

Fact Sheet for NPDES Permit WA0052175

Peshastin POTW

May 15, 2019

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the Public Utility District #1 of Chelan County (PUD or Permittee) Peshastin Publicly-Owned Treatment Works (POTW). **[gray highlighted text throughout this fact sheet indicate revisions after public review in response to public comments. See Appendix E for more details about these revisions]**

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 Peshastin POTW, NPDES permit WA0052175, are available for public review and comment from April 5, 2019 until May 5, 2019. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

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

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

Summary

Public Utility District No. 1 of Chelan County (PUD) is seeking reissuance of the NPDES Discharge Permit for its Community of Peshastin Publicly-Owned Treatment Works. The treatment plant is located in Peshastin and serves the unincorporated Community of Peshastin and two nearby fruit packing facilities. The initial POTW was constructed in response to failing onsite systems and began operating in October 1997. Major components of the existing POTW include a Septic Tank Effluent Pump (STEP) collection system with pressurized sewers, a five phase sequencing batch reactor, ultraviolet disinfection, and aerobic digestion and sludge dewatering. The POTW discharges treated wastewater to the Wenatchee River.

Ecology issued the existing permit for this facility with an effective date of June 1, 2016 and an expiration date of May 31, 2019.

In June 2007 Ecology issued the *Wenatchee River Watershed Temperature TMDL Report* that documented temperature impairments in the Wenatchee River. The existing and proposed permits contain the approved wasteload allocation for effluent temperature.

The proposed permit is largely unchanged from the existing permit. The primary differences are:

- The revised due date for the Permittee's submittal of the post-upgrade operations and maintenance manual in condition S5.G.
- Revision of the design loadings in condition S4.A.
- Addition of an effluent phosphorus limitation.

In August 2009 Ecology issued the *Wenatchee River Watershed Dissolved Oxygen and pH TMDL Report* (TMDL Report) that documented DO and pH impairments. Corrective actions for all such impairments (303(d)-listings) were established in the TMDL Report. A water quality-based total phosphorus WLA established by those TMDLs has been incorporated into the proposed permit.

Currently, the PUD is upgrading its treatment plant to achieve compliance with the phosphorus WLA identified in the TMDL report. The treatment plant upgrade is expected to be completed in March 2020.

The proposed permit revises two deadlines from the existing permit. First, the deadline for compliance with the phosphorus WLA has been extended from March 1, 2019 to March 1, 2020. This deadline was extended through mutual agreement between Ecology and the PUD. Second, the due date for the operations and maintenance manual for the upgraded treatment plant was extended from May 31, 2018 to July 1, 2020.

This permit contains interim and final effluent limitations and interim and final monitoring schedules. The effective date for final effluent limitations and monitoring provisions after the treatment plant upgrade is completed, is March 1, 2020. The final provisions contain a water quality-based effluent limit and monitoring requirements for total phosphorus.

The proposed permit contains effluent limits for 5-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), pH, and fecal coliform bacteria. In addition, temperature and total phosphorus effluent limits are included to address the water quality impairments and TMDL requirements. The proposed permit also contains revised design criteria as a result of the treatment plant upgrade.

In summary, the upcoming permit cycle will be utilized to complete construction of the ongoing treatment plant upgrade, fine tune its phosphorus removal operations and collect effluent data to support a full review of the facility's compliance with all applicable state and federal laws and regulations at the next permit renewal.

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I. Introduction

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

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

II. Background Information

Table 1 General Facility Information

Facility Information	
Applicant	Public Utility District #1 of Chelan County
Facility Name and Address	Peshastin Publicly-Owned Treatment Works 10395 Mill Road Peshastin, WA 98847
Contact at Facility	Name: Dale Pipkin Telephone #: (509) 548-6390
Responsible Official	Name: Ron Slabaugh Title: PUD Water/Wastewater Manager Address: PO Box 1231, Wenatchee, WA 98801 Telephone #: (509) 661-4131
Type of Treatment	Septic tank effluent pump (STEP), activated sludge, sequencing batch reactor (SBR), Ultraviolet (UV) disinfection.
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.574238 Longitude: -120.611102
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Wenatchee River, River Mile 20.7 Latitude: 47.573739 Longitude: -120.611632

Permit Status	
Issuance Date of Previous Permit	March 8, 2010
Issuance Date of Reauthorized Permit	April 27, 2016
Application for Permit Renewal Submittal Date	May 31, 2018
Date of Ecology Acceptance of Application	June 12, 2018

Inspection Status	
Date of Last Non-sampling Inspection Date	December 4, 2018

Figure 1 Facility Location Map



A. Facility description

History

In 1990, due to the concerns about onsite sewage system failures, the residents of the Community of Peshastin (Community) petitioned the Chelan County PUD #1 (PUD) to determine the feasibility of providing wastewater collection, treatment, and disposal services to the area. The Community is located on the lower east slopes of the Cascades in the upper reaches of the Wenatchee River Valley, on Highway 2, about 100 miles east of Seattle and 17 miles west of Wenatchee.

Construction began on the PUD's Publicly Owned Treatment Plant (POTW) in 1996 and it began operating in October 1997.

Collection system status

The collection system consists of approximately 3.3 miles of 2-inch through 8-inch pressurized piping which delivers the effluent from PUD-owned septic tanks to the treatment facility. This type of collection system eliminates the need for pumping stations and deep excavations, and typically has low rates of infiltration and inflow.

Treatment processes

Existing Treatment Plant Processes

The current, pre-upgrade treatment plant processes are briefly summarized below. The information is from the December 2009 fact sheet.

