology to include enforceable limits on water quality in the reclaimed water permits it issues. The enforceable limits are based on:

- General performance standards listed in chapter 173-219-330 WAC.
- Specific use-based requirements listed in chapter 173-219-390 WAC.
- Water quality standards for groundwater of the State of Washington in chapter 173-200 WAC when the reclaimed water authorizes groundwater recharge as a beneficial use.
- Water quality standards for surface waters of the State of Washington in chapter 173-201A WAC when the reclaimed water permit authorizes surface water augmentation or wetland enhancements as a beneficial use.
- Drinking water maximum contaminant levels in chapter 246-290-310 WAC when the permit authorizes certain groundwater recharge and surface water augmentation beneficial uses.
- Ecology applies the most stringent of the standards listed above in developing 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, monitoring, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules and standards adopted by the State of Washington. Ecology does not develop reclaimed water limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, and are not listed in regulation.

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

A. Reclaimed treatment process design criteria

Under WAC 173-219-240, flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for this facility's treatment plant in the *2002 Wastewater Treatment Plant Phase 2 Contract Drawings* prepared by Tetra Tech/KCM. Table 16 below summarizes the approved design criteria.

Table 16. Design Criteria for Reclaimed Water Production Facility

Parameter	Design Quantity
Maximum Month Design Flow (MMDF)	2.15 MGD
BOD_5 Loading for Maximum Month	5,220 lb/day
TSS Loading for Maximum Month	5,220 lb/day
Reclaimed Water Production MMDF	1.56 MGD

B. Limits based on reclaimed water performance standards

Reclaimed water produced and distributed in accordance with the proposed permit must meet minimum standards for biological oxidation, water clarity, and disinfection. The biological oxidation standard generally requires compliance with the secondary treatment requirements in chapter 173-221-040 WAC. Chapter 173-219-330 establishes the applicable performance standards for all Class A and Class B reclaimed water shown in Table 17.

Table 17. Minimum Biological Oxidation Standards

Parameter	Average Monthly Limit	Average Weekly Limit
Dissolved Oxygen	Must be measurably present (minimum of 0.2 mg/L)	
$CBOD_5$ concentration	25 mg/L	40 mg/L
	In addition, the average $CBOD_5$ effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	
TSS concentration	30 mg/L	45 mg/L
	In addition, the average TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	
Total Nitrogen	10 mg/L – N	15 mg/L – N
Parameter	**Minimum**	**Maximum**
pH	6.5 standard units	9.0 standard units

The biological oxidation standard listed above primarily defines the minimum quality of the source water to the reclaimed treatment facility, with the compliance point typically after the last secondary treatment unit and prior to the reclaimed water filtration and disinfection systems. Since not all water reclamation facilities use separate side-stream treatment systems to produce reclaimed water, Ecology may specify alternate compliance points based on the design of each permitted facility. The compliance point for the City of Snoqualmie WRF is the Eagle Lake at Snoqualmie Ridge Golf Course.

The performance standards require that dissolved oxygen be "measurably present" at the compliance point. Ecology includes a minimum limit of 0.2 mg/L in the permit for dissolved oxygen based on the quantitation level for dissolved oxygen testing using Standard Method 4500-OC/OG, as listed in Appendix A of the proposed permit.

In addition to the biological oxidation standards above for all Class A and B reclaimed water, each class of water must comply with separate standards for turbidity, a measure of water clarity, and disinfection. The City of Snoqualmie must ensure Class A reclaimed water from the permitted facility complies with following standards prior to distribution.

Table 18. Class A Turbidity and Disinfection Standards

Parameter	Average Monthly Limit	Sample Maximum Limit
Turbidity	2 NTU	5 NTU
	7-day median limit	**Sample Maximum Limit**
Total Coliform	2.2 MPN/100 mL	23 MPN/100 mL
Virus Removal	Minimum 4-log virus removal or inactivation see WAC 173-219-340	

Ecology based the turbidity standard on the levels typically achievable from a properly operated and maintained coagulation and filtration system, with the compliance point at the end of the filtration system prior to disinfection. Since continuous turbidity meters often record momentary fluctuations over the course of a day, the standards specify that a treatment system only violates the standard when the maximum turbidity remains over the sample maximum limit for more than five minutes.

Although chapter 173-219-330 WAC include virus removal as a performance standard for Class A reclaimed water, Ecology does not place a numeric limit for this parameter in permits. As stated in WAC 173-219-340, the combination of biological treatment, filtration and disinfection must achieve a minimum of 4-log virus removal or inactivation. In addition, the system must be capable of consistently complying with the water quality standard through the proper design, operation, and maintenance of each unit process in the treatment system. Ecology assesses whether proposed facility designs will comply with the virus removal standard during initial facility engineering reviews and approves the system designs before construction. The proposed permit requires the City of Snoqualmie to properly operate and maintain all reclaimed water treatment processes according to the approved operations and maintenance manual to maintain compliance with the performance standards.

C. Distribution system limits

Chapter 173-219-370 requires that the producer and distributor of reclaimed water maintain a chlorine residual in the distribution system to prevent biological growth, prevent deterioration of the reclaimed water quality, and to protect public health. The residual requirement applies

only to the distribution system conveying reclaimed water from the production facility to the point of use. It does not apply to water held in storage (in impoundments, storage tanks or storage ponds) or to water conveyed to a point of use through surface waters or groundwater. Ecology may also waive the requirement on a case-by-case basis.

On August 1, 2019, the City of Snoqualmie requested a waiver of the residual chlorine requirement based on the fact that Eagle Lake is located on the end user site (Snoqualmie Ridge Golf Course), where Class A reclaimed water is withdrawn for seasonal landscape irrigation. Moreover, the City has decided to provide irrigation for public spaces and private customers using potable water. In consultation with the Department of Health, Ecology determined that a waiver is warranted. Therefore, the proposed permit does not include a chorine residual requirement for the distribution system.

D. Comparison of reclaimed water limits with the previous permit issued on April 29, 2014, and modified on May 11, 2018

Table 19. Comparison of Previous and Proposed Limits

		Previous Limits		Proposed Limits	
Parameter	**Monitoring Point**	**MMDF**		**MMDF**	
Flow	Outfall 002	1.56 MGD		1.56 MGD	
Parameter	**Monitoring Point**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
$CBOD_5$	Outfall 002	25 mg/L	40 mg/L	25 mg/L	40 mg/L
TSS	Outfall 002	30 mg/L	45 mg/L	30 mg/L	45 mg/L
Parameter	**Monitoring Point**	**Average Monthly**	**Sample Maximum**	**Average Monthly**	**Sample Maximum**
Total Nitrogen	Outfall 002	10 mg/L	15 mg/L	10 mg/L	15 mg/L
		Minimum	**Maximum**	**Minimum**	**Maximum**
Dissolved Oxygen	Outfall 002	0.2 mg/L	N/A	0.2 mg/L	N/A
pH	Outfall 002	6.3	9.0	6.5	9.0
		Average Monthly	**Sample Maximum**	**Average Monthly**	**Sample Maximum**
Turbidity	Outfall 002	2 NTU	5 NTU	2 NTU	5 NTU
		7-Day Median	**Sample Maximum**	**7-Day Median**	**Sample Maximum**
Total Coliform	Outfall 002	2.2 MPN/100 mL	23 MPN/100 mL	2.2 MPN/100 mL	23 MPN/100 mL

V. Monitoring Requirements

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

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

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

A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-109) for a 2.15 MGD oxidation ditch treatment facility.

On January 1, 2021, the new water contact recreation use criteria will become effective. The new criteria will require changing bacterial indicators for protecting primary contact recreation activities. For fresh waters, the new bacterial indicator will be *E. Coli*. In order to make an efficient transition from the current fecal coliform-based criteria to the new criteria bacterial indicator (*E. Coli*), the proposed permit requires quarterly E. Coli monitoring during the last two years of this permit cycle. The purpose of the dual monitoring (fecal coliform and *E. Coli*) is to develop a site-specific correlation between the two indicators.

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. Reclaimed water monitoring

The proposed permit includes Condition R2, which details the monitoring requirements for reclaimed water production. Specified monitoring frequencies take into account the quantity and variability of the reclaimed water, quantity of each of the approved uses, 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 an oxidation ditch treatment facility.

Condition R2 contains monitoring for some parameters that also appear in the wastewater monitoring schedule (S2), namely CBOD, TSS and pH. Although the Snoqualmie WRF staff may collect samples for reclaimed water monitoring of these parameters at the same point as samples collected to monitor effluent being discharged to the river, they must report results on each DMR since both DMRs track compliance with different sets of permit conditions and standards. In addition, plant staff may not use monitoring done on days in which the facility did not produce reclaimed water to fulfill monitoring requirements for reclaimed water production monitoring. If the facility produces reclaimed water for only part of a week, the plant staff must ensure they meet the minimum monitoring frequency requirements for all reclaimed water parameters regardless of whether they may have already met the minimum requirements for wastewater disposal monitoring.

C. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). The laboratory at the Snoqualmie WRF holds an accreditation (#M745-13) for the following parameters:

Table 20. Accredited Parameters

Parameter	Category	Method	Matrix Description
Carbonaceous BOD_5 ($CBOD_5$)	General Chemistry	SM 5210 B-01	Non-Potable Water
TSS	General Chemistry	SM 2540 D-97	Non-Potable Water
Ammonia	General Chemistry	EPA 350.1_2_1993	Non-Potable Water
Orthophosphate	General Chemistry	EPA 365.1_2_1993	Non-Potable Water
Dissolved Oxygen	General Chemistry	Hach 10360 Rev 1.1	Non-Potable Water
pH	General Chemistry	SM 4500-H+ B-00	Non-Potable Water
Fecal Coliform	Microbiology	SM 9222 D (m-FC)-97	Non-Potable Water
Total Fecal Coliform	Microbiology	SM 9223 B Colilert	Non-Potable Water
Solids, Total, Fixed and Volatile	General Chemistry	SM 2540 G-97	Solids & Chemical Materials

VI. Other Permit Conditions

A. Reporting and record keeping

Ecology based Reclaimed Water Condition R3 on its authority to specify appropriate reporting and record keeping requirements to verify that the production, distribution and storage of reclaimed water complies the terms and conditions WAC 173-219 and the reclaimed water permit.

As documented in past inspection reports and enforcement documents, The Snoqualmie WRF has not consistently complied with reporting and record keeping requirements in the past permit. Documented problems include submission of inaccurate or incomplete data along with failing to validate data from the facility's SCADA system with field data. To correct ongoing problems with reporting and record keeping, Ecology plans to include provisions in the proposed permit requiring multiple staff to verify DMR data prior to submitting data to Ecology. The permit condition will require submittal of a cover letter with each DMR that identifies which operators validate the data; each operator must sign the cover letter. The proposed permit also includes a requirement for the facility to submit copies of laboratory bench sheets for the 2021 calendar year.

B. Prevention of facility overloading

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the City of Snoqualmie WRF 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. Reclaimed Water Condition R4 contains similar requirements for maintaining capacity of the reclaimed water system.

C. Operation and maintenance

The proposed permit contains Special Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that the City of Snoqualmie WRF takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment. In 2018, the City completed the WRF Improvements Phase 1 Project and in 2019 will complete the WRF Improvements Phase 2 Project. Therefore, the Operations and Maintenance (O&M) manual must be updated to incorporate all elements of the projects listed above.

Ecology requires the owner and operator of reclaimed water facilities to take all reasonable steps to properly operate and maintain their reclaimed water system in accordance with state regulations (WAC 173-219-240). They must ensure that ensure that facility operators use operation and maintenance (O&M) manuals that include detailed instructions for operating and maintaining all components of the reclaimed water production and distribution system under its control.

Past I/I studies completed by the City of Snoqualmie have documented localized instances of high inflow and infiltration in the collection system serving the historic area of the City. However the City has not documented that I/I contributes to sanitary sewer overflows and the treatment plant currently has sufficient capacity to treat the excess flow. Therefore, the proposed permit requires the City of Snoqualmie WRF 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.
- Location of each individual leaks.
- Size of each leak and/or volume of excess flow contributed by a run of sewer.
- Whether exfiltration occurs in the system's force mains and/or inverted siphons.

Three good references to aid in these tasks include:

- 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. Reclaimed water distribution and use

Reclaimed water condition R4 includes requirements governing the distribution and use of reclaimed water from the permitted facility. Ecology based these permit requirements on the following sections of the Reclaimed Water Rule:

- WAC 173-219-270 – Reclaimed water permit terms and conditions.
- WAC 173-219-290 – Use agreements.
- WAC 173-219-310 – Cross-connection control.
- WAC 173-219-360 – Storage and distribution system requirements.

This condition specifies the beneficial uses authorized by the permit and the areas in which reclaimed water from the permitted facility may be used. It also provides a mechanism for the City of Snoqualmie to expand the use of reclaimed water to areas not listed in the permit without modifying the permit.

The condition also specifies that the City of Snoqualmie may not allow the distribution or use of reclaimed water from the permitted facility unless it has signed enforceable use or distribution agreements with each user or distributor. The agreements must include specific conditions on the use and distribution of the water that are included in the proposed permit.

Reclaimed water condition R4.C requires City of Snoqualmie to develop and implement a cross-connection control program designed to protect the reclaimed water produced at the permitted facility from contamination with lower quality water. The condition also requires coordination with local water purveyors to ensure properties supplied with both reclaimed water and potable water have appropriate cross-connection controls in place to protect the potable water supply. While the drinking water purveyor is responsible for evaluating and approving the cross-connection controls installed to protect potable water, City of Snoqualmie must ensure such approval has been granted before it may provide water to the use location.

E. 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 City of Snoqualmie WRF [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 City of Snoqualmie 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.

F. 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 Seattle-King County Public Health.

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.

G. Spill plan

The City of Snoqualmie developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the facility to update this plan and submit it to Ecology.

H. Effluent mixing study

Ecology estimated the amount of mixing of the discharge with receiving water and the potential for the mixture to violate the water quality standards for surface waters at the edge of the mixing zone (chapter 173-201A WAC). The proposed permit requires the City of Snoqualmie to more accurately determine the mixing characteristics of the discharge (Special Condition S.10). The effluent mixing study must measure or 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.

I. Compliance schedule

The proposed permit includes a compliance schedule for meeting the minimum pH effluent limit of 6.5 and obtaining laboratory accreditation analysis for E. Coli. The compliance schedule requires the City of Snoqualmie to submit to Ecology for review and approval an Engineering Report, Plans and Specifications, and a Declaration of Construction of Water Pollution Control Facilities.

J. 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.

VII. 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.

VIII. 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.

1983. *Water Quality Standards Handbook*. USEPA Office of Water, Washington, D.C.

Earth Tech

1996. *Snoqualmie Ridge Class "A" Water System and Irrigation Plan*

1998. *Amendment No. 1 to Snoqualmie Ridge Class "A" Water System and Irrigation Plan*

Tetra Tech/KCM, Inc.

1994. *City of Snoqualmie Draft Wastewater Facilities Engineering Report*

2002. *Wastewater Treatment Plant Phase 2 Contract Drawings*

2003. *City of Snoqualmie General Sewer Plan*

RH2 Engineering, Inc.

2015. *City of Snoqualmie Water Reclamation Facility Improvements* – Engineering Report

2017. *Design Criteria for Solids Handling System Improvements* – Technical Memorandum

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

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

Washington State Department of Ecology.

July 2018. *Permit Writer's Manual*. Publication Number 92-109 (https://fortress.wa.gov/ecy/publications/documents/92109.pdf)

September 2011. *Water Quality Program Guidance Manual – Supplemental Guidance on Implementing Tier II Antidegradation*. Publication Number 11-10-073 (https://fortress.wa.gov/ecy/publications/summarypages/1110073.html)

October 2010 (revised). *Water Quality Program Guidance Manual – Procedures to Implement the State's Temperature Standards through NPDES Permits*. Publication Number 06-10-100 (https://fortress.wa.gov/ecy/publications/summarypages/0610100.html)

Laws and Regulations (http://leg.wa.gov/LawsAndAgencyRules/Pages/default.aspx)

Permit and Wastewater Related Information

https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance

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

1994. *Snoqualmie River Total Maximum Daily Load Study* Publication Number 94-71

2008. *Snoqualmie River Basin Fecal Coliform Bacteria, Dissolved Oxygen, Ammonia-Nitrogen, and pH Total Maximum Daily Load: Water Quality Effectiveness Monitoring Report* Publication Number 08-03-005

2011. *Snoqualmie River Basin Temperature Total Maximum Daily Load - Water Quality Improvement Report and Implementation Plan* Publication Number 11-10-041

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

Ecology will place a Public Notice of Draft on January 24, 2020, in the *Snoqualmie Valley Record* to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

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

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

You may obtain further information from Ecology by telephone, (425) 649-7037, 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

The primary author of this permit and fact sheet is Lazaro Eleuterio.

Appendix B--Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within thirty (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 month's 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.

Beneficial use -- The uses of reclaimed water for domestic, stock watering, industrial, commercial, agricultural, irrigation, hydroelectric power production, mining, fish and wildlife maintenance and enhancement, recreational, and thermal power production purposes, and for preservation of environmental and aesthetic values, and for all other uses compatible with the enjoyment of the waters of the state. Beneficial use of reclaimed water includes all uses authorized under chapter 90.46 RCW, and contained within WAC 173-219-390.

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 BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

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

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

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

Chlorine, free -- The amount of chlorine available in a water sample as dissolved gas (Cl_2), hypochlorous acid (HOCl), or hypochlorite ion (ClO^-).

Chlorine, total -- The sum of free chlorine and combined chloramines (compounds of organic or inorganic nitrogen and chlorine).

Class A reclaimed water -- A high-quality water resource derived from treated domestic wastewater that is suitable for use in areas with unlimited public access. The water must meet or exceed the minimum Class A performance standards in WAC 173-219-330 including, at a minimum, oxidation, coagulation, filtration, and disinfection.

Class B reclaimed water -- A high-quality water resource derived from treated domestic wastewater that is suitable for regulated use in areas with restricted public access. The water must meet or exceed the minimum Class B performance standards in WAC 173-219-330 including, at a minimum, oxidation, and disinfection.

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.

Cross-connection Control -- The practice of using approved devices and management strategies designed to eliminate or prevent the potential for contaminating high-quality waters with lower quality waters.

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.

Distributor -- The person authorized through a use agreement with a reclaimed water generator to distribute or supply reclaimed water to users. A distributor may also be a generator or a user. Users that distribute reclaimed water to use areas through a gravity conveyance system for agricultural water uses are not distributors.

Domestic wastewater -- Wastewater predominantly from residential sources that includes greywater, toilet, or urinal sources. Also includes wastewater generated by commercial, institutional and light industrial entities including restaurants, office complexes, schools, and hospitals. It may include process wastewaters from industrial sources when allowed under federal pretreatment regulations.

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.

Greywater -- Domestic type wastewater flows from bathtubs, showers, bathroom sinks, washing machines, dishwashers, and kitchen or utility sinks. It does not include wastewater from a toilet or urinal.

Generator -- Any person that generates any type of reclaimed water for a use regulated under RCW 90.46 and WAC 173-219. A generator may also be a distributor or a user.

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

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

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

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

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

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

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

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

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

Nonpotable -- Water that is not approved by state or local health authorities as being safe for human consumption.

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.

