Council Business Meeting

October 5, 2021

Agenda Item	Update on NPDES Permit Renewal & Compliance Projects for the Wastewater Treatment Plant	
From	Kaylea Kathol, PMP Scott Fleury, PE	Sr. Project Manager Public Works Director
Contact	kaylea.kathol@ashland.or.us scott.fleury@ashland.or.us	541-552-2419 541-552-2412

SUMMARY

Before Council is the City's draft National Pollution Discharge Elimination System (NPDES) Permit for the Wastewater Treatment Plant (WWTP), and an update on water quality mitigation projects associated with the draft permit. NPDES permits are issued under the Federal Clean Water Act and are administered by the Oregon Department of Environmental Quality (DEQ). These permits set limits and conditions to control pollutants discharged to receiving waters by permittees. In the City's case, the draft NPDES permit establishes terms to minimize pollutants in the effluent of the WWTP discharged to Ashland Creek and Bear Creek. Once the NPDES permit is finalized, the City will be required to adhere to the terms of the new NPDES permit to maintain regulatory compliance with the high standards of Oregon's water quality rules and the Clean Water Act. Currently, the City discharges treated effluent into Ashland Creek under a prior NPDES permit that expired in 2008 but has been administratively extended through present.

POLICIES, PLANS & GOALS SUPPORTED

City Council Goals:
Essential Services

- Sewer

Continue to leverage resources to develop and/or enhance Value Services

Climate Energy Action Plan Goals:

- Reduce solid waste and wastewater greenhouse gas emissions

Department Goals:

- Maintain existing infrastructure to meet regulatory requirements and minimize life-cycle costs
- Deliver timely life cycle capital improvement projects
- Maintain and improve infrastructure that enhances the economic vitality of the community
- Evaluate all city infrastructure regarding planning management and financial resources

PREVIOUS COUNCIL ACTION

Council has taken numerous actions over the past decade that have had a nexus to renewal of the NPDES permit, including:

- March 15, 2011 – DEQ and Keller Associates presented effluent temperature compliance solutions.
- April 17, 2012 – Council adopted a Comprehensive Sanitary Sewer Master Plan (and complimentary 2014 Wastewater Facilities Plan) that recommended a combination of

CITY OF ASHLAND

relocating the outfall from Ashland Creek to Bear Creek, effluent discharge through constructed wetlands during various times of the year, selective discharges from Reeder Reservoir, and water quality temperature trading to meet excess thermal loading exceedances.

- May 6, 2014 – City hired CH2M Hill (now Jacobs) to complete an outfall relocation study. The study investigated and recommended the best outfall relocation spot on Bear Creek that could comply with the mixing zone, thermal plume and toxics requirements anticipated in the updated NPDES permit.
- December 5, 2017 - City hired CH2M Hill (now Jacobs) to complete pre-engineering for the Outfall Relocation project. Predesign, including environmental permitting, was complete in early 2020.
- May 15, 2018 – Council approved the purchase of property adjacent to the treatment land for potential future use, in part, as treatment wetlands.
- September 4, 2018 – Council approved a contract with The Freshwater Trust to initiate Phase 1 of the Water Quality Trading Partnership. Development of a water quality temperature trading plan, in consultation with DEQ, was complete during Phase 1.
- September 3, 2019 – Council approved a contract with The Freshwater Trust to initiate Phase 2 of the Water Quality Trading Partnership. Phase 2 is characterized by a six-year agreement during which the contractor will implement water quality temperature trading plan accepted by DEQ.
- February 1, 2021 – Council received an update on the status of permit renewal and associated mitigation projects.
- May 4, 2021 – Council Approved a contract with Jacobs to complete final engineering for the Outfall Relocation project.

BACKGROUND AND ADDITIONAL INFORMATION

Permit Renewal Process

The City has long been planning for the renewal of the NPDES permit for the WWTP. Planning has included master plans and refined studies to ensure regulatory compliance by sound capital investments. Applicable water quality regulations in the Bear Creek watershed that the City must comply with when discharging effluent to receiving waters include criteria for ammonia and metals such as copper, stringent limitations on in-stream mixing zones, and regulations on temperature.

DEQ began developing draft permit conditions in 2020. In November of 2020 DEQ provided the City with proposed limits for effluent temperature, regulated toxins and mixing zones. The proposed limits were utilized by the City to develop a compliance schedule that identifies the capital projects the City will undertake to comply with permit limits. The compliance schedule, found on page 31 of the Draft NPDES permit, establishes regulatory milestones for major phases in each anticipated project needed to ensure regulatory compliance. The items in the compliance schedule are the result of negotiations between the City and DEQ, where parties sought to find a balance between highly protective water quality regulations and affordable, achievable solutions.

After an Applicant Review (City of Ashland) period during the spring of 2021, the draft version was released for Public Review from August 8 through September 13, 2021. The Public Review resulted

in comments from seven organizations, including state and federal agencies, a municipal association, a non-profit environmental advocacy group, an environmental law firm, and an individual. DEQ has scheduled a Public Hearing for October 20, 2021 to discuss the extensive comments received during the public review period. A final version of the permit will be issued to the City after all public comments have been considered by DEQ and incorporated into the terms of the permit where applicable. Once the permit is formally issued, the City will take the pertinent next steps to ensure regulatory compliance within the approved timelines. Staff is unable to estimate the date of final permit issuance.

Requirements and Compliance Strategies

The new permit criteria that will present the greatest compliance challenge pertain to temperature of the treated effluent, the in-stream mixing zone, and certain toxins found in the treated effluent. A detailed description of those requirements was provided to Council during a Study Session on February 1, 2021. The new permit's compliance schedule will include the following mandatory mitigation projects to achieve compliance with these challenging criteria:

a. Relocation of the outfall from Ashland Creek to Bear Creek, which will bring the discharge into compliance with certain mixing zone rules, thermal plume provisions, and toxic substance limits. These are criteria are often referred to as "near field" compliance criteria because they are measured at the point where the effluent meets the receiving water body.

b. Water quality trading via riparian restoration/stream corridor shading, which will facilitate compliance with a temperature provision known as "excess thermal load" (ETL). This is a complicated criterion, measured in millions of kilocalories per day (of heat released to Bear Creek). Riparian restoration provides long term, self-sustaining shade to the water surface. By blocking thermal inputs from solar radiation, the program generates "thermal credits" that can be used to offset ETL from the effluent. ETL limits are intended to protect various life stages of salmonids in Bear Creek. They are considered "far field" criteria because they protect the water quality within an approximately 20-mile reach of Bear Creek (essentially, between Ashland and Central Point).

c. Limited cold water releases from Hosler Dam, which may need to be utilized during brief periods for ETL compliance when conditions render other temperature mitigation projects insufficient. The City has completed a high-level analysis of recent hydrologic data and had identified a window between about October 15 and November 14 when flow augmentation may be needed on some days. The actual need for releases will depend largely on hydrologic conditions in Bear Creek upstream of the City's influence.

d. Depending on the outcome of the Public Comment/Public Hearing, DEQ may require the City to explore additional temperature mitigation options such as treatment wetlands. At this time, the City believes it can comply with proposed ETL limits using the three strategies described above but must be prepared to initiate an alternative compliance project if necessary.

Status of Compliance Projects

a. The Outfall Relocation Project is in final design phase. Currently, the designer has completed 60% design, and will be issuing 90% design documents in upcoming months. The project is on-track to be released for competitive bidding in February 2022, with contract award scheduled for April 2022. Construction is anticipated to begin in late May 2022, and will last approximately 10 months.

b. The Water Quality Temperature Trading program has been successfully advancing since the fall of 2019. Currently five project sites comprising almost 18 acres of riparian land along Bear Creek and Ashland Creek are in some phase of restoration. One of those sites has been restored to native riparian forest and has received formal DEQ approval to begin generating thermal credits. Two additional restoration sites are expected to receive approval to start generating thermal credits within the next month. The remaining two sites are currently being treated for invasive plants prior to restoration planting. In addition, the City's consultant continues recruiting efforts of landowners whose riparian lands have high potential for shade generation. By the time the permit is issued, Staff anticipates this program will have achieved slightly more than 50% of the required thermal credit target.

c. Cold water releases from Hosler Dam will require professional consultation to develop a flow augmentation program that meets regulatory standards. The City has prepared a Request for Proposals (RFP) for environmental consultation which will be released after a final permit is issued. The successful consultant will assist the City in completing a series of studies to characterize the need, timing, and limitations of flow augmentation; developing a model to determine the benefit of flow augmentation in terms of thermal credits and/or direct cooling; and coordinating with DEQ to develop a flow augmentation trading plan that must be implemented within 5 years of the permit issuance.

d. Alternative treatment methods will only be evaluated if cold water releases are found to be infeasible.

FISCAL IMPACTS

a. The Outfall Relocation Project is funded by DEQ Clean Water State Revolving Fund (CWSRF) Loan R11755 for $2.4M. CWSRF loans provide below-market low interest rates loans to public entities and tribes for the development of water treatment programs. Per the most recent 60% design estimate, the Outfall Relocation Project is expected to have direct construction costs of $1,867,828 (not including soft costs like construction engineering and environmental monitoring). This is an increase from the 2018 30% design estimate of $1,202,820. The factors that contribute to the increased cost include:
    - Cost of labor has increased since 2018. The average fully burdened labor cost went from $45.24 per hour in 2018 to $63.80 per hour in 2021, resulting in an increase of approximately $95,000
    - Cost of materials and construction equipment has increased over the past four years by approximately $56,000
    - Erosion controls, which were not included in the 30% design due to the low level of detail typical of preliminary engineering, were factored into the estimate. The erosion controls added $32,910.
    - Also factored in for 60% design were site restoration items such as re-seeding, gravel or other surfacing, geotextile slope protection, etc. These items resulted in an increase of $53,261.

- Another item added to support 60% design was the cost of pumping effluent around part of the project area that impacts the existing effluent pipe. Bypass pumping increased the estimate by $73,781.
- A portion of the pipeline that was previously specified as 30" PVC during 30% design was increased to 36" PVC. The larger segment of pipe will ensure there is adequate capacity to pass design flows of effluent over a segment of alignment with a low gradient. The larger pipe increased the cost estimate by $256,567
- Additional trenching associated with a larger pipe added $97,160

The City's consulting engineer is currently assessing the feasibility and value of alternative solutions to bring construction costs down, including:

- Substituting an alternative pipe material and trenching method to reduce material and labor costs
- Replacing a segment of pipe with pressure pipe to eliminate the need for up to seven manholes, valued at about $10,000 each
- Sequencing the installation of the flow diversion structure to coincide with seasonal low effluent flows, which could minimize or eliminate costs of bypass pumping, valued at $73,781

b. Construction of the Water Quality Trading Program will cost approximately $2.6 M. This program is funded by CWSRF Loan R1175 for $2.43 M. Opportunities to reduce project costs have arisen over the past year following the Almeda Fire, which cleared an overgrowth of invasive plants from the Bear Creek riparian corridor and created restoration opportunities that benefit from an economy of scale. If loan funds prove insufficient to complete this program, the City may need to negotiate a loan amendment with DEQ.

c. An estimate of the fiscal impact of developing a flow augmentation plan is not currently available. Since this program will not require capital improvements to implement, the cost of implementing flow augmentation will be a direct calculation of the value of domestic water the City will have to release down Ashland Creek when necessary.

STAFF RECOMMENDATION

N/A

ACTIONS, OPTIONS & POTENTIAL MOTIONS

N/A

REFERENCES & ATTACHMENTS

Attachment 1: Draft NPDES Permit

Public Notice

Public Hearing About The City of Ashland's Proposed Water Quality Permit: Oct. 20, 2021, In Zoom Virtual Meeting

The Oregon Department of Environmental Quality invites the public to submit oral and written comment on the conditions of the City of Ashland's proposed water quality permit, known officially as a National Pollutant Discharge Elimination permit.

Summary

Subject to public review and comment, DEQ intends to renew the permit, which allows the City to discharge wastewater to the Bear Creek and Ashland Creek. Part of the review process is an opportunity for public comment, based on the application and other DEQ information.

How do I participate?

Attend the public hearing to learn about the permit application, ask any questions you might have and provide oral or written comments on the proposed permit. You can also submit written comments by mail, fax or email.

Hearing details

When: 4 p.m.
Wednesday, Oct. 20, 2021.
Where: Zoom virtual meeting

DEQ will use the Zoom platform to conduct the virtual hearing. Here are the details of how to connect:

To join the Zoom meeting, click on the following link or copy and paste it into your browser:
https://us02web.zoom.us/j/89460024412?pwd=WGE0bGFMZm5rMkNlZjhMaXBWWTFuZz09

When prompted, enter the following information:

Meeting ID: 894 6002 4412
Passcode: 509637
Phone: 888 475 4499 US Toll-free

NOTE: After 15 minutes of no comments, DEQ will close the hearing. Otherwise, DEQ will close the hearing at 5:30 p.m.

Send written comments by mail, fax or email to:

Jennifer Maglinte-Timbrook
Water Quality Permit Coordinator
4026 Fairview Industrial Drive SE
Salem, OR 97302
Fax: 503-373-7944
Email: Jennifer.Maglinte-Timbrook@deq.state.or.us

Written comments due: 5 p.m., Thursday, Oct. 21, 2021.

About the facility

The City of Ashland has applied for a permit renewal for their domestic wastewater treatment plant located at 1195 Oak Street, Ashland, OR 97520.

The City of Ashland operates a domestic wastewater treatment system that discharges treated wastewater to Ashland Creek and under the proposed permit renewal, will discharge wastewater into Bear Creek.

Ashland Creek and Bear Creek are not currently in compliance with DEQ's temperature standard year round. Bear Creek is also not in compliance with the iron criterion. DEQ developed a total maximum daily load for the Bear Creek watershed that assigned thermal load limits to the City of Ashland. DEQ also developed a total maximum daily load to address violations of the dissolved oxygen criterion. This resulted in $CBOD_5$, ammonia and phosphorous limits for the discharge.

The City is currently under a mutual agreement and order to address the City's inability to comply with their thermal load limits. Upon permit issuance, the MAO will be terminated and the requirements will be incorporated into a permit compliance schedule.

What types of pollutants does the permit regulate?

This permit sets conditions for how the facility deals with the following pollutants: $CBOD_5$, TSS, ammonia, pH, *E.coli*, total phosphorous, and temperature.

Would the draft permit change the amount of pollution the facility is allowed to release?

The amount of pollution the facility is allowed to release has changed from the previous permit. The limits have changed for the following pollutants:

State of Oregon
Department of Environmental Quality

Western Region
4026 Fairview Industrial Drive SE
Salem, OR 97302
Phone: 503-378-8240
800-349-7677
Fax: 503-373-7944
Contact: Jennifer Maglinte Timbrook

www.oregon.gov/DEQ

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

Pollutant	Change
$CBOD_5$	decreased
Thermal Load	decreased
Ammonia	increased

How does DEQ determine permit requirements?

DEQ evaluates types and amounts of pollutants and the quality of the surface water or groundwater where the pollutants are proposed to be discharged. The agency then determines permit requirements to ensure the proposed discharges will meet applicable statutes, rules, regulations, and effluent guidelines of Oregon and the U.S. Environmental Protection Agency.

All evaluations showed that the discharge meets the requirements and exceptions of the applicable regulations, except as otherwise noted in the permit and fact sheet. DEQ conducted a reasonable potential analysis and permit limit calculations using statistical methods. The agency uses best professional judgement in choosing model inputs, critical case scenarios and statistical factors. DEQ also performed an antidegradation review to determine whether the agency could allow a renewed permit for discharge to waters of the state.

A compliance schedule for thermal load and antimony is included in the permit. A compliance schedule is needed to allow time to build a new outfall to Bear Creek and to perform stream restoration so the City can comply with the thermal load limits through thermal trading.

How does DEQ monitor compliance with the permit requirements?

This permit will require the facility to monitor pollutants discharged using approved monitoring practices and standards. DEQ reviews the facility's discharge monitoring reports to check for compliance with permit limits.

What happens after the meeting?

DEQ considers and responds to all comments received and may modify the proposed permit based on comments.

Where can I get more information?

View the application and related documents in person at the DEQ office in Salem. For a review appointment, call Jennifer Maglinte-Timbrook, Water Quality Permit Coordinator.

Alternative formats

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM WASTE DISCHARGE PERMIT

Oregon Department of Environmental Quality
Western Region – Salem Office
4026 Fairview Industrial Dr. SE,
Salem, OR 97302
Telephone: 541-276-4063

Issued pursuant to ORS 468B.050 and the federal Clean Water Act

ISSUED TO:

City of Ashland
20 E. Main Street
Ashland, Oregon, 97520

SOURCES COVERED BY THIS PERMIT:

Type of Waste	Outfall Number	Outfall Location
Treated Wastewater	001	Ashland Creek Lat/Long: 42.214546/-122.714678 River Mile: 0.32
	002	Bear Creek River Mile: 22.8 Lat/Long: 42.215335/-122.720688
Recycled Water Reuse	003	Specified in Recycled Water Use Plan

FACILITY LOCATION:

1195 Oak St.
Ashland, OR 97520
County: Jackson
EPA Permit Type: Major

RECEIVING STREAM INFORMATION:

WRD Basin: Rogue
USGS Sub-Basin: Middle Rogue
Receiving Stream name: Bear Creek
NHD Reach Code: 17100308000126 – 5.5%

Issued in response to Application No. 972841 on June 26, 2008. This permit is issued based on the land use findings in the permit record.

DRAFT	DRAFT	DRAFT
Ranei Nomura, Water Quality Manager, Western Region	Issuance Date	Effective Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to: 1) operate a wastewater collection, treatment, control and disposal system; and 2) discharge treated wastewater to waters of the state only from the authorized discharge point or points in Schedule A in conformance with the requirements, limits, and conditions set forth in this permit. Unless specifically authorized by this permit, by another NPDES or Water Pollution Control Facility permit, or by Oregon statute or administrative rule, any other direct or indirect discharge of pollutants to waters of the state is prohibited.

TABLE OF CONTENTS

Note: Schedule E: Pretreatment Activities is not a part of this permit

LIST OF TABLES

SCHEDULE A: WASTE DISCHARGE LIMITS

1. Internal Outfall 004 (Combined Outfall 001 and 002) – Permit Limits

After completion of the Bear Creek outfall, the permittee must comply with the limits in the following table:

Table A1: Internal Outfall 004 (Combined Outfall 001 and 002) Permit Limits

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
$CBOD_5$ (May 1 – Jul 31)	mg/L	8	12	-
	lb/day	113	280	500
	% removal	85	-	-
$CBOD_5$ (Aug 1 – Nov 30)	mg/L	8	12	-
	lb/day	59	280	500
	% removal	85	-	-
$CBOD_5$ (Dec 1 – Apr 30)	mg/L	25	40	-
	lb/day	400	920	1500
	% removal	85	-	-
Total Phosphorus (May 1 – Oct 31)	lb/day	2	-	-
Total Ammonia as N (May 1 – Nov 30)	lb/day	45	-	
TSS (May 1 – Nov 30)	mg/L	10	15	-
	lb/day	96	180	480
	% removal	85	-	-
TSS (Dec 1 – Apr 30)	mg/L	30	45	-
	lb/day	400	920	1500
	% removal	85	-	-
E. coli (year-round) (See note a.)	#/100 mL	Must not exceed a monthly geometric mean of 126, no single sample may exceed 406		
Excess Thermal Load (January)	million kcal/day	5.1 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (February)	million kcal/day	5.4 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (March)	million kcal/day	5.6 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (April)	million kcal/day	5.0 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (May)	million kcal/day	6.4 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (June)	million kcal/day	6.3 as a 7-day rolling average. (See note b)(option A)		

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
Excess Thermal Load (July)	million kcal/day	7.0 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (August)	million kcal/day	7.7 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (September)	million kcal/day	2.8 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (October)	million kcal/day	2.0 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (November)	million kcal/day	3.1 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (December)	million kcal/day	4.4 as a 7-day rolling average. (See note b)(option A)		
Excess Thermal Load (year-round)	million kcal/day	ETLL = $\Delta T(Q_e + Q_r)C_f$ as a 7-day rolling average. (See note b.) (option B)		

Notes:

a. If a single sample exceeds 406 *E. coli* organisms/100 mL, the permittee may take at least 5 consecutive re-samples at 4 hour intervals beginning within 28 hours after the original sample was taken. A geometric mean of the 5 re-samples that is less than or equal to 126 *E. coli* organisms/100 mL demonstrates compliance with the limit.

b. The permittee must select either Option A or Option B as the applicable 7-day rolling average Excess Thermal Load Limit (ETLL). If the permittee selects Option B, the permittee must calculate the daily ETLL using the above equation. The permittee must then calculate the 7-day rolling average ETLL from the daily ETLLs each day the Option B limit is selected.

$\Delta T = 0.1^oC$
Q_e = combined Outfall 001 and 002 effluent flow (cfs)
Q_r = Bear Creek flow upstream from Outfall 002 (cfs)
C_f = conversion factor (2.447)

There is a USGS flow gage downstream from the outfalls. If this gage is used for determining stream flow, the effluent flows must be subtracted from the stream flow. The minimum river flow (7Q10) to be used for each month is shown in the table below.