Septic tank effluent pump	Satellite septic tanks sited within the service area provide primary-level treatment, negating the need for a headworks at the treatment plant. Pumps within each tank transfer settled effluent through a pressurized collection system to the treatment plant.
Pre-chlorination injection system	Maintains wastewater pH above 6.0 to sustain alkalinity levels and facilitate nitrification. Also, minimizes toxicity and odors caused by hydrogen sulfide in the influent, which is a common occurrence in pressurized collection systems. This system has not been used, as of the date of this fact sheet.
Sequencing batch reactors (2)	Continuous-flow system which provides secondary treatment and nitrification. Utilizes a five-phase process that combines aeration and clarification in the same basin. SBR phases can be configured for ammonia, nitrogen or phosphorus removal by altering the aeration and mixing processes.
Sludge digesters (2)	Treats, stabilizes and thickens waste solids produced by the SBRs before pumping to the solids dewatering system. The digesters are currently equipped with coarse bubble diffusers supplied by aeration blowers.
Effluent meter	Continuously measures and records effluent flows. Provides effluent flow data to the effluent autosampler.
UV disinfection	Contains two banks of low-intensity lamps.

Upgraded Treatment Plant Processes

The following table summarizes the major modifications to treatment plant processes, based on information in the *Peshastin Wastewater Treatment Facility Upgrades Preliminary Design Report (Design Report)*, dated February 2017 and construction plans and specifications dated September 20, 2018 prepared by RH2 Engineering, Inc., for the ongoing current PUD POTW upgrade.

Influent Equalization	Two-tank 30,000 gallon equalization with pumping to the SBRs
Influent flow meter	Replace with electromagnetic meter.
Pre-chlorination injection system	Will be removed.
SBR blowers (3)	Replace with new blowers.
Aeration diffuser system	Replace with fine-bubble aeration system.
Digester blowers	Will be removed, digester air supply will be fed from new SBR blowers.
Effluent Equalization	15,000 gallon equalization with pumping to effluent filters.
Tertiary effluent filtration	Two-stage sand filtration with chemical dosing equipment.

The *Design Report* also contains information on systems that will be retained or will be evaluated for replacement during the upgrade.

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/>

Solid wastes/Residual Solids

Solids removed from the upgraded treatment plant processes will be thickened utilizing a new flat plate silicon carbide membrane thickening system and transferred to the aerobic digesters for further treatment. Dewatered biosolids will continue to be land applied under contract with Boulder Farms near Mansfield, WA.

Discharge outfall

Secondary treated and disinfected effluent is discharged from the facility via an open-ended pipe into the Wenatchee River at river mile 20.7. The discharge is continuous through a 300-foot long, 10-inch diameter effluent pipe that transitions to an 8-inch diameter pipe connected to the outfall located 6 feet from the nearest bank. The outfall, which rests on the bottom, was reported in the “as built drawings” at three feet below the water’s surface. This value was probably determined when the outfall was installed and it does not reflect low flow (7Q10) conditions. The 7Q10 low flow depth is 0.8 ft.

B. Description of the receiving water

The Peshastin treatment plant discharges to the Wenatchee River. Other nearby point source outfalls include the City of Leavenworth wastewater treatment plant, located approximately four miles upstream and the City of Cashmere wastewater treatment plant, located approximately 8 miles downstream. The Community of Dryden’s wastewater treatment system, located approximately five miles downstream of Peshastin, discharges to ground. Significant nearby non-point sources of pollutants include domestic drainfields, agricultural runoff, and stormwater runoff from nearby roads. Section III.E of this fact sheet describes any receiving waterbody impairments.

C. Wastewater influent characterization 2016-2018

The PUD reported the concentration of influent pollutants in discharge monitoring reports. The treatment plant’s existing and post-upgrade design loadings are also provided to provide context to the characterization data.

Table 2 Wastewater Influent Characterization 2016-2018

Parameter	3-year Average	Maximum Monthly Average	Existing Design Loadings	Upgraded Design Loadings
Average Flow (maximum month), in MGD	0.057	0.085	0.11	0.11
5-day Biochemical Oxygen Demand (BOD ₅) (maximum month), in lbs/day	80.5	130	240	200
Total Suspended Solids (TSS) (maximum month), in lbs/day	37.0	66.2	240	200