Potable water or drinking water -- Water that is approved under WAC 246-290 or WAC 246-291 as being safe for human consumption.

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

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

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

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

Quantitation level (QL) -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the

result to the number nearest to (1, 2, or 5) x 10^n, where n is an integer (64 FR 30417).
ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency, December 2007).

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

Reclaimed water -- Water derived in any part from a wastewater with a domestic wastewater component that has been adequately and reliably treated to meet the requirements of WAC 173-219, so that it can be used for beneficial purposes. Reclaimed water is not considered a wastewater.

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

Sample Maximum -- No sample may exceed this value.

Significant industrial user (SIU) --

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and

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

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

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

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

Soil scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5,3,or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

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

Soluble BOD_5 -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

Source water -- Water entering the reclaimed water treatment facility or unit processes from which Class A or Class B reclaimed water is generated. Source water generally refers to the effluent from a domestic wastewater treatment facility that meets or exceeds secondary treatment standards defined in WAC 173-221.

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

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

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

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

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

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

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

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

Use -- Application of reclaimed water in a manner and for a purpose, as designated in a permit or use agreement, and in compliance with all applicable requirements of the permit and WAC 173-219.

Use agreement -- An agreement or contract between the generator and the distributor or user, or between the distributor and user, that identifies terms and conditions for reclaimed water distribution and use to ensure compliance with the reclaimed water permit conditions.

Use area -- Any facility, building, or land area, surface water, or groundwater identified in the use agreement as the location where reclaimed water is beneficially used.

User -- Any person who uses reclaimed water under an agreement with a reclaimed water generator or distributor.

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

Appendix D--Technical Calculations

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found in the PermitCalc workbook on Ecology's webpage at: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance

Simple Mixing:

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

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

where: Ce = Effluent Concentration
Ca = Ambient Concentration
DF = Dilution Factor

Reasonable Potential Analysis:

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

Calculation of Water Quality-Based Effluent Limits:

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

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

WLA_a = (acute criteria x DF_a) – [(background conc. x (DF_a - 1)]
WLA_c = (chronic criteria x DF_c) – [(background conc. x (DF_c -1)]
where: DF_a = Acute Dilution Factor
DF_c = Chronic Dilution Factor

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

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

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

$z = 2.326$

CV = coefficient of variation = std. dev/mean

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

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

$z = 2.326$

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

MDL = Maximum Daily Limit

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

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

$z = 2.326$ (99th percentile occurrence)

LTA = Limiting long term average

AML = Average Monthly Limit

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

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

n = number of samples/month

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

LTA = Limiting long term average

NBOD+CBOD and Ammonia Limit Calculations

		$CBOD_5$ WLA	Ammonia WLA	
1. TMDL Waste Load Allocations (WLAs) (Maximum Daily Limit)		206	68.7	lbs/day
2. Calculate Long Term Average (LTA) from Maximum Daily Limit (MDL)				
	σ^2	0.50447	1.987888047	
	z_{99}	2.326	2.326	
	CV	0.81	2.51	
	LTA	51	7	lbs/day
3. Calculate Average Monthly Limit (AML) from LTA				
	# of Samples	12	4	per month
	z_{95}	1.645	1.645	
	σ_n^2	0.053232663	0.945859243	
	CV	0.81	2.51	
	AML	**72.3**	**21.6**	lbs/day

Dilution Factors Calculation

Dilution Factor Calculations and Receiving Water Critical Conditions

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Facility Name	City of Snoqualmie WWTWRF
Receiving Water	Snoquaknie River

Step 2: Enter Dilution Factors -OR- Calculate DFs by entering Facility/Receiving Water Flow Data

Do you want to enter dilution factors -or- flow data?	Flow Data

	Annual Average	Max Monthly Average	Daily Max
Facility Flow, MGD	0.92	1.62	3.92
Facility Flow, cfs (calculated)	1.42	2.51	6.06

	Condition	Receiving Water Flow, cfs	Allowable % of river flow	Max Dilution Factor Allowed
Aquatic Life - Acute	7Q10	346	0.025	**2.4**
Aquatic Life - Chronic	7Q10	346	0.25	**35.5**
HH-Non-Carcinogen	30Q5	484	0.25	**49.3**
HH-Carcinogen	Harmonic Mean	1038	0.25	**183.3**
Whole river at 7Q10	7Q10	346	1	**139.1**

Reasonable Potential Calculations

Reasonable Potential Calculation

Facility	City of Snoqualmie WWTWRF
Water Body Type	Freshwater
Rec. Water Hardness	Acute=64.1, Chronic=27.6 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	2.4	35.5
Human Health Carcinogenic		183.3
Human Health Non-Carcinogenic		49.3

Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH3	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	BERYLLIUM 7440417 3M	BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	CADMIUM - 7440439 4M Hardness dependent	CHROMIUM(HEX) 18540299 - Dissolved	COPPER - 744058 6M Hardness dependent	CYANIDE 57125 14M	LEAD - 7439921 7M Dependent on hardness	MERCURY 7439976 8M
Effluent Data	# of Samples (n)	54	4	4	4	4	4	4	4	4	4	4
	Coeff of Variation (Cv)	2.3	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)	11,900	2.55	7.61	0.03	0.3	0.06	0.63	12.4	17	4.26	0.0033
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L	30		1.51			0.1	2.2	2.7	0	0.42	0.0036
	Geo Mean, ug/L		0			0			0.9	0		0.0024
Water Quality Criteria	Aquatic Life Criteria, ug/L Acute	11,375	-	360	-	-	2.2859	15	11.19	22	39.663	2.1
	Aquatic Life Criteria, ug/L Chronic	1,413	-	190	-	-	0.3972	10	3.7756	5.2	0.6041	0.012
	WQ Criteria for Protection of Human Health, ug/L	-	6	-	-	0.045	-	-	1300	9	-	0.14
	Metal Criteria Translator, decimal Acute	-	-	1	-	-	0.943	-	FALSE	-	0.466	0.85
	Metal Criteria Translator, decimal Chronic	-	-	1	-	-	0.943	-	FALSE	-	0.466	-
	Carcinogen?	N	N	Y	Y	Y	N	N	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$	1.356	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.946	0.473	0.473	0.473	0.473	0.473	0.473	0.473	0.473
Multiplier		1.00	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
Max concentration (ug/L) at edge of...	Acute	4,922	8.996	0.119	1.965	1.587	18.113	2.362	0.005	
	Chronic	364	2.021	0.101	2.184	2.624	1.237	0.553	0.004	
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.5545	0.5545	0.5545	0.5545	
Pn	Pn=(1-confidence level)1/n	0.473	0.473	0.473	0.473	0.473	
Multiplier		1.0385	1.0385	1.0385	1.0385	1.0385	
Dilution Factor		49.281	183.33	49.281	49.281	49.281	
Max Conc. at edge of Chronic Zone, ug/L		0.0537	0.0017	1.143	0.3582	0.0024	
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	

Reasonable Potential Calculation - Page 2

Facility	City of Snoqualmie WWTWRF
Water Body Type	Freshwater
Rec. Water Hardness	Acute=64.1, Chronic=27.6 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	2.4	35.5
Human Health Carcinogenic		183.3
Human Health Non-Carcinogenic		49.3

Pollutant, CAS No. & NPDES Application Ref. No.		NICKEL - 7440020 9M - Dependent on hardness	PHENOL 108952 10A	SELENIUM 7782492 10M	TOLUENE 108883 25V	ZINC- 7440666 13M hardness dependent						
Effluent Data	# of Samples (n)	4	4	4	4	4						
	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)	12.5	0.04	3.15	2.9	305						
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L	2.2		0		6.1						
	Geo Mean, ug/L	0.4	0	0	0	0						
Water Quality Criteria	Aquatic Life Criteria, ug/L Acute	971.51	-	20	-	78.509						
	Chronic	52.862	-	5	-	35.086						
	WQ Criteria for Protection of Human Health, ug/L	80	9000	60	72	1000						
	Metal Criteria Translator, decimal Acute	0.998	-	-	-	FALSE						
	Chronic	0.997	-	-	-	FALSE						
	Carcinogen?	N	N	N	N	N						

Aquatic Life Reasonable Potential

Effluent percentile value		0.950		0.950		0.950						
s	$s^2=\ln(CV^2+1)$	0.555		0.555		0.555						
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.473		0.473		0.473						
Multiplier		2.59		2.59		2.59						
Max concentration (ug/L) at edge of...	Acute	14.585		3.356		3.586						
	Chronic	3.045		0.229		5.928						
Reasonable Potential? Limit Required?		**NO**		**NO**		**NO**						

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.5545	0.5545	0.5545	0.5545						
Pn	Pn=(1-confidence level)1/n	0.473	0.473	0.473	0.473	0.473						
Multiplier		1.0385	1.0385	1.0385	1.0385	1.0385						
Dilution Factor		49.281	49.281	49.281	49.281	49.281						
Max Conc. at edge of Chronic Zone, ug/L		0.6553	0.0008	0.0664	0.0611	6.427						
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**						

Ammonia Calculations

Freshwater Un-ionized Ammonia Criteria Calculation

Based on Chapter 173-201A WAC, amended November 20, 2006

		mixed @ Acute Boundary	mixed @ Chronic Boundary	mixed @ Whole River
INPUT				
1. Receiving Water Temperature (deg C):	20.7	21.7	20.8	20.7
2. Receiving Water pH:	7.6	7.5	7.6	7.6
3. Is salmonid habitat an existing or designated use?	Yes	Yes	Yes	Yes
4. Are non-salmonid early life stages present or absent?	Present	Present	Present	Present
OUTPUT				
Using mixed temp and pH at mixing zone boundaries?	no			
Ratio	15.631	17.204	15.781	15.670
FT	1.400	1.400	1.400	1.400
FPH	1.305	1.393	1.313	1.307
pKa	9.380	9.348	9.378	9.380
Unionized Fraction	0.016	0.015	0.016	0.016
Unionized ammonia NH3 criteria (mg/L as NH_3)				
Acute:	0.226	0.231	0.000	0.226
Chronic:	0.028	0.024	0.028	0.028
RESULTS				
Total ammonia nitrogen criteria (mg/L as N):				
Acute:	11.375	**12.696**		11.407
Chronic:	1.413		**1.405**	1.411

Fecal Coliforms and Dissolved Oxygen Calculations

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	35.5
Receiving Water Fecal Coliform, #/100 ml	49
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criteria, #/100 ml	*100*
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	**59**
Difference between mixed and ambient, #/100 ml	10

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	35.5
Receiving Water DO Concentration, mg/L	9.5
Effluent DO Concentration, mg/L	8.2
Effluent Immediate DO Demand (IDOD), mg/L	7
Surface Water Criteria, mg/L	*9.5*
OUTPUT	
DO at Mixing Zone Boundary, mg/L	**9.27**
DO decrease caused by effluent at chronic boundary, mg/L	**0.23**

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

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

Temperature Calculations

Freshwater Temperature Reasonable Potential and Limit Calculation

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

	Core Summer Critera
INPUT	
1. Chronic Dilution Factor at Mixing Zone Boundary	35.5
2. 7DADMax Ambient Temperature (T) (Upstream Background 90th percentile)	20.7 °C
3. 7DADMax Effluent Temperature (95th percentile)	23.2 °C
4. Aquatic Life Temperature WQ Criterion in Fresh Water	16.0 °C
OUTPUT	
5. Temperature at Chronic Mixing Zone Boundary:	20.8 °C
6. Incremental Temperature Increase or decrease:	0.1 °C
7. Maximum Allowable Incremental Temperature Increase:	0.3 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	21.0 °C
A. If ambient temp is warmer than WQ criterion	
9. Does temp fall within this warmer temp range?	YES
10. Temperature Limit if Required:	NO LIMIT
B. If ambient temp is cooler than WQ criterion but within 28/(T_{amb}+7) and within 0.3 °C of the criterion	
11. Does temp fall within this incremental temp. range?	---
12. Temp increase allowed at mixing zone boundary, if required:	---
C. If ambient temp is cooler than (WQ criterion-0.3) but within 28/(T_{amb}+7) of the criterion	
13. Does temp fall within this Incremental temp. range?	---
14. Temp increase allowed at mixing zone boundary, if required:	---
D. If ambient temp is cooler than (WQ criterion - 28/(T_{amb}+7))	
15. Does temp fall within this Incremental temp. range?	---
16. Temp increase allowed at mixing zone boundary, if required:	---
RESULTS	
17. Do any of the above cells show a temp increase?	**NO**
18. Temperature Limit if Required?	**NO LIMIT**

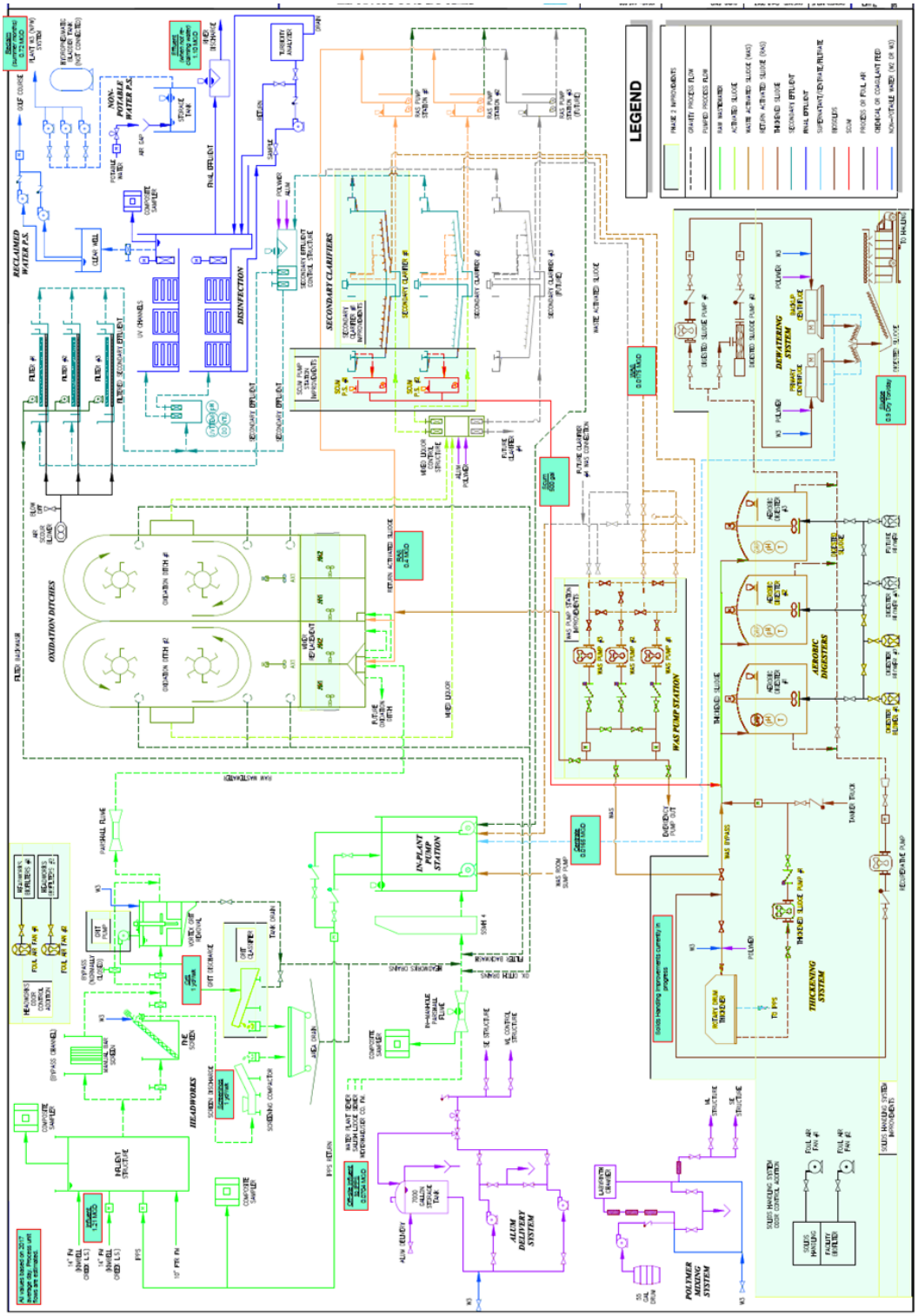
pH Calculations

Calculation of pH of a Mixture of Two Flows

Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

INPUT		
	@ Acute Boundary	**@ Chronic Boundary**
1. Dilution Factor at Mixing Zone Boundary	35.5	35.5
2. Ambient/Upstream/Background Conditions		
Temperature (deg C):	20.70	20.70
pH:	7.60	7.60
Alkalinity (mg CaCO3/L):	50.00	50.00
3. Effluent Characteristics		
Temperature (deg C):	21.70	21.70
pH:	6.0	6.5
Alkalinity (mg CaCO3/L):	99.00	99.00
4. Aquatic Life Use Designation	Char spawning & rearing and/or core summer habitat	
OUTPUT		
1. Ionization Constants		
Upstream/Background pKa:	6.38	6.38
Effluent pKa:	6.37	6.37
2. Ionization Fractions		
Upstream/Background Ionization Fraction:	0.94	0.94
Effluent Ionization Fraction:	0.30	0.59
3. Total Inorganic Carbon		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	53	53
Effluent Total Inorganic Carbon (mg CaCO3/L):	331	168
4. Condtions at Mixing Zone Boundary		
Temperature (deg C):	20.73	20.73
Alkalinity (mg CaCO3/L):	51.38	51.38
Total Inorganic Carbon (mg CaCO3/L):	60.83	56.22
pKa:	6.38	6.38
5. Allowable pH change	NA	0.20
RESULTS		
pH at Mixing Zone Boundary:	**7.11**	**7.40**
pH change at Mixing Zone Boundary:	0.49	0.20
Is permit limit needed?	NO	NO