Month	cfs
Jan	12.5
Feb	13.4
Mar	16.4
Apr	14.5
May	20.7
Jun	20.9
Jul	24.0
Aug	27.0
Sep	7.0
Oct	3.0
Nov	7.1
Dec	12

2. Outfall 002 (Bear Creek) Permit Limits

After completion of the Bear Creek outfall, the permittee must comply with the limits in the following table:

Table A2: Outfall 002 (Bear Creek) Permit Limits

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
Total Ammonia as N (May 1 – Nov 30)	mg/L	1.3	-	3.8
Total Ammonia as N (Dec 1 – Apr 30)	mg/L	2.1	-	6.1
pH (year-round)	SU	Instantaneous limit between a daily minimum of 6.4 and a daily maximum of 8.6		

3. Outfall 001 (Ashland Creek) Permit Limits (after Bear Creek outfall completion)

After completion of the Bear Creek outfall, the permittee must comply with the limits in the following table:

Table A3: Outfall 001 (Ashland Creek) Permit Limits

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
Total Ammonia as N (May 1 – Nov 30)	mg/L	1.3	-	3.8
Total Ammonia as N (Dec 1 – Apr 30)	mg/L	2.1	-	6.1
pH (year-round)	SU	Instantaneous limit between a daily minimum of 6.4 and a daily maximum of 8.6		
Note: Discharge to Outfall 001 is allowed only when the hydraulic capacity to Outfall 002 is exceeded.				

4. Outfall 001 (Ashland Creek) Permit Limits (before Bear Creek outfall completion)

Prior to completion of the Bear Creek outfall, the permittee must comply with the limits in the following table:

Table A4: Outfall 001 (Ashland Creek) Permit Limits

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
$CBOD_5$ (May 1 – Jul 31)	mg/L	8	12	-
	lb/day	113	280	500
	% removal	85	-	-
$CBOD_5$ (Aug 1 – Nov 30)	mg/L	8	12	-
	lb/day	59	280	500
	% removal	85	-	-
$CBOD_5$ (Dec 1 – Apr 30)	mg/L	25	40	-
	lb/day	400	920	1500
	% removal	85	-	-
Total Phosphorus (May 1 – Oct 31)	lb/day	2	-	-
Total Ammonia as N (May 1 – Nov 30)	mg/L	0.52	-	1.2
	lb/day	45	-	-
Total Ammonia as N (Dec 1 – Apr 30)	mg/L	0.8	-	1.8
TSS (May 1 – Nov 30)	mg/L	10	15	-
	lb/day	96	180	480
	% removal	85	-	-
TSS (Dec 1 – Apr 30)	mg/L	30	45	-
	lb/day	400	920	1500
	% removal	85	-	-
pH (year-round)	SU	Instantaneous limit between a daily minimum of 6.5 and a daily maximum of 8.5		
E. coli (year-round) (See note a.)	#/100 mL	Must not exceed a monthly geometric mean of 126, no single sample may exceed 406		
Excess Thermal Load (October 15 – May 15)	million kcal/day	3.2 as a 7-day rolling average (Option A)		
Excess Thermal Load (May 16 – Oct 14)	million kcal/day	1.6 as a 7-day rolling average (Option A)		
Excess Thermal Load (year-round)	million kcal/day	$ETTL = \Delta T(Q_e + Q_r)C_f$ as a 7-day rolling average. (See note b.) (Option B)		

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum

Notes:

a. If a single sample exceeds 406 *E. coli* organisms/100 mL, the permittee may take at least 5 consecutive re-samples at 4 hour intervals beginning within 28 hours after the original sample was taken. A geometric mean of the 5 re-samples that is less than or equal to 126 *E. coli* organisms/100 mL demonstrates compliance with the limit.

b. The permittee must select either Option A or Option B as the applicable 7-day rolling average Excess Thermal Load Limit (ETLL). If the permittee selects Option B, the permittee must calculate the daily ETLL using the above equation. The permittee must then calculate the 7-day rolling average ETLL from the daily ETLLs each day the Option B limit is selected.

$\Delta T = 0.1^{o}C$

Q_e = effluent flow (cfs)

Q_r = Ashland Creek flow upstream from the outfall(cfs)

C_f = conversion factor (2.447)

The minimum river flow value (7Q10) to be used is 1 cfs.

5. Regulatory Mixing Zone

a. Bear Creek Outfall 002

The mixing zone is defined as 50 percent of Bear Creek flow and no more than 60 feet downstream from the outlet into the creek. The zone of initial dilution is defined as 50 percent of the Bear Creek flow and no more than 20 feet downstream from the outlet into the creek.

b. Ashland Creek Outfall 001

The mixing zone is defined as 50 percent of Ashland Creek flow and no more than 60 feet downstream from the outlet into the creek. The zone of initial dilution is defined as 50 percent of the Ashland Creek flow and no more than 20 feet downstream from the outlet into the creek.

6. Use of Recycled Water

The permittee is authorized to distribute recycled water if it is:

a. Treated and used according to the criteria listed in Table A5.

b. Managed in accordance with its DEQ-approved Recycled Water Use Plan unless exempt as provided in Schedule D.

c. Used in a manner and applied at a rate that does not adversely affect groundwater quality.

d. Applied at a rate and in accordance with site management practices that ensure continued agricultural, horticultural, or silvicultural production and does not reduce the productivity of the site.

e. Irrigated using sound irrigation practices to prevent:

i. Offsite surface runoff or subsurface drainage through drainage tile;

ii. Creation of odors, fly and mosquito breeding, or other nuisance conditions; and

iii. Overloading of land with nutrients, organics, or other pollutants.

Table A5: Recycled Water Limits

Class	Level of Treatment (after disinfection unless otherwise specified)	Beneficial Uses
A.	Class A recycled water must be oxidized, filtered and disinfected. Before disinfection, turbidity may not exceed: • An average of 2 NTUs within a 24-hour period. • 5 NTUs more than five percent of the time within a 24-hour period. • 10 NTUs at any time. After disinfection, total coliform may not exceed: • A median of 2.2 organisms per 100 mL based on daily sampling over the last 7 days that analyses have been completed. • 23 organisms per 100 mL in any single sample.	Class A recycled water may be used for: • Class B, Class C, Class D, and non-disinfected uses. • Irrigation for any agricultural or horticultural use. • Landscape irrigation of parks, playgrounds, school yards, residential landscapes, or other landscapes accessible to the public. • Commercial car washing or fountains when the water is not intended for human consumption. • Water supply source for non-restricted recreational impoundments.
B.	Class B recycled water must be oxidized and disinfected. Total coliform may not exceed: • A median of 2.2 organisms per 100 mL, based on the last 7 days that analyses have been completed. • 23 total coliform organisms per 100 mL in any single sample.	Class B recycled water may be used for: • Class C, Class D, and non-disinfected uses. • Stand-alone fire suppression systems in commercial and residential building, non-residential toilet or urinal flushing, or floor drain trap priming. • Water supply source for restricted recreational impoundments.
C.	Class C recycled water must be oxidized and disinfected. Total coliform may not exceed: • A median of 23 total coliform organisms per 100 mL, based on results of the last 7 days that analyses have been completed. • 240 total coliform organisms per 100 mL in any two consecutive samples.	Class C recycled water may be used for: • Class D and non-disinfected uses. • Irrigation of processed food crops; irrigation of orchards or vineyards if an irrigation method is used to apply recycled water directly to the soil. • Landscape irrigation of golf courses, cemeteries, highway medians, or industrial or business campuses. • Industrial, commercial, or construction uses limited to: industrial cooling, rock crushing, aggregate washing, mixing concrete, dust control, nonstructural firefighting using aircraft, street sweeping, or sanitary sewer flushing.

Class	Level of Treatment (after disinfection unless otherwise specified)	Beneficial Uses
D.	Class D recycled water must be oxidized and disinfected. *E. coli* may not exceed: • A 30-day geometric mean of 126 organisms per 100 mL. • 406 organisms per 100 mL in any single sample.	Class D recycled water may be used for: • Non-disinfected uses. • Irrigation of firewood, ornamental nursery stock, Christmas trees, sod, or pasture for animals.
Non-disinfected	Non-disinfected recycled water must be oxidized.	Non-disinfected water may be used for: • Irrigation for growing commercial timber, fodder, fiber or seed crops not intended for human ingestion.

7. Chlorine Usage

The permittee is prohibited from using chlorine or chlorine compounds for effluent disinfection purposes. Chlorine residual in effluent resulting from chlorine or chlorine-containing chemicals used for maintenance or other purposes is also prohibited.

8. Mercury Minimization Plan

By the date listed in Table B1, the permittee must submit an MMP (Mercury Minimization Plan) to DEQ for review and approval. At a minimum, the MMP must include the following:

a. Identification and evaluation of current and potential mercury (both methyl mercury and total mercury) sources

b. Identification of industrial, commercial, and residential sources of mercury

c. Identification of potential methods for reducing or eliminating mercury. These may include but are not limited to:

   i. BMP requirements or limits for industrial and commercial sources of mercury to a collection system

   ii. Material substitution

   iii. Material recovery

   iv. Spill control and collection

   v. Waste recycling

   vi. Process modifications

   vii. Laboratory housekeeping, use and disposal practices and

   viii. Public education.

   ix. A monitoring plan to confirm current or potential sources of mercury (Monitoring Plan)

d. Ongoing monitoring of effluent to enable evaluation of the effectiveness and implementation of the MMP.

Within 60 days of receiving DEQ comments on the MMP, the permittee must revise the plan to be consistent with DEQ's comments and resubmit for DEQ approval. Before approving the plan, DEQ will put the plan out on public notice. The permittee must use a DEQ-approved template unless authorized in writing by DEQ to use an alternative. The permittee must begin implementation of the approved plan within 30 days of DEQ's approval. If DEQ determines that the MMP is not effective at reducing sources of mercury from entering its collection system, or if a water column translation of the fish tissue criterion is developed, DEQ may reopen the permit to modify the permit conditions. These modifications may include, but are not limited to, the addition of a numeric effluent limit.

SCHEDULE B: MINIMUM MONITORING AND REPORTING REQUIREMENTS

1. Reporting Requirements

The permittee must submit to DEQ monitoring results and reports as listed below.

Table B1: Reporting Requirements and Due Dates

Reporting Requirement	Frequency	Due Date (See note a.)	Report Form (See note b.)	Submit To:
Mercury Minimization Plan (see Schedule A)	One time	Submit by January 2023	One electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Tables B2, B3, B4, B5, and B6 Influent Monitoring and Effluent Monitoring	Monthly	By the 15th of the following month	Specified in Schedule B. Section 2 of this permit	Electronic reporting as directed by DEQ
Table B7: Copper Biotic Ligand Model and Aluminum Sampling Requirements	Monthly for 24 months beginning January 2023	By the 15th of the following month	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Tables B8 – B11: Effluent Toxics Characterization	Quarterly beginning in January 2023 – December 2025 (See note c.)	By the 15th of the month following each quarter	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Table B12: WET Test Monitoring	Quarterly for one year beginning in January 2023. (See note c.)	With the first DMR submittal after receipt of the test results	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Inflow and infiltration report (see Schedule D)	Annually	February 15	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Recycled Water Annual Report (see Schedule D)	Annually (when irrigating)	January 15	Electronic copy in the DEQ-approved format	Attached via electronic reporting as directed by DEQ Electronic copy to DEQ Water Reuse Program Coordinator

Reporting Requirement	Frequency	Due Date (See note a.)	Report Form (See note b.)	Submit To:
Wastewater solids annual report (see Schedule D)	Annually	February 19	Electronic copy in the DEQ-approved format	Attached via electronic reporting as directed by DEQ Electronic copy to DEQ Biosolids Program Coordinator
Hauled Waste Control Plan (see Schedule D)	One time	Submit *(two months after permit effective date)*	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Hauled Waste Annual Report (see Schedule D)	Annually	January 15	Electronic copy in the DEQ-approved format	Attached via electronic reporting as directed by DEQ
Industrial User Survey (see Schedule D)	One time	Submit by *(24 months after permit effective date)*	1 electronic copy and 1 hard copy in a DEQ-approved format	• 1 Hard copy to DEQ Pretreatment Coordinator • 1 Electronic copy to Compliance Officer

Notes:
a. For submittals that are provided to DEQ by mail, the postmarked date must not be later than the due date.
b. All reporting requirements are to be submitted in a DEQ-approved format, unless otherwise specified in writing.
c. Quarters are defined as: Q1: Jan–Mar, Q2: Apr–Jun, Q3: Jul–Sep, Q4: Oct–Dec. 2023 toxics characterization testing must be collected on the same day a WET test sample is collected.

2. Monitoring and Reporting Protocols

a. **Electronic Submissions**

The permittee must submit to DEQ the results of monitoring indicated in Schedule B in an electronic format as specified below.

i. The permittee must submit monitoring results required by this permit via DEQ-approved web-based Discharge Monitoring Report (DMR) forms to DEQ via electronic reporting. Any data used to calculate summary statistics must be submitted as a separate attachment approved by DEQ via electronic reporting.

ii. The reporting period is the calendar month.

iii. The permittee must submit monitoring data and other information required by this permit for all compliance points by the 15th day of the month following the reporting period unless specified otherwise in this permit or as specified in writing by DEQ.

b. **Test Methods**

The permittee must conduct monitoring according to test procedures in 40 CFR part 136 and 40 CFR part 503 for biosolids or other approved procedures as per Schedule F.

c. **Detection and Quantitation Limits**

i. Detection Level (DL) – The DL is defined as the minimum measured concentration of a substance that can be distinguished from method blank results with 99% confidence. The DL is derived using the procedure in 40 CFR part 136 Appendix B and evaluated for reasonableness relative to method blank concentrations to ensure results reported above the DL are not a result of routine background contamination. The DL is also known as the Method Detection Limit (MDL) or Limit of Detection (LOD).

ii. Quantitation Limits (QLs) – The QL is the minimum level, concentration or quantity of a target analyte that can be reported with a specified degree of confidence. It is the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration for the analyte. It is normally equivalent to the concentration of the lowest calibration standard adjusted for sample weights, volumes, preparation and cleanup procedures employed. The QL as reported by a laboratory is also sometimes referred to as the Method Reporting Limit (MRL) or Limit of Quantitation (LOQ).

d. **Sufficient Sensitivity of Quantitation Limits**

The Laboratory QLs (adjusted for any dilutions) for analyses performed to demonstrate compliance with permit limits or as part of effluent characterization, must meet at least one of the requirements below:

i. The QL is at or below the level of the water quality criterion for the measured parameter

ii. The QL is above the water quality criterion but the amount of the pollutant in a facility's discharge is high enough that the method detects and quantifies the level of the parameter in the discharge

iii. The QL has the lowest sensitivity of the analytical methods procedure specified in 40 CFR 136

iv. The QL is at or below those defined in Oregon DEQ list of quantitation limits posted online at the DEQ permitting website

v. Matrix effects are present that prevent the attainment of Qs and these matrix effects are demonstrated according to procedures described in EPA's *Solutions to Analytical Chemistry Problems with Clean Water Act Methods*, March 2007. If using alternative methods and taking appropriate steps to eliminate matrix effects does not eliminate the matrix problems, DEQ may authorize in writing re-sampling or allow a higher QL to be reported. In the case of effluent characterization monitoring, DEQ may allow the re-sampling to be done as part of Tier 2 monitoring. Section B.5 contain more information on Tier 1 and Tier 2 monitoring.

e. **Quality Assurance and Quality Control**

i. Quality Assurance Plan – The permittee must develop and implement a written Quality Assurance Plan that details the facility sampling procedures, equipment calibration and maintenance, analytical methods, quality control activities and laboratory data handling and reporting. The QA/QC program must conform to the requirements of 40 CFR 136.7.

ii. If QA/QC requirements are not met for any analysis, the permittee must re-analyze the sample. If the sample cannot be re-analyzed, the permittee must re-sample and analyze at the earliest opportunity. If the permittee is unable to collect a sample that meets QA/QC requirements, then the permittee must include the result in the discharge monitoring report (DMR) along with a notation (data qualifier). In addition, the permittee must explain how the sample does not meet QA/QC requirements. The permittee may not use the result that failed the QA/QC requirements in any calculation required by the permit unless authorized in writing by DEQ.

iii. Flow measurement, field measurement, and continuous monitoring devices - The permittee must:

(A) Establish verification and calibration frequency for each device or instrument in the quality assurance plan that conforms to the frequencies recommended by the manufacturer.

(B) Verify at least once per year that flow-monitoring devices are functioning properly according to manufacturer's recommendation. Calibrate as needed according to manufacturer's recommendations.

(C) Verify at least weekly that the continuous monitoring instruments are functioning properly according to manufacturer's recommendation unless the permittee demonstrates a longer period is sufficient and such longer period is approved by DEQ in writing.

f. **Reporting Sample Results**

i. The permittee must report the laboratory DL and QL as defined above for each analyte, with the following exceptions: pH, temperature, BOD, CBOD, TSS, Oil & Grease, hardness, alkalinity, bacteriological analytes and nitrate-nitrite. For temperature and pH, neither the QL nor the DL need to be reported. For the other parameters listed above, the permittee is only required to report the QL and only when the result is ND.

ii. The permittee must report the same number of significant digits as the permit limit for a given parameter.

iii. Chemical Abstracts Service (CAS) Numbers. CAS numbers (where available) must be reported along with monitoring results.

iv. (For Discharge Monitoring Reports) If a sample result is above the DL but below the QL, the permittee must report the result as the DL preceded by DEQ's data code "e". For example, if the DL is 1.0 µg/l, the QL is 3.0 µg/L and the result is estimated to be between the DL and QL, the permittee must report "e1.0 µg/L" on the DMR. This requirement does not apply in the case of parameters for which the DL does not have to be reported.

v. (For Discharge Monitoring Reports) If the sample result is below the DL, the permittee must report the result as less than the specified DL. For example, if the DL is 1.0 µg/L and the result is ND, report "<1.0" on the discharge monitoring report (DMR). This requirement does not apply in the case of parameters for which the DL does not have to be reported.

g. **Calculating and Reporting Mass Loads**

The permittee must calculate mass loads on each day the parameter is monitored using the following equation:

Example calculation: Flow (in MGD) X Concentration (in mg/L) X 8.34 = Pounds per day

i. Mass load limits all have two significant figures unless otherwise noted.

ii. When concentration data are below the DL: To calculate the mass load from this result, use the DL. Report the mass load as less than the calculated mass load. For example, if flow is 2 MGD and the reported sample result is <1.0 µg/L, report "<0.02 lb/day" for mass load on the DMR (1.0 µg/L x 2 MGD x conversion factor = 0.017 lb/day, round off to 0.02 lb/day).

iii. When concentration data are above the DL, but below the QL: To calculate the mass load from this result, use the detection level. Report the mass load as the calculated mass load preceded by "e". For example, if flow is 2 MGD and the reported sample result is e1.0 µg/L, report "e0.02 lb/day" for mass load on the DMR (1.0 µg/L x 2 MGD x conversion factor = 0.017 lb/day, round off to 0.02 lb/day).

3. Monitoring and Reporting Requirements

a. The permittee must monitor influent just before the grit basin and report results in accordance with the table below:

Table B2: Influent Monitoring Requirements

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type / Required Action See note a.	Report Statistic See note b.
$CBOD_5$ (80082)	mg/L	Year-round	2/week	24-hour composite	Monthly Average
TSS (00530)	mg/L	Year-round	2/week	24-hour composite	Monthly Average
pH (00400)	SU	Year-round	3/week	Grab	Monthly Maximum Monthly Minimum

Notes:

a. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must perform grab measurements.

b. When submitting DMRs electronically, the permittee must submit all data used to determine summary statistics in a DEQ-approved format as a spreadsheet via electronic reporting unless otherwise directed by DEQ.

b. The permittee must monitor effluent at Outfalls 001 and 002 as follows:

i. When using the membrane filtration system, effluent must be sampled from the membrane building effluent well and report results in accordance with Tables B1, B3, B4, B5 and B6.

ii. When the membrane filtration system is not in use, effluent must be sampled from the re-aeration chamber just downstream of the UV disinfection system and report results in accordance with Tables B1, B3, B4, B5 and B6.