Figure 2 Wastewater Influent Flow 2015 - 2018

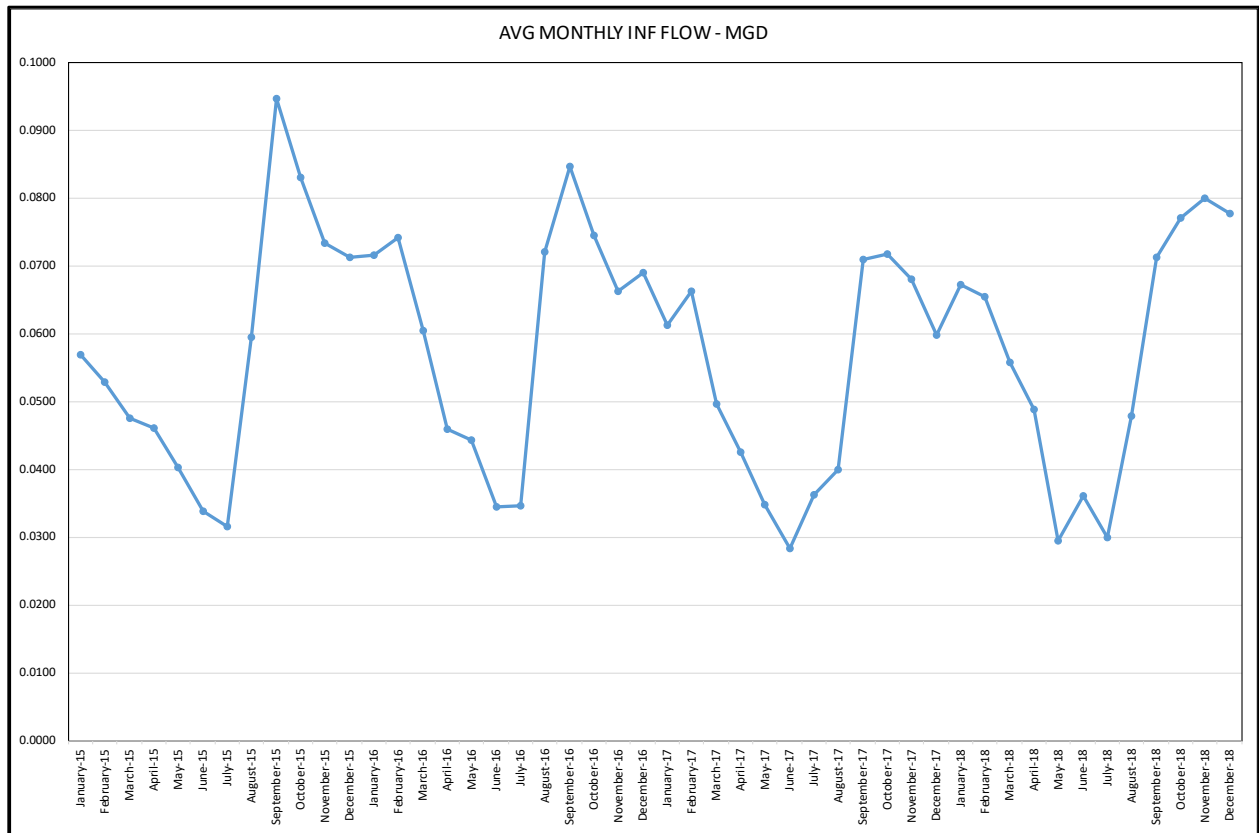


Figure 2 above presents the average monthly influent flow (expressed as million gallon per day) that exhibits pronounced within-year variation.

D. Wastewater effluent characterization 2016-2018

The PUD reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data is based on DMR data and represents the quality of the wastewater effluent discharged from January 1, 2016 through December 31, 2018. The wastewater effluent character is as follows:

Table 3 Wastewater Effluent Characterization 2016-2018

Parameter	Monthly Average	Highest Reported Average Monthly	Highest Reported Average Weekly
BOD ₅ , in mg/L	4.7	10.1	16.5
TSS, in mg/L	6.5	15.2	45

Parameter	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean	Monthly Geometric Mean	Weekly Geometric Mean
Fecal Coliforms, in colony forming units (CFUs)	16.3	59	200	400

Parameter	Minimum Value	Maximum Value	Minimum	Maximum
pH, in standard units (SUs)	6.98	8.82	6	9

E. Summary of compliance with previous permit (effective date June 1, 2016).

The 2016 permit placed effluent limits on BOD₅, TSS, fecal coliform bacteria, pH, and temperature.

The Peshastin POTW has generally complied with the effluent limits and permit conditions throughout the duration of the 2016 permit. Ecology assessed compliance based on its review of the facility's information in the Ecology Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on inspections.

According to Ecology's PARIS permit database, the Permittee has generally complied with the permit's effluent limitations throughout the term of the permit. The only exceedance of an effluent limit from January 2016 through December 2018 occurred on December 28, 2018. The exceedance was caused by the failure of a float in one of the SBR tanks. Without the float input, the control system extended the decant phase and lowered the tank level beyond the normal set point. The effluent withdrawn from this lower level contained an elevated concentration of TSS. The PUD replaced the failed float and the control system returned to normal operation.

Sampling and reporting violations occurred during May 2017 due to the illness of the Certified Operator. Treatment plant staff did not perform essential monitoring and reporting and incurred nine violations as a result. The operator-in-training kept the plant running, but was not consistently able to carry out sampling and analysis procedures. The PUD has committed to provide additional cross-training for its staff. As described above, no enforcement action was taken on these noncompliance issues besides technical outreach. The following table summarizes compliance with report submittal requirements over the permit term.

Table 4 Submittals

Permit Section	Submittal Name	Submittal Status	Due Date	Received Date	Comments
S4.E	Infiltration & Inflow Evaluation	Received	11/30/2018	11/29/2018	Received
S4.F	Wasteload Assessment	Received	11/30/2018	11/29/2018	Received
S5.G.a.4	O&M Manual for Upgraded Plant	Not Received	5/31/2019	Not Due	Due date will be revised in the proposed permit.
S8.	Compliance with Phosphorus TMDL	Not applicable this permit cycle.	Not applicable this permit cycle.	Not Due	Due date will be revised in the proposed permit.
S9.	Application for Permit Renewal	Received	5/31/2018	5/31/2018	Ecology accepted the application as complete on 6/12/2018.

F. State environmental policy act (SEPA) compliance

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

III. Proposed Permit Limits

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

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a

regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).

- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

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

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

A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. The table below includes design criteria for the existing treatment plant and revised design criteria for the plant upgrade occurring at this time. Design criteria for the permittee's treatment plant upgrade currently under construction were taken from the plans and specifications documents dated September 20, 2018 and prepared by RH2 Engineering, Inc. Construction of the modified treatment plant is expected to be completed by December 2019.

Table 5 Design Criteria for the Chelan PUD Peshastin POTW

Parameter	Existing Design Criteria	Upgraded Design Criteria
Maximum Month Design Flow (MMDF)	0.11 MGD	0.11 MGD
BOD ₅ Loading for Maximum Month	240 lbs./day	200 lbs./day
TSS Loading for Maximum Month	240 lbs./day	200 lbs./day

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, BOD₅, and TSS, as listed in chapter 173-221 WAC. Section III.F of this fact sheet describes the potential for water quality-based limits.

Table 6 Technology-based Limits

Parameter	Average Monthly Limit	Average Weekly Limit
BOD ₅ (concentration)	30 mg/L	45 mg/L
TSS (concentration)	30 mg/L	45 mg/L

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

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

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

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

where:

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

DF = Maximum Monthly Average Design flow (MGD)

CF = Conversion factor of 8.34

Monthly Average Mass Limit

$$30 \text{ mg/L} \times 0.11 \text{ MGD} \times 8.34 = 27.5 \text{ lbs/day}$$

Weekly Average Mass Limit
 $45 \text{ mg/L} \times 0.11 \text{ MGD} \times 8.34 = 41.3 \text{ lbs/day}$

Table 7 Technology-based Mass Limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD ₅ Monthly Average	30	27.5
BOD ₅ Weekly Average	45	41.3
TSS Monthly Average	30	27.5
TSS Weekly Average	45	41.3

Ecology is required to calculate technology-based limits based on both pollutant concentrations in the effluent and the 85 percent removal criterion. Regulatory requirements are described in WAC 173-220-130(3)(b), WAC 173-221-030(11)(b), WAC 173-220-130(1)(a) and (g), and WAC 173-221-040(1).