Appendix E--City of Snoqualmie WRF Process Flow Diagram



Appendix F--City of Snoqualmie WRF Data

	Influent											
Date	Flow, MGD	Flow, MGD	CBOD, mg/L	CBOD, mg/L	BOD, mg/L	BOD, mg/L	BOD, ppd	BOD, ppd	TSS, mg/L	TSS, mg/L	TSS, ppd	TSS, ppd
	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max
May-14	1.2	35.5	272.2	308.0	279.5	340	2,489.5	3,082	305.8	418	2,815	4,034
June-14	1.1	1.3	337.5	375.0	302.8	325	2,562.6	2,877	337.1	413	2,887	3,402
July-14	1.0	1.3	294.6	409.0	296.9	413	2,429.4	3,398	304.6	356	2,566	3,422
August-14	1.0	1.4	305.2	368.0	321.5	500	2,462.7	4,112	339.9	504	2,862	4,405
September-14	1.0	1.2	298.8	355.0	297.4	350	2,612.6	3,283	316.4	506	2,794	4,895
October-14	1.3	1.8	267.0	422.0	275.9	338	2,762.6	4,665	315.6	618	3,280	6,692
November-14	1.4	2.0	232.7	354.0	279.0	473	2,892.7	5,021	250.3	332	2,607	3,613
December-14	1.3	1.8	247.9	313.0	295.9	430	3,264.6	6,195	257.4	311	2,831	3,687
January-15	1.3	2.3	237.5	360.0	277.2	500	2,708.3	4,238	245.9	336	2,430	3,706
February-15	1.3	1.9	230.8	350.0	272.4	380	2,573.2	3,145	278.8	363	2,678	3,327
March-15	1.1	1.5	287.3	360.0	340.0	430	2,943.7	3,405	324.3	411	2,838	3,577
April-15	1.0	1.4	319.4	410.0	367.1	470	2,772.3	3,775	335.4	462	2,546	3,796
May-15	0.9	1.1	299.4	355.0	385.8	600	2,750.4	4,611	379.8	578	2,752	4,111
June-15	1.0	1.2	294.4	370.0	357.7	560	2,712.2	3,929	349.2	412	2,707	3,594
July-15	0.9	1.1	302.6	455.0	375.7	540	2,618.4	4,186	349.3	681	2,423	4,233
August-15	0.9	1.1	289.8	340.0	335.4	390	2,316.4	3,280	333.5	384	2,338	3,187
September-15	0.9	1.0	312.6	450.0	375.7	470	2,427.7	3,464	301.6	350	1,929	2,256
October-15	0.9	1.6	322.8	420.0	366.7	510	2,268.6	3,192	326.8	390	2,041	2,697
November-15	1.5	3.1	281.0	430.0	316.2	470	3,559.8	7,025	222.7	300	2,459	5,944
December-15	1.8	4.3	281.6	425.0	325.6	490	4,309.7	8,164	218.1	302	2,853	5,759
January-16	1.2	1.8	275.6	325.0	321.3	380	3,011.3	3,959	260.3	436	2,417	3,837
February-16	1.3	1.5	288.8	390.0	343.3	450	3,267.2	4,275	293.5	386	2,814	3,760
March-16	1.3	1.8	332.3	520.0	384.7	570	3,970.8	6,267	340.1	520	3,490	5,738
April-16	1.0	1.1	352.1	415.0	391.7	470	3,077.2	3,701	296.5	434	2,304	3,348
May-16	1.0	1.5	506.8	998.0	590.7	1140	4,985.5	8,780	351.9	506	2,896	3,898
June-16	1.1	1.3	397.3	473.0	456.1	555	3,811.4	5,638	355.0	545	2,948	4,522
July-16	1.0	1.1	408.5	520.0	462.5	570	3,700.8	4,734	330.0	447	2,606	3,444
August-16	1.0	1.2	372.7	503.0	428.2	540	3,472.4	4,296	324.2	423	2,608	3,357
September-16	1.0	1.1	372.8	465.0	440.4	585	3,535.3	5,264	324.1	390	2,570	3,239
October-16	1.3	1.9	338.4	510.0	380.7	525	3,717.0	4,431	266.7	330	2,609	3,584
November-16	1.5	2.1	312.4	593.0	390.0	780	4,918.4	7,885	239.7	340	2,947	4,120
December-16	1.3	1.8	343.8	435.0	389.2	495	3,951.3	4,895	269.6	392	2,691	3,867
January-17	1.0	1.7	448.2	608.0	493.1	630	3,920.7	5,090	359.7	555	2,856	4,059
February-17	1.5	3.0	304.3	465.0	366.2	585	3,873.0	5,964	298.2	601	3,086	6,174
March-17	1.5	2.3	227.9	280.0	262.1	330	3,059.1	3,544	201.6	253	2,345	3,129
April-17	1.3	1.6	235.1	349.0	309.8	428	3,239.8	4,429	244.6	553	2,644	7,271
May-17	1.1	1.5	362.9	638.0	463.1	675	4,156.0	6,265	311.9	385	2,746	3,533
June-17	1.0	1.1	320.7	413.0	445.4	630	3,445.7	4,843	353.6	542	2,717	3,966
July-17	1.0	1.3	272.5	340.0	368.6	495	2,802.7	4,211	311.8	401	2,354	3,076
August-17	1.0	1.4	312.0	645.0	397.7	765	3,177.9	6,186	305.4	443	2,440	3,738
September-17	0.9	1.0	332.9	440.0	420.8	550	3,052.3	4,058	301.7	386	2,154	2,742
October-17	1.1	1.9	245.3	425.0	303.3	520	2,393.5	3,832	271.5	341	2,306	3,715
November-17	1.5	2.4	208.7	570.0	233.6	340	2,801.3	4,506	180.7	260	2,045	2,539
December-17	1.4	2.2	248.8	345.0	335.0	500	3,540.4	5,246	204.8	334	2,168	4,305
January-18	1.6	2.2	260.4	350.0	357.9	510	4,633.2	6,888	183.2	254	2,283	3,073
February-18	1.3	1.9	315.0	380.0	417.5	580	4,149.3	6,387	262.2	360	2,493	3,328
March-18	1.0	1.4	313.8	425.0	426.9	550	3,419.0	4,054	261.6	360	2,042	2,721
April-18	1.4	2.1	252.9	365.0	340.0	460	3,462.3	5,559	219.3	260	2,232	3,059
May-18	1.1	1.4	231.3	315.0	303.7	460	2,551.2	3,885	241.2	286	2,005	2,580
June-18	0.9	1.0	222.3	289.0	299.7	383	2,060.8	2,649	270.0	311	1,874	2,233
July-18	0.9	1.0	268.1	330.0	321.0	368	2,129.7	2,552	313.2	374	2,114	2,642
August-18	0.8	0.9	241.2	293.0	298.1	368	1,859.1	2,299	285.7	402	1,812	2,578
September-18	0.9	1.1	246.2	320.0	299.8	400	1,970.4	3,445	272.1	324	1,796	2,562
October-18	0.9	1.5	241.6	320.0	294.7	350	2,019.8	2,870	229.2	370	1,546	2,323
AVE:	1.2	2.3	298.7	420.0	355.2	498.4	3,122	4,591	289.4	406	2,511	3,748
MIN:	0.8	0.9	208.7	280.0	233.6	325.0	1,859	2,299	180.7	253	1,546	2,233
MAX:	1.8	35.5	506.8	998.0	590.7	1,140.0	4,985	8,780	379.8	681	3,490	7,271
Median	1.1	1.5	294.5	399.5	341.7	492.5	3,032	4,256	299.9	388	2,568	3,589
95th Percentile	1.5	3.0	401.2	618.5	462.7	706.5	4,423	7,326	354.1	586	2,996	6,024
Standard Deviation	0.22	4.65	58.48	119.44	68.15	136.90	749.41	1453.24	48.88	98.82	389.02	1092.38
CV	0.2	2.1	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3

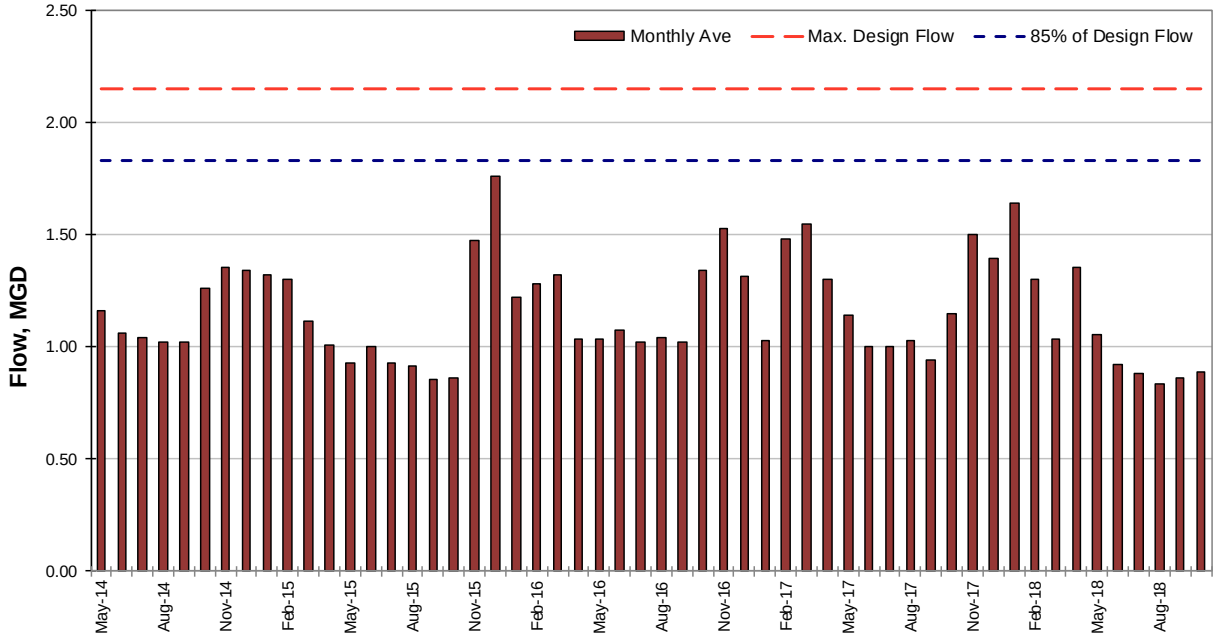
	Effluent																	Effluent											
Date	Flow, MGD	Flow, MGD	CBOD, mg/L	CBOD, mg/L	CBOD, ppd	CBOD, ppd	CBOD, ppd	CBOD, % Removal	TSS, mg/L	TSS, mg/L	TSS, ppd	TSS, ppd	TSS, % Removal	PH	PH	Fecal Coliform, #/100 ml	Fecal Coliform, #/100 ml	Ammonia, mg/l (as N)	Ammonia, mg/l (as N)	Ammonia, ppd (as N)	Ammonia, ppd (as N)	Ortho-phosphate, mg/l (as P)	Ortho-phosphate, mg/l (as P)	Ortho-phosphate, ppd (as P)	Ortho-phosphate, ppd (as P)	Temperature °C	Temp - TDADMax oC
	Monthly	Monthly	Monthly	Wkly	Monthly	Wkly	Daily		Monthl		Wkly	Monthly	Wkly					Monthly		Monthly		Daily	Monthly		Monthly	Daily	Daily	Monthly
	Ave	Max	Ave	Ave	Ave	Ave	Max	Ave	y Ave	Ave	Ave	Ave	Ave	Min	Max	GEM	GM7	Ave	Max	Ave	Max	Max	Ave	Max	Ave	Max	Max	Averag
May-14	1.05	1.58	1.8	2.3	16	19	25.0	99.3	2.2	2.7	19	22	99.3	7.28	7.51	1	3	0.05	0.1	0.4	0.6	0.52	0.8	4.4	7.27	18.30	17.93
June-14	0.49	1.03	1.3	1.7	5	7	8.5	99.6	1.9	2.0	8	12	99.4	7.32	7.66	1	1	0.05	0.1	0.2	0.5	1.10	1.9	3.8	14.35	20.20	19.96
July-14	0.26	0.72	1.2	3.5	3	4	4.9	99.6	2.4	3.3	5	7	99.2	6.70	7.69	2	2	0.01	0.0	0.0	0.0	0.36	0.4	0.8	1.16	21.80	21.60
August-14	0.27	0.65	1.7	2.2	4	7	10.8	99.5	2.8	3.3	8	12	99.2	7.22	7.65	2	3	0.43	1.6	1.6	6.1	0.89	1.5	3.4	6.52	22.30	21.90
September-14	0.63	1.13	2.1	2.3	12	18	26.3	99.3	2.5	3.0	13	21	99.2	6.34	8.23	1	2	0.02	0.0	0.1	0.2	0.30	0.3	1.7	2.94	21.90	21.69
October-14	1.08	1.63	2.6	5.3	23	41	82.6	99.0	8.8	32.0	71	243	97.2	6.53	8.10	1	2	0.36	0.9	4.3	12.2	0.57	1.1	5.4	9.67	20.50	20.14
November-14	1.20	1.85	1.6	1.8	17	23	31.7	99.3	1.5	1.7	15	16	99.4	6.55	8.10	1	1	1.03	2.1	11.8	29.4	0.40	0.5	3.9	4.76	17.90	17.77
December-14	1.23	1.73	2.7	3.3	29	33	44.0	98.9	2.7	4.0	29	40	99.0	6.34	8.04	1	2	3.55	5.5	42.0	65.6	1.07	3.5	14.1	49.73	15.30	14.88
January-15	1.25	2.20	3.5	5.0	36	54	74.3	98.5	4.8	6.0	49	76	98.0	7.00	7.54	1	3	3.46	11.1	38.9	124.4	0.28	0.8	3.0	9.27	14.60	14.36
February-15	1.22	1.85	3.1	4.7	30	45	55.5	98.7	3.8	4.7	37	41	98.7	6.62	8.12	2	5	0.36	1.2	3.1	10.7	0.57	1.5	5.0	12.56	14.70	14.54
March-15	1.04	1.41	3.0	4.0	27	33	44.5	98.9	3.0	3.7	26	30	99.1	6.47	7.52	1	2	0.05	0.1	0.5	0.8	0.43	0.6	3.8	4.48	15.90	15.50
April-15	0.93	1.29	2.8	3.3	22	34	32.4	99.1	2.9	3.3	22	27	99.2	6.60	8.74	1	2	0.13	0.3	1.1	3.2	0.58	0.9	4.8	9.59	17.40	16.50
May-15	0.67	0.86	2.1	3.2	12	21	26.3	99.3	1.9	3.3	11	21	99.5	6.79	7.59	1	1	0.10	0.1	0.7	0.9	1.40	2.3	8.9	13.93	19.80	19.37
June-15	0.21	0.61	1.8	2.0	3	4	20.0	99.4	2.4	3.3	4	7	99.3	6.39	8.67	1	1	0.05	0.1	0.1	0.4	0.94	1.6	2.6	6.49	22.20	21.40
July-15	0.13	0.57	1.6	2.3	3	10	19.0	98.5	2.0	2.0	3	13	99.4	6.34	7.89	1	3	0.75	3.7	0.4	1.7	1.31	2.0	1.2	2.75	23.00	22.31
August-15	0.05	0.37	1.5	1.7	1	2	3.1	99.5	1.2	1.3	1	2	99.6	6.75	7.68	1	1	0.05	0.1	0.0	0.0	1.27	2.0	0.4	1.05	23.20	23.03
September-15	0.56	0.84	1.4	2.0	7	13	13.5	99.6	2.2	3.7	11	21	99.3	6.99	7.64	1	2	0.06	0.2	0.4	1.0	1.07	1.4	5.1	9.01	21.90	22.00
October-15	0.88	1.52	2.2	3.0	15	20	27.9	99.3	5.3	13.0	38	94	98.4	6.32	7.67	2	5	0.30	0.5	2.2	3.5	1.32	1.6	9.6	11.58	20.60	20.49
November-15	1.40	3.17	2.5	2.7	31	56	79.4	99.0	4.2	5.7	55	123	98.0	6.59	7.28	2	4	0.64	1.2	7.5	17.8	0.53	1.6	5.3	15.51	17.80	18.77
December-15	1.62	3.92	2.9	4.7	38	58	65.5	99.0	4.1	4.7	58	103	98.0	6.60	7.30	3	12	1.16	1.3	15.0	27.0	0.38	0.8	3.6	6.25	14.50	14.53
January-16	1.11	1.58	3.4	3.7	32	32	42.8	98.8	3.6	4.7	33	39	98.6	6.54	7.74	1	2	1.49	1.7	13.5	15.8	0.60	0.8	5.3	7.04	13.20	13.04
February-16	1.14	1.39	3.3	4.0	30	33	46.5	99.0	3.1	3.3	29	37	98.9	6.85	7.29	1	1	0.48	1.1	4.2	9.7	0.58	0.8	5.2	6.90	14.00	13.80
March-16	1.16	1.59	3.7	4.0	36	36	57.1	98.0	4.5	6.7	45	75	98.0	6.58	7.07	1	3	0.13	0.2	1.4	2.4	0.33	0.7	3.2	5.51	14.60	14.17
April-16	0.79	0.95	2.3	3.3	15	24	28.9	99.4	2.8	4.0	18	29	99.1	6.82	7.44	1	1	0.09	0.1	0.6	0.7	0.94	1.3	5.9	8.77	18.10	17.64
May-16	0.27	0.88	1.5	2.0	4	7	14.7	99.8	1.8	2.0	5	8	99.0	6.90	7.69	1	1	0.10	0.3	0.2	0.8	1.04	1.1	2.0	2.66	19.20	18.63
June-16	0.49	0.91	1.1	1.4	4	7	10.6	99.0	2.9	3.7	10	25	99.0	6.87	7.57	1	1	0.03	0.0	0.1	0.2	0.63	1.5	1.4	2.73	20.00	19.94
July-16	0.22	0.87	1.5	1.7	2	3	4.4	99.7	2.5	3.0	4	5	99.2	6.62	7.04	1	1	0.03	0.0	0.0	0.1	1.73	2.8	2.4	3.78	22.10	21.83
August-16	0.22	0.30	1.0	1.0	2	2	2.5	99.0	1.8	2.7	3	5	99.5	6.58	7.17	1	1	0.01	0.0	0.0	0.0	0.56	0.9	1.1	2.01	22.40	22.16
September-16	0.78	0.91	1.2	1.7	8	11	13.3	99.0	2.2	3.0	14	19	99.0	6.77	7.10	1	1	0.02	0.0	0.1	0.1	0.48	0.8	3.3	5.08	21.50	21.64
October-16	1.13	1.62	1.2	1.6	11	18	22.9	99.0	2.1	3.7	19	35	99.0	6.50	7.12	1	1	0.03	0.1	0.2	0.4	0.54	0.7	4.4	6.05	20.40	20.71
November-16	1.33	1.78	2.5	4.0	28	40	55.3	99.0	6.4	10.0	70	97	97.0	6.49	6.94	2	2	0.26	0.6	3.0	6.3	1.68	3.2	19.8	23.46	17.90	17.63
December-16	1.20	1.64	4.5	6.3	44	59	66.4	98.0	7.8	9.3	77	86	97.0	6.68	7.13	1	4	8.37	11.9	79.2	102.2	0.47	1.2	4.7	11.97	15.50	15.71
January-17	0.97	1.55	5.1	7.0	42.1	57	59.9	98.0	8.2	12.6	69	103	97.0	6.89	7.25	4	22	8.67	11.6	81.2	144.6	0.44	0.6	3.9	5.78	13.60	13.23
February-17	1.35	2.45	5.6	8.3	65	108	179.5	99.1	9.2	19.7	107	247	96.0	6.62	6.96	2	4	0.16	0.4	1.8	4.8	0.44	0.6	4.5	8.20	12.80	13.21
March-17	1.42	2.13	3.0	3.4	36	49	53.2	98.0	5.4	6.7	65	86	97.0	6.41	6.96	1	2	0.07	0.1	0.9	1.4	0.66	1.3	7.9	13.68	13.00	12.83
April-17	1.15	2.05	4.6	4.9	45	50	60.7	98.0	9.5	10.7	92	96	96.0	6.37	7.86	3	6	0.25	0.5	2.4	5.5	1.08	1.8	11.2	19.30	15.00	14.81
May-17	0.86	1.31	1.8	3.0	13	25	39.5	99.0	3.8	6.3	27	53	98.0	6.70	7.59	1	3	0.09	0.3	0.7	2.2	0.96	1.4	6.7	11.06	18.90	18.30
June-17	0.76	0.95	1.4	2.0	8	11	13.6	99.0	2.5	3.0	16	21	99.0	6.94	8.28	2	4	0.04	0.1	0.2	0.5	0.72	1.4	4.6	8.56	20.50	19.69
July-17	0.79	1.28	1.9	3.3	13	20	42.9	99.3	2.3	2.5	16	20	99.3	5.23	8.20	1	1	0.07	0.1	0.4	0.6	0.60	0.8	3.7	5.06	31.88	23.41
August-17	0.12	0.69	1.0	1.0	1	3	5.7	99.0	2.7	3.3	3	11	99.0	6.53	7.52	1	1	0.03	0.0	0.0	0.1	0.44	0.6	0.4	1.63	23.03	23.40
September-17	0.94	1.03	1.2	1.3	9	11	16.4	99.0	2.9	3.3	23	28	99.0	6.75	7.15	1	1	0.04	0.0	0.3	0.3	0.28	0.4	2.2	3.13	22.84	22.73
October-17	0.68	1.09	1.6	2.8	9	22	29.1	99.0	2.9	4.7	17	32	99.0	6.34	7.12	2	5	0.23	0.5	1.6	5.0	0.35	0.5	2.0	2.86	23.50	21.26
November-17	0.97	1.81	2.6	3.3	22	33	36.7	98.0	5.4	9.3	44	60	96.0	6.41	6.92	2	3	0.65	0.9	4.7	6.6	0.37	0.5	2.8	2.95	17.35	18.28
December-17	1.14	2.08	2.7	3.5	24	31	37.4	98.0	5.1	6.7	45	58	97.0	6.44	7.01	1	2	0.51	0.8	4.7	8.5	0.30	0.4	0.5	2.12	14.69	14.48
January-18	1.50	2.01	2.5	3.0	31	45	50.3	99.0	4.6	6.0	59	91	97.0	6.48	6.89	1	3	0.10	0.2	1.1	2.8	0.04	0.1	0.4	1.01	13.68	13.33
February-18	1.25	1.67	2.5	4.0	24	36	37.7	99.0	4.5	5.6	46	51	98.0	6.43	6.98	1	1	0.17	0.3	1.8	3.5	0.11	0.3	0.8	2.52	13.24	13.07
March-18	1.04	1.37	2.1	3.3	18	38	31.2	99.0	3.7	4.3	32	39	99.0	6.38	7.23	1	1	0.03	0.1	0.2	0.4	0.02	0.0	0.2	0.30	14.78	14.31
April-18	1.30	2.10	1.6	2.6	18	37	42.0	99.0	3.6	4.6	37	46	98.0	6.47	7.19	1	2	0.03	0.1	0.4	0.9	0.37	0.7	4.4	10.27	16.11	15.67
May-18	0.70	1.20	2.0	3.0	11	17	22.9	99.0	2.5	3.0	15	24	98.0	6.86	7.11	1	1	0.05	0.1	0.3	0.6	0.85	1.9	3.5	7.13	19.76	19.45
June-18	0.07	0.53	2.0	2.7	2	7	13.3	99.0	2.0	2.3	2	6	99.0	6.74	7.12	1	1	0.18	0.5	0.1	0.4	1.06	1.8	0.7	3.61	22.10	21.22
July-18	0.03	0.65	1.8	2.0	0	2	5.4	99.0	2.0	2.0	1	4	99.0	6.77	7.21	1	1	0.06	0.1	0.0	0.0	0.19	0.4	0.0	0.07	23.84	23.43
August-18	0.04	0.52	1.2	1.3	0	2	4.3	99.0	1.9	2.0	1	3	99.0	7.02	7.22	1	1	0.05	0.1	0.0	0.0	0.42	0.5	0.1	0.29	23.76	23.53
September-18	0.57	1.00	1.6	2.0	9	13	15.6	99.0	2.5	4.3	14	29	99.0	6.79	7.21	3	18	0.10	0.2	0.6	1.2	0.51	0.9	3.1	6.18	22.73	22.58
October-18	0.84	1.41	2.6	3.6	20	35	51.7	99.0	5.3	7.0	38	51	98.0	6.63	7.11	2	4	0.26	0.5	2.0	3.3	0.56	1.0	4.1	6.70	21.06	21.06
AVE:	0.82	1.37	2.3	3.1	18	26	35.4	99.0	3.6	5	29	47.2	98.5	6.63	7.48	1	3	0.66	1.2	6.3	11.8	0.66	1.1	4.0	7.5	18.8	18.6
MIN:	0.03	0.30	1.0	1.0	0	2	2.5	98.0	1.2	1	1	1.7	96.0	5.23	6.89	1	1	0.01	0.0	0.0	0.0	0.02	0.0	0.0	0.1	13.2	13.0
MAX:	1.62	3.92	5.6	8.3	65	108	179.5	99.8	9.5	32	107	247.2	99.6	7.32	8.74	4	22	8.67	11.9	81.2	144.6	1.73	3.5	19.8	49.7	23.2	23.0
Median	0.91	1.34	2.0	3.0	15	23	30.1	99.0	2.9	4	20	29.7	99.0	6.61	7.37	1	2	0.10	0.2	0.6	1.3	0.56	0.9	3.6	6.2	19.5	19.1
95th Percentile	1.41	2.29	4.6	5.7	43	58	76.1	99.6	8.4	13	73	110.2	99.4	7.09	8.25	3	8	3.49	7.4	40.0	78.4	1.35	2.5	10.1	16.8	22.8	22.3
Standard Deviation	0.44	0.68	1.05	1.48	14.45	20.60	29.19	0.46	2.01	4.98	25.41	50.38	0.98	0.31	0.45	1	4	1.70	2.71	16.69	29.61	0.39	0.74	3.56	7.64	3.18	3.16
CV	0.5	0.5	0.5	0.5	0.8	0.8	0.8	0.0	0.6	0.9	0.9	1.1	0.0	0.05	0.06	0.4	1.3	2.60	2.3	2.7	2.5	0.60	0.7	0.9	1.0	0.2	0.2