Table B3: Internal Outfall 004 (Combined Outfall 001 and 002) Effluent Monitoring Requirements

Item or Parameter	**Units**	**Time Period**	**Minimum Frequency**	**Sample Type/ Required Action** (See note a.)	**Report Statistic** (See note b.)
Flow (50050)	MGD	Year-round	Daily	Metered	Monthly Average Daily Maximum
$CBOD_5$ (80082)	mg/L	Year-round	2/week	24-hour composite	Monthly Average Maximum Weekly Average
$CBOD_5$ (80082)	lb/day	Year-round	2/week	Calculation	Daily Maximum Monthly Average Maximum Weekly Average
$CBOD_5$ Percent Removal (81383) (See note c).	%	Year-round	1/month	Calculation based on monthly average $CBOD_5$ concentration values	Monthly Average
TSS (00530)	mg/L	Year-round	2/week	24-hour composite	Monthly Average Maximum Weekly Average
TSS (00530)	lb/day	Year-round	2/week	Calculation	Daily Maximum Monthly Average Maximum Weekly Average
TSS Percent Removal (81011) (See note c.)	%	Year-round	1/month	Calculation based on monthly average TSS concentration values	Monthly Average

Item or Parameter	**Units**	**Time Period**	**Minimum Frequency**	**Sample Type/ Required Action** (See note a.)	**Report Statistic** (See note b.)
Temperature (00010)	ºC	Year-round	1/hour	Continuous	Daily Maximum Maximum 7-day Rolling Average of Daily Maximums (See note h)
Sum of Thermal Credits Generated	Million kcal/day	Year-round	Daily	Calculation, per the procedures in the approved trading program	Sum of Credits
Excess Thermal Load Limit	Million kcal/day	Year-round	Daily	Calculation (See note f below and note b in Table A1)	Report on daily data attachment only. (See note f)
Excess Thermal Load (51405)	Million kcal/day	Year-round	Daily	Calculation (See note d.)	Maximum 7-day Rolling Average (See note h)
E. coli (51040)	#/100 mL	Year-round	2/week	Grab (See note i)	Daily Maximum Monthly Geometric Mean
Mercury, Total Recoverable (MMP) (71901)	µg/L	See note e.	Quarterly	24-hour composite	Quarterly Value
Total Ammonia (as N) (00610)	lb/day	May 1 – Nov 30	2/week	Calculation	Monthly Average
Total Phosphorus (00665)	mg/L	May 1 – Oct 31	2/week	Grab	Daily Maximum Monthly Average
Total Phosphorus (00665)	lb/day	May 1 – Oct 31	2/week	Calculation	Monthly Average
Hardness (00900)	mg/L	Year-round	1/month	24-hour composite	Daily Maximum

Item or Parameter	**Units**	**Time Period**	**Minimum Frequency**	**Sample Type/ Required Action** (See note a.)	**Report Statistic** (See note b.)
UV intensity	mW/cm^2	Year-round	Daily	Continuous	Maintain records on site (See note g)
UV dose	mJ/cm^2	Year-round	Daily	Calculation	Maintain records on site (See note g)
UV transmittance	%	Year-round	Daily	Continuous	Maintain records on site (See note g)
Dissolved Oxygen (00300)	mg/L	2024	Quarterly	Grab	Quarterly Minimum
Total Kjeldahl Nitrogen (TKN) (00625)	mg/L	2024	Quarterly	Grab	Quarterly Maximum
Nitrate Plus Nitrite Nitrogen (NO_3+NO_2) (00630)	mg/L	2024	Quarterly	Grab	Quarterly Maximum
Total Dissolved Solids (70295)	mg/L	2024	Quarterly	Grab	Quarterly Maximum
Oil and Grease (00556)	mg/L	2024	Quarterly	Grab	Quarterly Maximum

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action (See note a.)	Report Statistic (See note b.)

Notes:

a. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must perform grab measurements. If the failure or loss is for continuous temperature monitoring equipment, the permittee must perform grab measurements daily between 2 PM and 4 PM until continuous monitoring equipment is redeployed.

b. When submitting DMRs electronically, all data used to determine summary statistics must be submitted in a DEQ-approved format as a spreadsheet via electronic reporting unless otherwise directed by DEQ.

c. Percent Removal must be calculated on a monthly basis using the following formula:

$$Percent\ Removal = \frac{[Influent\ Concentration] - [Effluent\ Concentration]}{[Influent\ Concentration]} \times 100$$

Where:

Influent Concentration = Corresponding monthly average influent concentration based on the analytical results of the reporting period.

Effluent Concentration = Corresponding monthly average effluent concentration based on the analytical results of the reporting period.

d. The daily excess thermal load (ETL) discharged must be calculated using the daily maximum effluent temperature and the corresponding daily average effluent flow using the formula below.
The 7-day rolling average is then calculated from the daily ETLs.
The daily ETL is calculated as follows: ETL= 3.785 * Qe *ΔT
Where:

ETL =	Excess Thermal Load (million kcal/day)
Q_e =	Daily Average Effluent flow (MGD)
ΔT =	Daily Maximum Effluent temperature (°C) minus temperature criterion (°C)
Criterion =	18ºC (May 16 – Oct 14)
Criterion =	13ºC (Oct 15 – May 15)

e. Monitoring must occur in the 3rd quarter 2021, 4th quarter 2021, 1st quarter 2022, 2nd quarter 2022.

f. If the permittee selects Excess Thermal Load Limit (ETLL) Option B from Table A1, then the permittee must calculate the ETLL (million kcal/day) each day the permittee uses this option. The permittee must use the equation and procedure noted in Table A1. The daily limit must be reported on the daily data spreadsheet.

g. Continuous UV records must be maintained onsite. UV intensity and transmittance must be recorded at a minimum of every 15 minutes.

h. The 7-day rolling average for any day is the average of the daily values for that day and the preceding six days. The maximum 7-day rolling average is the maximum value from this series of 7-day averages.

i. The compliance monitoring point for E. coli is after the UV system and prior to the membrane treatment.

Table B4: Outfall 002 (Bear Creek) Effluent Monitoring Requirements

(after Bear Creek outfall completion)

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action See note a.	Report Statistic See note b.
Flow (50050)	MGD	Year-round	Daily	Metered	Monthly Average Daily Maximum
pH (00400)	SU	Year-round	3/week	Grab	Daily Maximum Daily Minimum
Total Ammonia (as N) (00610)	mg/L	Year-round	2/week	24-hour composite	Daily Maximum Monthly Average

Notes:

a. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must perform grab measurements. If the failure or loss is for continuous temperature monitoring equipment, the permittee must perform grab measurements daily between 2 PM and 4 PM until continuous monitoring equipment is redeployed.

b. When submitting DMRs electronically, all data used to determine summary statistics must be submitted in a DEQ-approved format as a spreadsheet via electronic reporting unless otherwise directed by DEQ.

Table B5: Outfall 001 (Ashland Creek) Effluent Monitoring Requirements (after Bear Creek outfall completion)

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action See note a.	Report Statistic See note b.
Flow (50050)	MGD	Year-round	Daily	Metered	Monthly Average Daily Maximum
pH (00400)	SU	Year-round	3/week	Grab	Daily Maximum Daily Minimum
Total Ammonia (as N) (00610)	mg/L	Year-round	2/week	24-hour composite	Daily Maximum Monthly Average

Table B6: Outfall 001 (Ashland Creek) Effluent Monitoring Requirements (before Bear Creek outfall completion)

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action (See note a.)	Report Statistic (See note b.)
Flow (50050)	MGD	Year-round	Daily	Metered	Monthly Average Daily Maximum
pH (00400)	SU	Year-round	3/week	Grab	Daily Maximum Daily Minimum
Total Ammonia (as N) (00610)	mg/L	Year-round	2/week	24-hour composite	Daily Maximum Monthly Average
Total Ammonia (as N) (00610)	lb/day	May 1 – Nov 30	2/week	Calculation	Monthly Average
$CBOD_5$ (80082)	mg/L	Year-round	2/week	24-hour composite	Monthly Average Maximum Weekly Average
$CBOD_5$ (80082)	lb/day	Year-round	2/week	24-hour composite	Monthly Average Daily Maximum Maximum Weekly Average
CBOD5 Percent Removal (81383) (See note c).	%	Year-round	1/month	Calculation based on monthly average CBOD5 concentration values	Monthly Average
TSS (00530)	mg/L	Year-round	2/week	24-hour composite	Monthly Average Maximum Weekly Average
TSS (00530)	lb/day	Year-round	2/week	Calculation	Monthly Average Daily Maximum Maximum Weekly Average
TSS Percent Removal (81011) (See note c.)	%	Year-round	1/month	Calculation based on monthly average TSS concentration values	Monthly Average
Total Phosphorus (00665)	mg/L	Year-round	2/week	Grab	Monthly Average

Item or Parameter	**Units**	**Time Period**	**Minimum Frequency**	**Sample Type/ Required Action** (See note a.)	**Report Statistic** (See note b.)
Total Phosphorus (00665)	lb/day	Year-round	2/week	Calculation	Monthly Average
E. coli (51040)	#/100 mL	Year-round	2/week	Grab (See note g)	Monthly Geometric Mean Daily Maximum
Hardness (00900)	mg/L	Year-round	1/month	24-hour composite	Daily Maximum
UV intensity	mW/cm^2	Year-round	Daily	Continuous	Maintain records on site (See note d)
UV dose	mJ/cm^2	Year-round	Daily	Calculation	Maintain records on site (See note d)
UV transmittance	%	Year-round	Daily	Continuous	Maintain records on site (See note d)
Temperature (00010)	ºC	Year-round	1/hour	Continuous	Daily Maximum Maximum 7-day Rolling Average of Daily Maximums (See note f)
Excess Thermal Load (51405)	Mkcal/day	Year-round	1/day	Calculation (See note c.)	Maximum 7-day Rolling Average (See note f)
Mercury, Total Recoverable (MMP) (71901)	µg/L	See note e.	Quarterly	24-hour composite	Quarterly Value

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action (See note a.)	Report Statistic (See note b.)

Notes:

a. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must perform grab measurements. If the failure or loss is for continuous temperature monitoring equipment, the permittee must perform grab measurements daily between 2 PM and 4 PM until continuous monitoring equipment is redeployed.

b. When submitting DMRs electronically, all data used to determine summary statistics must be submitted in a DEQ-approved format as a spreadsheet via electronic reporting unless otherwise directed by DEQ.

c. The daily excess thermal load (ETL) discharged must be calculated using the daily maximum effluent temperature and the corresponding daily average effluent flow using the formula below.

   The 7-day rolling average is then calculated from the daily ETLs.

   The daily ETL is calculated as follows: $ETL = 3.785 * Qe * \Delta T$

   Where:

   ETL = Excess Thermal Load (million kcal/day)
   Q_e = Daily Average Effluent flow (MGD)
   ΔT = Daily Maximum Effluent temperature (°C) minus temperature criterion (°C)
   Criterion = 18ºC (May 16 – Oct 14)
   Criterion = 13ºC (Oct 15 – May 15)

d. Continuous UV records must be maintained onsite. UV intensity and transmittance must be recorded at a minimum of every 15 minutes.

e. Monitoring must occur in the 3rd quarter 2024, 4th quarter 2024, 1st quarter 2025, 2nd quarter 2025.

f. The 7-day rolling average for any day is the average of the daily values for that day and the preceding six days. The maximum 7-day rolling average is the maximum value from this series of 7-day averages.

g. The compliance monitoring point for *E. coli* is after the UV system and prior to the membrane treatment.

4. Copper Biotic Ligand Model and Aluminum Parameters

The permittee must monitor Bear Creek and Outfall 004 for copper biotic ligand model and aluminum parameters per the table below. The permittee must collect upstream samples such that the effluent does not impact the samples (e.g., upstream for riverine discharges).

Table B7: Copper Biotic Ligand Model and Aluminum Sampling Requirements

Parameter (See note b.)	**CAS** (See note d.)	**Units**	**Sampling Frequency** (See note c.)	**Sampling Location** (See note a.)
Copper, Total and Dissolved	7440097	µg/L	1/month	Upstream and Effluent
Aluminum, Total	7429905	µg/L	1/month	Upstream and Effluent
Hardness (as $CaCO_3$)	–	mg/L	1/month	Upstream and Effluent
Dissolved Organic Carbon	–	mg/L	1/month	Upstream and Effluent
pH	–	S.U.	1/month	Upstream and Effluent
Temperature	–	°C	1/month	Upstream and Effluent
Calcium, dissolved	7440702	mg/L	1/month	Upstream and Effluent
Magnesium, dissolved	7439954	mg/L	1/month	Upstream and Effluent
Sodium, dissolved	7440235	mg/L	1/month	Upstream and Effluent
Potassium, dissolved	7440097	mg/L	1/month	Upstream and Effluent
Sulfate, dissolved	14808798	mg/L	1/month	Upstream and Effluent
Chloride, dissolved	16887006	mg/L	1/month	Upstream and Effluent
Alkalinity, dissolved	–	mg/L	1/month	Upstream and Effluent

Notes:

a. Samples must be collected upstream from the Bear Creek outfall (outside the influence of the effluent) and from the effluent on the same day.

b. All effluent samples must be 24-hr composite samples except grab samples must be collected for pH, alkalinity and temperature. All receiving stream samples must be grab samples.

c. Samples must be collected monthly as required in Table B1

d. Chemical Abstract Service

5. Effluent Toxics Characterization Monitoring (Tier 1 Monitoring)

The permittee must collect and analyze effluent samples for the parameters listed in the tables below. The permittee must collect effluent samples at Outfall 004 as required in Table B1.

Samples must be 24-hour composites, except as noted in the tables below for total cyanide, free cyanide and volatile organic compounds. Sample results must be submitted to DEQ using approved electronic format.

Table B8: Metals, Cyanide, and Hardness
(µg/L unless otherwise specified)

Pollutant (See note a.)	**CAS** (See note b.)	**Pollutant** (See note a.)	**CAS** (See note b.)
Antimony (total)	7440360	Lead (total and dissolved)	7439921
Arsenic (total)	7440382	Mercury (total)	7439976
Arsenic (Total Inorganic)	7440382	Nickel (total and dissolved)	7440020
Arsenic (Total Inorganic Dissolved)	7440382	Selenium (total and dissolved)	7782492
Beryllium (total)	7440417	Silver (total and dissolved)	7440224
Cadmium (total and dissolved)	7440439	Thallium (total)	7440280
Chromium (total)	7440473	Zinc (total and dissolved)	7440666
Chromium III (total and dissolved)	16065831	Cyanide (Free) (See note c. & d.)	57125
Chromium VI (total and dissolved)	18540299	Cyanide (Total) (See note d.)	57125
Iron (Total)	7439896	Hardness (Total as CaCO3)	

Notes:

a. The term "total" used in reference to metals is intended to cover all EPA-accepted standard digestion methods and is considered to be equivalent to the term "total recoverable".

b. Chemical Abstract Service

c. There are multiple approved methods for testing for free cyanide. For more information, refer to DEQ's analytical memo on the subject of cyanide monitoring at https://www.oregon.gov/deq/FilterDocs/sToxicscyanide.pdf

d. When sampling for Cyanide (free and total), the permittee must collect at least six discrete grab samples over the operating day with samples collected no less than one hour apart. The aliquot must be at least 100 mL and collected and composited into a larger container that has been preserved with sodium hydroxide to insure sample integrity. If the result for Total Cyanide exceeds 5.0 µg/L, the permittee must monitor for Free Cyanide as part of the Tier 2 monitoring.

Table B9: Volatile Organic Compounds
(µg/L unless otherwise specified)

Pollutant (See note a.)	CAS	Pollutant (See note a.)	CAS
Acrolein (See note k.)	107028	1,2-trans-dichloroethylene (See note d.)	156605
Acrylonitrile (See note k.)	107131	1,1-dichloroethylene (See note e.)	75354
Benzene	71432	1,2-dichloropropane	78875
Bromoform	75252	1,3-dichloropropylene (See note f.)	542756
Carbon Tetrachloride	56235	Ethylbenzene	100414
Chlorobenzene	108907	Methyl Bromide (See note g.)	74839
Chlorodibromomethane (See note b.)	124481	Methyl Chloride (See note h.)	74873
Chloroethane	75003	Methylene Chloride	75092
2-Chloroethylvinyl Ether (See note k.)	110758	1,1,2,2-tetrachloroethane	79345
Chloroform	67663	Tetrachloroethylene (See note i.)	127184
Dichlorobromomethane (See note c.)	75274	Toluene	108883
1,2-Dichlorobenzene (o)	95501	1,1,1-trichloroethane	71556
1,3-Dichlorobenzene (m)	541731	1,1,2-trichloroethane	79005
1,4-Dichlorobenzene (p)	106467	Trichloroethylene (See note j.)	79016
1,1-dichloroethane	75343	Vinyl Chloride	75014
1,2-dichloroethane	107062		

Notes:

a. The permittee must collect six discrete samples (not less than 40 mL each) over the operating day at intervals of at least one hour. The samples may be analyzed separately or composited. If analyzed separately, the analytical results for all samples must be averaged for reporting purposes. If composited, they must be composited in the laboratory at the time of analysis in a manner that maintains the integrity of the samples and prevents the loss of volatile analytes. The quantitation limits listed above remain in effect for composite samples.

b. Chlorodibromomethane is identified as Dibromochloromethane in 40 CFR 136.3, Table 1C.

c. Dichlorobromomethane is identified as Bromodichloromethane in 40 CFR 136.3, Table 1C.

d. 1,2-Trans-dichloroethylene is identified as Trans-1,2-dichloroethene in 40 CFR 136.3, Table 1C.

e. 1,1-Dichloroethylene is identified as 1,1-Dichloroethene in 40 CFR 136.3, Table 1C.

f. 1,3-Dichloropropylene consists of both cis-1,3-Dichloropropene and Trans-1,3-dichloropropene. Both should be reported individually.

g. Methyl bromide is identified as Bromomethane in 40 CFR 136.3, Table 1C.

h. Methyl chloride is identified as Chloromethane in 40 CFR 136.3, Table 1C.

i. Tetrachloroethylene is identified as Tetrachloroethene in 40 CFR 136.3, Table 1C.

j. Trichloroethylene is identified as Trichloroethene in 40 CFR 136.3, Table 1C.

k. Acrolein, Acrylonitrile, and 2-Chloroethylvinyl ether must be tested from an unacidified sample.

Table B10: Acid-Extractable Compounds
(µg/L unless otherwise specified)

Pollutant	CAS	Pollutant	CAS
p-chloro-m-cresol (See note a.)	59507	2-nitrophenol	88755
2-chlorophenol	95578	4-nitrophenol	100027
2,4-dichlorophenol	120832	Pentachlorophenol	87865
2,4-dimethylphenol	105679	Phenol	108952
4,6-dinitro-o-cresol (See note b.)	534521	2,4,5-trichlorophenol (See note c.).	95954
2,4-dinitrophenol	51285	2,4,6-trichlorophenol	88062

Notes:

a. p-chloro-m-cresol is identified as 4-Chloro-3-methylphenol in 40 CFR 136.3, Table 1C.

b. 4,6-dinitro-o-cresol is identified as 2-Methyl-4,6-dinitrophenol in 40 CFR 136.3, Table 1C.

c. To monitor for 2,4,5-trichlorophenol, use EPA Method 625.1.

Table B11: Base-Neutral Compounds
(µg/L unless otherwise specified)

Pollutant	CAS	Pollutant	CAS
Acenaphthene	83329	Dimethyl phthalate	131113
Acenaphthylene	208968	2,4-dinitrotoluene	121142
Anthracene	120127	2,6-dinitrotoluene	606202
Benzidine	92875	1,2-diphenylhydrazine (See note c.)	122667
Benzo(a)anthracene	56553	Fluoranthene	206440
Benzo(a)pyrene	50328	Fluorene	86737
3,4-benzofluoranthene (See note a.)	205992	Hexachlorobenzene	118741
Benzo(ghi)perylene	191242	Hexachlorobutadiene	87683
Benzo(k)fluoranthene	207089	Hexachlorocyclopentadiene	77474
Bis(2-chloroethoxy)methane	111911	Hexachloroethane	67721
Bis(2-chloroethyl)ether	111444	Indeno(1,2,3-cd)pyrene	193395
Bis(2-chloroisopropyl)ether (See note b.)	108601	Isophorone	78591
Bis (2-ethylhexyl)phthalate	117817	Napthalene	91203
4-bromophenyl phenyl ether	101553	Nitrobenzene	98953
Butylbenzyl phthalate	85687	N-nitrosodi-n-propylamine	621647
2-chloronaphthalene	91587	N-nitrosodimethylamine	62759
4-chlorophenyl phenyl ether	7005723	N-nitrosodiphenylamine	86306
Chrysene	218019	Pentachlorobenzene (See note d.)	608935
Di-n-butyl phthalate	84742	Phenanthrene	85018
Di-n-octyl phthalate	117840	Pyrene	129000
Dibenzo(a,h)anthracene	53703	1,2,4-trichlorobenzene	120821
3,3-Dichlorobenzidine	91941	Tetrachlorobenzene,1,2,4,5 (See note d.)	95943
Diethyl phthalate	84662		

Pollutant	CAS	Pollutant	CAS

Notes:

a. 3,4-benzofluoranthene is listed as Benzo(b)fluoranthene in 40 CFR part 136.

b. Also known as Chloroisopropyl Ether bis 2, and 2,2'-oxybis(2-chloro-propane)

c. 1,2-diphenylhydrazine is difficult to analyze given its rapid decomposition rate in water. Azobenzene (a decomposition product of 1,2-diphenylhydrazine), should be analyzed as an estimate of this chemical.

d. To analyze for Pentachlorobenzene and Tetrachlorobenzene 1,2,4,5, use EPA 625.1.

6. Whole Effluent Toxicity (WET) Requirements

The permittee must monitor 004 for whole effluent toxicity as described in the table below using the testing protocols specified in Schedule D, Whole Effluent Toxicity Testing for Freshwater.

Table B12: WET Test Monitoring

Parameter	Sample Type/Location	Minimum Frequency	Report
Acute toxicity	For acute toxicity: 24-hr composite, taken at Outfall 004	See Table B1	Report must include test results and backup information such as bench sheets sufficient to demonstrate compliance with permit requirements. Report must include a statement certifying that the results do or do not show toxicity.
Chronic toxicity	For chronic toxicity: 24-hr composite, taken at Outfall 004		

7. Recycled Water Monitoring Requirements: Outfall 003

The permittee must monitor recycled water for Outfall 003 as listed below. The samples must be representative of the recycled water delivered for beneficial reuse at a location identified in the Recycled Water Use Plan.