As allowed by WAC 173-221-050(4) and the above regulations, Ecology revised the 85 percent removal rate calculation because the satellite STEP tanks within the service area essentially provide primary level treatment of wastewater, which results in treatment plant receiving weak strength influent at the treatment plant.

Ecology's July 2018 Permit Writers Manual states: A NPDES discharge permit and fact sheet for a POTW with a STEP system should include the following:

1. The permit should contain the appropriate effluent concentration limits and percent removal requirements from WAC 173-221-040 or 050 (1) or (2).
2. The 85% TSS & BOD₅ removal requirement in the draft permit's S2 Monitoring Requirements has been footnoted with the following:

e	$\left[(InfluentConcentration / 0.6 - EffluentConcentration) \div \frac{InfluentConc.}{0.6} \right] \times 100$ <p>Calculate the percent (%) removal of BOD₅ using the above equation.</p>
f	$\left[(InfluentConcentration / 0.3 - EffluentConcentration) \div \frac{InfluentConc.}{0.3} \right] \times 100$ <p>Calculate the percent (%) removal of TSS using the above equation.</p>

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 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); 2016) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below the potential to:

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

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

Antidegradation

Description--The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2016) is to:

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

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

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

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

Measurable change in the regulations is defined as follows:

- Temperature increase greater than 0.3°C.
- Dissolved oxygen concentration decrease greater than 0.2 mg/L.
- Bacteria level increase greater than 2 CFU/100 mL.
- pH change greater than 0.1 standard units.
- Turbidity increase greater than 0.5 NTU.
- Any detectable change in concentration of toxic or radioactive substances, which include ammonia and chloride.

When an existing wastewater treatment facility is modified Ecology will typically require the Permittee to conduct a Tier II analysis to verify the modified facility will comply with the state's antidegradation policies. The antidegradation evaluation is generally required to be included in the engineering report/facility plan. If the evaluation is not included in the engineering documents, Ecology will often require submittal of the evaluation as a permit requirement.

Ecology's *Permit Writers Manual* provides additional clarification:

Tier II is applicable to new dischargers or any discharger increasing pollutant loading which then causes a measurable degradation (concentration exceeding detection levels) of the receiving water (boundary of the chronic zone for those pollutants with near field effects). Measurable degradation is defined in regulation for temperature, dissolved oxygen, bacteria, pH, and turbidity. (*Permit Writers Manual*, dated July 2018, p. 166)

The Ecology-approved 2015 Facility Plan did not contain a Tier II analysis. The purpose of the Peshastin POTW upgrade is to enhance the treatment processes of an already well-performing WwTP from secondary-level treatment to tertiary-level treatment to achieve compliance with the Wenatchee River phosphorus TMDL wasteload allocation mentioned earlier in the document. The draft permit implements this stringent wasteload allocation by requiring the discharge of only 37 grams (1.32 ounces) per day of phosphorus on an average monthly basis.

Although the 2015 Facility Plan does not contain a discrete antidegradation analysis, it does state that any change in the effluent quality would be less than measurable at the edge of the chronic mixing zone (Facility Plan, dated 2015, pp. 3-3 and 3-4).

In addition to the 99 percent removal of phosphorus in the treated wastewater, the upgrade will replace much of the facility's 20+ year old treatment process equipment with more up-to-date equipment that is expected to enhance the overall quality of the effluent discharged to the Wenatchee River.

Given the upgrade to tertiary levels of treatment, the upgraded plant is not likely to *"cause measurable degradation to existing water quality at the edge of the chronic mixing zone"* and therefore trigger the need for a Tier II analysis. The new tertiary treatment performance is expected to result in a higher quality effluent discharge to the river.

Based on the above rationale the proposed permit does not require the PUD to submit a Tier II analysis. However, the Permittee is cautioned that performance of the upgraded treatment plant will be evaluated on an ongoing basis, and any measurable degradation of receiving water quality may result in additional permit requirements.

Mixing zones

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

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

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of

the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii) 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 period when the most critical condition is likely to occur (see Ecology's *Permit Writers 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 in section G 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 Peshastin POTW 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 Writers 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>

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 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 distance 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 8 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	<ul style="list-style-type: none"> • 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
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 9 Recreational Uses and Associated Criteria

Recreational Use	Criteria
Primary Contact Recreation	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.

- 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

The PUD's facility discharges to the Wenatchee River at river mile 20.7. Ecology documented temperature, DO and pH impairments in the Wenatchee River near the PUD's discharge. All such impairments (303(d)-listings) have been addressed by the *Wenatchee River Watershed Temperature TMDL* and the *Wenatchee River Watershed Dissolved Oxygen and pH TMDL*. Water quality-based temperature and total phosphorus WLAs determined by those TMDLs have been incorporated into the proposed permit.

After completion of the upgrades at the PUD's treatment plant by March 2020 the PUD and Ecology anticipate the facility will be in compliance with the assigned **phosphorus WLA** contained in the EPA-approved Wenatchee River TMDL.

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

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

Retention of Existing Dilution Factors and Reasonable Potential Determination

The proposed permit does not reevaluate existing dilution factors or contain a new reasonable potential analysis (RPA). Rather, the proposed permit carries over the existing dilution factors to the next permit renewal. Ecology considers this approach appropriate for the following reasons:

- All effluent limitation parameters are either technology-based limits (BOD₅, TSS, fecal coliform bacteria, pH) or water quality-based limits (total phosphorus and temperature) established in approved TMDLs.