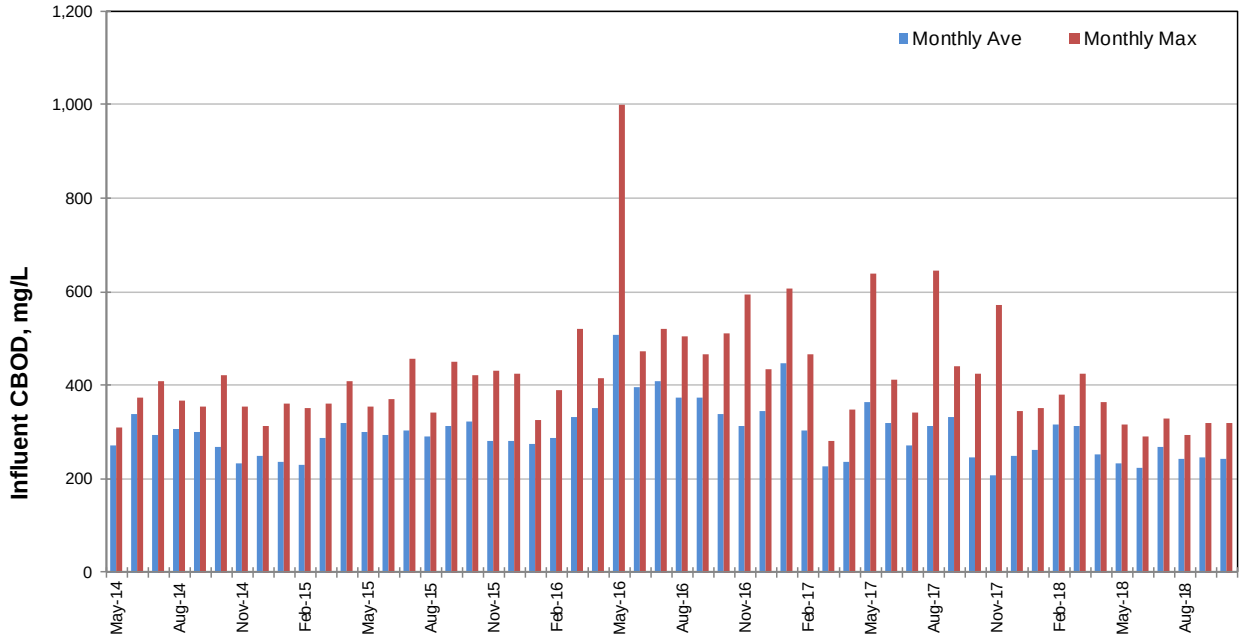
	Production Monitoring									
Date	Dissolved Oxygen, mg/L	Dissolved Oxygen, mg/L	Pre-filtered Turbidity, NTU	Pre-filtered Turbidity, NTU	Post-filtered Turbidity, NTU	Post-filtered Turbidity, NTU	Coagulant, ppd	Coagulant, ppd	Coagulant Aid, ppd	Coagulant Aid, ppd
	Monthly Ave	Monthly Min	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max	Monthly Ave	Monthly Max
May-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
June-14			0.6	1.9	0.5	1.4	23.8	M|	81.6	135
July-14			0.6	0.9	0.5	1.0	25.7	145	M|	M|
August-14			0.9	2.3	0.5	1.2	19.7	ND	ND	ND
September-14			0.9	5.0	0.4	0.6	17.5	ND	ND	ND
October-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-15	3.2	1.6	0.8	1.7	0.5	1.3	1.0	15	M|	M|
June-15	2.3	**0.1**	0.6	1.0	0.4	0.5	15.2	10	M|	M|
July-15	ND	ND	0.6	2.0	0.4	0.8	25.7	ND	ND	ND
August-15	ND	ND	0.6	2.6	0.3	0.4	8.8	ND	ND	ND
September-15	ND	ND	1.3	3.0	1.0	2.4	17.4	ND	ND	ND
October-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-16	ND	ND	1.0	1.0	0.6	0.9	11.4	ND	ND	ND
May-16	ND	ND	1.6	2.4	0.8	1.6	18.4	ND	ND	ND
June-16	1.7	1.1	1.4	3.5	0.9	3.0	19.5	3	1.1	1
July-16	ND	ND	1.0	1.6	0.4	0.5	15.1	ND	ND	ND
August-16	ND	ND	0.9	1.1	0.3	0.4	17.1	ND	ND	ND
September-16	ND	ND	0.8	0.9	0.3	0.3	14.5	ND	ND	ND
October-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-17	ND	ND	1.5	1.7	0.6	0.7	18.2	ND	ND	ND
June-17	0.4	0.2	2.3	5.0	0.6	0.7	11.5	22	1	1
July-17	ND	ND	2.8	3.7	1.6	1.9	93.0	ND	ND	ND
August-17	ND	ND	3.3	11.7	1.9	4.9	43.7	ND	ND	ND
September-17	ND	ND	2.1	4.7	1.1	2.6	27.1	ND	ND	ND
October-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-18	3.1	2.7	4.1	7.6	1.6	2.6	21.0	1	0.02	0
June-18	2.9	2.4	5.2	20.0	0.9	2.3	22.2	3	1	1
July-18	2.9	2.8	2.8	6.1	0.4	0.9	21.6	3	1	1
August-18	ND	ND	2.1	4.1	0.4	1.1	21.4	ND	ND	ND
September-18	ND	ND	1.9	2.2	0.5	0.9	22.2	ND	ND	ND
October-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AVE:	2.4	1.6	1.7	3.9	0.7	1.4	22	25	14.3	23
MIN:	0.4	0.1	0.6	0.9	0.3	0.3	1	1	0.0	-
MAX:	3.2	2.8	5.2	20.0	1.9	4.9	93	145	81.6	135
Median	2.9	1.6	1.3	2.4	0.5	1.0	20	7	1.0	1
95th Percentile	3.2	2.8	4.0	10.9	1.6	2.9	40	102	61.5	102

Product Water Distribution

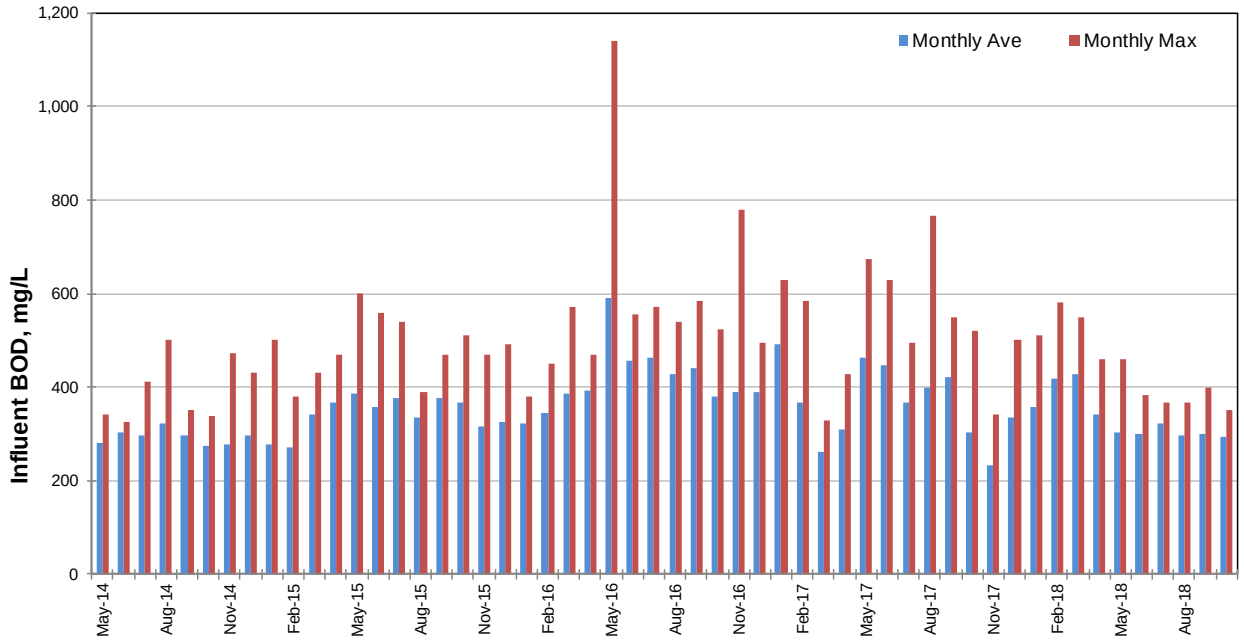
Date	Flow, MGD	Flow, MGD	CBOD, mg/L	CBOD, mg/L	Dissolved Oxygen, mg/L	Dissolved Oxygen, mg/L	Total Nitrogen, mg/l (as N)	Total Nitrogen, mg/l (as N)	TSS, mg/L	TSS, mg/L	PH	PH	Total Coliform, MPN/100 ml	Total Coliform, MPN/100 ml	Chlorine Residual, mg/L	Chlorine Residual, mg/L
	Monthly Ave	Monthly Max	Monthly Ave	Wkly Ave	Monthly Ave	Monthly Min	Ave	Daily Max	Monthly Ave	Wkly Ave	Min	Max	7-day Median	Max	Min	Avg
May-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
June-14	0.6	1.0	1.4	1.7	4.8		2.8	4.9	2.0	2.0	7.4	7.7	1.0	1.0	0.7	2
July-14	0.7	0.8	1.2	1.3	6.9	4.8	1.4	1.7	2.4	3.3	6.7	7.7	1.0	12.4	1.7	1
August-14	0.7	1.3	1.7	2.2	ND	ND	3.5	4.8	2.8	3.3	7.2	7.7	1.0	1.0	0.7	ND
September-14	0.6	0.7	2.3	3.0	ND	ND	4.3	5.1	2.8	3.3	6.3	8.2	1.0	1.0	2.2	ND
October-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-15	0.4	0.7	1.4	2.0	5.8	3.0	2.7	3.2	1.1	1.3	6.8	7.5	1.0	1.0	2.5	5
June-15	0.7	1.0	1.8	2.0	5.5	4.7	2.3	4.5	2.4	3.3	6.4	8.7	1.0	8.7	0.8	5
July-15	0.7	0.9	1.6	2.3	ND	ND	4.7	7.6	2.0	3.3	6.3	7.9	1.0	3.1	1.1	ND
August-15	0.8	0.9	1.5	1.3	ND	ND	4.1	4.9	1.2	1.3	6.8	7.7	1.0	2.0	1.2	ND
September-15	0.6	0.7	1.0	1.0	ND	ND	2.4	2.6	1.6	1.7	7.0	7.6	1.0	1.0	2.1	ND
October-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-16	0.5	0.7	1.3	1.3	ND	ND	3.4	3.4	2.7	2.7	7.0	7.2	1.0	1.0	5.1	ND
May-16	0.7	0.7	1.4	2.0	ND	ND	2.4	5.7	1.8	2.0	7.0	7.7	1.0	1.0	1.3	ND
June-16	0.6	0.7	1.6	4.7	6.2	6.2	1.6	2.2	1.6	3.7	6.9	7.6	1.0	1.0	0.9	4
July-16	0.7	0.8	1.5	1.7	ND	ND	5.7	6.1	2.5	3.0	6.6	7.0	1.0	1.0	4.5	ND
August-16	0.7	1.0	1.0	1.0	ND	ND	2.8	4.4	1.8	2.7	6.6	7.2	1.0	**60.9**	5.0	ND
September-16	0.5	0.7	1.0	1.0	ND	ND			1.0	1.0	7.0	7.1	1.0	1.0	6.8	ND
October-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-17	0.6	0.7	1.5	2.0	ND	ND	7.0	9.0	3.0	3.0	6.8	7.2	1.0	1.0	5.8	ND
June-17	0.5	0.8	2.0	2.5	4.6	8.0			2.3	2.5	7.0	8.3	**17.8**	**200.5**	20.0	3
July-17	0.9	1.0	1.3	1.3	ND	ND	5.7	5.7	2.0	2.0	7.1	7.4	1.0	4.2		ND
August-17	0.7	1.1	1.0	1.0	ND	ND	5.8	5.8	2.7	3.3	6.5	7.5	**4.2**	9.9	C	ND
September-17	0.6	0.8	1.1	1.3	ND	ND	4.4	4.6	3.2	3.3	6.9	7.2	2.0	15.0	M	ND
October-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
November-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
December-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
January-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
February-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
March-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
April-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
May-18	0.6	0.8	2.6	3.0	6.0	6.0	4.8	5.0	2.6	3.0	6.9	7.1	1.0	2.0	M	8
June-18	0.8	0.9	2.0	2.7	6.5	5.5	6.5	7.9	2.0	2.3	6.7	7.1	1.3	2.5	M	10
July-18	0.8	0.9	1.8	2.0	6.7	5.8	4.5	5.5	2.0	2.0	6.8	7.2	1.0	2.0	M	2
August-18	0.7	0.8	1.2	1.3	ND	ND	7.1	8.6	1.9	2.0	7.0	7.2	1.0	1.0	M	ND
September-18	0.7	0.8	1.0	1.0	ND	ND	5.5	5.5	2.0	2.0	6.9	7.2	1.0	1.0	M	ND
October-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AVE:	0.6	0.9	1.5	1.9	5.89	5.50	4.1	5.2	2.1	3	7	7.5	1.9	13.45	4	4
MIN:	0.4	0.7	1.0	1.0	4.60	3.00	1.4	1.7	1.0	1	6	7.0	1.0	1.00	1	1
MAX:	0.9	1.3	2.6	4.7	6.90	8.00	7.1	9.0	3.2	4	7	8.7	17.8	200.50	20	10
Median	0.7	0.8	1.4	1.7	6.00	5.65	4.3	5.0	2.0	3	7	7.5	1.0	1.00	2	4
95th Percentile	0.8	1.1	2.3	3.0	6.80	3.60	6.9	8.5	3.0	3	7	8.3	3.8	51.72	9	9