Table B13: Recycled Water Monitoring

Item or Parameter	Time Period	Minimum Frequency	Sample Type/ Required Action	Report
Quantity Irrigated (inches/acre)	Year-round (when irrigating)	Daily	Measurement	Annual Report
UV dose (mJ/cm^2)	Year-round (when irrigating)	Daily	Calculation based on UVI grab and average daily flow	Annual Report
pH	Year-round (when irrigating)	2/Week	Grab	Annual Report
Total Coliform See note a.	Year-round (when irrigating)	Daily (Class A) 3/Week (Class B) Weekly (Class C)	Grab	Weekly median Annual Report
E. coli	Year-round (when irrigating)	Weekly (Class D)	Grab	Annual Report
Turbidity	Year-round (when irrigating)	Hourly (Class A only)	Measurement	Annual Report
Nitrogen Loading Rate (lbs/acre-year)	Year-round (when irrigating)	Annually	Calculation	Annual Report
Nutrients (TKN, NO_2+NO_3-N, Total Ammonia (as N), Total Phosphorus)	Year-round (when irrigating)	Quarterly	Grab	Annual Report

Note:
a. Calculations of the median total coliform levels in Classes A – C are based on the results of the last seven days that analyses have been completed.

SCHEDULE C: COMPLIANCE SCHEDULE

1. Compliance Schedule to Meet Final Effluent Limitation

The permittee must comply with the following schedule:

Compliance Date:	Requirement:
By DATE (12 months from permit effective date)	The permittee must submit final design plans and specifications for the outfall relocation to Bear Creek to DEQ for review and approval
By DATE (24months from permit effective date)	• The permittee must submit to DEQ a progress report summarizing the progress made toward constructing the outfall to Bear Creek. • Permittee must complete flow augmentation feasibility studies and submit findings to DEQ.
By DATE (30 months from permit effective date)	The permittee must submit to DEQ a progress report summarizing the progress made toward acquiring the thermal credit target. The permittee must have obtained a total of at least 40% of the needed kilocalories.
By DATE (36 months from permit effective date)	• The permittee must complete construction of the outfall to Bear Creek. • Permittee must complete a study and submit findings to DEQ on the thermal benefits of cold water releases from Reeder Reservoir at the new outfall site in Bear Creek.
By DATE (48 months from permit effective date)	• The permittee must submit to DEQ a progress report summarizing the progress made toward acquiring the thermal credit target. The permittee must have obtained a total of at least 70% of the needed kilocalories to comply with the outfall 004 excess thermal load limits • Permittee must submit a DRAFT Flow Augmentation Water Quality Trading Plan to DEQ that details an analysis approach to evaluate benefits transferrable to the outfall site in Bear Creek and possible permit conditions.
By DATE (60 months from permit effective date)	The permittee must submit to DEQ a final report summarizing all of the thermal credits that have been obtained. The permittee must achieve compliance with the final outfall 004 excess thermal load limits.

2. Responsibility to Meet Compliance Dates

No later than 14 days following each compliance date listed in the table above, the permittee must notify DEQ in writing of its compliance or noncompliance with the requirements. Any reports of noncompliance must include the cause of noncompliance, any remedial actions taken, and a discussion of the likelihood of meeting the next scheduled requirement(s).

SCHEDULE D: SPECIAL CONDITIONS

1. Inflow and Infiltration

The permittee must submit to DEQ an annual inflow and infiltration report on a DEQ-approved form as directed in Table B1. The report must include the following:

a. An assessment of the facility's I/I issues based on a comparison of summer and winter flows to the plant.

b. Details of activities performed in the previous year to identify and reduce inflow and infiltration.

c. Details of activities planned for the following year to identify and reduce inflow and infiltration.

d. A summary of sanitary sewer overflows that occurred during the previous year. This should include the following: date of the SSO, location, estimated volume, cause, follow-up actions and if performed, the results of receiving stream monitoring.

2. Emergency Response and Public Notification Plan

The permittee must develop an Emergency Response and Public Notification Plan ("plan"), or ensure the facility's existing plan is current and accurate, per Schedule F, Section B, and Condition 8 within 6 months of permit effective date. The permittee must update the plan annually to ensure all information contained in the plan, including telephone and email contact information for applicable public agencies, is current and accurate. An updated copy of the plan must be kept on file at the facility for DEQ review. The latest plan revision date must be listed on the plan cover along with the reviewer's initials or signature.

3. Recycled Water Use Plan

In order to distribute recycled water, the permittee must develop and maintain a DEQ-approved Recycled Water Use Plan meeting the requirements in OAR 340-055-0025. The permittee must submit this plan or any significant modifications to DEQ for review and approval with sufficient time to clear DEQ review and a public notice period prior to distribution of recycled water. The permittee is prohibited from distributing recycled water prior to receipt of written approval of its Recycled Water Use Plan from DEQ. The permittee must keep the plan updated. All plan revisions require written authorization from DEQ and are effective upon permittee's receipt of DEQ written approval. No significant modifications can be made to a plan for an administratively extended permit (after the permit expiration date). Conditions in the plan are enforceable requirements under this permit. DEQ will provide an opportunity for public review and comment on any significant plan modifications prior to approving or denying. Public review is not required for minor modifications, changes to utilization dates or changes in use within the recycled water class.

a. Recycled Water Annual Report – The permittee must submit a recycled water annual report by the date specified in Table B1: Reporting Requirements and Due Dates. The permittee must use the DEQ-approved recycled water annual report form. This report must include the monitoring data and analytical laboratory reports for the previous year's monitoring required under Schedule B.

4. Exempt Wastewater Reuse at the Treatment System

Recycled water used for landscape irrigation within the property boundary or in-plant processes at the wastewater treatment system is exempt from the requirements of OAR 340-055 if all of the following conditions are met:

a. The recycled water is an oxidized and disinfected wastewater.

b. The recycled water is used at the wastewater treatment system site where it is generated or at an auxiliary wastewater or sludge treatment facility that is subject to the same NPDES or WPCF permit as the wastewater treatment system.

c. Spray and/or drift from the use does not migrate off the site.

d. Public access to the site is restricted.

5. Wastewater Solids Annual Report

The permittee must submit a Wastewater Solids Annual Report by February 19 each year documenting removal of wastewater solids from the facility during the previous calendar year. The permittee must use the DEQ-approved wastewater solids annual report form. This report must include the volume of material removed and the name of the permitted facility that received the solids.

6. Wastewater Solids Transfers

a. *Within state.* The permittee may transfer wastewater solids including Class A and Class B biosolids, to another facility permitted to process or dispose of wastewater solids, including but not limited to: another wastewater treatment facility, landfill, or incinerator. The permittee must satisfy the requirements of the receiving facility. The permittee must report the name of the receiving facility and the quantity of material transferred in the wastewater solids annual report identified in Schedule B.

b. *Out of state.* If wastewater solids, including Class A and Class B biosolids, are transferred out of state for use or disposal, the permittee must obtain written authorization from DEQ, meet Oregon requirements for the use or disposal of wastewater solids, notify in writing the receiving state of the proposed use or disposal of wastewater solids, and satisfy the requirements of the receiving state.

7. Hauled Waste Control Plan

The permittee may accept hauled wastes at discharge points designated by the POTW. The permittee must submit a written Hauled Waste Control Plan by the date listed in Table B1. Within 60 days of receiving DEQ comments, the permittee must submit hauled waste control plan revised to be consistent with DEQ's comments. Hauled wastes may include wastewater solids from another wastewater treatment facility, septage, grease trap wastes, portable and chemical toilet wastes, landfill leachate, groundwater remediation wastewaters and commercial/industrial wastewaters. The permittee must keep the plan updated and submit substantial modifications to an existing plan to DEQ for approval at least 60 days prior to making the proposed changes. Plan modifications are effective upon receipt of written DEQ approval. A Hauled Waste Control Plan is not required in the event biological seed must be added to the process at the POTW to facilitate effective wastewater treatment.

8. Hauled Waste Annual Report

By the date listed in Table B1, the permittee must submit a report of hauled waste received by the POTW. This report must include the date, time, type, and amount received each time the POTW accepts hauled waste. Hauled waste is described in the permittee's Hauled Waste Control Plan.

9. Whole Effluent Toxicity Testing for Freshwater

a. The permittee must conduct whole effluent toxicity (WET) tests as specified here and in Schedule B of this permit.

b. Acute Toxicity Testing - Organisms and Protocols

i. The permittee must conduct 48-hour static renewal tests with *Ceriodaphnia dubia* (water flea) and 96-hour static renewal tests with *Pimephales promelas* (fathead minnow).

ii. All test methods and procedures must be in accordance with *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, EPA-821-R-02-012, October 2002*, or the most recent version of this publication if such edition is available. If the permittee wants to deviate from the bioassay procedures outlined in this method, the permittee must submit a written request to DEQ for review and approval prior to use.

iii. Treatments to the final effluent samples (for example, dechlorination, ammonia removal), except those included as part of the methodology, may not be performed by the laboratory unless approved by DEQ in writing prior to analysis.

iv. WET acute testing must be conducted using a dilution series based upon the effluent percentage at the ZID in the following manner: 100%; 89%, 77%, 39%, 19% and a control (0% effluent).

v. An acute WET test shows toxicity if there is a statistically significant difference in survival between the control and 77% effluent reported as the NOEC < 77% effluent.

c. Chronic Toxicity Testing - Organisms and Protocols

i. The permittee must conduct tests with *Ceriodaphnia dubia* (water flea) for reproduction and survival test endpoint, *Pimephales promelas* (fathead minnow) for growth and survival test endpoint, and *Raphidocelis subcapitata* (green alga formerly known as *Selanastrum capricornutum*) for growth test endpoint.

ii. All test methods and procedures must be in accordance with *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA-821-R-02-013, October 2002*, or the most recent version of this publication if such edition is available. If the permittee wants to deviate from the bioassay procedures outlined in the applicable method, the permittee must submit a written request to DEQ for review and approval prior to use.

iii. Treatments to the final effluent samples (for example, dechlorination, ammonia removal), except those included as part of the methodology, may not be performed by the laboratory unless approved by DEQ in writing prior to analysis.

iv. WET chronic testing must be conducted using a dilution series based upon the effluent percentage at the RMZ (EPRMZ) in the following manner: 100% effluent; 82%, 63%, 31%, 16%, and a control (0% effluent).

v. A chronic WET test shows toxicity if the IC25 (25% inhibition concentration) occurs at dilutions equal to or less than the dilution that is known to occur at the edge of the mixing zone, that is, IC25 ≤ 63%.

d. Dual End-Point Tests

i. WET tests may be dual end-point tests in which both acute and chronic end-points can be determined from the results of a single chronic test. The acute end-point will be based on 48-hours for the *Ceriodaphnia dubia* (water flea) and 96-hours for the *Pimephales promelas* (fathead minnow).

ii. All test methods and procedures must be in accordance with *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA-821-R-02-013, October 2002*, or the most recent version of this publication if such edition is available. If the permittee wants to deviate from the bioassay procedures outlined in this method, the permittee must submit a written request to DEQ for review and approval prior to use.

iii. Tests run as dual end-point tests must be conducted on a control (0%) and the following dilution series: 19%, 39%, 63%, 77%, and 100% effluent.

iv. Toxicity determinations for dual end-point tests must correspond to the acute and chronic tests described in conditions 9.b.v and 9.c.v above.

e. Sampling Requirements

At the time of WET sampling, the permittee must collect and analyze effluent samples for the priority pollutants listed in Schedule B.

f. Evaluation of Causes and Exceedances

i. If any test exhibits toxicity as described in conditions 9.b.v. and 9.c.v. above, the permittee must conduct another toxicity test using the same species and DEQ-approved methodology within two weeks unless an extension is granted by DEQ in writing.

ii. If two consecutive WET test results indicate acute or chronic toxicity as described in conditions 9.b.v. and 9.c.v. above, the permittee must immediately notify DEQ of the results. DEQ will work with the permittee to determine the appropriate course of action to evaluate and address the toxicity.

g. Quality Assurance and Reporting

i. Quality assurance criteria, statistical analyses, and data reporting for the WET tests must be in accordance with the EPA documents stated in this condition.

ii. For each test, the permittee must provide a bioassay laboratory report according to the EPA method documents referenced in this Schedule. The report must include all QA/QC documentation, statistical analysis for each test performed, standard reference toxicant test (SRT) conducted on each species required for the toxicity tests, and completed Chain of Custody forms for the samples including time of sample collection and receipt. The permittee must submit reports to DEQ within 60 days of test completion.

iii. The report must include all endpoints measured in the test: NOEC (No Observed Effects Concentration), LOEC (Lowest Observed Effects Concentration), and IC_{25} (chronic effect 25% inhibition concentration).

iv. The permittee must make available to DEQ upon request the written standard operating procedures they, or the laboratory performing the WET tests, use for all toxicity tests required by DEQ.

h. Reopener

DEQ may reopen and modify this permit to include new limits, monitoring requirements, and/or conditions as determined by DEQ to be appropriate, and in accordance with procedures outlined in OAR Chapter 340, Division 45 if:

i. WET testing data indicate acute and/or chronic toxicity.

ii. The facility undergoes any process changes.

iii. Discharge monitoring data indicate a change in the reasonable potential to cause or contribute to an exceedance of a water quality standard.

i. Circumstances not addressed in this section, or that require deviation from the requirements of this section, must be approved in writing by DEQ before changes are implemented.

10. Operator Certification

a. Definitions

i. "Supervise" means to have full and active responsibility for the daily on site technical operation of a wastewater treatment system or wastewater collection system.

ii. "Supervisor" or "designated operator", means the operator delegated authority by the permittee for establishing and executing the specific practice and procedures for operating the wastewater treatment system or wastewater collection system in accordance with the policies of the owner of the system and any permit requirements.

iii. "Shift Supervisor" means the operator delegated authority by the permittee for executing the specific practice and procedures for operating the wastewater treatment system or wastewater collection system when the system is operated on more than one daily shift.

iv. "System" includes both the collection system and the treatment systems.

b. The permittee must comply with OAR Chapter 340, Division 49, "Regulations Pertaining to Certification of Wastewater System Operator Personnel" and designate a supervisor whose certification corresponds with the classification of the collection and/or treatment system as specified in the DEQ Supervisory Wastewater Operator Status Report. DEQ may revise the permittee's classification in writing at any time to reflect changes in the collection or treatment system. This reclassification is not considered a permit modification and may be made after the permit expiration date provided the permit has been administratively extended by DEQ. If a facility is re-classified, a certified letter will be mailed to the system owner from the DEQ Operator Certification Program. Current system classifications are publicized on the DEQ Supervisory Wastewater Operator Status Report found on the DEQ Wastewater Operator Certification Homepage.

c. The permittee must have its system supervised full-time by one or more operators who hold a valid certificate for the type of wastewater treatment or wastewater collection system, and at a grade equal to or greater than the wastewater system's classification.

d. The permittee's wastewater system may be without the designated supervisor for up to 30 consecutive days if another person supervises the system, who is certified at no more than one grade lower than the classification of the wastewater system. The permittee must delegate authority to this operator to supervise the operation of the system.

e. If the wastewater system has more than one daily shift, the permittee must have another properly certified operator available to supervise operation of the system. Each shift supervisor must be certified at no more than one grade lower than the system classification.

f. The permittee is not required to have a supervisor on site at all times; however, the supervisor must be available to the permittee and operator at all times.

g. The permittee must notify DEQ in writing of the name of the system supervisor by completing and submitting the Supervisory Wastewater System Operator Designation Form. The most recent version of this form may be found on the DEQ Wastewater Operator Certification homepage *NOTE: This form is different from the Delegated Authority form. The permittee may replace or re-designate the system supervisor with another properly certified operator at any time and must notify DEQ in writing within 30 days of replacement or re-designation of the operator in charge. As of this writing, the notice of replacement or re-designation must be sent to Water Quality Division, Operator Certification Program, 700 NE Multnomah St, Suite 600, Portland, OR 97232-4100. This address may be updated in writing by DEQ during the term of this permit.

h. When compliance with item (d) of this section is not possible or practicable because the system supervisor is not available or the position is vacated unexpectedly, and another certified operator is not qualified to assume supervisory responsibility, the Director may grant a time extension for compliance with the requirements in response to a written request from the system owner. The Director will not grant an extension longer than 120 days unless the system owner documents the existence of extraordinary circumstances.

11. Industrial User Survey

a. By the date listed in Table B1, the permittee must conduct an industrial user survey as described in 40CFR 403.8(f)(2)(i-iii) to determine the presence of any industrial users discharging wastewaters subject to pretreatment and submit a report on the findings to DEQ. The purpose of the survey is to identify whether there are any industrial users discharging to the POTW, and ensure regulatory oversight of these discharges to state waters.

b. Should the DEQ determine that a pretreatment program is required, the permit must be reopened and modified in accordance with 40 CFR 403.8(e)(1) to incorporate a compliance schedule for development of a pretreatment program. The compliance schedule must be developed in accordance with the provisions of 40 CFR 403.12(k), and must not exceed twelve (12) months.

12. Water Quality Trading in the Rogue Basin

a. Water Quality Trading Plan

The permittee's water quality trading plan is incorporated into this permit by reference as enforceable conditions of this permit provided the plan is approved by DEQ. Prior to approval, DEQ must provide an opportunity for public notice and comment on the trading plan for a minimum of 35 days as a Category III permitting action pursuant to OAR 340-045-0055. Once DEQ approves of the plan, the permittee is authorized to use water quality trading to comply with the Excess Thermal Load waste discharge limitations in Schedule A provided its trading activities comply with the requirements of this section, OAR 340-039, and its trading plan.

b. Water Quality Trading Plan Modifications

Any changes to the plan must be submitted to DEQ for review and approval according to OAR 340-039-0025(7). Prior to approval, DEQ must provide an opportunity for public notice and comment on the trading plan for a minimum of 35 days as a Category III permitting action pursuant to OAR 340-045-0055. DEQ cannot approve of any modifications to the plan if this permit is administratively extended beyond its expiration date.

c. Individual Trading Projects

All individual trading projects and modifications to these projects must be consistent with the DEQ-approved plan; they are not subject to public notice and comment and may be modified if this permit is administratively extended beyond its expiration date.

d. Events Beyond the Permittee's Reasonable Control

i. Damage to a project due an event beyond the permittee's reasonable control (for example, wildfire, flood, vandalism) is not in and of itself considered a violation of this permit.

ii. The permittee must report these events as required in Schedule F, Section D whenever applicable. The permittee must also report the following to DEQ within 90 days of the damage:

(A) A description of the event, including an assessment of the damage.

(B) A plan for addressing the damage. Natural restoration and/or active replanting of the site is allowed if continued maintenance is expected to provide a reasonable potential for the long term restoration of the shading function in an ecologically appropriate manner. Replacement with an alternate site or sites is also allowed.

(C) Schedule for implementation of the permittee's plan.

iii. Credits from projects that are damaged due to events beyond the reasonable control of the permittee remain valid provided the permittee demonstrates to DEQ that the sites will be restored or alternative solutions implemented within a reasonable timeframe.

e. Recordkeeping

The permittee must keep the following records for each project site for as long as credits generated at the site is being used. These records must be made available to DEQ within 14 days of request.

i. Project name and address.

ii. General description of the project, including land ownership information, a description with latitudes and longitudes delineating the project boundary and, if applicable, the georeferenced GIS shapefile of the project boundary.

iii. Site-specific design or, for riparian restoration, a planting plan if developed.

iv. Monitoring documentation including photos.

v. Name and contact information of party or parties responsible for conducting the planting and monitoring.

f. Annual Report

By February 1 of each year, the permittee must submit an annual report to DEQ. The report must describe trading plan implementation and performance over the past year. The annual report must include information specific to each trading project implemented including:

i. The location of each trading project and best management practices implemented in the preceding year.

ii. The trading project baseline.

iii. The trading ratios used.

iv. Trading project monitoring results.

v. Verification of trading plan performance including the quantity of credits acquired from each trading project and the total quantity of credits generated under the trading plan to date.

vi. Funding source for each trading project.

vii. If applicable, adaptive management measures implemented under the trading plan.

SCHEDULE F: NPDES GENERAL CONDITIONS

SCHEDULE F
NPDES GENERAL CONDITIONS – DOMESTIC FACILITIES
October 1, 2015 Version

SECTION A. STANDARD CONDITIONS

A1. Duty to Comply with Permit

The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and the federal Clean Water Act and is grounds for an enforcement action. Failure to comply is also grounds for DEQ to terminate, modify and reissue, revoke, or deny renewal of a permit.

A2. Penalties for Water Pollution and Permit Condition Violations

The permit is enforceable by DEQ or EPA, and in some circumstances also by third-parties under the citizen suit provisions of 33 USC § 1365. DEQ enforcement is generally based on provisions of state statutes and Environmental Quality Commission (EQC) rules, and EPA enforcement is generally based on provisions of federal statutes and EPA regulations.

ORS 468.140 allows DEQ to impose civil penalties up to $25,000 per day for violation of a term, condition, or requirement of a permit.

Under ORS 468.943, unlawful water pollution in the second degree, is a Class A misdemeanor and is punishable by a fine of up to $25,000, imprisonment for not more than one year, or both. Each day on which a violation occurs or continues is a separately punishable offense.