- As demonstrated in the characterization table below, BOD₅, TSS, fecal coliform bacteria and pH concentrations comply with the technology-based standards at end of pipe.
- Reported concentrations of fecal coliform bacteria comply with primary recreation water quality criteria at end of pipe. (See following table.)
- pH complies with water quality standards at end of pipe: pH shall be within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units. (See following table.)
- Reported BOD₅, TSS and fecal coliform bacteria concentrations are a small fraction of the technology-based standards, and effluent flows are small relative to receiving water flows.
- The RPA prepared for the 2010 permit found no reasonable potential for any parameter and 2016-2019 effluent characteristics are relatively consistent those during the 2010 to 2015 permit cycle.
- The only pollutant in the discharge with the potential for toxicity is Ammonia. Ammonia concentrations have decreased from the 2011-6 to the 2016-8 characterization periods. No reasonable potential was found for the significantly higher 2011-6 concentrations, so the more recent concentrations are not expected to result in reasonable potential.
- Ecology approved the 2015 Facility Plan and the associated plans and specifications and these documents essentially certify that the upgraded treatment plant is expected to comply with all applicable state and federal regulations.
- Ecology typically uses three years of empirical discharge data for a reasonable potential analysis. This proposed permit will be issued in May 2019, the treatment plant upgrade will be completed in February 2020, and effluent data collection will occur from May 2020 through May 2023. The next permit renewal application will be due in approximately May 2024. Consequently, most of the upcoming permit cycle will consist of completing the treatment plant upgrade and collecting discharge data for a new reasonable potential determination.

Completion of the upgraded treatment plant is scheduled by the end of the year 2019. By March 1, 2020 compliance with all water quality based permit limits are expected. After the treatment plant upgrade is completed, the Permittee will collect discharge data and receiving water data, and Ecology will use this data to reevaluate the facility's compliance with all applicable standards.

Consideration of the TMDL Phosphorus Wasteload Allocation (WLA)

The 2016 Peshastin NPDES permit states that the Total Phosphorus WLA is *“Not effective this permit cycle. Permit limits and calculation method will be added at the time of permit reissuance or major permit modification.”* [see footnote g, in S1]

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

Outfall and Mixing Zones

The discharge is continuous through a 300-foot long, 10-inch diameter effluent pipe that transitions to an 8-inch diameter and connects to the single port outfall located 6 feet from the nearest bank. The outfall, which rests on the bottom, was reported in the “as built drawings” at 3 feet below the water’s surface. This value was probably

determined when the outfall was installed and doesn't reflect low flow (7Q10) conditions. The 7Q10 low flow depth is 0.78 ft.

Dilution factors were recalculated for the 2010 permit. The 2010 fact sheet (p.23) supporting the permit contains the following clarification:

Ecology recalculated the dilution factors contained in the proposed permit using the RIVPLUM V mixing model. Ecology believes the use of the CORMIX model derived a larger dilution factor because the model is more appropriate for slower flowing and deeper river, whereas the Wenatchee at the Peshastin location is shallow. RIVPLUM V on the other hand works well in shallow fast moving waters where vertical mixing is almost instantaneous. The recalculation reduced the chronic dilution factor by 12%.

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. The WAC also specifies the zone not utilize greater than 25% of the flow, and not occupy greater than 25% of the width of the water body.

The horizontal distance of the chronic mixing zone is 300 feet. The mixing zone extends from the bottom to the top of the water column.

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.

The horizontal distance of the acute mixing zone is 30 feet. The mixing zone extends from the bottom to the top of the water column. The dilution factor is based on this distance.

Ecology determined the dilution factors that occur within these zones at the critical condition using the RIVPLUM V model. The dilution factors are listed below.

Table 10 Dilution Factors

Criteria	Acute	Chronic
Aquatic Life	59	242

With one exception of elevated effluent TSS, the Peshastin treatment plant has a perfect record of compliance with technology-based effluent limitations and the temperature TMDL limitations during this 2016 to 2019 permit cycle. The reasonable potential analysis (RPA) prepared for the 2016 permit found no

reasonable potential for any parameter. Most pollutant concentrations, especially for ammonia, have decreased since the 2010 and 2016 permits, that found no reasonable potential to exceed water quality standards.

The upgrade of the treatment plant will be completed in one year or less from the date of issuance of this permit. After completion of the POTW upgrade, the Permittee will collect effluent data during the remainder of the permit cycle and Ecology will conduct an updated RPA at the next permit renewal. Therefore, Ecology feels a new RPA is not necessary at this time.

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.

Ecology determined the applicant's discharge does not contain chemicals of concern based on existing effluent data or knowledge of discharges to the wastewater treatment system. Ecology will reevaluate this discharge for impacts to human health at the next permit reissuance.

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.

Using the screening criteria in chapter 173-205-040 WAC, Ecology determined that toxic effects caused by unidentified pollutants in the effluent are unlikely. Therefore, this permit does not require WET testing. Ecology may require WET testing in the future if it receives information indicating that toxicity may be present in this effluent.

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 Peshastin POTW does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

L. Comparison of effluent limits with the previous permit effective June 11, 2016

Table 11 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
Biochemical Oxygen Demand (5-day)	Technology	30 mg/L 27.5 lbs/day	45 mg/L 41.3 lbs/day	30 mg/L 27.5 lbs/day	45 mg/L 41.3 lbs/day
Total Suspended Solids	Technology	30 mg/L 27.5 lbs/day	45 mg/L 41.3 lbs/day	30 mg/L 27.5 lbs/day	45 mg/L 41.3 lbs/day

		Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
Parameter	Basis of Limit	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

		Previous Effluent Limits: Outfall # 001	Proposed Effluent Limits: Outfall # 001
Parameter	Basis of Limit	Maximum Daily	Maximum Daily
Temperature	Water Quality	33°C	33 °C

		Previous Effluent Limits: Outfall # 001	Proposed Effluent Limits: Outfall # 001
Parameter	Basis of Limit	Maximum Daily	Average Monthly
Total Phosphorus	Water Quality	Not applicable ^a	37 grams/day

^a The effluent limitations table in condition S1.A of the 2016 permit includes the total phosphorus TMDL WLA as an effluent limitation, but footnote g states the limit is “*Not effective this permit cycle. Permit limits and calculation method will be added at the time of permit reissuance or major permit modification.*”

IV. Monitoring Requirements

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

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

A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is somewhat less than agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-109) for an activated sludge treatment plant with a design flow of less than 2.0 MGD. For example, Ecology feels once per week sampling for BOD₅ and TSS is more reasonable than the two sample per week guidance in the manual. The reduced monitoring is due to the relatively small size of the treatment plant (maximum monthly design flow of 0.011 MGD) and the Permittee's generally excellent compliance record with current and previous permits.