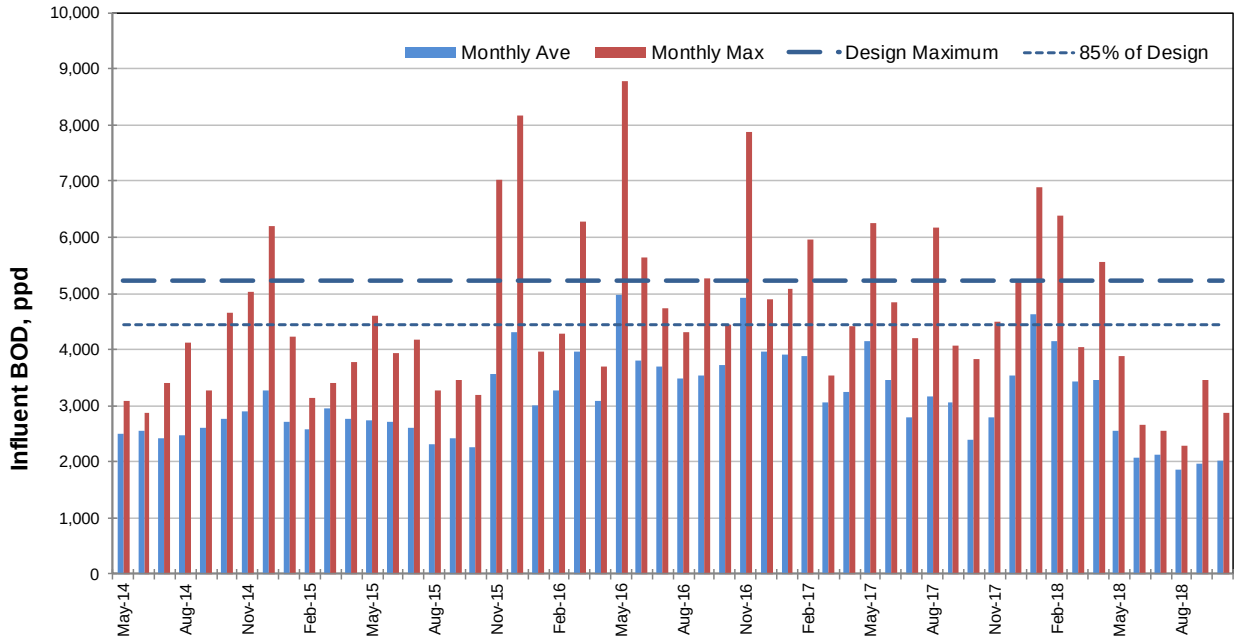
City of Snoqualmie WRF Influent – Flow and CBOD



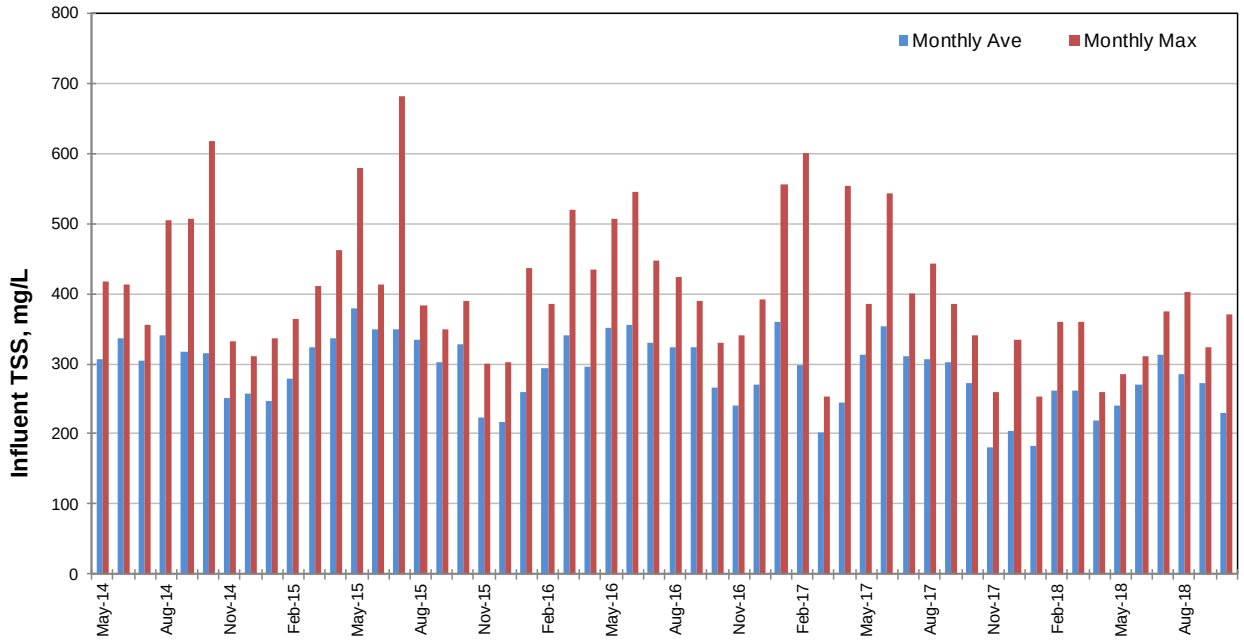


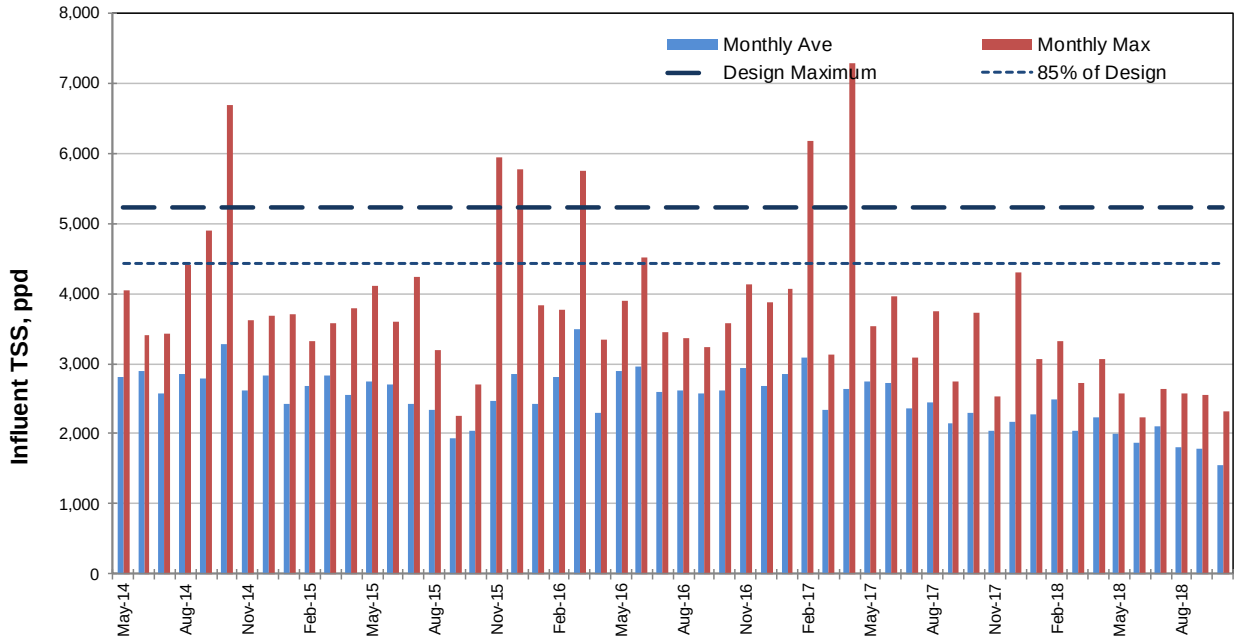
City of Snoqualmie WRF Influent – BOD



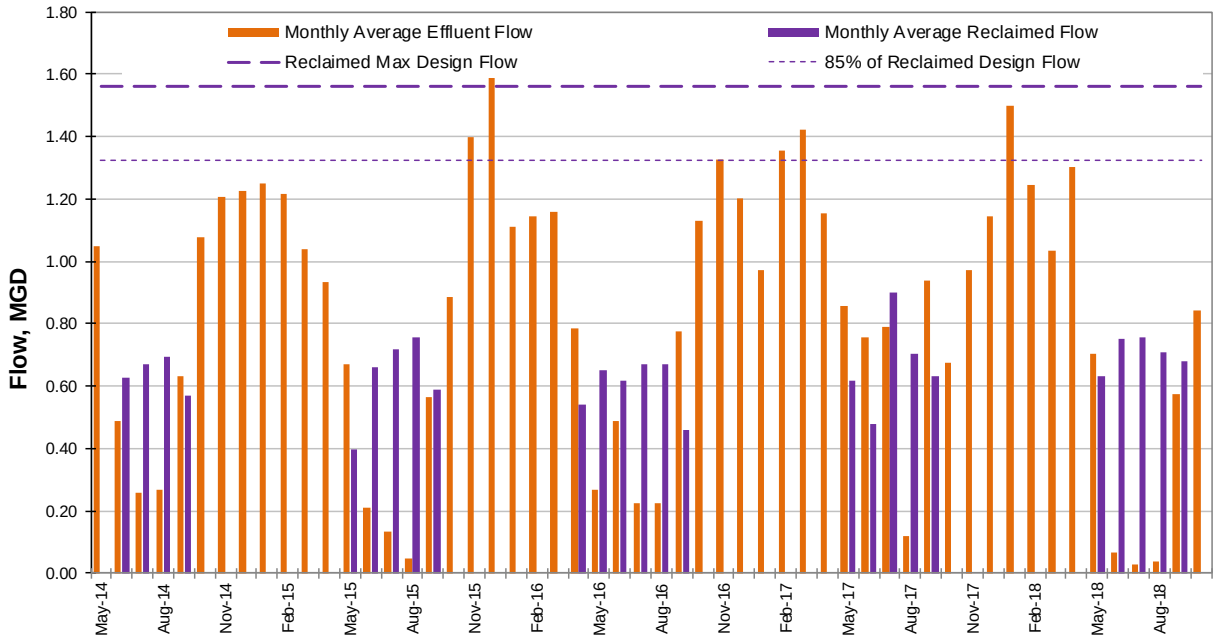


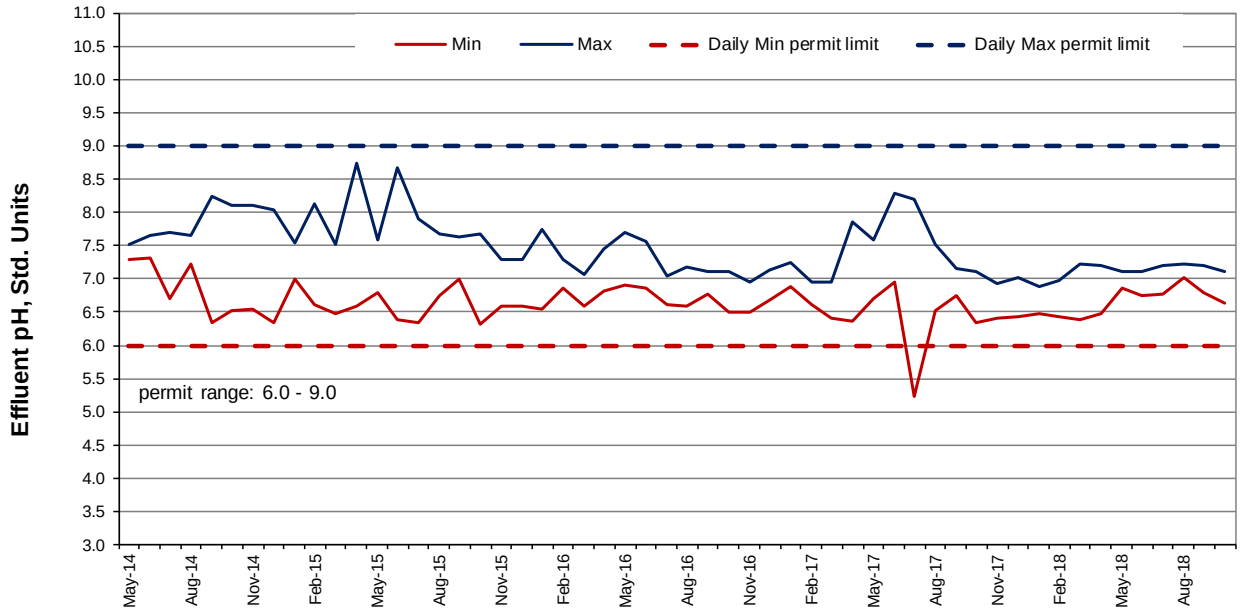
City of Snoqualmie WRF Influent – TSS



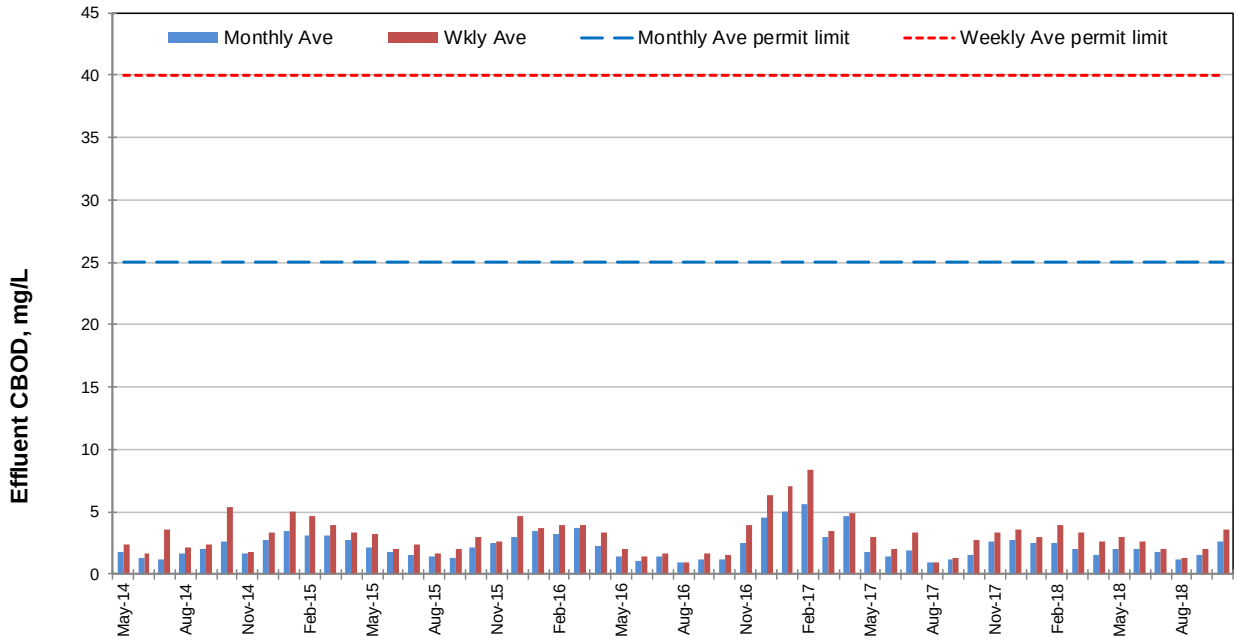


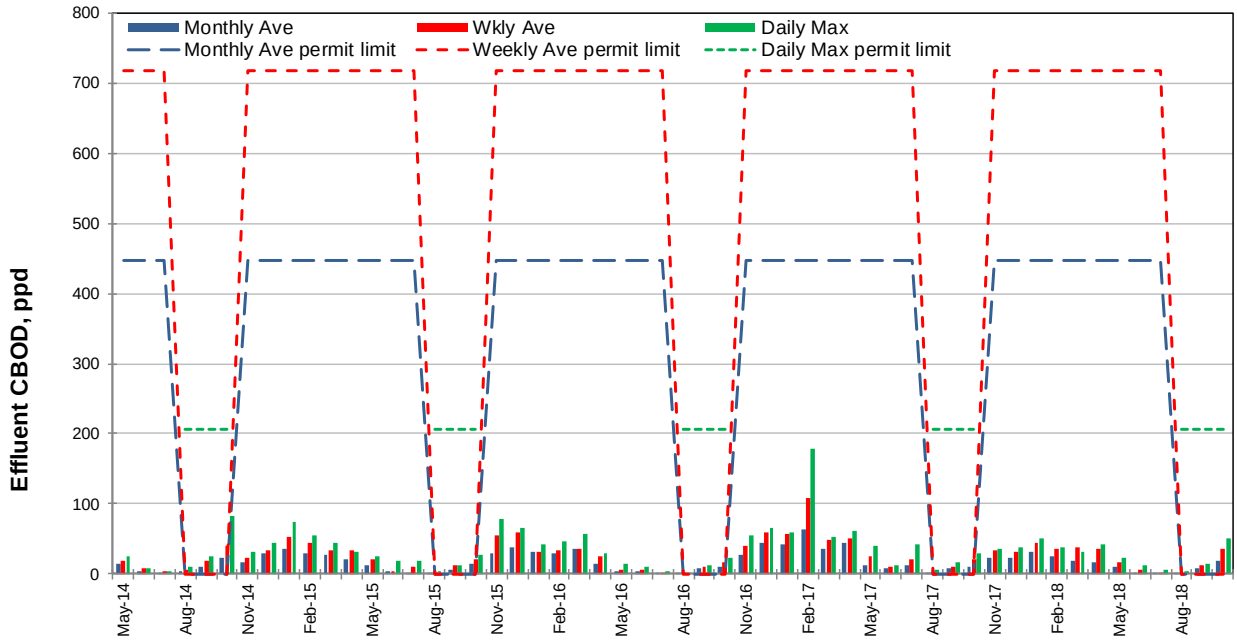
City of Snoqualmie WRF Effluent – Flow and pH