Under ORS 468.946, unlawful water pollution in the first degree is a Class B felony and is punishable by a fine of up to $250,000, imprisonment for not more than 10 years, or both.

The Clean Water Act provides that any person who violates permit condition, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation.

The Clean Water Act provides that any person who negligently violates any condition, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both.

In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both.

Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both.

In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

Any person who knowingly violates section any permit condition, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both.

In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both.

An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

Any person may be assessed an administrative penalty by the Administrator for violating any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act.

Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000.

Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

A3. Duty to Mitigate

The permittee must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit. In addition, upon request of DEQ, the permittee must correct any adverse impact on the environment or human health resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

A4. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and have the permit renewed. The application must be submitted at least 180 days before the expiration date of this permit.

DEQ may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

A5. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:

a. Violation of any term, condition, or requirement of this permit, a rule, or a statute.
b. Obtaining this permit by misrepresentation or failure to disclose fully all material facts.
c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.
d. The permittee is identified as a Designated Management Agency or allocated a wasteload under a total maximum daily load (TMDL).
e. New information or regulations.
f. Modification of compliance schedules.
g. Requirements of permit reopener conditions
h. Correction of technical mistakes made in determining permit conditions.
i. Determination that the permitted activity endangers human health or the environment.
j. Other causes as specified in 40 CFR §§ 122.62, 122.64, and 124.5.
k. For communities with combined sewer overflows (CSOs):
    (1) To comply with any state or federal law regulation for CSOs that is adopted or promulgated subsequent to the effective date of this permit.

(2) If new information that was not available at the time of permit issuance indicates that CSO controls imposed under this permit have failed to ensure attainment of water quality standards, including protection of designated uses.
(3) Resulting from implementation of the permittee's long-term control plan and/or permit conditions related to CSOs.

The filing of a request by the permittee for a permit modification, revocation or reissuance, termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

A6. Toxic Pollutants
The permittee must comply with any applicable effluent standards or prohibitions established under Oregon Administrative Rule (OAR) 340-041-0033 and section 307(a) of the federal Clean Water Act for toxic pollutants, and with standards for sewage sludge use or disposal established under section 405(d) of the federal Clean Water Act, within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

A7. Property Rights and Other Legal Requirements
The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other private rights, or any infringement of federal, tribal, state, or local laws or regulations.

A8. Permit References
Except for effluent standards or prohibitions established under section 307(a) of the federal Clean Water Act and OAR 340-041-0033 for toxic pollutants, and standards for sewage sludge use or disposal established under section 405(d) of the federal Clean Water Act, all rules and statutes referred to in this permit are those in effect on the date this permit is issued.

A9. Permit Fees
The permittee must pay the fees required by OAR.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

B1. Proper Operation and Maintenance
The permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

B2. Need to Halt or Reduce Activity Not a Defense
For industrial or commercial facilities, upon reduction, loss, or failure of the treatment facility, the permittee must, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It is not a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

B3. Bypass of Treatment Facilities
a. Definitions
(1) "Bypass" means intentional diversion of waste streams from any portion of the treatment facility. The permittee may allow any bypass to occur which does not cause effluent limitations to be

exceeded, provided the diversion is to allow essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs b and c of this section.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Prohibition of bypass.

(1) Bypass is prohibited and DEQ may take enforcement action against a permittee for bypass unless:

i. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventative maintenance; and

iii. The permittee submitted notices and requests as required under General Condition B3.c.

(2) DEQ may approve an anticipated bypass, after considering its adverse effects and any alternatives to bypassing, if DEQ determines that it will meet the three conditions listed above in General Condition B3.b.(1).

c. Notice and request for bypass.

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, a written notice must be submitted to DEQ at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee must submit notice of an unanticipated bypass as required in General Condition D5.

B4. Upset

a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operation error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of General Condition B4.c are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the causes(s) of the upset;

(2) The permitted facility was at the time being properly operated;

(3) The permittee submitted notice of the upset as required in General Condition D5, hereof (24-hour notice); and

(4) The permittee complied with any remedial measures required under General Condition A3 hereof.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

B5. Treatment of Single Operational Upset

For purposes of this permit, a single operational upset that leads to simultaneous violations of more than one pollutant parameter will be treated as a single violation. A single operational upset is an exceptional incident that causes simultaneous, unintentional, unknowing (not the result of a knowing act or omission), temporary

noncompliance with more than one federal Clean Water Act effluent discharge pollutant parameter. A single operational upset does not include federal Clean Water Act violations involving discharge without a NPDES permit or noncompliance to the extent caused by improperly designed or inadequate treatment facilities. Each day of a single operational upset is a violation.

B6. Overflows from Wastewater Conveyance Systems and Associated Pump Stations

a. Definition. "Overflow" means any spill, release or diversion of sewage including:
   (1) An overflow that results in a discharge to waters of the United States; and
   (2) An overflow of wastewater, including a wastewater backup into a building (other than a backup caused solely by a blockage or other malfunction in a privately owned sewer or building lateral), even if that overflow does not reach waters of the United States.

b. Reporting required. All overflows must be reported orally to DEQ within 24 hours from the time the permittee becomes aware of the overflow. Reporting procedures are described in more detail in General Condition D5.

B7. Public Notification of Effluent Violation or Overflow

If effluent limitations specified in this permit are exceeded or an overflow occurs that threatens public health, the permittee must take such steps as are necessary to alert the public, health agencies and other affected entities (for example, public water systems) about the extent and nature of the discharge in accordance with the notification procedures developed under General Condition B8. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

B8. Emergency Response and Public Notification Plan

The permittee must develop and implement an emergency response and public notification plan that identifies measures to protect public health from overflows, bypasses, or upsets that may endanger public health. At a minimum the plan must include mechanisms to:

a. Ensure that the permittee is aware (to the greatest extent possible) of such events;
b. Ensure notification of appropriate personnel and ensure that they are immediately dispatched for investigation and response;
c. Ensure immediate notification to the public, health agencies, and other affected public entities (including public water systems). The overflow response plan must identify the public health and other officials who will receive immediate notification;
d. Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained;
e. Provide emergency operations; and
f. Ensure that DEQ is notified of the public notification steps taken.

B9. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must be disposed of in such a manner as to prevent any pollutant from such materials from entering waters of the state, causing nuisance conditions, or creating a public health hazard.

SECTION C. MONITORING AND RECORDS

C1. Representative Sampling

Sampling and measurements taken as required herein must be representative of the volume and nature of the monitored discharge. All samples must be taken at the monitoring points specified in this permit, and must be taken, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points must not be changed without notification to and the approval of DEQ. Samples must be collected in accordance with requirements in 40 CFR part 122.21 and 40 CFR part 403 Appendix E.

C2. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices must be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices must be installed, calibrated and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected must be capable of measuring flows with a maximum deviation of less than ± 10 percent from true discharge rates throughout the range of expected discharge volumes.

C3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR part 136 or, in the case of sludge (biosolids) use and disposal, approved under 40 CFR part 503 unless other test procedures have been specified in this permit.

For monitoring of recycled water with no discharge to waters of the state, monitoring must be conducted according to test procedures approved under 40 CFR part 136 or as specified in the most recent edition of Standard Methods for the Examination of Water and Wastewater unless other test procedures have been specified in this permit or approved in writing by DEQ.

C4. Penalties for Tampering

The federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit may, upon conviction, be punished by a fine of not more than $10,000 per violation, imprisonment for not more than two years, or both. If a conviction of a person is for a violation committed after a first conviction of such person, punishment is a fine not more than $20,000 per day of violation, or by imprisonment of not more than four years, or both.

C5. Reporting of Monitoring Results

Monitoring results must be summarized each month on a discharge monitoring report form approved by DEQ. The reports must be submitted monthly and are to be mailed, delivered or otherwise transmitted by the 15th day of the following month unless specifically approved otherwise in Schedule B of this permit.

C6. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR part 136 or, in the case of sludge (biosolids) use and disposal, approved under 40 CFR part 503, or as specified in this permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the discharge monitoring report. Such increased frequency must also be indicated. For a pollutant parameter that may be sampled more than once per day (for example, total residual chlorine), only the average daily value must be recorded unless otherwise specified in this permit.

C7. Averaging of Measurements

Calculations for all limitations that require averaging of measurements must utilize an arithmetic mean, except for bacteria which must be averaged as specified in this permit.

C8. Retention of Records

Records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities must be retained for a period of at least 5 years (or longer as required by 40 CFR part 503). Records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit and records of all data used to complete the application for this permit must be retained for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of DEQ at any time.

C9. Records Contents

Records of monitoring information must include:

a. The date, exact place, time, and methods of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The individual(s) who performed the analyses;
e. The analytical techniques or methods used; and
f. The results of such analyses.

C10. Inspection and Entry

The permittee must allow DEQ or EPA upon the presentation of credentials to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by state law, any substances or parameters at any location.

C11. Confidentiality of Information

Any information relating to this permit that is submitted to or obtained by DEQ is available to the public unless classified as confidential by the Director of DEQ under ORS 468.095. The permittee may request that information be classified as confidential if it is a trade secret as defined by that statute. The name and address of the permittee, permit applications, permits, effluent data, and information required by NPDES application forms under 40 CFR § 122.21 are not classified as confidential [40 CFR § 122.7(b)].

SECTION D. REPORTING REQUIREMENTS

D1. Planned Changes

The permittee must comply with OAR 340-052, “Review of Plans and Specifications” and 40 CFR § 122.41(l)(1). Except where exempted under OAR 340-052, no construction, installation, or modification involving disposal systems, treatment works, sewerage systems, or common sewers may be commenced until the plans and specifications are submitted to and approved by DEQ. The permittee must give notice to DEQ as soon as possible of any planned physical alternations or additions to the permitted facility.

D2. Anticipated Noncompliance

The permittee must give advance notice to DEQ of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.

D3. Transfers

This permit may be transferred to a new permittee provided the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of the permit and EQC rules. No permit may be transferred to a third party without prior written approval from DEQ. DEQ may require modification, revocation, and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under 40 CFR § 122.61. The permittee must notify DEQ when a transfer of property interest takes place.

D5. Compliance Schedule

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date. Any reports of noncompliance must include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements.

D6. Twenty-Four Hour Reporting

The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) to the DEQ regional office or Oregon Emergency Response System (1-800-452-0311) as specified below within 24 hours from the time the permittee becomes aware of the circumstances.

a. Overflows.
   (1) Oral Reporting within 24 hours.
      i. For overflows other than basement backups, the following information must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311. For basement backups, this information should be reported directly to the DEQ regional office.
         (a) The location of the overflow;
         (b) The receiving water (if there is one);
         (c) An estimate of the volume of the overflow;
         (d) A description of the sewer system component from which the release occurred (for example, manhole, constructed overflow pipe, crack in pipe); and
         (e) The estimated date and time when the overflow began and stopped or will be stopped.
      ii. The following information must be reported to the DEQ regional office within 24 hours, or during normal business hours, whichever is earlier:
         (a) The OERS incident number (if applicable); and
         (b) A brief description of the event.
   (2) Written reporting postmarked within 5 days.
      i. The following information must be provided in writing to the DEQ regional office within 5 days of the time the permittee becomes aware of the overflow:
         (a) The OERS incident number (if applicable);
         (b) The cause or suspected cause of the overflow;
         (c) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
         (d) Steps taken or planned to mitigate the impact(s) of the overflow and a schedule of major milestones for those steps; and
         (e) For storm-related overflows, the rainfall intensity (inches/hour) and duration of the storm associated with the overflow.

      DEQ may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

b. Other instances of noncompliance.
   (1) The following instances of noncompliance must be reported:
      i. Any unanticipated bypass that exceeds any effluent limitation in this permit;
      ii. Any upset that exceeds any effluent limitation in this permit;
      iii. Violation of maximum daily discharge limitation for any of the pollutants listed by DEQ in this permit; and
      iv. Any noncompliance that may endanger human health or the environment.
   (2) During normal business hours, the DEQ regional office must be called. Outside of normal business hours, DEQ must be contacted at 1-800-452-0311 (Oregon Emergency Response System).
   (3) A written submission must be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:

i. A description of the noncompliance and its cause;
ii. The period of noncompliance, including exact dates and times;
iii. The estimated time noncompliance is expected to continue if it has not been corrected;
iv. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and
v. Public notification steps taken, pursuant to General Condition B**7.**

(4) DEQ may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

D7. Other Noncompliance

The permittee must report all instances of noncompliance not reported under General Condition D4 or D5 at the time monitoring reports are submitted. The reports must contain:

a. A description of the noncompliance and its cause;
b. The period of noncompliance, including exact dates and times;
c. The estimated time noncompliance is expected to continue if it has not been corrected; and
d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

D8. Duty to Provide Information

The permittee must furnish to DEQ within a reasonable time any information that DEQ may request to determine compliance with the permit or to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit. The permittee must also furnish to DEQ, upon request, copies of records required to be kept by this permit.

Other Information: When the permittee becomes aware that it has failed to submit any relevant facts or has submitted incorrect information in a permit application or any report to DEQ, it must promptly submit such facts or information.

D9. Signatory Requirements

All applications, reports or information submitted to DEQ must be signed and certified in accordance with 40 CFR § 122.22.

D10. Falsification of Information

Under ORS 468.953, any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, is subject to a Class C felony punishable by a fine not to exceed $125,000 per violation and up to 5 years in prison per ORS chapter 161. Additionally, according to 40 CFR § 122.41(k)(2), any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or non-compliance will, upon conviction, be punished by a federal civil penalty not to exceed $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

D11. Changes to Indirect Dischargers

The permittee must provide adequate notice to DEQ of the following:

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the federal Clean Water Act if it were directly discharging those pollutants and;
b. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

c. For the purposes of this paragraph, adequate notice must include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

SECTION E. DEFINITIONS

E1. *BOD* or *BOD_5* means five-day biochemical oxygen demand.
E2. *CBOD* or *$CBOD_5$* means five-day carbonaceous biochemical oxygen demand.
E3. *TSS* means total suspended solids.
E4. *Bacteria* means but is not limited to fecal coliform bacteria, total coliform bacteria, *Escherichia coli* (*E. coli*) bacteria, and *Enterococcus* bacteria.
E5. *FC* means fecal coliform bacteria.
E6. *Total residual chlorine* means combined chlorine forms plus free residual chlorine
E7. *Technology based permit effluent limitations* means technology-based treatment requirements as defined in 40 CFR § 125.3, and concentration and mass load effluent limitations that are based on minimum design criteria specified in OAR 340-041.
E8. *mg/l* means milligrams per liter.
E9. *µg/l* means microgram per liter.
E10. *kg* means kilograms.
E11. *m^3/d* means cubic meters per day.
E12. *MGD* means million gallons per day.
E13. *Average monthly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
E14. *Average weekly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.
E15. *Daily discharge* as defined at 40 CFR § 122.2 means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge must be calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge must be calculated as the average measurement of the pollutant over the day.
E16. *24-hour composite sample* means a sample formed by collecting and mixing discrete samples taken periodically and based on time or flow.
E17. *Grab sample* means an individual discrete sample collected over a period of time not to exceed 15 minutes.
E18. *Quarter* means January through March, April through June, July through September, or October through December.
E19. *Month* means calendar month.
E20. *Week* means a calendar week of Sunday through Saturday.
E21. *POTW* means a publicly-owned treatment works.

State of Oregon
Department of
Environmental
Quality

National Pollutant Discharge Elimination System
Permit Renewal Fact Sheet
City of Ashland

Permittee	City of Ashland 20 E. Main Street Ashland, OR, 97520
Existing Permit Information	File Number: 3780 Permit Number: 101609 EPA Reference Number: OR0026255 Category: Major Domestic Expiration Date: December 31, 2008
Permittee Contact	Scott Fleury Public Works Director 541-552-2411 1195 Oak St. Ashland, OR 97520
Receiving Water Information	Water Body Name: Bear Creek, River Mile 22.8 Assessment Unit ID: OR_SR_1710030801_05_105552 Water Body Name: Ashland Creek, River Mile 0.25 Assessment Unit ID: OR_SR_1710030801_02_105548 Sub Basin Name: Middle Rogue Basin Basin Name: Rogue Basin
Proposed Action	Permit Renewal Application Number: 972841 Date Application Received: June 26, 2008
Permit Writer	Steve Schnurbusch 503-378-8306 Date Prepared: July 27, 2021

NPDES Permit Renewal Fact Sheet
City of Ashland

Table of Contents

List of Tables

List of Figures

NPDES Permit Renewal Fact Sheet
City of Ashland

1. Introduction

As required by Oregon Administrative Rule 340-045-0035, this fact sheet describes the basis and methodology used in developing the permit. The permit is divided into several sections:

Schedule A – Waste discharge limitations
Schedule B – Minimum monitoring and report requirements
Schedule C – Compliance conditions and schedules
Schedule D – Special conditions
Schedule E – Pretreatment – not applicable
Schedule F – General conditions

A summary of the major changes to the permit are listed below:

- A new primary outfall discharging to Bear Creek
- Limited discharges to Ashland Creek after Bear Creek outfall is completed
- More stringent thermal load limits.
- Compliance schedule to allow time to comply with thermal load limits
- A mercury minimization plan requirement
- Authorization to use water quality trading as a method to comply with Schedule A limits

2. Facility Description

2.1 Wastewater Facility

The City of Ashland wastewater treatment facility receives wastewater primarily from residential and commercial sources. The facility was originally built in 1936, upgraded in 1974 and again from 1998-2002. The facility currently operates as an activated sludge facility and contains a headworks, two oxidation ditches, three secondary clarifiers, an ultraviolet (UV) disinfection unit, a membrane filtration system, and solids handling processes consisting of lime stabilization/sludge storage tank and two centrifuges. All the original membrane filters were replaced from 2008-2013. During the summer months from May 1 to November 30, the facility uses alum addition and a tertiary membrane system for phosphorus removal to aid in meeting a seasonal phosphorus permit limit. Equipment for lime stabilization of the waste solids is currently not in use. Waste solids from the biological process are pumped and stored in the lime stabilization unit and sent to the sludge dewatering facility where the solids are dewatered and hauled to a landfill for disposal in White City, Oregon. The facility currently discharges treated effluent through Outfall 001 to Ashland Creek. The existing permit lists the Outfall 001 location at River Mile 0.25. However, DEQ's updated mapping tool locates the outfall at river mile 0.32.

Ashland is proposing to move their outfall to Bear Creek where more stream flow is available to dilute the effluent. The proposed outfall will be relocated in Bear Creek at River Mile 22.8 approximately 135 feet downstream of the confluence of Ashland Creek and Bear Creek. This location was chosen because it is in a reach of bedrock streambed that is unsuitable for salmonid spawning habitat.

In addition, Ashland is considering other measures to reduce the impact of their discharge on Bear Creek including water quality trading with riparian restoration, constructed wetlands for effluent cooling, and cold-water release from Reeder Reservoir. The figure below shows the location of the wastewater treatment facility, the existing Outfall 001 into Ashland Creek and the proposed relocated Outfall 002 into Bear Creek. The existing outfall to Ashland Creek will be retained and used when the hydraulic capacity to the Bear Creek outfall is exceeded.

Figure 2-1: Site Map

Table 2-1: List of Outfalls

Outfall Number	Type of Waste	Lat/Long	Design Flow[1] (mgd)	Existing Flow[2] (mgd)
001 (Ashland Creek)	Domestic waste	42.214546º N 122.714678º W	2.3 (2012)	2.3(2020)
002 (Bear Creek)	Domestic waste	42.215335º N 122.720688º W	2.3 (2012)	2.3(2020)

- Design Flow = average dry weather design flow
- Existing Flow = existing average monthly dry weather flow

2.2 Compliance History

The facility was last inspected on June 14, 2018, to determine compliance with the NPDES permit. During the evaluation, it was discovered the facility laboratory was not conducting *E. coli* bacteria test correctly. The permittee was issued a Class II warning letter with corrective action requirements.

Ashland and DEQ entered into a Mutual Agreement and Order No. WQ/M-WR-2019-017 on February 12, 2019 because Ashland was unable to comply with the excess thermal load limits in the existing permit. DEQ and Ashland acknowledge that until the permit is renewed and modified to allow thermal trading to meet the ETL limit and relocating the outfall for effluent discharge to Bear Creek, Ashland will continue to violate the permit effluent limitations at times.

2.3 Groundwater

All units at the Ashland WWTF are manufactured of concrete. No lagoons, or ponds are used in the process. Based on DEQ's current information, this facility has a low potential for adversely impacting groundwater quality.

2.4 Stormwater

General NPDES permits for stormwater are not required for wastewater treatment facilities with a design flow of greater than 1 MGD when stormwater is collected, treated, and discharged as part of its treated wastewater. Stormwater is processed through their wastewater treatment system.

2.5 Industrial Pretreatment

Ashland conducted an Industrial User Survey during the last permit cycle and determined that a DEQ-approved industrial pretreatment program is not needed. No categorical industrial users were identified in the IU survey update submitted with the city's permit renewal application. The proposed permit requires the permittee to conduct and submit to DEQ an updated Industrial User Survey (Survey) within one year of permit issuance. DEQ will review the Survey results and, if DEQ determines that a pretreatment program is required, the permit may be reopened and modified to require development of a pretreatment program.

2.6 Biosolids

Ashland does not currently land apply biosolids or produce biosolids for sale or distribution, and does not intend to do so during the term of this permit. Wastewater solids are treated with a polymer before being dewatered by either of two centrifuge units. The dewatered solids are loaded into a dump truck and hauled to the Dry Creek Landfill in White City, Oregon.