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 to support existing and potential future TMDLs.

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

B. Lab accreditation

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

Table 12 Accredited Parameters

Parameter Name	Category	Method Name	Matrix Description
BOD	General chemistry	SM 5210 B-2011	Non-potable water
TSS	General chemistry	SM 2540 D-2011	Non-potable water
Fecal Coliform-count	Microbiology	SM 9222 D (mFC)-06	Non-potable water
pH	General chemistry	SM 4500-H+ B-2011	Non-potable water
Ammonia	General chemistry	USGS I-3520-85	Non-potable water

V. Other Permit Conditions

A. Reporting and record keeping

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

B. Prevention of facility overloading

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

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

D. Pretreatment

Duty to enforce discharge prohibitions

This provision prohibits the 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 Peshastin POTW [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.

E. Solid wastes

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

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

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

I. Outfall evaluation

The proposed permit requires the PUD to conduct an outfall inspection and submit a report detailing the findings of that inspection (Special Condition S9). A review of the current and previous permits back to 1996 indicates an outfall evaluation has never been required and the Permittee indicated an evaluation has never been conducted. Based on this rationale the proposed permit requires the PUD to conduct an outfall evaluation during the upcoming permit cycle.

The inspection must evaluate and document the physical condition of the discharge pipe and diffusers, and evaluate the extent of sediment accumulations near the outfall, and determine the latitude and longitude of the outfall.

K. General conditions

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

VI. Permit Issuance Procedures

A. Permit modifications

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

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

B. Proposed permit issuance

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

VII. References for Text and Appendices

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.
1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.
1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. USEPA Office of Water, Washington, D.C.
1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.
1983. *Water Quality Standards Handbook*. USEPA Office of Water, Washington, D.C.
2004. Memo from J. Hanlon to J. Capacasa. Annual Permit Limits for Nitrogen and Phosphorus for Permits Designed to Protect Chesapeake Bay and its tidal tributaries from Excess Nutrient Loading under the National Pollutant Discharge Elimination System. March 3, 2004
2006. Benjamin Grumbles Memo: Establishing TMDL "Daily" Loads in Light of the Decision by the U.S. Court of Appeals for the D.C. Circuit in *Friends of the Earth, Inc. v. EPA, et al.*, No. 05-5015, and Implications, for NPDES Permits

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.

- January 2015. *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>

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(E2). (Cited in EPA 1985 op.cit.)

Appendix A—Public Involvement Information

Ecology proposes to reissue a permit to Public Utility District No. 1 of Chelan County – Peshastin POTW. 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 April 5, 2019 in the Wenatchee World 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.

NOTICE: ANNOUNCEMENT OF AVAILABILITY OF DRAFT PERMIT

PERMIT NO.: WA0052175

APPLICANT: Public Utility District No. 1 of Chelan County

FACILITY: Peshastin POTW

10395 Mill Road

Peshastin, WA 98847

Public Utility District No. 1 of Chelan County has applied for renewal of National Pollutant Discharge Elimination System (NPDES) Permit No. WA0052175 for the Peshastin POTW in accordance with the provisions of Chapter 90.48 Revised Code of Washington (RCW) and Chapter 173-220 Washington Administrative Code (WAC), and the Federal Clean Water Act.

Public Utility District No. 1 of Chelan County presently operates a wastewater treatment plant which is designed to handle an average/maximum daily flow of 11,000 gallons per day. The wastewater, following treatment, must meet the requirements of the Washington State Water Pollution Control Act and applicable regulations for a permit to be issued.

Following evaluation of the application and other available information, a draft permit has been developed which would allow the discharge of treated domestic wastewater from 10395

Mill Road, Peshastin, WA to the Wenatchee River at river mile 20.7. All discharges to be in compliance with the Department of Ecology's Water Quality Standards for a permit to be issued.

A tentative determination has been made on the effluent limitations and special permit conditions that will prevent and control pollution. A final determination will not be made until all timely comments received in response to this notice have been evaluated.

PUBLIC COMMENT AND INFORMATION

The draft permit and fact sheet may be viewed at the Department of Ecology (Department) website:

<https://apps.ecology.wa.gov/paris/PermitDocumentSearch.aspx?PermitNumber=WA0052175&FacilityName=&City=&County=&Region=0&PermitType=0> . The application, fact sheet, proposed permit, and other related documents are also available at the Department's Central Regional Office for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m., weekdays. To obtain a copy or to arrange to view copies at the Central Regional Office, please call Jackie Cameron at (509) 575-2027.

Interested persons are invited to submit written comments regarding the proposed permit. All comments must be submitted by May 5, 2019 to be considered for the final determination. Submit comments online at: <http://ws.ecology.commentinput.com/?id=5u3DQ> .

Written comments should be sent to: Cynthia Huwe, WQ Permit Coordinator, Department of Ecology, Central Regional Office, 1250 West Alder Street, Union Gap, WA 98903-0009.

Any interested party may request a public hearing on the proposed permit within 30 days of the publication date of this notice. The request for a hearing shall state the interest of the party and the reasons why a hearing is necessary. The request should be sent to the above address. The Department will hold a hearing if it determines that there is significant public interest. If a hearing is to be held, public notice will be published at least 30 days in advance of the hearing date. Any party responding to this notice with comments will be mailed a copy of a hearing public notice.

Please bring this public notice to the attention of persons who you know would be interested in this matter. The Department is an equal opportunity agency. If you need this publication in an alternate format, please contact us at (509) 575-2490 or TTY (for the speech and hearing impaired) at 711 or 1-800-833-6388.