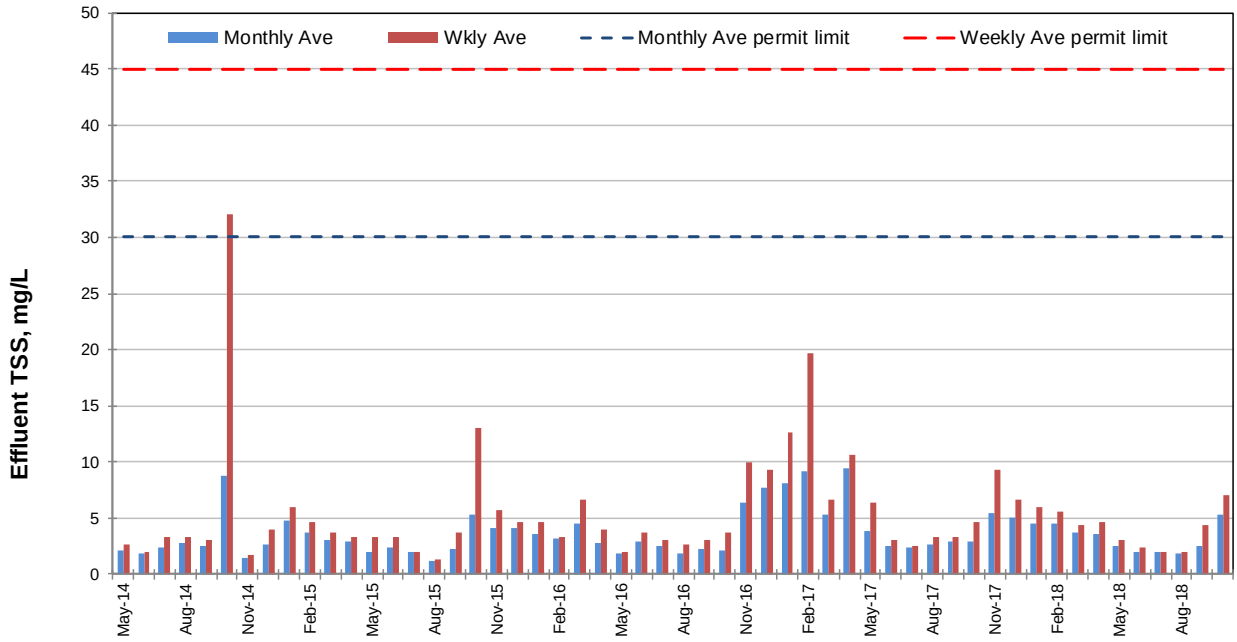


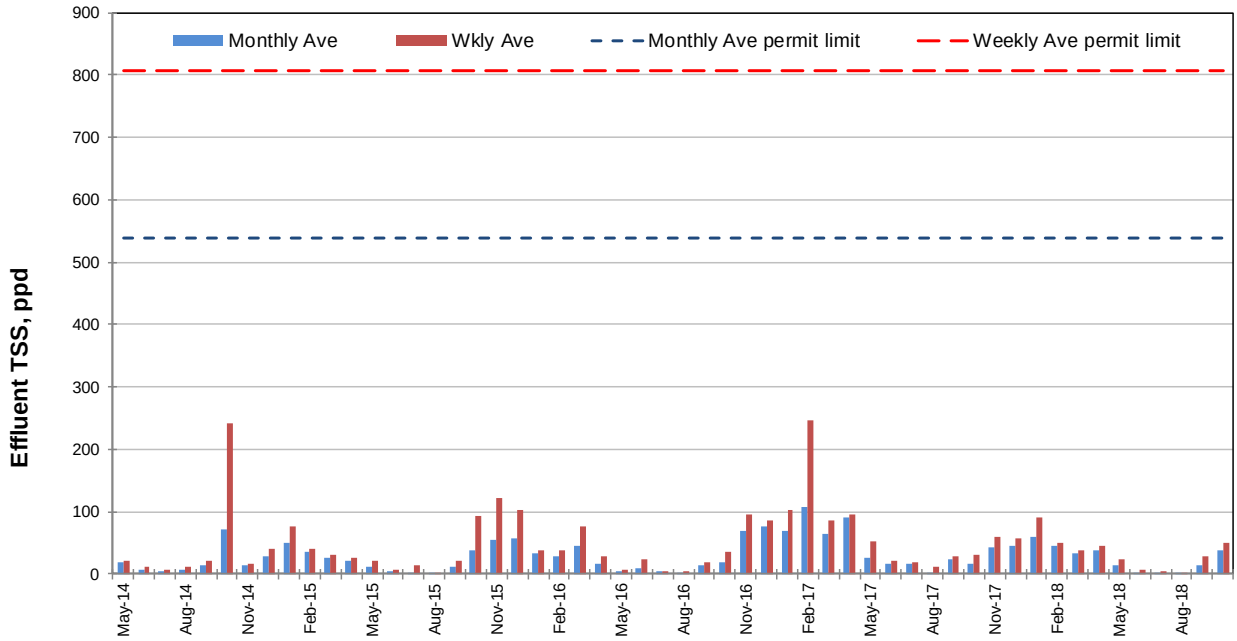
City of Snoqualmie WRF Effluent – CBOD



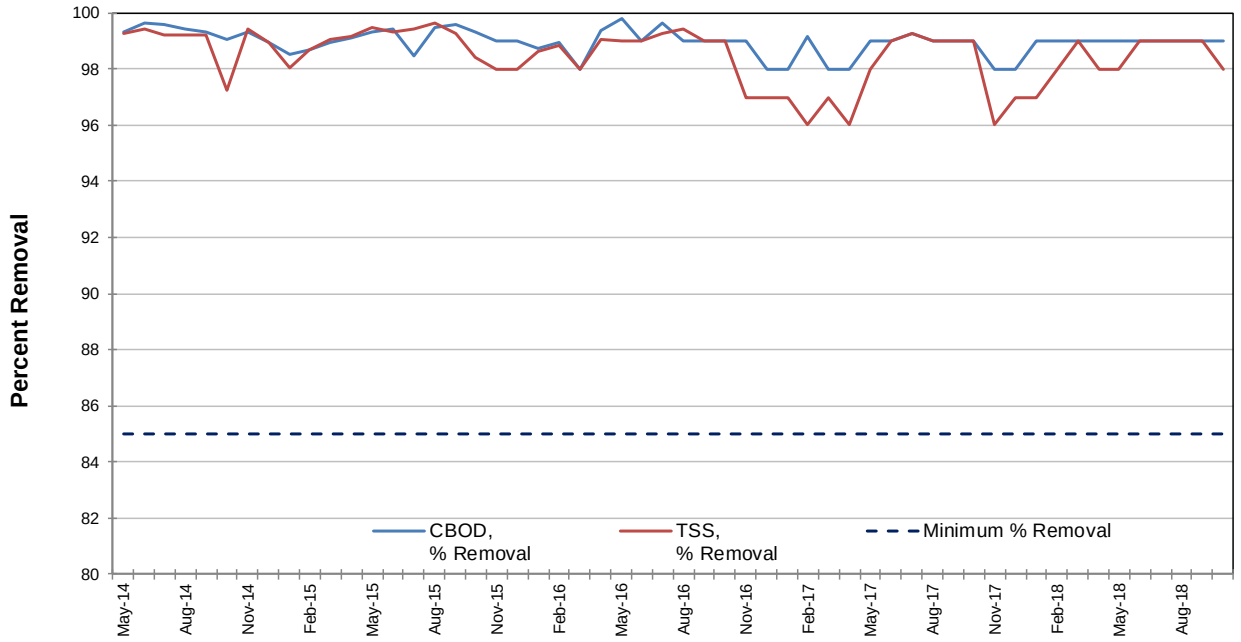


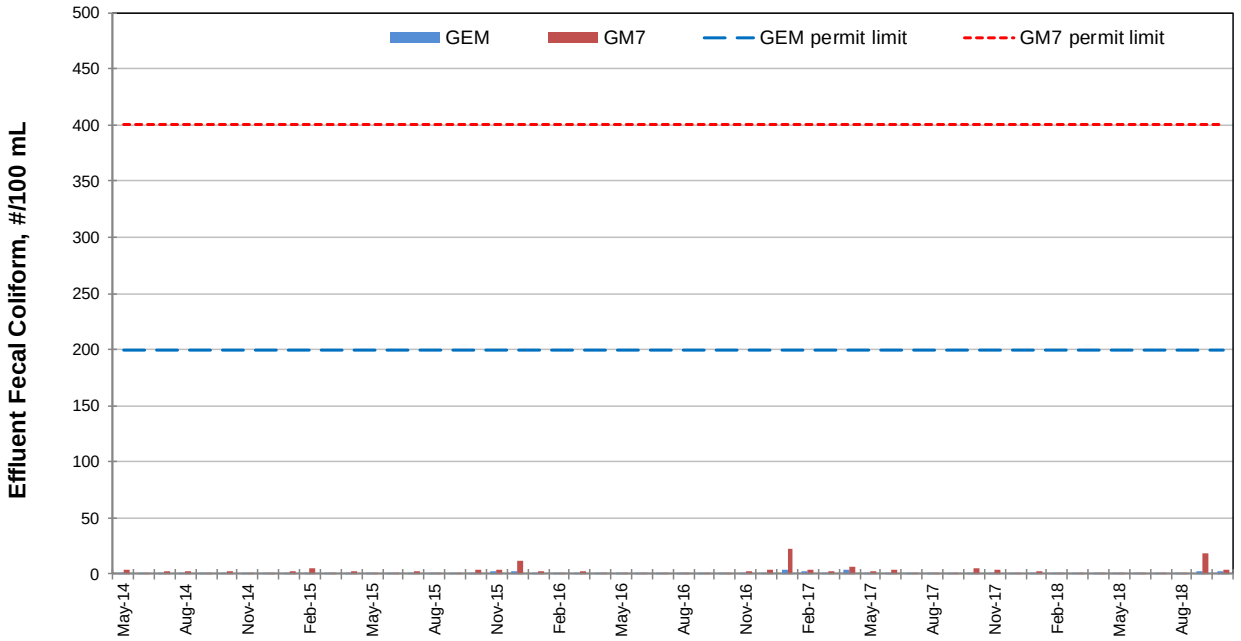
City of Snoqualmie WRF Effluent – TSS



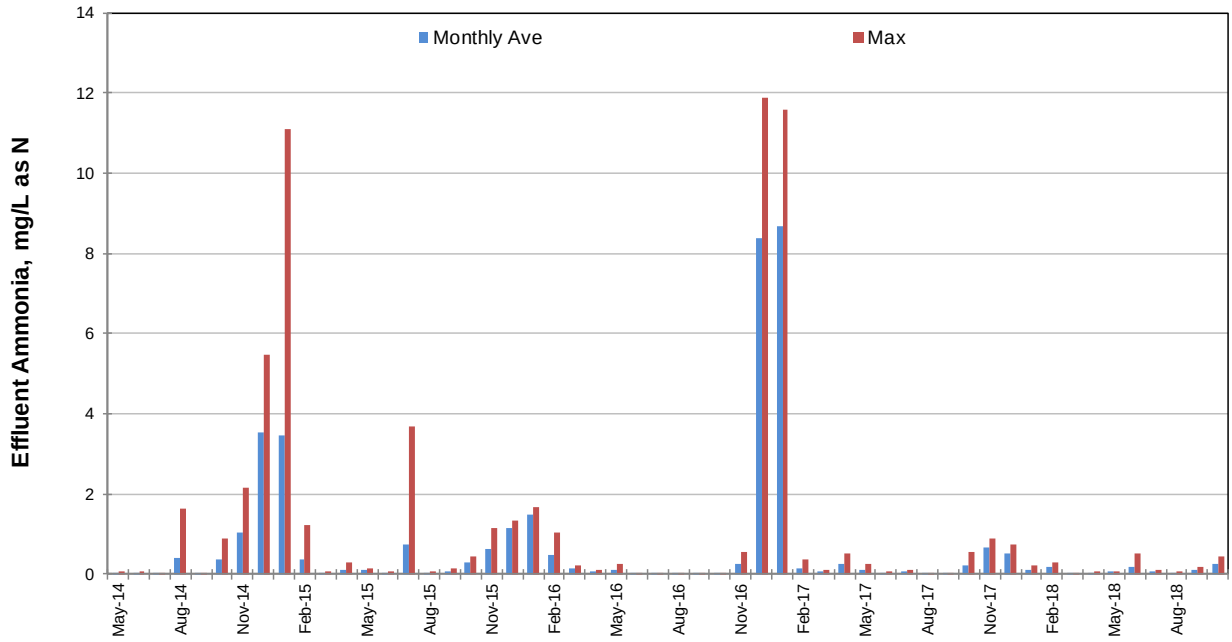


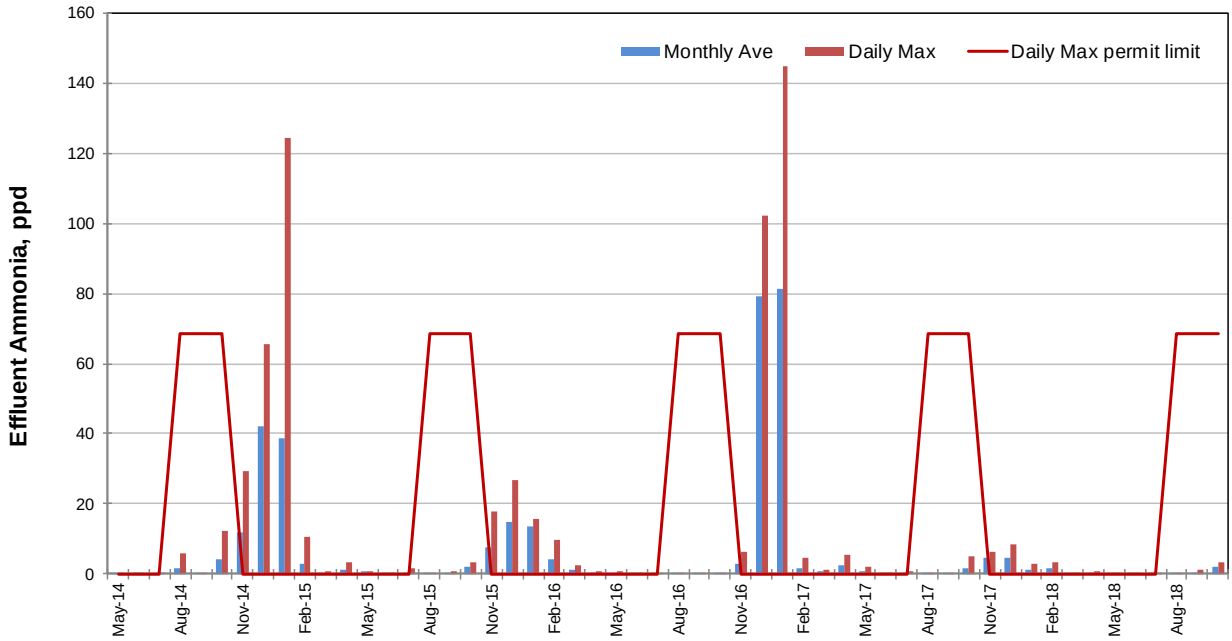
City of Snoqualmie WRF – CBOD & TSS % Removal and Effluent Fecal Coliform



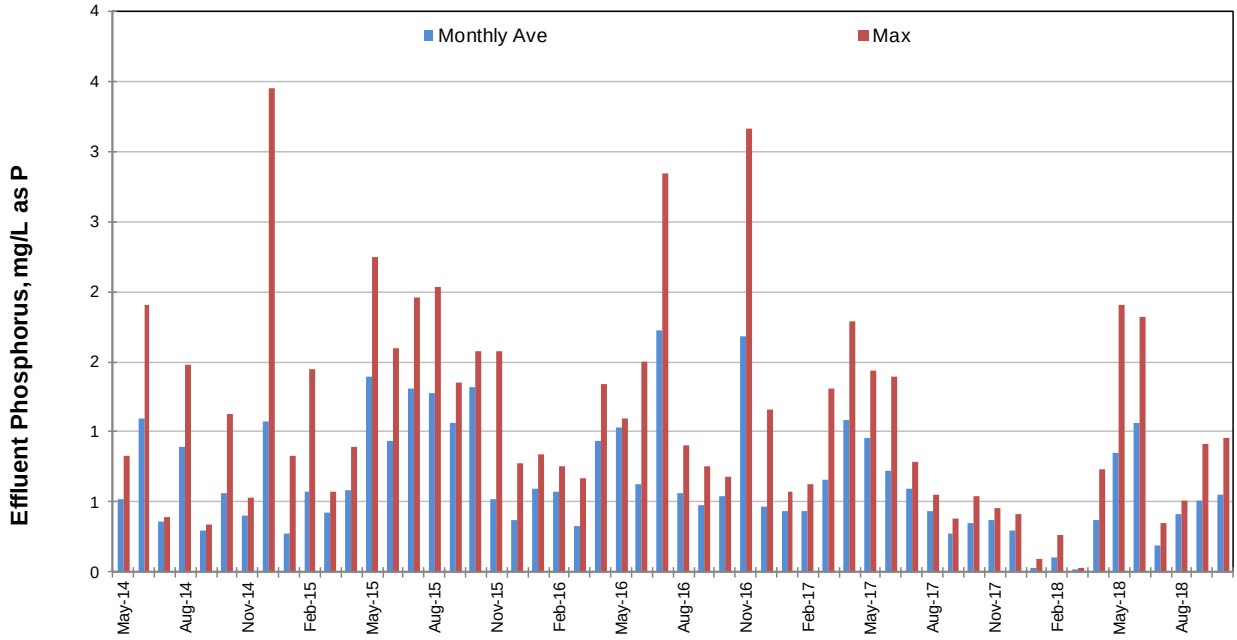


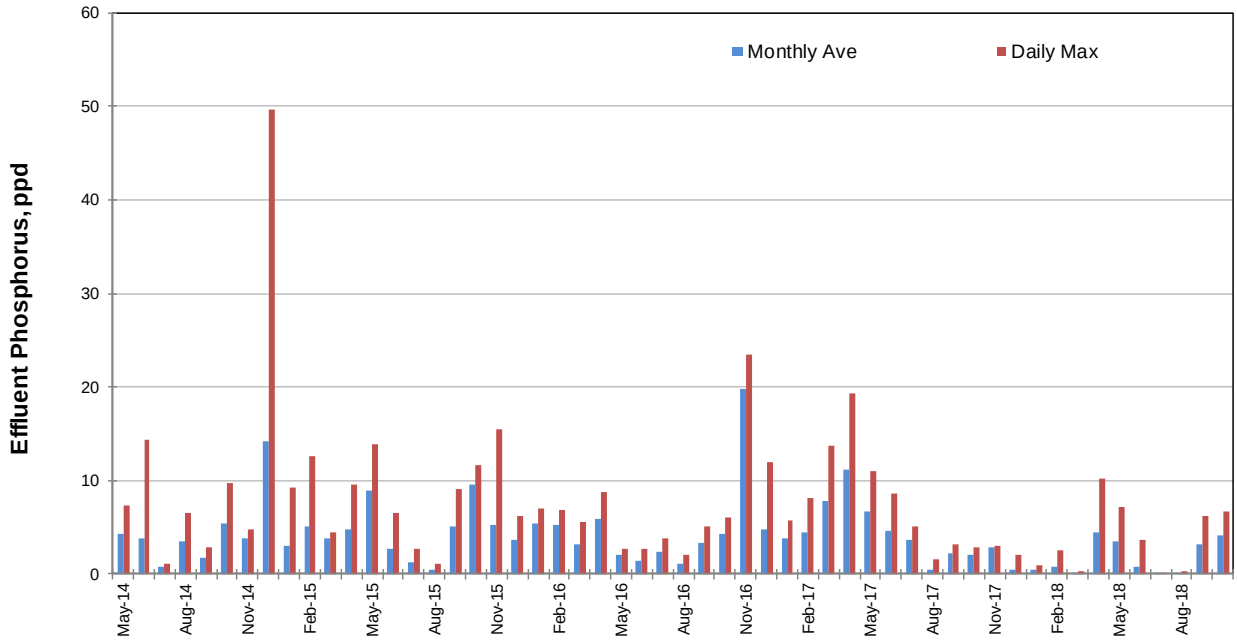
City of Snoqualmie WRF Effluent – Ammonia