2.7 Recycled Water

Ashland does not currently operate a recycled water program, but may develop one during the term of this permit. If Ashland chooses to develop a recycled water program, Ashland must first prepare a comprehensive recycled water use plan meeting the requirements in OAR 340-055. DEQ, Oregon Health Authority, and Oregon Water Resources Department have review roles. Once the agency reviews are completed, the recycled water use plan, including the locations of any proposed irrigation projects will be made available for public review and comment.

2.8 Wastewater Classification

OAR 340-049 requires that all permitted municipal wastewater collection and treatment facilities receive a classification based on the size and complexity of the systems. DEQ evaluated the classifications for the treatment and collection system, which are publicly available at: https://www.deq.state.or.us/wq/opcert/Docs/OpcertReport.pdf.

3. Schedule A: Effluent Limit Development

Effluent limits serve as the primary mechanism in NPDES permits for controlling discharges of pollutants to receiving waters. Effluent limitations can be based on either the technology available to control the pollutants or limits that are protective of the water quality standards for the receiving water. DEQ refers to these two types of permit limits as technology-based effluent limitations (TBELs) and water quality-based effluent limits (WQBELs) respectively. When a TBEL is not restrictive enough to protect the receiving stream, DEQ must include a WQBEL in the permit.

3.1 Technology-Based Effluent Limit Development

40 CFR 122.(a)(1) requires publically owned treatment works (POTW) to meet technology-based effluent limits, for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS) and pH (i.e., federal secondary treatment standards). Substitution of 5-day carbonaceous oxygen demand ($CBOD_5$) for BOD_5 is allowed. The numeric standards for these pollutants are contained in 40 CFR 133.102. In addition, DEQ has developed minimum design criteria for BOD_5 and TSS that apply to specific watershed basins in Oregon. These are listed in the basin-specific criteria sections under OAR 340-041-0101 to 0350. During the summer low flow months as defined by OAR, these design criteria are more stringent than the federal secondary treatment standards. The basin-specific criteria are not effluent limits, but are implemented as design criteria for new or expanded wastewater treatment plants. The following table shows a comparison of the federal secondary treatment standards and the basin-specific design criteria for the Rogue basin.

Table 3-1: Comparison of TBELs for Federal Secondary Treatment Standards and Oregon Basin-Specific Design Criteria

Parameter	Federal Secondary Treatment Standards		Rogue Basin-Specific Design Criteria (OAR 340-041-0275)
	30-Day Average	7-Day Average	Monthly Average
BOD_5 (mg/L)	30	45	10 mg/L during summer months, 30 mg/L during winter
TSS (mg/L)	30	45	
pH (S.U.)	6.0 – 9.0. (instantaneous)		Not applicable because pH in basin is water quality-based
$CBOD_5$ and TSS % Removal	85%		Not applicable

EPA allows the substitution of $CBOD_5$ for BOD_5. The 30-day average $CBOD_5$ limit is set at 25 mg/L and the 7-day average is 40 mg/L. EPA has not established substitution values for lower limits. DEQ's policy is to use the $CBOD_5/BOD_5$ ratio (25/30) of 0.8 to calculate $CBOD_5$ limits for lower values. The BOD_5 design criterion of 10 mg/L becomes a $CBOD_5$ limit of 8 mg/l.

The limits for $CBOD_5$ and TSS shown in the table above are concentration-based limits. Mass-based limits are also required per OAR 340-041-0061(9)(b). Mass load limits must be calculated by the department based on the proposed treatment facility capabilities and the highest and best practicable treatment. These limits were established by DEQ's regional engineer during the last permit renewal as follows:

Dry Weather Period: May - Nov
The dry weather design flows are as follows:

Monthly average: design flow = 2.3 mgd
Weekly average: design flow = 2.8 mgd
Daily maximum: design flow = 3.8 mgd

During the previous permit renewal, DEQ determined the treatment plant was capable of consistently meeting a TSS concentration of 5 mg/L as a monthly average, 7.5 mg/L as a weekly average and 15 mg/L as a daily maximum. These values were used to calculate the TSS mass based limits as follows:

Monthly average = 2.3 mgd x 5 mg/L x 8.34 = 96 lb/day
Weekly average = 2.8 mgd x 7.5 mg/L x 8.34 = 180 lb/day
Daily maximum = 3.8 mgd x 15 mg/L x 8.34 = 480 lb/day

The monthly average $CBOD_5$ design criterion is 8 mg/L as discussed above. Following the same pattern for TSS, the weekly average effluent capability is assumed to be 12 mg/L and the daily maximum is assumed to be 16 mg/L.

$CBOD_5$ mass load limits were calculated as follows:

Mass Load = Design Flow x Monthly Concentration Limit x Unit Conversion factor

Monthly Average = 2.3 mgd x 8 mg/L x 8.34 = 150 lb/day
Weekly Average = 2.8 mgd x 12 mg/L x 8.34 = 280 lb/day
Daily Maximum = 3.8 mgd x 16 mg/L x 8.34 = 500 lb/day
(Values are rounded to two significant figures)

Wet Weather Period: Dec - Apr
The winter mass load limits are calculated in a similar manner with $CBOD_5$ and TSS having the same limits. These are based on an engineering assessment that the treatment facility can achieve a monthly average $CBOD_5$ and TSS of 20 mg/L, a weekly average of 25 mg/L and daily maximum of 30 mg/L. These concentrations were used to establish the mass load limits per OAR 340-041-0061(9)(b).:

Monthly average: design flow = 2.4 mgd, $CBOD_5$ = 20 mg/L
Weekly average: design flow = 4.4 mgd, $CBOD_5$ = 25 mg/L
Daily maximum: design flow = 6.1 mgd, $CBOD_5$ = 30 mg/L

Monthly Average = 2.4 mgd x 20 mg/L x 8.34 = 400 lb/day
Weekly Average = 4.4 mgd x 25 mg/L x 8.34 = 920 lb/day
Daily Maximum = 6.1 mgd x 30 mg/L x 8.34 = 1500 lb/day

The following table summarizes the TBELs. These TBELs apply to both outfalls.

Table 3-2: $CBOD_5$ and TSS TBELs

Parameter	Concentration Limits (mg/L)			Mass Load Limits (lb/day)		
	Monthly	Weekly	Daily	Monthly	Weekly	Daily
May - Nov						
$CBOD_5$	8	12	NA	150	280	500
TSS	10	15	NA	96	180	480
Dec - Apr						
$CBOD_5$	25	40	NA	400	920	1500
TSS	30	45	NA	400	920	1500
$CBOD_5$ and TSS percent removal = 85% year round						
Note: The $CBOD_5$ and TSS concentration limits are established based on EPA's secondary treatment standard requirements.						

3.2 Water Quality-Based Effluent Limit Development

40 CFR 122.44(d) requires that permits include limitations more stringent than technology-based requirements where necessary to meet water quality standards. Water quality-based effluent limits may be in the form of a wasteload allocation required as part of a Total Maximum Daily Load (TMDL). They may also be required if a site specific analysis indicates the discharge has the reasonable potential to cause or contribute to an exceedance of a water quality criterion. DEQ establishes effluent limits for pollutants that have a reasonable potential to exceed a criterion. The analyses are discussed below. The analyses are for the proposed Bear Creek outfall. Limits for the existing to Outfall 001 are discussed in a separate section.

3.2.1 Designated Beneficial Uses

NPDES permits issued by DEQ must protect the following designated beneficial uses of Bear Creek. These uses are listed in OAR-340-041-0271 for the Rogue Basin.

- Public domestic water supply (currently under investigation)
- Industrial water supply
- Irrigation and livestock watering
- Fish and aquatic life (including salmonid rearing, migration and spawning)
- Wildlife and hunting
- Fishing
- Boating
- Water contact recreation
- Aesthetic quality

3.2.2 Water Quality-Limited Parameters and Total Maximum Daily Loads

The following tables list the parameters in the 2018 303(d) list for which Bear Creek and Ashland Creek is water quality-limited within the stream reach of the discharge. The table also lists any parameters covered by a TMDL.

Table 3-3: Bear Creek Water Quality Limited and TMDL Parameters

Water Quality Limited Parameters - Category 5 (needing a TMDL)
AU ID: OR_SR_1710030801_05_105552 **AU Name:** Bear Creek **AU Description:** Emigrant Creek to confluence with Rogue River **Year Last Assessed:** 2018 **AU Status:** Impaired **Impaired Uses:** Aesthetic Quality; Fish and Aquatic Life; Water Contact Recreation **Category 5*:*** Temperature- Year Round; Temperature- Spawning; Iron (total)- Aquatic Life
TMDL Parameters
Dissolved oxygen, pH (1992 TMDL), Bacteria, Temperature (2007 TMDL)
Notes
There is an EPA-approved TMDL for temperature. Therefore temperature should not be listed as category 5. DEQ does not have a phosphorous criterion. The 1992 pH TMDL set instream targets for phosphorous and these were contained in rule at one point but have since been removed.

Table 3-4: Ashland Creek Water Quality Limited and TMDL Parameters

Water Quality Limited Parameters - Category 5 (needing a TMDL)
AU ID: OR_SR_1710030801_02_105548 **AU Name:** Ashland Creek **AU Description:** Reeder Reservoir to confluence with Bear Creek **Year Last Assessed:** 2018 **AU Status:** **Impaired Uses:** Water Contact Recreation; Fish and Aquatic Life **Year Listed:** 2010 ***Category 5:*** Temperature- Spawning
TMDL Parameters
Dissolved oxygen, pH (1992 TMDL), Bacteria, Temperature (2007 TMDL)
Notes
There is an EPA-approved TMDL for temperature. Therefore temperature should not be listed as category 5.

3.2.3 TMDL Wasteload Allocations

In 1992 EPA approved TMDLs to address dissolved oxygen and pH violations in Bear Creek. WLAs from this TMDL that are applicable to the permittee are listed in the following table.

Table 3-5: Applicable WLAs

Time Period	Bear Cr Flow (cfs)	Phosphorous lb/day	Ammonia lb/day	CBOD lb/day
May 1-Nov 15	<10	2 (May 1-Oct 30)	45	59
May 1-Nov 15	11-15	2 (May 1-Oct 30)	45	86
May 1-Nov 15	16-30	2 (May 1-Oct 30)	45	113
May 1-Nov 15	>30	2 (May 1-Oct 30)	45	161

Bear Creek 7Q10 critical stream flows are as follows:

Apr 15 – Jun 14: 25 cfs
Jun 15 – Jul 14: 19 cfs
Jul 15 – Aug 14: 28 cfs
Aug 15 – Sep 14: 9 cfs
Sep 15 – Oct 14: 3 cfs
Oct 15 – Nov 14: 3.7 cfs

The above WLAs are applied on a monthly average basis. The table below provides a summary of the proposed $CBOD_5$, ammonia and phosphorous limits established to comply with the TMDL WLAs. After completion of Outfall 002, these limits will apply to the combined discharges from Outfalls 001 and 002. Prior to the completion of Outfall 002, these limits will apply to the Outfall 001 discharge.

Table 3-6: Proposed Limits

Time Period	Phosphorous lb/day	Ammonia lb/day	$CBOD_5$ Monthly Avg lb/day
May - Jul	2	45	113
Aug – Nov	2 (Aug -Oct)	45	59

These monthly $CBOD_5$ mass load limits are more stringent than the monthly technology-based limits discussed above and therefore are being applied in the proposed permit for the noted time periods.

EPA also approved a TMDL in 2007 to address temperature violations in Bear Creek. The City of Ashland was assigned a WLA that allows them to increase Bear Creek by 0.1ºC. This is discussed in more detail in the temperature section below.

The 2007 TMDL also references the 1992 dissolved oxygen and pH TMDL and reaffirms those WLAs. During the previous renewal, additional modeling was performed to develop allocations addressing a newly adopted dissolved oxygen criterion. These allocations were applied in the existing permit resulting in less stringent limits than what would be required from the 1992 TMDL. These allocations were never officially approved so the allocations shown above and reaffirmed in the 2007 TMDL are applicable and are being proposed in this permit.

3.2.4 Pollutants of Concern

To ensure that a permit is protective of water quality, DEQ must identify pollutants of concern. These are pollutants that are expected to be present in the effluent at concentrations that could adversely impact water quality. DEQ uses the following information to identify pollutants of concern:

- Effluent monitoring data.
- Knowledge about the permittee's processes.
- Knowledge about the receiving stream water quality.
- Pollutants identified by applicable federal effluent limitation guidelines.

Based on EPA's NPDES permit application requirements, toxic pollutants of concern for domestic facilities are listed in the following table.

Table 3-7: Domestic Toxic Pollutants of Concern

Flow Rate	Pollutants
< 0.1 mgd	Total Residual Chlorine
> 0.1 mgd and < 1.0 mgd	Total Residual Chlorine, Total Ammonia Nitrogen
> 1.0 mgd	Total Residual Chlorine, Total Ammonia Nitrogen, Metals, Volatile Organic Compounds, Acid Extractable Compounds, Base Neutral Compounds

Using this information and information related to the other categories noted above, DEQ identified the pollutants of concern for this facility listed in the following table.

Table 3-8: Pollutants of Concern

Pollutant	How was pollutant identified?
pH	Effluent Monitoring
Temperature	Effluent Monitoring
E. coli	Type of Wastewater
Total Ammonia Nitrogen	Application Requirement
Metals	Application Requirement
Volatile Organic Compounds	Application Requirement
Acid Extractable Compounds	Application Requirement
Base-Neutral Compounds	Application Requirement
Base-Neutral Compounds	Application Requirement

The sections below discuss the analyses that were conducted for the pollutants of concern to determine if water quality based effluent limits are needed to meet water quality standards.

3.2.5 Regulatory Mixing Zone

Permits issued by DEQ typically specify a mixing zone. Mixing zones are allowed under both state and federal regulation. They are areas in the vicinity of outfalls in which all or some of Oregon's water quality standards can be suspended. DEQ allows mixing zones when the overall impact, evaluated with respect to Oregon's Mixing Zone Rule (OAR 340-041-0053) appears to be negligible.

Two mixing zones are typically developed for each discharge:

1. The acute mixing zone, also known as the "zone of initial dilution" (ZID). This is a small area where acute criteria can be exceeded as long as it does not cause acute toxicity to organisms drifting through it.

2. The chronic mixing zone, usually referred to as "the mixing zone." This is an area where acute criteria must be met but chronic criteria can be exceeded. It must be designed to protect the integrity of the entire water body.

Bear Creek Discharge

The City is proposing to move their outfall to Bear Creek. During extremely low stream flow conditions, the effluent flow may exceed the stream flow. In these situations, simulating the plume behavior and estimating dilutions is not amenable to using mixing zone models. Instead, a common practice is to allocate the mixing zone as a percentage of the receiving stream flow. The following mixing zone and zone of initial dilution is being proposed:

> *The mixing zone is defined as 50 percent of Bear Creek flow and no more than 60 feet downstream from the outlet into the creek. The zone of initial dilution is defined as 50 percent of the Bear Creek flow and no more than 20 feet downstream from the outlet into the creek.*

The distance of 60 feet was set based on the average sized mixing zone for streams of similar widths as Bear Creek. Modeling was also done for the harmonic mean flow case, which showed mixing with 50% of the stream should occur no farther than 60 feet downstream. Environmental mapping data provided in the mixing zone study report indicates the size of this mixing zone should:

- Minimize adverse effects to aquatic life in Bear Creek
- Allow room for fish passage
- Avoid known public recreation areas
- Avoid impingement on critical resource areas such as spawning habitat and cold water refugia
- The ZID size will prevent lethality to drifting organisms

The dilutions at the edge of the ZID and mixing zone are shown in the table below.

Dilution Summary - Dry Weather						
Water Quality Standard	**Stream Flow (cfs)**		**Effluent Flow (mgd)**		**Dilution**	**Location**
	Statistic	**Flow**	**Statistic**	**Flow**		
Aquatic Life, Acute	1Q10	3	☐ ADWDF x PF ☒ Max Daily Avg ☐ Other	3.8	1.3	ZID
Aquatic Life, Chronic	7Q10	3	☐ ADWDF ☒ Max Monthly Avg ☐ Other	3.5	1.3	MZ
Human Health, Non-Carcinogen	30Q5	7	☐ ADWDF ☒ Max Monthly Avg ☐ Other	3.5	1.6	MZ
Human Health, Carcinogen	Harmonic Mean	28	☐ Annual Avg Design ☒ Annual Avg ☐ Other	2.85	4.2	MZ
ADWDF = Average dry weather design flow *PF = Peaking factor*						
Comments: Effluent flow values are based on the 2040 year design flow projections. The 1Q10 and 7Q10 flows are based on the minimum flows required to be maintained for the protection of salmonids (Biological opinion flows).						

Dilution Summary - Wet Weather						
Water Quality Standard	**Stream Flow (cfs)**		**Effluent Flow (mgd)**		**Dilution**	**Location**
	Statistic	**Flow**	**Statistic**	**Flow**		
Aquatic Life, Acute	1Q10	6.5	☐ AWWDF x PF ☒ Max Daily Avg ☐ Other	6.3	1.3	ZID
Aquatic Life, Chronic	7Q10	8.0	☐ AWWDF ☒ Max Monthly Avg ☐ Other	4.7	1.6	MZ
Human Health, Non-Carcinogen	30Q5	11.5	☐ AWWDF ☒ Max Monthly Avg ☐ Other	4.7	1.8	MZ
Human Health, Carcinogen	Harmonic Mean	28	☐ Annual Avg Design ☒ Annual Avg ☐ Other	2.85	4.2	MZ
AWWDF = Average wet weather design flow *PF = Peaking factor*						
Comments: Effluent flow values are based on the 2040 year design flow projections.						

Ashland Creek Outfall

The City is planning to use Ashland Creek as a secondary outfall. It would only be used when the hydraulic capacity of the Bear Creek outfall pipe is exceeded. This will occur during heavy rain events when Ashland Creek has adequate flow in it. The existing permit does not have a mixing zone because during the dry season there is not enough flow in Ashland Creek. DEQ is proposing a mixing zone since the outfall will only be used during wet weather periods when there will be adequate flow in Ashland Creek. The mixing zone is being proposed as follows:

> *The mixing zone is defined as 50 percent of Ashland Creek flow and no more than 60 feet downstream from the outlet into the creek. The zone of initial dilution is defined as 50 percent of the Ashland Creek flow and no more than 20 feet downstream from the outlet into the creek.*

The City submitted an engineering analysis estimating when the effluent would need to be discharged to Ashland Creek and determined what the Ashland Creek stream flows would be. Their analysis demonstrated that minimum dilutions at the ZID and mixing zone would be virtually identical to than those for Outfall 002 in Bear Creek. Therefore, all of the water quality analyses for Bear Creek apply to the Ashland Creek outfall. DEQ is assuming no available dilution for the Ashland Creek discharge prior to the Bear Creek outfall being completed.

3.2.6 pH

The pH criterion for this basin is 6.5 – 8.5 per OAR 340-041-0271. The technology based effluent limits for pH allow the pH to be within the range of 6.0 – 9.0. DEQ conducted a pH analysis to determine if these limits would meet the basin criteria at the edge of the mixing zone for Outfall 002 (Bear Creek). The analysis indicates those limits are not stringent enough. DEQ determined that effluent limits within the range of 6.4 – 8.6 are needed to comply with the basin criteria. These limits would also be applied to Outfall 001 (Ashland Creek) after the Bear Creek outfall is completed.

The existing pH limits of 6.5 – 8.5 are being retained for Outfall 001 until the Bear Creek outfall is completed. There is a general prohibition against renewing a permit with less stringent limits unless an exception applies. One exception exists when material and substantial modifications have been made to a facility. DEQ has determined that the changing outfall location and the change in the discharge frequency to Outfall 001 meets this exception and is therefore proposing the less stringent pH limits. The following table provides a summary of the data used for the analysis.

Table 3-9: pH Reasonable Potential Analysis (for Bear Creek and Ashland Creek outfall)

INPUT	Lower pH Criteria	Upper pH Criteria
1. DILUTION AT MZ BOUNDARY	1.3	1.3
2. UPSTREAM CHARACTERISTICS		
Temperature (deg C):	4.9	20.4
pH (S.U.):	7.8	8.3
Alkalinity (mg CaCO3/L):	63.4	91.4
3. EFFLUENT CHARACTERISTICS		
Temperature (deg C):	8.0	24.0
pH (S.U.):	6.0	9.0
Alkalinity (mg CaCO3/L):	64.0	134.6
4. APPLICABLE PH CRITERIA	6.5	8.5
pH at Mixing Zone Boundary:	6.1	8.8
Is there Reasonable Potential?	Yes	Yes
Proposed Effluent Limits	6.4	8.6
Effluent Data Source: ICIS summary stats 2017-2020. Temp 10th %ile= minimum of daily reported maximum. Temp 90th %ile = 90th %ile of daily reported maximum. Alkalinity defaults used.		
Ambient Data Source: AWQMS 2010-2019. Stations 10434 and 10435		

3.2.7 Temperature

3.2.7.1 Temperature Criteria OAR 340-041-0028

The following table summarizes the temperature criteria that apply at both discharge locations along with whether the receiving stream is water quality-limited for temperature and whether a TMDL wasteload allocation has been assigned. Using this information, DEQ performed several analyses to determine if effluent limits were needed to comply with the temperature criteria.