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, 509-457-7105 or by writing to the address listed below.

Fact Sheet for NPDES Permit WA0052175
June 1, 2019
Peshastin POTW
Page 43 of 60

Water Quality Permit Coordinator
Department of Ecology
Central Regional Office
1250 West Alder Street
Union Gap, WA 98903

The primary author of this permit and fact sheet is Jim LaSpina.

Appendix B—Your Right to Appeal

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

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

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

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

ADDRESS AND LOCATION INFORMATION

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

Appendix C—Glossary

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Quantitation level (QL) -- Also known as Minimum Level of Quantitation (ML) -- The lowest level at which the entire analytical system must give a recognizable signal

and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to $(1,2, \text{or } 5) \times 10^n$, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix D—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:

$$\frac{C_m}{z} = C_a + \frac{(C_e - C_a)}{DF}$$

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.

$$\begin{aligned} WLA_a &= (\text{acute criteria} \times DF_a) - [(\text{background conc.} \times (DF_a - 1))] \\ WLA_c &= (\text{chronic criteria} \times DF_c) - [(\text{background conc.} \times (DF_c - 1))] \\ \text{where: } DF_a &= \text{Acute Dilution Factor} \\ DF_c &= \text{Chronic Dilution Factor} \end{aligned}$$

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

$$\begin{aligned} LTA_a &= WLA_a \times e^{[0.5\sigma^2 - z\sigma]} \\ \text{where: } \sigma^2 &= \ln[CV^2 + 1] \\ z &= 2.326 \\ CV &= \text{coefficient of variation} = \text{std. dev}/\text{mean} \end{aligned}$$

$$\begin{aligned} LTA_c &= WLA_c \times e^{[0.5\sigma^2 - z\sigma]} \\ \text{where: } \sigma^2 &= \ln[(CV^2 + 4) + 1] \\ z &= 2.326 \end{aligned}$$

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

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

$$\begin{aligned} \text{where: } \sigma^2 &= \ln[CV^2 + 1] \\ z &= 2.326 \text{ (99th percentile occurrence)} \\ LTA &= \text{Limiting long term average} \end{aligned}$$

AML = Average Monthly Limit

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

$$\begin{aligned} \text{where } \sigma_n^2 &= \ln[(CV^2 \div n) + 1] \\ : \quad n &= \text{number of samples/month} \\ z &= 1.645 \text{ (95th \% occurrence probability)} \\ LTA &= \text{Limiting long term average} \end{aligned}$$

Appendix E—Response to Comments

Comments received from Public Utility District No. 1 of Chelan County, on May 2, 2019 to the public reviewed permit and fact sheet. Included with the excerpted text of the comments below are Ecology's response to comments in *italicized* text.

PUD comment letter, page 1:



PUBLIC UTILITY DISTRICT NO. 1 of CHELAN COUNTY
P.O. Box 1231, Wenatchee, WA 98807-1231 • 327 N. Wenatchee Ave., Wenatchee, WA 98801
(509) 663-8121 • Toll free 1-888-663-8121 • www.chelanpud.org

May 2, 2019

Ms. Cindy Huwe
Washington Department of Ecology – CRO
1250 West Alder Street
Union Gap, WA 98903-0009

Re: Review of Draft Fact Sheet and Permit for Permit No. WA0052175 for the Community of Peshastin

Dear Ms. Huwe:

We have completed our review of the subject documents, and offer the following comments for your consideration:

Permit

1. Page 4, Summary of Permit Report Submittals – Please enter submittal dates for 53.A.4.a (DMR) and 53.A.4.b (Annual DMR).
2. Page 10, interim monitoring schedule and page 13 final monitoring schedule - Footnotes e and f specify the formulas for calculating compliance with the 85% removal for BOD₅ and TSS, respectively. The formulas assume 30% BOD₅ and 50% TSS removal from raw sewage in the collection system septic tanks prior to entering the treatment plant. In our experience, these amounts underestimate actual septic tank removals. Please refer to Washington Department of Health Publication # 337-105. 337-105 is a Rule Development Committee Issue Research Report prepared by the Wastewater Management Program to identify septic tank effluent parameters. This report provided multiple references that studied septic tank effluent quality. Based on a wide variety of performance data, the report concluded that a well-functioning septic tank will reduce BOD₅ by 40% and TSS by 70%. We request the calculation for BOD₅ removal in footnote e be revised to reflect 40% removal by replacing all occurrences of 0.7 in the formula with 0.6. Similarly, we request the calculation for TSS removal in footnote f be revised to reflect 70% removal by replacing all occurrences of 0.5 in the formula with 0.3.

Fact Sheet

1. The District previously submitted fact sheet comments to Ecology in an email to James LaSpina dated March 18, 2019. District staff met with Ecology staff in Ecology's Union Gap office on March 20, 2019 and during part of that meeting discussed the District's fact sheet comments. We understood Ecology was agreeable to

COMMISSIONERS: Garry Arseneault, Dennis Bolz, Ann Congdon, Steve McKenna, Randy Smith GENERAL MANAGER: Steve Wright

PUD comment letter, page 2

incorporating many of the submitted comments. Upon reviewing the most recent draft fact sheet we find that very few of our previously submitted comments were incorporated, and many factual errors remain. We request Ecology revisit the District's previously submitted comments and incorporate changes into the final fact sheet to improve its accuracy.

2. Page 19 – Please revise BOD₅ and TSS percent removal formulas as identified in Permit comment No. 2 above.

Thank you for the opportunity to review these draft documents. Please call me at (509) 661-4131 if you have any questions or need additional information.

Sincerely,



Ron Slabaugh, P.E.
Water & Wastewater Manager

Permit

1. Page 4, Summary of Permit Report Submittals – Please enter submittal dates for S3.A.4a (DMR) and S3.A.4.b (Annual DMR).

Ecology response to comment: Corrected submittal dates entered into Summary of Permit Report Submittals.