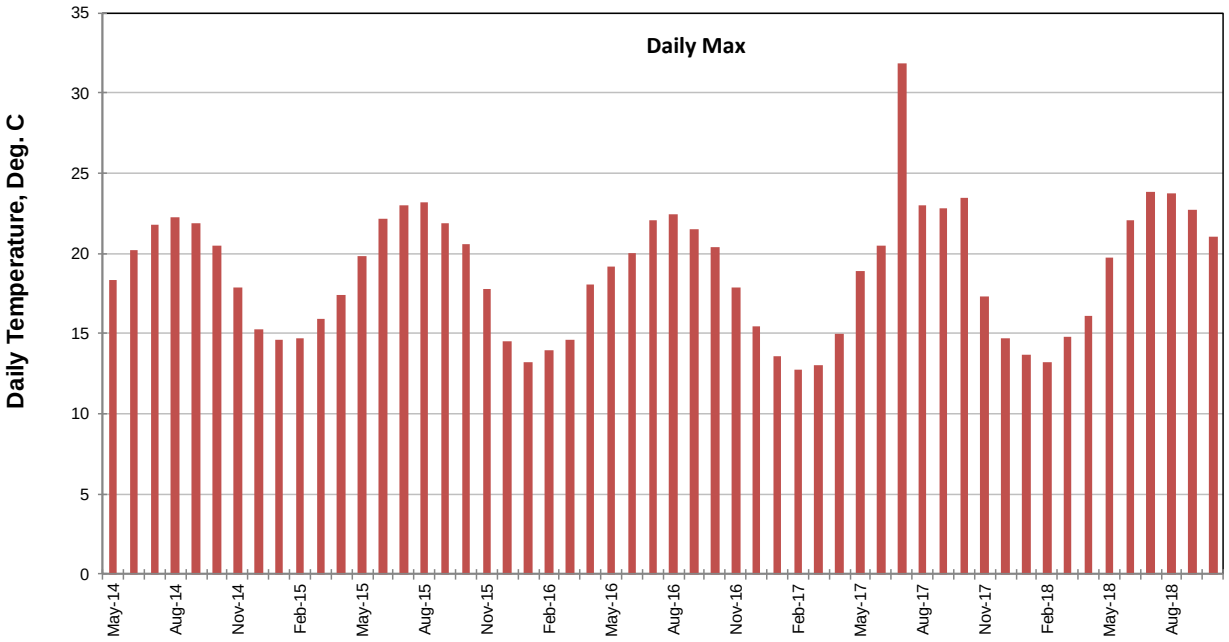


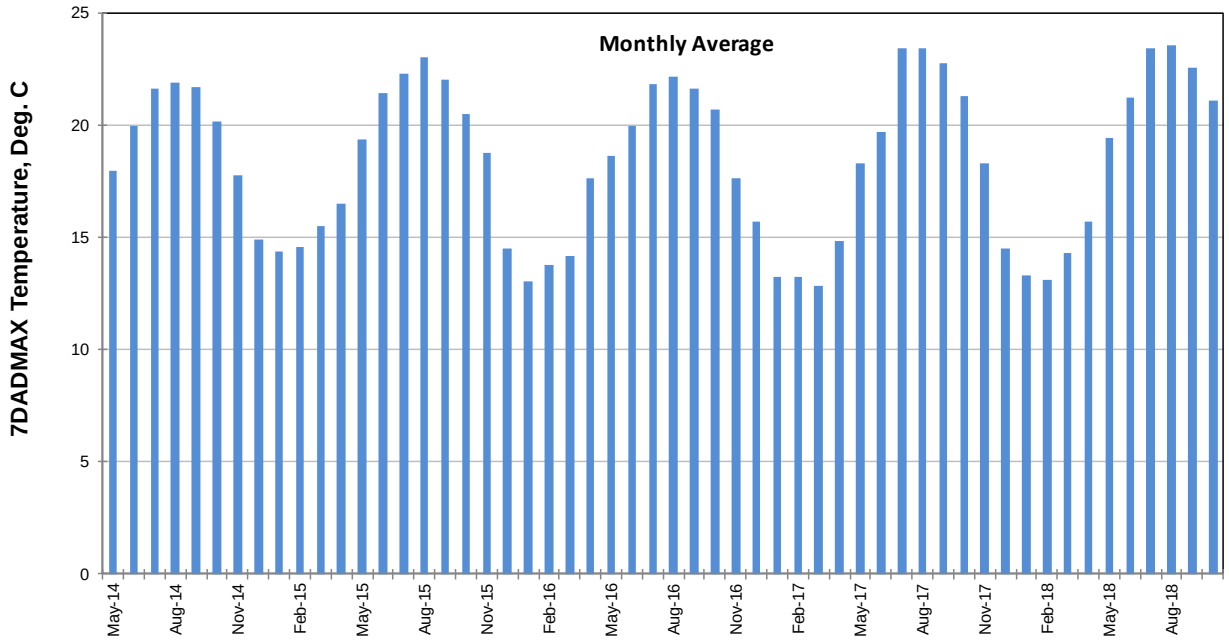
City of Snoqualmie WRF Effluent – Phosphorus





City of Snoqualmie WRF Effluent – Temperature





WET Test Results Summary for City of Snoqualmie WWTWRF											
Scheduled	Test Code	Collected	Start Date	Duration	Organism	Endpoint	NOEC	LOEC	PMSD	Effluent Survival (100%)	Met Performance Standard?
2017 January	JAMM0141	1/17/2017	1/18/2017	Acute	*Ceriodaphnia dubia* Water Flea	48-Hour Survival	100%	>100	n/a	100.0%	**Yes**
2017 January	JAMM0142	1/17/2017	1/18/2017	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	50%	100%	4.9%	95.0%	**Yes**
2017 April	JAMM0143	4/24/2017	4/25/2017	Chronic	*Ceriodaphnia dubia* Water Flea	7-Day Survival 7-Day Reproduction	100% 100%	>100% >100%	n/a 16.80%	N/A	**Yes**
2017 April	JAMM0144	4/24/2017	4/25/2017	Chronic	*pimephales promelas* Fathead Minnow	7-Day Survival 7-Day Growth	100% 100%	>100% >100%	5.6% 9.26%	N/A	**Yes**
2017 July	CDUD010	7/10/2017	7/11/2017	Acute	*Ceriodaphnia dubia* Water Flea	48-Hour Survival	100%	>100%	n/a	100.0%	**Yes**
2017 July	CDUD011	7/10/2017	7/11/2017	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	12.0%	100.0%	**Yes**
2017 October	CDUD071	10/3/2017	10/2/2017	Chronic	*Ceriodaphnia dubia* Water Flea	7-Day Survival 7-Day Reproduction	100% 100%	>100% >100%	n/a 38.9%	N/A	**Yes**
2017 October	CDUD072	10/3/2017	10/2/2017	Chronic	*pimephales promelas* Fathead Minnow	7-Day Survival 7-Day Growth	100% 100%	>100% >100%	16.0% 11.0%	N/A	**Yes**

Appendix G--Response to Comments

City of Snoqualmie Entity Review Comments:

Fact Sheet Comments:

City's Comment # 1: Consider revising facility name to "City of Snoqualmie Water Reclamation Facility (WRF)".

Ecology's Response: *Per City's request, the name of the facility has been revised.*

City's Comment # 2: Page 1 - Summary - The City of Snoqualmie owns, operates and maintains an oxidation ditch wastewater treatment facility that provides conventional secondary wastewater treatment and biological nutrient removal. Following the oxidation ditch treatment process, the facility uses gravity sand filtration and UV disinfection to produce Class A Reclaimed Water for seasonal irrigation uses on The Club at Snoqualmie Ridge.~~TPC Snoqualmie Ridge Golf Club~~. Ecology issued the previous permit for this facility on April 29, 2014 and modified it on May 11, 2018.

Ecology's Response: *Per City's request, the Summary paragraph has been revised.*

City's Comment # 3: Page 8 - Reclaimed water storage location - Change reference from TPC to "The Club at Snoqualmie Ridge."

Ecology's Response: *Per City's request, the name of the Golf Course has been changed.*

City's Comment # 4: Page 9 - First paragraph, add new 5th sentence: "As part of the City's planning effort, Ecology approved a Sewer System Comprehensive Plan in 1992 and a Final Wastewater Facilities Engineering Report in 1995, which recommended construction of new wastewater treatment facilities, including improvements for production of Class A reclaimed water and a force main pipeline for delivery of reclaimed water for summer golf course reuse."

Ecology's Response: *Per City's request, the first paragraph of the Facility Description section has been revised.*

City's Comment # 5: Page 10 - second paragraph, second sentence - Revise language as follows: "Major improvements related to this phase include replacement of the existing grit classifier and the air lift grit removal system, replacement of **anaerobic zone** mixers, construction of **a three cell** aerobic digester, upgrades to the WAS pump station, and a new Solids Hand**l**ing building. **The project also included the addition of odor control systems for the headworks and solids handling facilities.**"

Ecology's Response: *Per City's request, second paragraph of the "Facility Description" section has been revised.*

City's Comment # 6: Page 10 - Consider revising WWTWRF to WRF throughout the factsheet.

Ecology's Response: *Per City's request, Ecology has changed the name of the facility from City of Snoqualmie Wastewater Treatment and Water Reclamation Facility (WWTWRF) to City of Snoqualmie Water Reclamation Facility (WRF) throughout the entire document.*

City's Comment # 7: Page 10 - third paragraph, first and third sentences - Revise "City of Snoqualmie WWTWRF" to "City of Snoqualmie **WRF"**.

Ecology's Response: *Please, see response to comment # 6.*

City's Comment # 8: Page 10 - first paragraph under Collection system status - Revise first and second sentences as follows: "The collection system comprises of **seventeen** pump stations **(owned and operated by the City)**, **43** miles of gravity sewers and **6.8** miles of force mains." The mill site has a private pump station that discharges directly at the sewer plant so technically there are 3 private pump stations.

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 9: Page 10 - 4th paragraph last sentence. Weyerhaeuser mill site is not owned by Weyerhaeuser and the site has a gravity sewer system that is pumped by a private lift station to our site through a private forcemain.

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 10: Page 10 – Last paragraph - The WWTWRF's Supervisory Control and Data Acquisition (SCADA) system uses remote telemetry to monitor operations at all lift stations ~~except Lift Station #5 (Honey Farm).~~Honey farm has the ability to be connected to a portable generator while Pickering has a diesel powered pump that must be manually started during power extended power failures.

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 11: Page 11, first paragraph, second sentence under *Treatment processes*: "The 10 MGD headworks consist of a 6-mm perforated plate mechanical screen, two in-series manual bar screens (1.5-inch and 3/8-inch)…". Revise as follows: "… mixed liquor concentration of **2,500** mg/L…" Also, "overflow weir" should be called denitrification gate or diverter gate. Nothing about the gate overflows.

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 12: Page 11 - second paragraph, second to last sentence under *Treatment processes*: "Oxidation ditch system has a SRT of approximately 14 days and a mixed liquor concentration of 10,000 mg/L." Revise as follows: "… mixed liquor concentration of **2,500** mg/L…" Also, "overflow weir" should be called denitrification gate or diverter gate. Nothing about the gate overflows.

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 13: Page 11 - Second to the last paragraph. Wasted activated sludge (WAS) is collected in a ~~hopper~~ ~~and in a~~ sump.

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 14: Page 11 - Second paragraph, last sentence under *Treatment processes*. Revise language as follows: "Phosphorus and nitrogen are monitored **in the influent and effluent** of the ditches."

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 15: Page 12 – First paragraph - ~~November through May)~~, effluent flow from the secondary clarifiers are directed to a Trojan UV disinfection system with two channels and an average annual flow capacity of about ~~1.32~~ 10 MGD per channel at 67.5% UVT. Each channel houses three banks and each bank has nine ~~lamps~~ modules and each module has 6 lamps. Disinfected effluent is then discharge into the Snoqualmie River via outfall 001.

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 16: Page 12 - First paragraph, last sentence under *Reclaimed Water Production Process*: "A product water is blended with well water then pumped approximately one mile to the Eagle Lake storage reservoir at the TPC Snoqualmie Ridge Golf Course." Revise as follows "A product water is ~~blended with well water then~~ pumped approximately one mile to the Eagle Lake storage reservoir at the ~~TPC~~ <u>The Club at</u> Snoqualmie Ridge Golf Course."

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 17: Page 12 - First paragraph and several other locations. During dry weather ~~months~~ ~~(from June through October)~~ Class A is produced not just June through October. Revise wording. We usually start the system March 1 and run to November 1. Revise language to actual dates.

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 18: Page 13 - First paragraph, first sentence under *Reclaimed Water Distribution and Use Area*: "The City's WWTWRF delivers Class A reclaimed water blended with raw well water to the Eagle Lake storage reservoir at the TPC Snoqualmie Ridge Golf Course." Revise to: "The City's ~~WWT~~WRF delivers Class A reclaimed water ~~blended with raw well water~~ to the Eagle Lake storage reservoir at the ~~TPC~~ <u>The Club</u> at Snoqualmie Ridge Golf Course."

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 19: Page 13 - First paragraph, last sentence under *Reclaimed Water Distribution and Use Area*. Revise last sentence to read: "The City **uses** ~~divides~~ its allocation <u>and the City's municipal irrigation system to serve</u> ~~among~~ various <u>City and commercial municipal irrigation customers</u> in an 85-acre area in <u>Snoqualmie Ridge I</u>."

Ecology's Response: *The current permit does not authorize the City to provide reclaimed water to private customers (City of Snoqualmie; City of Snoqualmie Storm; Bandera; Snoqualmie Residential Owners Association; Snoqualmie Ridge Business Park Owners Association; and the Snoqualmie Ridge Joint Commission). Per letter from the City to Ecology on August 1, 2019, the City decided to transition its private irrigation customers to potable water supply. If the City aims to provide reclaimed water for these customers in the future, the City must submit a plan detailing how the reclaimed water produced at the facility will be conveyed to the users without being deteriorated with stormwater or any water of lower quality. After review and approval of the plan by the Department of Ecology and DOH, the City must also submit an engineering report followed by design documents (drawings and construction specifications) per WAC 173-240.*

City's Comment # 20: Page 13 - second paragraph under *Reclaimed Water Distribution and Use Area* regarding reclaimed water irrigation. Revise language to track language from previous Fact Sheets, *i.e.*, as follows: "City uses include irrigation of athletic fields at Snoqualmie Community Park, plants in the Snoqualmie Parkway median strip and landscape planters around businesses <u>in the Snoqualmie Ridge Business Park and</u> along Snoqualmie Parkway.

Ecology's Response: *Please, see response to comment # 19.*

City's Comment # 21: Page 13 - Under heading: *Authorized Uses*. Add the following: "<u>2. Seasonal irrigation of municipally- and commercially-owned properties within Snoqualmie Ridge I through the City's municipal irrigation system, with a maximum allocation of 0.57 MGD</u>."

Ecology's Response: *Please, see response to comment # 19.*

City's Comment # 22: Page 14 - Add new last sentence under heading *Water Rights Protection* to read: "<u>The joint Departments of Ecology and Health Reclaimed Water Facilities Manual, Publication No. 15-10-024, known as "the Purple Book," states that the "purpose of the impairment analysis is to evaluate the potential for impairment of existing water rights when a new reclaimed water project is planned." Accordingly, the Purple Book indicates, "the Reclaimed Water Rule, WAC 173-219-090(1), requires that an applicant for a reclaimed water permit demonstrate compliance with RCW 90.46.130 for all new reclaimed water projects, and for existing reclaimed water permits when permit modifications that change capacity and/or discharge volume are proposed</u>."

Ecology's Response: *Ecology has added a paragraph explaining that the City has conducted a water rights impairment analysis and it was concluded that as long as the City maintains the authorized reclaimed production limit of 1.56 MGD, no impairment of existing water rights downstream from the discharge point will occur.*

City's Comment # 23: Page 14 - first paragraph, last sentence under *Solid wastes/Residual Solids*. Revise sentence as follows: "Grit is **pumped** ~~then passes~~ through a grit classifier prior to being discharged to the dumpster."

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 24: Page 14 - second paragraph, fifth sentence under *Solid wastes/Residual Solids*. Revise sentence as follows: "Each digester has a capacity of **250,000** gallons, contains a top mixer in the center of the reactor and coarse air diffusers at the bottom."

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 25: Page 14 - second paragraph under *Solid wastes/Residual Solids*. Add new sentence to end of paragraph as follows: "**Odorous air is removed from the solids handling facility and digesters and treated with an in-ground biofilter.**"

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 26: Page 15 - first complete sentence on top of page: "Currently, the solids are hauled by Republic Services to Roosevelt Regional Landfill in Klickitat County. Revise to "Currently, the **Class B biosolids** are hauled by **Tenelco** to **Class B permitted sites**."

Ecology's Response: *Per City's request, paragraph has been revised.*

City's Comment # 27: Page 15 - Table 2, parameter: pH (Maximum / Minimum). Values are reversed. "Value Used" column should read "**8.3 / 6.2 standard units (s. u.)**"

Ecology's Response: *pH values on Table 2 (Ambient Background Data) have been revised.*

City's Comment # 28: Page 15 - table 2, parameter: TSS (90^{th} percentile / Average). Are the TSS concentrations in the river really this high? Value Used: 28 / 12.6 mg/L.

Ecology's Response: *The TSS values on Table 2 are correct. The Department of Ecology requires a quality assurance project plan (QAPP) for all ambient monitoring data stored unto the EIM database. Specifically, Ecology relies on sound freshwater data that is used to assess the health of the state's waterbodies. Data help us to identify trends and serve as the foundation for federal water quality 303(d) listings and subsequent water-cleanup investigations. Our Freshwater Quality Monitoring team follow strict protocols for sampling and processing to assure we produce quality data supporting water quality protection and cleanup across the state.*

City's Comment # 29: Page 17 – Table 4 and Table 5. The average ortho-phosphate in Table 4 is higher than the average Total Phosphorus in Table 5 (0.66 mg/L and 0.45 mg/L, respectively).

Ecology's Response: *All data listed on Table 4 and Table 5 come from the monthly DMR reports provided by the City. While it is expected that TP values are greater than ortho-phosphorus values, Ecology uses the best data available provided by the City. There is a possibility that the concentrations aforementioned are not necessarily from the same sample.*

City's Comment # 30: Page 18 - Table 6, parameter: BOD_5, Violation/Trigger. May-16 and November-16 BOD triggers (85% of design) – These are not triggers, they only occurred on one month. Per the permit, it would only be a trigger if 85% was reached for 3 consecutive months.

Ecology's Response: *Ecology's Permit and Report Information System (PARIS) registers each time influent flows and loadings reach 85 percent of design as "Permit Trigger". Technically, it does not constitute a permit trigger per Ecology's Permit Writers Manual. However, it functions as a warning to Ecology and to the Permittee.*

City's Comment # 31: Page 19 - Section F, water rights impairment analysis. Add new third and revised fourth sentences, as follows: "The Reclaimed Water Rule, WAC 173-219-090(1), requires that an applicant for a reclaimed water permit demonstrate compliance with RCW 90.46.130 for all new reclaimed water projects, and for existing reclaimed water permits when permit modifications that change capacity and/or discharge volume are proposed. Based on information supplied in the Reclaimed Water Permit Application, the Snoqualmie WRF is an existing facility planned, approved by Ecology and constructed by the City prior to adoption of RCW 90.46.130, and no new or expanded reclaimed water production is proposed in this Permit renewal. Therefore, the diversion of reclaimed water produced at the City of Snoqualmie WRF does not impair downstream water rights."

Ecology's Response: *Please, see response to comment # 22.*

City's Comment # 32: Page 26 - Table 11 average annual flow of 0.92 MGD??.