Table 3-10: Temperature Criteria Information

Applicable Temperature Criterion	Rearing/Migration 18 C (OAR 340-041-0028(4)(c))
Applicable dates: May 16 – Oct 14	
Salmon/Steelhead Spawning 13°C? *OAR 340-041-0028(4)(a)*	☒Yes ☐No
Applicable dates: Oct 15 – May 15	
WQ-limited?	☒Yes ☐No
TMDL wasteload allocation assigned?	☒Yes ☐No
Applicable dates: Year round	
TMDL based on natural conditions criterion?	☐Yes ☒No
Cold water summer protection criterion applies?	☐Yes ☒No
Cold water spawning protection applies?	☐Yes ☒No
Comments:	

Water temperatures affect the life cycles of aquatic species and are a critical factor in maintaining and restoring healthy salmonid populations. The purpose of the temperature criteria in OAR 340-041-0028 is to protect designated, temperature-sensitive beneficial uses (including salmonid life cycle stages) from adverse warming caused by human activities.

DEQ's 2007 Bear Creek temperature TMDL assigned a WLA to the City of Ashland for their existing discharge into Ashland Creek and for their proposed discharge to Bear Creek. The WLA is the same for either location and allows the City to warm Bear Creek 0.1ºC above the biologically-based numeric criterion. The criterion is 18ºC (rearing and migration) from May 16 – October 14 and 13ºC (spawning) from October 15 – May 15. The TMDL allows the WLA to be implemented on a daily basis where the WLA is calculated daily based on stream flow and temperature or on a less frequent basis. WLAs are expressed as excess thermal load limits (ETLLs). Monthly excess thermal load limits were calculated using the equation below and are included in the proposed permit:

$$WLA = dT(Q_e + Q_r)C_f$$

Where: $dT = 0.1^{o}C$
Q_e = combined Outfall 001 and 002 effluent flow (cfs)
Q_r = Bear Creek flow (cfs)
C_f = conversion factor (2.447)

The table below shows the monthly excess thermal load limits for the combined (Outfalls 001 and 002) discharge. Limits were calculated using the 2040 design flow and the estimated 7Q10 flow above the proposed outfall location to Bear Creek. BASO (in the table below) refers to the stream flow gage downstream of the outfall in Bear Creek.

Table 3-11: Bear Creek Monthly Excess Thermal Load Limits

	Bear Creek 7Q10 (BASO)	Historical Effluent Flows	Estimated 7Q10 Flows Above Outfall	2040 Max Week Effluent Flow	2040 Max Week Effluent Flow	Excess Thermal Load Limit
Month	**cfs**	**cfs**	**cfs**	**mgd**	**cfs**	**Mkcals/d**
Jan	16	3.5	12.5	5.41	8.37	5.1
Feb	17	3.6	13.4	5.5	8.51	5.4
Mar	20	3.6	16.4	4.32	6.68	5.6
Apr	18	3.5	14.5	3.74	5.79	5.0
May	24	3.3	20.7	3.46	5.35	6.4
Jun	24	3.1	20.9	3.06	4.73	6.3
Jul	27	3.0	24.0	2.88	4.46	7.0
Aug	30	3.0	27.0	2.86	4.42	7.7
Sep	10	3.0	7.0	2.97	4.59	2.8
Oct	4.6	2.9	3.0	3.26	5.04	2.0
Nov	7.1	3.3	3.8	5.78	8.94	3.1
Dec	12	3.6	8.4	6.3	9.75	4.4

The above equation is also included in the proposed permit in the event the City wants to calculate the excess thermal load limit on a daily basis. In this situation, the City would need to measure daily stream flow (above Outfall 2) to calculate the daily excess thermal load limit and then calculate the moving 7-day average. Compliance is based on complying with the 7-day average excess thermal load limit.

The equation below is included in Schedule B for calculating the amount of excess thermal load discharged. This will be calculated on a daily basis and then a 7-day moving average will be calculated. The 7-day average must be less than the excess thermal load limit to be in compliance.

$$ETL = Q_e(T_e-T_c)C_f$$

Where: Qe = combined Outfall 001 and 002 effluent flow (cfs)
Te = effluent temperature (ºC)
Tc = temperature criterion (ºC)
Cf = conversion factor (2.447)

The City has determined that their discharge will not be able to comply with these thermal load limits and has requested a compliance schedule to allow them time to achieve compliance. The compliance schedule is discussed in more detail in Section 6.

3.2.7.2 Thermal Plume OAR 340-041-0053(2)(d)

OAR 340-041-0053(2)(d) contains thermal plume limitation provisions designed to prevent or minimize adverse effects to salmonids that may result from thermal plumes. The discharge was evaluated for compliance with these provisions as follows:

- Impairment of an active salmonid spawning area where spawning reds are located or likely to be located. This adverse effect is prevented or minimized by limiting potential fish exposure to temperatures of 13 °C or less for salmon and steelhead, and 9 °C for bull trout.

  Salmonid spawning and rearing occurs in Bear Creek downstream of the proposed outfall; however, there is no spawning habitat within the mixing zone. The outfall relocation study selected an area of Bear Creek for the relocated outfall that is mainly bedrock and not suitable for salmonid spawning. The TMDL contains WLAs during the spawning season that will ensure protection of salmonid spawning downstream of the outfall. Therefore, the proposed excess thermal load limits discussed above will ensure that impairment of active salmonid spawning areas downstream of the proposed outfall will be prevented or minimized.

- Acute impairment or instantaneous lethality is prevented or minimized by limiting potential fish exposure to temperatures of 32.0 °C or more for less than two seconds.

  The maximum recorded effluent temperature is 25.9 ºC. Therefore, the discharge complies with this criterion.

- OAR 340-041-0053(d)(C): Thermal shock caused by a sudden increase in water temperature is prevented or minimized by limiting potential fish exposure to temperatures of 25 ºC or more to less than 5% of the cross-section of 100% of the 7Q10 flow of the water body.

  The effluent only occasionally exceeds 25º C. DEQ performed an analysis for several critical time periods ranging from July through October and determined the discharge from Outfall 002 into Bear Creek will comply with this criterion.

  The discharge from 001 into Ashland Creek is expected to occur during the rainy season. Effluent temperatures are not expected to exceed 25ºC. No limit is need for the Outfall 001 discharge.

  The spreadsheets used for these analyses are in the appendix.

- OAR 340-041-0053(d)(D): Unless ambient temperature is 21 ºC or greater, migration blockage is prevented or minimized by limiting potential fish exposure to temperatures of 21 ºC or more to less than 25% of the cross-section of 100% of the 7Q10 flow of the water body.

  Monitoring data indicate that the ambient (stream) temperatures are typically 21ºC or greater during the July – October period, so migration blockage as defined under this rule is not expected. DEQ performed an analysis for the May – June critical shoulder months when ambient temperatures drop below 21ºC and determined that the discharge complies with this criterion. Since the discharge complies during the May – June critical period,

compliance will be ensured the remainder of the year. The spreadsheets used for these analyses are in the appendix.

Table 3-12: Outfall 002 Thermal Plume Effluent Limit

Effluent limit needed? ☐Yes ☒No
Calculated limit: NA
Applicable timeframe: NA
Comments:

3.2.8 Bacteria

OAR 340-041-0006(b) requires discharges of bacteria into freshwaters meet a monthly geometric mean of 126 *E. coli* per 100 mL, with no single sample exceeding 406 *E. coli* per 100 mL. If a single sample exceeds 406 *E. coli* per 100 mL, then the permittee may take five consecutive re-samples. If the log mean of the five re-samples is less than or equal to 126, a violation is not triggered. The re-sampling must be taken at four-hour intervals beginning within 28 hours after the original sample was taken. The following table includes the proposed permit limits and apply year round. These limits apply to the outfalls to Bear Creek and Ashland Creek.

Table 3-13: Proposed *E. coli* Limits

***E. coli* (#/100 ml)**	**Geomean**	**Maximum**
Existing Limit	126	406
Proposed Limit	126	406

3.2.9 Toxic Pollutants

DEQ typically performs the reasonable potential analysis for toxics according to EPA guidance provided in the Technical Support Document for Water Quality-Based Toxics Control (TSD) (Office of Water Enforcement and Permits, U.S. EPA, March 1991). The factors incorporated into this analysis include:

- Effluent concentrations and variability
- Water quality criteria for aquatic life and human health
- Receiving water concentrations
- Receiving water dilution (if applicable)

DEQ performs these analyses using spreadsheets that incorporate EPA's statistical methodology. The following sections describe the analyses for various toxic pollutants below.

3.2.9.1 Total Ammonia Nitrogen

The existing permit contains ammonia limits for their outfall into Ashland Creek (Outfall 001). Because the existing permit contains ammonia limits, a reasonable potential analysis is not performed. Instead, new limits are calculated based on the updated outfall information, receiving stream and effluent data and compared to the existing effluent limits. DEQ calculated new effluent limits for their discharge into Bear Creek (Outfall 002). DEQ's ammonia criteria vary with changes in pH and temperature. These limits account for the effluent and receiving water pH and temperature variability. Effluent limits were calculated for the summer and winter time

period. These limits are less stringent than those in the existing limit. There is a general prohibition against renewing a permit with less stringent limits unless an exception applies. One exception exists when material and substantial modifications have been made to a facility. DEQ has determined that the changing outfall location meets this exception and is therefore proposing the less stringent ammonia limits. The following tables provide a summary of the data used for the ammonia analysis along with the proposed seasonal effluent limits for outfall 002. These limits will also apply at the Ashland Creek outfall (Outfall 001) after the Bear Creek outfall is completed. The existing ammonia limits will be maintained for outfall 001 prior to the Bear Creek outfall being completed. The existing May - Nov limits are a monthly average of 0.52 mg/L and a daily maximum of 1.2 mg/L. The existing Dec – Apr limits are a monthly average of 0.8 mg/L and a daily maximum of 1.8 mg/L.

Table 3-14: Outfall 001 and 002 Ammonia Analysis Information: May – Nov (post-Bear Creek outfall completion)

	Acute	Chronic	
		4-day	30-day
Dilution	1.3	1.3	1.6
Ammonia Criteria (mg/L)	3.1	1.8	0.7
Effluent Data Used			
Ammonia (mg/L)	0.8	0.8	
pH (SU)	7.9	7.9	
Temperature (ºC)	24.0	24.0	
Alkalinity (mg/L CaCO3)	64.0	64.0	
Receiving Stream Date Used			
Ammonia (mg/L)	0.01	0.01	
pH (SU)	8.4	8.1	
Temperature (ºC)	20.7	16.8	
Alkalinity (mg/L CaCO3)	64.8	64.8	
Ammonia Limit Needed?	Yes		
Calculated Limits	**AML**	**MDL**	
Ammonia (mg/L)	1.3	3.8	
Effluent data source: ICIS Summary stats: 2015-2020. Ammonia- max of daily max. Temp 90th = 90th %ile of daily max, pH 90th = 90th %ile of daily max. Alkalinity defaults used.			
Ambient data source: AWQMS: 2010-2020 Stations 10434 and 10435			

Table 3-15 Outfall 001 and 002 Ammonia Analysis Information: Dec – Apr

(post-Bear Creek outfall completion)

	Acute	Chronic	
		4-day	30-day
Dilution	1.3	1.6	1.8
Ammonia Criteria (mg/L)	4.7	2.9	1.2
Effluent Data Used			
Ammonia (mg/L)	0.8	0.8	
pH (SU)	8.1	8.1	
Temperature (ºC)	17.4	17.4	
Alkalinity (mg/L CaCO3)	64.0	134.6	
Receiving Stream Date Used			
Ammonia (mg/L)	0.01	0.01	
pH (SU)	8.1	8.0	
Temperature (ºC)	9.9	6.7	
Alkalinity (mg/L CaCO3)	98.0	98.0	
Ammonia Limit Needed?	Yes		
Calculated Limits	**AML**	**MDL**	
Ammonia (mg/L)	2.1	6.1	
Effluent data source: ICIS Summary stats: 2015-2020. Ammonia- max of daily max. Temp 90th = 90th %ile of daily max, pH 90th = 90th %ile of daily max. Alkalinity defaults used.			
Ambient data source: AWQMS: 2010-2020 Stations 10434 and 10435			

3.2.9.2 Priority Pollutant Toxics

DEQ conducted a reasonable potential analysis for the group of toxics listed in the following table. A complete list of the pollutants is located in the reasonable potential spreadsheet located in the appendix.

Table 3-16: Toxic Pollutants Analyzed

Toxic Group
Metals
Volatile Organic Compounds
Acid Extractable Compounds
Base-Neutral Compounds
Effluent data source: 2016-2020 effluent data
Receiving water data source: Bear Creek – 2 DEQ stations downstream of proposed discharge: 11051, 10434 (except for copper data – those were collected by Ashland upstream from the outfall)

The reasonable potential analysis indicates the there is no reasonable potential for the discharge to Bear Creek or the emergency discharge to Ashland Creek to exceed any of the above toxic criteria. The reasonable potential analysis is shown in the appendix. Bis (2-ethylhexyl) phthalate effluent samples showed elevated levels of the pollutant. Bis(2-ethylhexyl)phthalate is a semi-volatile organic compound prevalent in plastics to make them more pliable. It often results in sample or laboratory contamination due to contact with plastic sampling containers or sampling through rubber composite sampler tubing. DEQ suspects that the effluent samples were contaminated via the rubber tubing and may not be representative of actual effluent concentrations. DEQ has seen this with other facilities. These data are not appropriate for use in the reasonable potential analysis. Accordingly, Bis(2-ethylhexyl)phthalate limits will not be incorporated into this permit. Instead, the proposed permit contains additional effluent monitoring for bis(2-ethylhexyl)phthalate that will be evaluated with the next permit renewal.

The reasonable potential analysis for the existing discharge to Ashland Creek indicates there is a reasonable potential to exceed the antimony human health criterion. The proposed permit restricts the discharge to Ashland Creek when the hydraulic capacity of the Bear Creek outfall is exceeded. This eliminates the reasonable potential to exceed the antimony criterion because there is more dilution and because the discharge will be infrequent. The reasonable potential analysis is shown in the appendix. The City will not be able to comply with these flow restrictions upon permit issuance. The proposed permit includes a compliance schedule to allow time to move the outfall to Bear Creek where adequate dilution is available. Once the Bear Creek outfall is completed, the permit will restrict discharges to Ashland Creek only when the hydraulic capacity of the Bear Creek outfall is exceeded. This will only occur during rainy periods when there is adequate dilution in Ashland Creek. After the Bear Creek outfall is installed, the flow restriction to Ashland Creek will serve as the limit to ensure compliance with the Antimony water quality criterion.

3.2.9.3 Copper Biotic Ligand Model

Monthly paired effluent and ambient copper BLM input data was collected by Ashland STP staff and analyzed by various labs starting in August 2017 through September 2019. For the RPAs, the mixed concentration of each input parameter were then entered into the BLM model to calculate the instantaneous water quality criteria (IWQC) for each paired data set. Each IWQC was compared to the corresponding copper concentration at the edge of the ZID, mixing zone and at complete mix. The table below shows the sample date, calculated criterion, calculated copper value, and toxic unit (copper concentration divided by the instantaneous criterion) for each outfall. A toxic unit greater than one indicates there is a potential for the discharge to exceed the criterion. There is no reasonable potential to exceed the copper criterion because no toxic units exceed 1.0. These results are the same for the Ashland Creek outfall (post Bear Creek outfall completion) since the mixing zone dilutions are the same and the ambient water quality is expected to be similar. The requirement to collect 24 paired monthly effluent and receiving stream (Bear Creek) samples is included in the proposed permit. This data will be used at the next permit renewal. DEQ also performed an analysis for the existing discharge to Ashland Creek which showed there is no reasonable potential for the discharge to exceed the copper criterion.

Table 3-17: Outfall 002 (Bear Creek) Copper BLM Analysis Results

Date	ZID	BLM CMC		RMZ	BLM CCC		100% mix	BLM CCC	
	Cu ug/L	ug/L	Toxic Units	Cu ug/L	ug/L	Toxic Units	Cu ug/L	Cu ug/L	Toxic Units
8/31/2017	3.10	33.33	0.09	3.10	20.70	0.15	2.88	18.76	0.15
9/14/2017	3.09	26.02	0.12	3.09	16.16	0.19	2.62	15.23	0.17
10/5/2017	3.03	26.51	0.11	3.03	16.46	0.18	2.50	15.08	0.17
11/16/2017	4.68	24.24	0.19	4.68	15.05	0.31	3.46	16.11	0.21
12/21/2017	1.91	45.75	0.04	1.91	28.42	0.07	1.60	19.09	0.08
1/11/2018	2.76	34.41	0.08	2.76	21.37	0.13	2.09	13.12	0.16
2/8/2018	1.87	40.99	0.05	1.87	25.46	0.07	1.54	19.16	0.08
3/8/2018	2.61	46.33	0.06	2.61	28.77	0.09	2.01	21.65	0.09
4/5/2018	2.09	26.27	0.08	2.09	16.31	0.13	1.59	14.85	0.11
5/3/2018	2.26	26.34	0.09	2.26	16.36	0.14	1.95	16.42	0.12
6/7/2018	2.23	25.64	0.09	2.23	15.93	0.14	2.27	15.54	0.15
7/12/2018	2.42	20.66	0.12	2.42	12.83	0.19	2.08	13.11	0.16
8/9/2018	2.41	22.43	0.11	2.41	13.93	0.17	2.06	13.13	0.16
9/6/2018	0.15	19.76	0.01	0.15	12.27	0.01	0.14	12.76	0.01
11/8/2018	2.67	14.90	0.18	2.67	9.25	0.29	2.34	10.99	0.21
12/5/2018	3.25	35.46	0.09	3.25	22.02	0.15	2.53	17.83	0.14
1/10/2019	2.10	49.95	0.04	2.10	31.02	0.07	1.89	25.60	0.07
2/7/2019	3.17	31.77	0.10	3.17	19.73	0.16	2.47	19.53	0.13
3/7/2019	2.11	48.14	0.04	2.11	29.90	0.07	1.99	28.42	0.07
4/4/2019	2.40	43.91	0.05	2.40	27.27	0.09	1.99	21.59	0.09
5/9/2019	3.28	25.96	0.13	3.28	16.12	0.20	2.66	16.13	0.16
6/6/2019	0.72	19.73	0.04	0.72	12.25	0.06	0.45	13.06	0.03
7/11/2019	5.85	22.48	0.26	5.85	13.96	0.42	4.10	15.24	0.27
8/8/2019	2.57	19.92	0.13	2.57	12.37	0.21	2.05	14.10	0.15
9/12/2019	2.94	20.16	0.15	2.94	12.52	0.24	2.26	12.44	0.18

3.2.9.4 Mercury – Human Health Criterion

Oregon's human health water quality criterion for mercury is expressed in terms of a fish tissue concentration rather than a water column concentration. Because of this, DEQ's approach to performing the reasonable potential analysis for mercury is different than that for other parameters. This approach is described in DEQ's "Implementation of Methylmercury in NPDES Permits" internal management directive.

According to the IMD, "Any facility contributing significant and consistent concentrations of total mercury to the receiving water body is considered to have the reasonable potential to exceed the water quality criterion unless a site-specific survey determines otherwise." Because the water quality criterion for mercury is a fish tissue-based concentration rather than a water column concentration, permit limits for mercury cannot be expressed in terms of a concentration. Therefore, when mercury is detected in treated effluent on a consistent basis, the permit needs to contain a narrative effluent limit that consists of a Mercury Minimization Plan (MMP).

A review of effluent monitoring data indicates that total mercury is present in the discharge and therefore there is a reasonable potential to cause or contribute to the exceedance of the water quality standard. Accordingly, the proposed permit requires the facility to develop and implement a mercury minimization plan. This requirement is contained in Schedule A of the permit. Once the plan is submitted to DEQ for review, it must go on public notice for public review before being incorporated into the permit.

3.2.10 Summary of TBELs and TMDL WLA Limits

The table below provides a summary of the TBELs and the TMDL WLA limits to clarify what limits apply and what the basis of those limits are.