2. Page 10, interim monitoring schedule and page 13 final monitoring schedule – Footnotes e and f specify the formulas for calculating compliance with the 85% removal for BODs and TSS, respectively. The formulas assume 30% BODs and 50% TSS removal from raw sewage in the collection system septic tanks prior to entering the treatment plant. In our experience, these amounts underestimate actual septic tank removals. Please refer to Washington Department of Health Publication # 337-105. 337-105 is a Rule Development Committee Issue Research Report prepared by the Wastewater Management Program to identify septic tank effluent parameters. This report provided multiple references that studied septic tank effluent quality. Based on a wide variety of performance data, the report concluded that a well-functioning septic tank will reduce BODs by 40% and TSS by 70%. We request the calculation for BODs removal in footnote e be revised to reflect 40% removal by replacing all occurrences of 0.7 in the formula with 0.6. Similarly, we request the calculation for TSS removal in footnote f be

revised to reflect 70% removal by replacing all occurrences of 0.5 in the formula with 0.3.

Ecology response to comments: The BOD & TSS removal rate calculation footnotes in the Permit's S2 section were revised to reflect the WA DOH publication.

Fact Sheet PUD comment #1

1. The District previously submitted fact sheet comments to Ecology in an email to James LaSpina dated March 18, 2019. District staff met with Ecology staff in Ecology's Union Gap office on March 20, 2019 and during part of that meeting discussed the District's fact sheet comments. We understood Ecology was agreeable to incorporating many of the submitted comments. Upon reviewing the most recent draft fact sheet we find that very few of our previously submitted comments were incorporated and many factual errors remain. We request Ecology revisit the District's previously submitted comments and incorporate changes into the final fact sheet to improve its accuracy.

Ecology response to comments: Regrets not acting upon the previously submitted fact sheet comments, prior to sending out the public review draft fact sheet. Ecology incorporated most of the PUD comments in this revised, final fact sheet, to improve its accuracy. For clarity, Ecology addressed the omissions noted above by highlighting the added portions with gray highlights. Struck out portions of the fact sheet are presented below.

Ecology deleted the following, first bulleted sentence from the fact sheet's Summary Section on page 2, because the previous permit was unclear about the phosphorus limit effective date:

- ~~• The revised deadline requiring the Permittee's compliance with the Wenatchee River Watershed Dissolved Oxygen and pH TMDL, from March 1, 2019 to March 1, 2020, to reflect completion of the treatment plant upgrade in condition S1.A.2.~~

Ecology struck-out the last words of this sentence in the Summary Section:

In August 2009 Ecology issued the Wenatchee River Watershed Dissolved Oxygen and pH TMDL Report (TMDL Report) that documented DO and pH impairments in the Wenatchee River in the vicinity of the PUD's POTW discharge.

Ecology revised this sentence in the Summary Section:

Currently, the PUD is upgrading its treatment plant to achieve compliance with the phosphorus WLA identified in the Dissolved Oxygen and pH TMDL requirements report.

Ecology revised this sentence in the Summary Section:

The proposed permit revises two deadlines from the existing permit. First, the deadline for compliance with the ~~Dissolved oxygen and pH TMDL~~ phosphorus WLA has been extended from March 1, 2019 to March 1, 2020.

Ecology struck-out words within the table on page 10, Existing Treatment Plant Processes:

Effluent meter	Continuously measures and records effluent flows. Provides effluent flow data to the downstream ultraviolet (UV) disinfection system and the effluent autosampler.
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Ecology deleted the first paragraph in the Solid wastes/Residual Solids section because it is not applicable at the Peshastin POTW:

Solid wastes/Residual Solids

~~The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. The District drains grit, rags, scum, and screenings and disposes this solid waste at the local landfill.~~

Ecology deleted the following sentence from the Description of the receiving water because Ecology agrees with the PUD that it is not pertinent to the Peshastin permit.

~~Ecology believes Dryden's discharge to ground may have hydraulic continuity to the Wenatchee River.~~

Ecology revised this paragraph in the fact sheet's Summary of Compliance section, by adding the gray highlighted section and deleting the struck-out section:

According to Ecology's PARIS permit database, the Permittee has generally complied with the permit's effluent limitations throughout the term of the permit. The only exceedance of an effluent limit from January 2016 through December 2018 occurred on December 28, 2018. The exceedance was caused by the failure of the float in one of the SBR tanks. Without the float input, the control system extended the decant phase and lowered the tank level beyond the normal setpoint. The effluent withdrawn from this lower level contained an elevated concentration of TSS. The PUD replaced the failed float and the control system returned to normal operation. ~~system in a wet well located at a fruit packer industrial user that then slug loaded the POTW's STEP tank and caused an overflow to the river. The overloaded STEP tank also upset the treatment plant. The PUD has worked closely with the fruit packer to prevent such incidents from reoccurring.~~

Fact Sheet PUD comment #2: Page 19 – Please revise BOD5 and TSS percent removal formulas as identified in Permit comment No.2 above.

Ecology replaced the BOD & TSS %removal formulas (struck-out) in the fact sheet with the following revised footnote calculations to match changes to the permit:

BOD_e	$\left[\left(\frac{\text{Influent Concentration}}{0.7} - \text{Effluent Concentration} \right) \div \frac{\text{Influent Conc.}}{0.7} \right] \times 100$ Calculate the percent (%) removal of BOD₅ using the above equation.
TSS_f	$\left[\left(\frac{\text{Influent Concentration}}{0.5} - \text{Effluent Concentration} \right) \div \frac{\text{Influent Conc.}}{0.5} \right] \times 100$ Calculate the percent (%) removal of TSS using the above equation.

e	$\left[(\text{InfluentConcentration}/0.6 - \text{EffluentConcentration}) \div \frac{\text{InfluentConc.}}{0.6} \right] \times 100$ Calculate the percent (%) removal of BOD ₅ using the above equation.
f	$\left[(\text{InfluentConcentration}/0.3 - \text{EffluentConcentration}) \div \frac{\text{InfluentConc.}}{0.3} \right] \times 100$ Calculate the percent (%) removal of TSS using the above equation.