Ecology's Response: *Ecology conducted a statistical analysis using the data provided by the City through the monthly DMR reports. The 0.92 MGD average annual flow is in alignment with the average annual flow value computed in the previous permit cycle (0.94 MGD).*

City's Comment # 33: Page 27 - paragraph 4 and 5. The City's lab has been accredited for total coliform and Ecoli quantification for the last 10 years. There is no need to delay the change to the indicator from fecal to E.coli.

Ecology's Response: *Excellent. Ecology has removed the E.Coli accreditation from the Compliance Schedule.*

City's Comment # 34: Page 28 – paragraph 6 - Our outfall does not have a diffuser to limit mixing zone size???

Ecology's Response: *This is a standard language from the municipal NPDES fact sheet. Per Ecology's Permit Writers Manual, mixing zones are minimized by design factors and typically sized for the pollutant with the largest potential to violate water quality standards. Regardless, if an outfall has a diffuser or not, the mixing zone size is limited to protect water quality. For instance, WAC 173-201A specifies mixing zone sizes for acute and chronic criteria. The mixing zone specified for chronic aquatic life-based criteria will be used for the human health-based criteria. This mixing zone allows for some dilution when calculating effluent limits, but is still protective of human health.*

City's Comment # 35: Pages 33 and 67 - It is not consistent with the Permit Writers' Manual and other recently issued permits which include waste load allocations (WLAs) based on TMDL studies to require TMDL WLAs to be expressed as both average monthly and average daily limits.

A TMDL WLA is by definition a daily limit (e.g. 206 lb/day of CBOD). The reference that is cited in the Fact Sheet for the statistical based calculation of a more stringent average monthly limit is Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001, PB91-127415, March 1991). This method is intended to apply to bioconcentratable pollutants (toxics), not to far field pollutants such as CBOD and NBOD (NH3). The daily load allocation for CBOD and NH3 should be 206 lb/day and 68.7 lb/day (NH3 as N), respectively.

The following language from the Peshastin NPDES permit explains the rationale for establishing a monthly average which is the same as the daily WLA.

The Total Phosphorus WLA for the Peshastin POTW was established in the 2009 TMDL report as a maximum daily limit. The draft permit takes a different approach, implementing the WLA as an **average monthly limit** to achieve the objectives of the TMDL.

As explained at the beginning of this section, nutrients are far-field pollutants whose adverse effects occur away from the discharge even after dilution has occurred. Thus, for compliance with the WLA, Ecology determined an average monthly Total Phosphorus loading is appropriate. This approach is necessarily different from a WLA needed for a **toxic pollutant** where a maximum daily limit is more appropriate.

The draft permit determines compliance with the average monthly limit, based on eight monthly phosphorus sampling events, thus providing a sound statistical basis for meeting the WLA.

To illustrate support for the average monthly determination of the Total Phosphorus WLA, consider the following information.

A similar approach was used in when Ecology implemented a seasonal average to determine compliance with the Spokane River and Lake Spokane (Long Lake) Dissolved Oxygen TMDL in the 2011 permit issued for the Spokane County Regional Water Reclamation Facility. The seasonal average was based on an eight-month period (245 days) to determine compliance with the Total Phosphorus loading WLA in the TMDL. The Peshastin draft permit utilizes a monthly or 30-day average.

A longer term averaging approach for a WLA is allowed in federal regulation: 40 CFR122.45(d) allows that if daily maximum limits are impractical, longer-term averaging alternatives such as monthly, seasonal, or annual limits may be appropriate.

Additionally, the EPA has approved longer term averaging for nutrient-based wasteload allocation in various TMDLs, documents, and memos (see section VII. References for Text and Appendices).

- 2004 EPA Memo; James Hanlon
- 2006 EPA Memo; Benjamin Grumbles

Ecology's Response: *Ecology recognizes that the method used in the Peshastin NPDES permit is a viable option to establish WLAs. However, previous NPDES permits issued for the City of Snoqualmie were based on the Snoqualmie River TMDL and followed the federal NPDES regulations, where all permit limits must be expressed as both average monthly and maximum daily limits. The average monthly limit (AML) is calculated according to the method in EPA's Technical Support Document for Water Quality-based Toxics Control (1991). Changing the $CBOD_5$ and ammonia maximum daily limits to average monthly limits would result in less stringent limits, which constitutes backsliding. Therefore, the existing maximum daily limits will be retained in the proposed permit.*

City's Comment # 36: Page 33 - Paragraphs 4 and 5 on pH. As shown in the model pH Calculations table in Appendix D, an Effluent Alkalinity value of 99.00 mg CaCO3/L is used for the Effluent pH conditions of 6.0 and 6.5. The Effluent Alkalinity value is believed to be based on

very limited data. More importantly, the Effluent Alkalinity data may not reflect achievable levels when there are low Effluent pH conditions. Lower Effluent pH conditions will occur when more alkalinity is being consumed, which results in decreased buffering capacity. Effluent pH levels around 6.0 and 6.5 may only occur when Effluent Alkalinity is lower than 99.00 mg CaCO3/L. If that is the case, the calculations are not reflective of achievable "critical conditions".

The City is requesting that the NPDES permit limit remain at 6.3 for Minimum pH and instead 1 year of weekly of Effluent Alkalinity monitoring be required. Effluent pH level will be recorded at the same time each alkalinity sample is taken. The data would then be used to correlate Effluent Alkalinity levels to Effluent pH levels. Then the model pH Calculations (Appendix D) would be updated accordingly to determine a change or no change to the Minimum pH permit limit of 6.3.

Ecology's Response: *Ecology used the best available data provided by the City. A preliminary computation of the pH limits using the alkalinity data from the WET reports yielded a minimum pH limit of 6.68, which was the same approach used in previous permit cycles. Recognizing that a minimum pH limit of 6.68 would represent a challenge for the City, the Department of Ecology contacted the City immediately and requested one and half months of effluent alkalinity data to recalculate the pH limits. The sample size used for the pH limits recalculation is greater than the sample size used in previous permits and it is statistically significant. Therefore, the minimum pH limit of 6.5 will be retained in the proposed permit.*

A compliance schedule is included in the permit to give enough time for the City to plan and implement treatment process adjustments to reliably meet the newly established minimum pH limit.

City's Comment # 37: Page 36 - Paragraph under "*Reasonable Potential Analysis*" on **Temperature** in regards to a waste load allocation of 24.7 degrees C from June 1st to September 30th. During the period of June 1st to September 30th, the City's WRF experiences the lowest flows of the year (dry weather flows) and for much of this time period sends a large portion or all of the treated effluent to Eagle Lake as reclaimed water. As such, the effluent flows to the river can vary from 0 MGD to 0.9 MGD during this time period.

The 2011 Snoqualmie River Basin Temperature TMDL report set this waste load allocation, and in Table 28, also indicated that the 24.7 degrees C limit was for the design flow of 2.15 MGD. Table 28 also includes data for Snoqualmie at "Current Flow" of 1.24 MGD the T(npdes) should be 31.1 degrees C. The City is requested that the NPDES permit temperature limits be updated to be flow based and match the flow based temperature limits as noted in Table 28.

Ecology's Response: *Historical data show that the City of Snoqualmie WRF can reliably meet the wasteload allocation of 24.7°C based on design flow conditions. In other words, per "Snoqualmie River Basin Temperature Total Maximum Daily Load" from 2011, the facility can meet the design condition discharge temperatures with negligible chance of causing A 0.3°C temperature exceedance to the Snoqualmie River. The 24.7°C T_{NPDES} listed on Table 28 of the TMDL study represents the most conservative effluent temperature that is protective of aquatic life any time of the year when ambient temperatures rise above the numeric standard.*

The temperature limit of 24.7°C was included in the previous NPDES permit and the City has been able to comply with it. Changing the temperature limit from 24.7°C to 31.1°C would constitute backsliding, which is not allowed under the Water Quality Standards (WAC 173-201A). Therefore, the TMDL wasteload allocation of 24.7°C will be retained in the proposed permit.

City's Comment # 38: Page 43 - Section C, "*Distribution system limits*". First paragraph, modify third sentence to read as follows: "A chlorine residual is not required ~~It does not apply to water held in storage (~~in reclaimed water impoundments, storage tanks or storage ponds **at the point of use**~~)~~ or to water conveyed **along** ~~to a point of use~~ along ~~through~~ surface waters or groundwater.

Second paragraph, modify to read as follows: On August 1, 2019, the City of Snoqualmie requested a waiver of the residual chlorine requirement based on the fact that Eagle Lake is a reclaimed water impoundment to which the chlorine residual does not apply, and which is located on ~~the~~ **an** end user site (~~TPC~~ The Club at Snoqualmie Ridge Golf Club), where Class A reclaimed water is withdr**a**~~o~~wn for seasonal landscape irrigation on the golf course and nearby Snoqualmie Ridge I municipal and commercial properties. ~~Moreover, the City has decided to provide irrigation for public spaces and private customers using potable water~~. In consultation with the Department of Health, Ecology determined that, to the extent necessary, a waiver is warranted. Therefore, the proposed permit does not include a chorine residual requirement for the distribution system for seasonal irrigation downstream of Eagle Lake.

Ecology's Response: *The standard language used in this first paragraph is accurate and will be retained. No revision is needed. With respect to the second paragraph, please see response to comment # 19.*

Permit Comments:

City's Comment # 39: Page 5 - Summary of Permit Report Submittals - Delete DMR QA/QC review letter because it is not in other NPDES permits.

Ecology's Response: *This requirement is specific for the City of Snoqualmie WRF and it will be retained. In previous permit cycles, the City did not consistently comply with requirements for timely submittal of reports and data. Specifically, the facility submitted several monthly DMRs either late or with significant errors that required correction and, consequently, resubmittal. If the City successfully complies with this requirement in the proposed permit cycle, Ecology may eliminate it from future permit cycles.*

City's Comment # 40: Page 5 - Summary of Permit Report Submittals – The permit reference to the Analytical Bench Sheets is incorrect.

Ecology's Response: *Per City's request, the reference to the Analytical Bench Sheets submittal has been corrected.*

City's Comment # 41: Page 5 - Summary of Permit Report Submittals - The Permittee must immediately report to Ecology and the Public Health of Seattle-King County (at the numbers listed below), all:

- Failures of the disinfection system ***that results in a violation of the effluent discharge limits. The disinfection system is defined as the Trojan UV 3000+ equipment.***

- For the ccollection system owned by the city, overflows ***discharged to waters of the state, or public areas, that are not contained and present no risk to the public.***

- Plant bypasses resulting in a discharge ***that exceeds the effluent limitations of the permit.***

Any other *Major* failures of the sewage system *as* ***determined by the certified operator*** (pipe breaks, etc) ***that in the operators opinion effluent limits could be exceeded or public health is at risk.***

Ecology's Response: *Language in the Reporting Permit Violations section was slightly revised and it is appropriated to the City of Snoqualmie WRF.*

City's Comment # 42: Page 5 - Summary of Permit Report Submittals - Delete number 5 or delete the reference to immediate reporting in S3.F.2 Which is it? We are ok with immediate reporting as long as the clarifications are made in the previous comments. Permittee is only required to do a 5 day follow up report if immediate reporting was required under section A. Remove reference to section B.

Ecology's Response: *Bullet point # 5 of the S3.F.b section (Twenty-four-hour reporting) is redundant and it has been deleted.*

The 5-day reporting is required 5 days of the time that the Permittee becomes aware of any reportable event under subparts S3.F.a or S3.F.b. One reporting does not exclude the other. Per provisions of the NPDES; immediate reporting, twenty-four-hour reporting and report within 5 days must be submitted to Ecology for the same non-compliance event. Ecology has learned that additional information becomes available to the Permittee as time and investigation progress, and the latest reporting always corroborate reports that are submitted earlier.

City's Comment # 43: Page 5 - Summary of Permit Report Submittals (Infiltration and Inflow Evaluation). Why do we need to do this when the comp plan clearly takes into account how we will deal with the projected flows for instance either by reducing I&I or increase system capacity through upgrades? I would recommend deleting this requirement because the flows and loads are included and projected in the comp plan.

Ecology's Response: *As it is discussed in the Facility Description section of the fact sheet, the City completed an evaluation of inflow and infiltration (I&I) in November 2012. The evaluation used plant flow, water usage, and rainfall data from 2007 to 2010 to estimate I&I in the system. While the study identified that the older portions of the collection system in the historic Snoqualmie City core has I&I rates approximately 14 times higher than newer section in the Snoqualmie Ridge area, the overall rates of I&I are not above the level EPA considers "excessive". The Snoqualmie WRF presently has sufficient treatment capacity to treat excess flow caused by I&I and the City has not reported any sanitary sewer overflows that can be attributed to I&I.*

However, the City has verbally communicated to Ecology that the 2012 General Sewer Plan is currently been updated and it will present a discussion of the current status of I/I in the collection system. Furthermore, 7 years have passed and no I/I evaluation has been requested from Ecology.

City's Comment # 44: Page 20 , Section 5, Operation and Maintenance. This operator must be in responsible charge of the day-to-day operation ***and maintenance*** of the wastewater treatment plant. Need to add the word maintenance to comply with the RCW covering certification requirements.

Keep maintenance records on all major electrical, ***SCADA*** and mechanical components of the treatment plant, as well as the sewage system and pumping stations. Such records must clearly specify the frequency and type of maintenance recommended by the manufacturer and must show the frequency and type of maintenance performed.

Ensure all operations and maintenance tasks done on WWTP process equipment or systems, including process management and SCADA computer systems ***(including WRF control system servers and internal network control system infrastructure,*** are performed or supervised by an operator certified by the State of Washington. The Permittee may allow qualified mechanics**,** ***programmers or network engineers*** and electricians or other trained tradespersons appropriate for specific tasks to perform work on equipment as long as a certified operator is on site to ***supervise, authorize, and*** verify that the work performed does not adversely impact facility operations, effluent quality, or process monitoring and alarm reliability.

Make maintenance records available for inspection at all times ***on site at the*** *WRF*.

Ecology's Response: *Section 5 (Operation and Maintenance) has been properly revised to reflect the most current operation and maintenance practices at the facility.*

City's Comment # 45: S5.D. Electrical power failure - For this section the operator is the authority on determining if sufficient treatment is being provided to maintain the biota.

Ecology's Response: *Ecology concur with the City. The operation and maintenance practices at the City of Snoqualmie WRF must assure that appropriate treatment is being provided to maintain a healthy activated sludge (active biomass). The provisions related to the Reliability Class II apply to facilities whose discharge, or potential discharge, as a result of its volume and/or characteristics, would not permanently or unacceptably damage or affect the receiving waters or public health during periods of short-term operations interruptions, but could be damaging if continued interruption of normal operations were to occur (on the order of several days).*

City's Comment # 46: Section 8 - Lab Accreditation for E. Coli Analysis. The permittee has been accredited for Ecoli for the last 10 years. We have no issue with eliminating the compliance schedule and changing the limit from fecals to Ecoli when the permit is finalized.

Ecology's Response: *Ecology has removed the laboratory accreditation for E.Coli from the Compliance Schedule section.*

City's Comment # 47: Section R2.A - Reclaimed Water Monitoring Report - The Permittee must monitor the source water to the reclaimed water treatment system to verify it meets the minimum biological oxidation performance standards. The compliance point for this monitoring is the finished reclaimed water prior to ~~distribution~~. Consider revising word to transmission because there are no customers between treatment and the unrestricted storage impoundment eagle lake

Ecology's Response: *Per City's request, text of the R2.A section has been revised.*

City's Comment # 48: Section R3.B - Annual Summary Report. It is not possible to provide all the requested data because each use location doesn't have a water meter.

Ecology's Response: *This report is designed to gather information related to the reclaimed water production at the City of Snoqualmie WRF. The City must provide its best estimate of the number of days of reclaimed water production and distribution, the total volume produced and distributed and so on. In the propose permit, the City has only one customer (the Snoqualmie Ridge Golf Course) and it should not be impossible to provide the information requested.*

City's Comment # 49: Section R3.C - Reporting Violations of Reclaimed Water Production and Distribution Conditions. Should be r3G and the same comments for outfall 1 on this topic should be included for this about reporting. See comment above.

Ecology's Response: *Per City's request, the reference and numbering has been corrected.*

City's Comment # 50: Section R4.A.1 (Authorized uses and locations). Modify first sentence to read as follows: "The Permittee may produce and distribute Class A reclaimed water to Eagle Lake at The Club at Snoqualmie Ridge, for seasonal landscape irrigation at the golf course and nearby Snoqualmie Ridge I municipal and commercial properties pursuant to use agreements authorized under R4.B.d below.

Ecology's Response: *Please, see response to comment # 19.*

City's Comment # 51: Section R4.B.c.1 (Use are requirement). Modify first sentence to read as follows: "Use of reclaimed water ~~at the TPC Snoqualmie Ridge Golf Club~~ must comply with the following restrictions...."

Ecology's Response: *Per City's request, first sentence of section R4.B.c.1 has been revised.*

City's Comment # 52: Section R4.C (Cross-connection Control Program Plan). It is unclear how these requirements are different from local purveyor's cross connection control program. Is this a cross connection control program that is in addition to the Cities water system cross connection control program? Please verify.

Ecology's Response: *The cross-connection control program plan discussed in Section R4.C is different from the City's plan for drinking water cross-connection (WAC-246-290-490). For the purpose of compliance with the provisions of the reclaimed water permit, the City must develop a plan that details how the City will ensure that cross-connections between reclaimed water and water of lower quality, and between drinking water and reclaimed water are eliminated or controlled.*

Conversely, the local purveyor's cross connection control program from the City focuses on cross-connections between the distribution system and a customer's premises.

City's Comment # 53: Section R4.D (Water Rights Protection). Delete second paragraph, as follows: ~~The Permittee must document in the next application for permit renewal how theuse of reclaimed water from the permitted facility complies with the water rights protection provisions in WAC 173-219-090 and RCW 90.46.130.~~

Replace this paragraph with the section from the fact sheet that reads: "The Reclaimed Water Rule, WAC 173-219-090(1), requires that an applicant for a reclaimed water permit demonstrate compliance with RCW 90.46.130 for all new reclaimed water projects, and for existing reclaimed water permits when permit modifications that change capacity and/or discharge volume are proposed. Based on information supplied in the Reclaimed Water Permit Application, the Snoqualmie WRF is an existing facility planned, approved by Ecology and constructed by the City prior to adoption of RCW 90.46.130, and no new or expanded reclaimed water production is proposed in this Permit renewal. Therefore, the diversion of reclaimed water produced at the City of Snoqualmie WRF does not impair downstream water rights."

Ecology's Response: *Please, see response to comment # 19.*

City's Comment # 54: Section R6.A. Certified operator first sentence. Consider revising sentence as follows:An operator certified for at least a Class III plant by the State of Washington must be in responsible charge of the day-to-day operation of the reclaimed water production ***and distribution.***

Ecology's Response: *This is a standard language of the NPDES permit and no revisions are needed.*

City's Comment # 55: Page 50 - R5A.1, Second Sentence: "This average does not include the flow volume of any raw well water that the Permittee blends with Class A product water for the delivery to the Eagle Lake storage reservoir." The City no longer blends raw well water with Class A reclaimed water.

Ecology's Response: *Per City's request, the second sentence of section R5.A.1 has been revised.*