Table 3-18: Summary of Permit Limits for Outfall 004 (after the Bear Creek outfall is completed)

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum	Basis
$CBOD_5$ (May 1 – Jul 31)	mg/L	8	12	-	Basin Design Criterion
	lb/day	-	280	500	Engineering Design
	lb/day	113	-	-	TMDL
	% removal	85	-	-	Federal TBEL
$CBOD_5$ (Aug 1 – Nov 30)	mg/L	8	12	-	Basin Design Criterion
	lb/day	-	280	500	Engineering Design
	lb/day	59	-	-	TMDL
	% removal	85	-	-	Federal TBEL
$CBOD_5$ (Dec 1 – Apr 30)	mg/L	25	40	-	Federal TBEL
	lb/day	400	920	1500	Engineering Design
	% removal	85	-	-	Federal TBEL

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum	Basis
Total Phosphorus (May 1 – Oct 31)	lb/day	2	-	-	TMDL
Total Ammonia as N (May 1 – Nov 30)	lb/day	45	-		TMDL
TSS (May 1 – Nov 30)	mg/L	10	15	-	Basin Design Criterion
	lb/day	96	180	480	Engineering Design
	% removal	85	-	-	Federal TBEL
TSS (Dec 1 – Apr 30)	mg/L	30	45	-	Federal TBEL
	lb/day	400	920	1500	Engineering Design
	% removal	85	-	-	Federal TBEL
E. coli	#/100 mL	Must not exceed a monthly geometric mean of 126, no single sample may exceed 406			WQBEL
Excess Thermal Load (January)	million kcal/day	5.1 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (February)	million kcal/day	5.4 as a 7-day rolling average. See note b (option A)			TMDL
Excess Thermal Load (March)	million kcal/day	5.6 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (April)	million kcal/day	5.0 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (May)	million kcal/day	6.4 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (June)	million kcal/day	6.3 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (July)	million kcal/day	7.0 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (August)	million kcal/day	7.7 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (September)	million kcal/day	2.8 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (October)	million kcal/day	2.0 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (November)	million kcal/day	3.1 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (December)	million kcal/day	4.4 as a 7-day rolling average. (option A)			TMDL
Excess Thermal Load (Year round)	million kcal/day	$ETLL = \Delta T(Q_e + Q_r)C_f$ as a 7-day rolling average (option B)			TMDL

Table 3-19: Summary of Permit Limits for Outfall 001 and 002 (after the Bear Creek outfall is completed)

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum	Basis
Total Ammonia as N (May 1 – Nov 30)	mg/L	1.3	-	3.8	WQBEL
Total Ammonia as N (Dec 1 – Apr 30)	mg/L	2.1	-	6.1	WQBEL
pH	SU	Instantaneous limit between a daily minimum of 6.4 and a daily maximum of 8.6			WQBEL

Table 3-20 Summary of Permit Limits for Outfall 001 (before the Bear Creek outfall is completed)

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum	Basis
$CBOD_5$ (May 1 – Jul 31)	mg/L	8	12	-	Basin Design Criterion
	lb/day	-	280	500	Engineering Design
	lb/day	113	-	-	TMDL
	% removal	85	-	-	Federal TBEL
$CBOD_5$ (Aug 1 – Nov 30)	mg/L	8	12	-	Basin Design Criterion
	lb/day	-	280	500	Engineering Design
	lb/day	59	-	-	TMDL
	% removal	85	-	-	Federal TBEL
$CBOD_5$ (Dec 1 – Apr 30)	mg/L	25	40	-	Federal TBEL
	lb/day	400	920	1500	Engineering Design
	% removal	85	-	-	Federal TBEL
Total Phosphorus (May 1 – Oct 31)	lb/day	2	-	-	TMDL
Total Ammonia as N (May 1 – Nov 30)	mg/L	0.52	-	1.2	Existing WQBEL
	lb/day	45	-	-	TMDL
Total Ammonia as N (Dec 1 – Apr 30)	mg/L	0.8	-	1.8	Existing WQBEL
TSS (May 1 – Nov 30)	mg/L	10	15	-	Basin Design Criterion
	lb/day	96	180	480	Engineering Design
	% removal	85	-	-	Federal TBEL
TSS (Dec 1 – Apr 30)	mg/L	30	45	-	Federal TBEL
	lb/day	400	920	1500	Engineering Design
	% removal	85	-	-	Federal TBEL
pH	SU	Instantaneous limit between a daily minimum of 6.5 and a daily maximum of 8.5			Existing WQBEL

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum	Basis
E. coli	#/100 mL	Must not exceed a monthly geometric mean of 126, no single sample may exceed 406			Existing WQBEL
Excess Thermal Load (October 15 – May 15)	million kcal/day	3.2 as a 7-day rolling average (option A)			TMDL
Excess Thermal Load (May 16 – Oct 14)	million kcal/day	1.6 as a 7-day rolling average (option A)			TMDL
Excess Thermal Load (Year round)	million kcal/day	ETTL = $\Delta T(Q_e + Q_r)C_f$ as a 7-day rolling average (option B)			TMDL

3.3 Antibacksliding

The proposed permit complies with the antibacksliding provisions of CWA sections 402(o) and 303(d)(4) and 40 CFR 22.44(l). With the exception of pH and ammonia, the proposed limits are the same or more stringent than the existing permit so the antibacksliding provision is satisfied. Antibacksliding exceptions for pH and ammonia were discussed above in the pH and ammonia sections.

3.4 Antidegradation

DEQ must ensure the permit complies with Oregon's antidegradation policy found in OAR 340-041-0004. This policy is designed to protect water quality by limiting unnecessary degradation from new or increased sources of pollution.

DEQ has performed an antidegradation review for this discharge. The proposed permit does not allow any increases to discharge loadings. Permit renewals with the same or lower discharge loadings as the previous permit are not considered to lower water quality from the existing condition. DEQ is not aware of any information that existing limits are not protective of the receiving stream's designated beneficial uses. DEQ is also not aware of any existing uses present within the water body that are not currently protected by standards developed to protect the designated uses. Therefore, DEQ has determined that the proposed discharge complies with DEQ's antidegradation policy. DEQ's antidegradation worksheet for this permit renewal is available upon request.

3.5 Whole Effluent Toxicity

Whole effluent toxicity (WET) tests are used to determine the treated wastewater's aggregate toxic effect on aquatic organisms. Wastewater samples are collected and aquatic organisms are subjected to a range of concentrations in controlled laboratory experiments. EPA recommends that WET tests be used in NPDES permits together with requirements based on chemical-specific water quality criteria.

WET tests are used to determine the percentage of effluent that produces an adverse effect on a group of test organisms. The measured effect may be fertilization, growth, reproduction, or survival. EPA's methodology includes both an acute test and a chronic test. An acute WET test is considered to show toxicity if adverse effects occur at effluent concentrations less than what is found at the edge of the zone of immediate dilution (ZID). A chronic WET test is considered to show toxicity if adverse effects occur at effluent concentration less than what is known to occur at the edge of the mixing zone.

The City of Ashland conducted WET tests twice per year on its effluent from 2006 through 2008, and again from 2012 through 2016. The 2006 through 2008 tests showed no acute toxicity in any of the tests using 100% effluent. In addition, the WET test showed no chronic toxicity at effluent concentrations equivalent to those at the edge of the mixing zone. The 2012 through 2016 tests showed no acute toxicity in any of the tests using 100 % effluent for Ceriodaphnia dubia (water flea) and Pimephales promelas (fathead minnow) in any of the tests using 100% effluent and showed no chronic toxicity at effluent concentrations equivalent to those at the edge of the mixing zone. The 2012 through 2016 tests showed no acute toxicity in any of the tests using 100% effluent for the Raphidocelis subcapitata (algae). However, the 2012 through 2016 tests showed a statistically significant reduction in growth for the Raphidocelis subcapitata for chronic toxicity at effluent sample concentrations of 30 and 100 percent. These results are based on their existing discharge to Ashland Creek and not their proposed discharge to Bear Creek.

The proposed permit requires quarterly WET testing during the first year of permit issuance. This testing coincides with the priority pollutant toxics testing so that if there are failed WET tests, potential toxics might be identified.

3.6 Trading

The City has submitted a March 7, 2018 water quality-trading plan. DEQ has reviewed the plan and has concluded that it is consistent with DEQ's water quality trading rules in OAR 340-039-0025. The trading plan provides details on how the City will obtain thermal credits for performing stream bank restoration. The proposed permit allows the city to use thermal credits generated to offset thermal load limits in the proposed permit. Riparian restoration will provide shading that will reduce solar thermal loading to Bear Creek. It will create cooler, shaded spaces in the river for fish and directly advantage beneficial uses in the watershed by supporting the recruitment of large wood that supports salmonid spawning, rearing and migration habitat. In addition, Ashland's trading plan is also likely to improve functional habitat for macro-invertebrate life, provide year-round shading of the waterbody (beyond the time periods when the restored ecosystem will provide shade credits), help minimize nutrient inputs, result in some floodplain restoration, and help control erosion. The permittee is authorized to use water quality trading to comply with the waste discharge limitations in Schedule A, provided its credit activities comply with the requirements in OAR 340-039, the City of Ashland's trading plan and Schedule D of the permit.

The current plan used the 2008 Rogue River TMDL to determine the applicable baseline requirements. In addition, review of applicable federal, state and local requirements and existing site conditions are required to determine site-specific baselines prior to planting. The permittee uses The Freshwater Trust to manage its trading activities and The Willamette Partnership to validate kcal credits obtained by each project. The Willamette Partnership provides third party

verification on the projects managed by The Freshwater Trust by reviewing the type of project, quantity of credits, type of financing, and compliance with state, federal and local laws.

The trading plan will be put on public notice along with the draft permit renewal. The Plan will be available as separate document to the proposed permit. Upon completion of the public review process, the credit trading plan proposal will be incorporated into the permit by reference and the Ashland wastewater facility's trading activities would be allowed. Because the public will be given the opportunity to review and comment on the proposed trading plan before it becomes part of the permit and permit requirements governing trades, public notice of individual trades made during the course of implementing the approved trading plan is not required.

4. Schedule A: Other Limitations

4.1 Recycled Water

As discussed above, the City does not currently have any plans to apply recycled water. In the event that they develop and receive approval to apply recycled water during this permit term, Schedule A of the permit requires the permittee to apply recycled water according to their recycled water use plan. Schedule A also restricts the application of recycled water to prevent the following:

- Irrigating above agronomic rates,
- Adverse impact to groundwater,
- Offsite surface runoff or subsurface drainage through drainage tile,
- Creation of odors, fly and mosquito breeding, or other nuisance conditions

5. Schedule B: Monitoring and Reporting Requirements

Schedule B of the permit describes the minimum monitoring and reporting necessary to demonstrate compliance with the proposed effluent limits. In addition, monitoring for other parameters is required to better characterize the effluent quality and the receiving stream. This data will be used during the next permit renewal. Detailed monitoring frequency and reporting requirements are in Schedule B of the proposed permit. The required monitoring, reporting and frequency for many of the parameters are based on DEQ's monitoring and reporting matrix guidelines, permit writer judgment, and to ensure the needed data is available for the next permit renewal.

All technology-based effluent limits, mass load limits and thermal load limits are being applied at an internal outfall (004). This internal outfall will address combined discharges to Outfalls 001 and 002.

6. Schedule C: Compliance Schedules and Conditions

The proposed permit contains more stringent thermal load limits and a restriction on when discharging to the Ashland Creek outfall is allowed. The facility is unable to meet these limits upon permit issuance. The proposed permit contains a compliance schedule that allows time for the facility to make facility modifications in order to meet the new limits. This compliance

schedule lays out a series of milestones which upon completion, will enable the permittee to meet the permit's water quality-based effluent limits (see 40 CFR 122.47 and OAR 340-041-0061(16)).

The compliance schedule allows time for the City to finalize the design and construction of a new outfall to Bear Creek. The discharge will no longer have the potential to exceed the antimony criterion in Ashland Creek since the permit will restrict flows into Ashland Creek by only allowing a discharge when the hydraulic capacity of the Bear Creek outfall is exceeded. The Bear Creek outfall will also move them towards compliance with their thermal load limits. The City is also planning to perform riparian restoration that will offset thermal loading to the stream. These offsets will apply as thermal credits and is expected to achieve compliance with their thermal load limits. The proposed permit requires compliance with the thermal load limits within 60 months of permit issuance. DEQ considers the proposed schedule to be reasonable, requires the final effluent limits to be met as soon as possible, and is in compliance with 40 CFR § 122.47. Per OAR 340-045-055 an interim compliance date can be modified provided the new date is not more than 120 days after the existing permit and does not interfere with the final compliance date requirement.

7. Schedule D: Special Conditions

The proposed permit contains the following special conditions. The conditions include the following:

7.1 Inflow and Infiltration

A requirement to submit an updated inflow and infiltration plan in order to reduce groundwater and stormwater from entering the collection system;

7.2 Emergency Response and Public Notification Plan

A requirement to develop and submit an emergency and spill response plan or ensure the current one is current per General Condition B.8 in Schedule F.

7.3 Recycled Water Use Plan

In the event the City decides to land apply recycled water, this condition requires the permit holder to develop and maintain a recycled water use plan that meet the requirements in OAR 340-055-0025. The plan must also include location-specific information describing where and how recycled water is managed to protect public health and the environment.

7.4 Exempt Wastewater Reuse at the Treatment System

A condition that exempts the permit holder from the recycled water requirements in OAR 340-055, when recycled water is used for landscape irrigation at the treatment facility or for in-plant processes, such as in plant maintenance activities.

7.5 Wastewater Solids Annual Report

This condition requires the permittee to submit a Wastewater Solids Annual Report each year documenting removal of wastewater solids from the facility during the previous calendar year.

7.6 Wastewater Solids Transfers

A condition that allows the facility to transfer treated or untreated wastewater solids to other in-state or out-of-state facilities that are permitted to accept the wastewater solids.

7.7 Hauled Waste Control Plan

A condition that allows the acceptance of hauled waste after a hauled waste plan is submitted and approved by DEQ. The hauled waste plan ensures waste is not accepted that could negatively impact the treatment capabilities of the facility.

7.8 Hauled Waste Annual Report

A condition requiring submittal of an annual hauled waste report that summarizes hauled waste accepted at the facility during the previous year.

7.9 Whole Effluent Toxicity Testing

The permittee is required to perform WET testing to ensure the aggregate of toxics is not negatively impacting aquatic life. This condition describes the test procedures and requirement for the WET testing. A dilution series has been specified on the basis of the mixing zone analysis.

7.10 Operator Certification

The permit holder is required to have a certified operator consistent with the size and type of treatment plant covered by the permit per OAR 340-049-0005. This special condition describes the requirements relating to operator certification.

7.11 Industrial User Survey

This condition requires the permittee to conduct or update an industrial user survey. The purpose of the survey is to identify whether there are any categorical industrial users discharging to the POTW, and ensure regulatory oversight of these discharges.

7.12 Water Quality Trading in the Bear Creek Watershed

The permit allows the restoration of bank vegetation to increase shading over water bodies to prevent warming in the watershed in lieu of reducing thermal load at the plant outfall. The permittee is authorized to use water quality trading to comply with the waste discharge limitations in Schedule A provided its credit activities comply with the requirements in Schedule D of the permit.

8. Schedule F: NPDES General Conditions

Schedule F contains the following general conditions that apply to all NPDES permittees. These conditions are reviewed by EPA on a regular basis.

- Section A. Standard Conditions
- Section B. Operation and Maintenance of Pollution Controls
- Section C. Monitoring and Records

- Section D. Reporting Requirements
- Section E. Definitions

9. Next Steps

The proposed NPDES permit will be made available for public comment for a minimum of 35 days as required by OAR 340-045-0027. Public notice and links to the proposed permit will be posted on DEQ's website and sent to subscribers of DEQ's pertinent public notice e-mail lists. DEQ will schedule a public hearing scheduled if requested by 10 or more people, or by an authorized person representing an organization of at least 10 people. DEQ will provide a minimum of 30 days' notice for a hearing if one is scheduled.

DEQ will respond to comments received during the comment period. All those providing comment will receive a copy of DEQ's response. Interested parties may also request a copy of DEQ's response. Once comments are received and evaluated, DEQ will decide whether to issue the permit as proposed, to make changes to the permit, or to deny the permit. DEQ will notify the permittee of DEQ's decision. If substantive changes are made to the permit, then an additional public notice period may occur. DEQ may also revise this fact sheet or update the fact sheet through memorandum.

Appendix A: Temperature

Facility Name:	City of Ashland - outfall 002	**Time Period**	May - Jun

Enter data into white cells below:

7Q10 =	**24**	cfs
Ambient Temperature or Criterion =	**19.2**	ºC
Effluent Flow =	**2.84**	mgd
Max Effluent Temperature =	**21.6**	ºC
7 day Max Effluent Temperature =	**20.5**	ºC

5% of 7Q10 =	**1.2**	cfs
5% dilution =	**1.3**	
25% of 7Q10 =	**6.0**	cfs
25% dilution =	**2.4**	dilution = (Qe+Qr)/Qe

Temperature at 5% cross section =	**21.1**	**ºC**	**No Reasonable Potential**
Temperature at 25% cross section =	**19.7**	**ºC**	**No Reasonable Potential**
ΔT at 25% Stream Flow=	**0.55**	**ºC**	

Facility Name:	City of Ashland outfall 002	**Time Period** Jul - Sep

Enter data into white cells below:

7Q10 =	**28.3**	cfs
Ambient Temperature or Criterion =	**22.5**	ºC
Effluent Flow =	**2.61**	mgd
Max Effluent Temperature =	**25.9**	ºC
7 day Max Effluent Temperature =	**24.8**	ºC

5% of 7Q10 =	**1.4**	cfs
5% dilution =	**1.4**	
25% of 7Q10 =	**7.1**	cfs
25% dilution =	**2.8**	dilution = (Qe+Qr)/Qe

Temperature at 5% cross section =	**25.0**	**ºC**	**No Reasonable Potential**
Temperature at 25% cross section =	**23.3**	**ºC**	**No Reasonable Potential**
ΔT at 25% Stream Flow=	**0.84**	**ºC**	

Facility Name:	City of Ashland outfall 001		Date:	May - Jun
Enter data into white cells below:				
7Q10 =	1	cfs		
Ambient Temperature or Criterion =	19.2	ºC		
Effluent Flow =	2.84	mgd		
Max Effluent Temperature =	21.6	ºC		
7 day Max Effluent Temperature =	20.5	ºC		
5% of 7Q10 =	0.1	cfs		
5% dilution =	1.0			
25% of 7Q10 =	0.3	cfs		
25% dilution =	1.1	dilution = (Qe+Qr)/Qe		
Temperature at 5% cross section =	**21.6**	**ºC**	**No Reasonable Potential**	
Temperature at 25% cross section =	**20.4**	**ºC**	**No Reasonable Potential**	
ΔT at 25% Stream Flow=	**1.23**	**ºC**		

Appendix B: Toxics Analyses

Bear Creek Aquatic Life Reasonable Potential Analysis

RPA Run Information	
Facility Name:	City of Ashland
Permit Writer Name:	Schnurbusch
Preparation Date:	4/2/2021
Outfall Number:	002 (Bear Creek)
Determination Date:	4/2/21

Color Key:	"*" = Enter data
Intermediate Calc.s	"--" = Will calculate
Calculation Results	

Facility Information					
1. Are there dilution #'s from mixing zone study? (Yes/No)					yes
2. Is the receiving waterbody fresh water? (Yes/No)					yes
3. If Question 1 = "No", then fill in the following table					
Eff. Flow Rate		MGD	N/A	Calculated dilution Factors	
Stream Flow: 7Q10		CFS	N/A	Dilution @ ZID	N/A
Stream Flow: 1Q10		CFS	N/A	Dilution @ MZ	N/A
% dilution at ZID		%	10%		
% dilution at MZ		%	25%		
4. If answered "Yes" to Question #1, then fill in dilution values			Dilution @ ZID (7Q10 from study)		1.3
			Dilution @ MZ (1Q10 from study)		1.3
5. Enter Water Hardness. Use average hardness during critical (usually low-flow period). Effluent default is 25 mg/L.			Effluent	mg/L $CaCO_3$	68
			Up-stream	mg/L $CaCO_3$	61
			ZID boundary	mg/L $CaCO_3$	66
			MZ boundary	mg/L $CaCO_3$	66
6. Please enter statistical Confidence and Probablity values (note: defaults already entered)			Confidence Level	%	99%
			Probability Basis	%	95%

Pollutant Parameter	Evaluation Required?	Identify Pollutants of Concern: # of Sample	Highest Effluent Conc.	Coefficent of Variation	Est. Max Eff. Conc.	RP at end of pipe?	Determine In-Stream Conc.: Ambient Conc.	Max Total Conc. @ ZID	Max Total Conc. @ RMZ	Det. Reasonable Potential: WQ Crit: 1 Hour (CMC)	WQ Crit: 4 Day (CCC)	Is there Reasonable Potential to Exceed? (Yes/No) Acute	Chronic
	(Yes/No)		(µg/l)	Default=0.6	(µg/l)	(Yes/No)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)		
Table 2: Metals (total recoverable), cyanide and total phenols									Use total recoverable data as surrogate.			yes	
Arsenic (total recoverable)	Yes	14	1.12	1.47	--	No Aquatic Water Quality Criteria							
Arsenic (Dissolved)	Yes	14	1.12	1.47	3.472	No	*	--	--	340.00	150.00	--	--
Arsenic (total inorganic)	Yes	14	1.12	1.47	3.472	No	*	--	--	340.00	150.00	--	--
Cadmium (total recoverable)	Yes	15	0.0017	0.65	0.00302	No	*	--	--	2.47	--	--	--
Cadmium (dissolved)	Yes	15	0.0017	0.65	0.00302	No	*	--	--	--	0.20	--	--
Chromium (total recoverable)	Yes	15	0.866	1.74	--	No Aquatic Water Quality Criteria							
Chromium III (dissolved)	Yes	15	0.866	1.74	2.8578	No	*	--	--	1288.72	61.60	--	--
Chromium VI (dissolved)	Yes	15	0.866	1.74	2.8578	No	*	--	--	16.00	11.00	--	--
Copper (total recoverable)	Yes	42	9.78	0.50	--	No Aquatic Water Quality Criteria							
Copper (dissolved)	Yes	42	9.78	0.50	11.736	No	*	--	--	See BLM	See BLM	--	--
Iron (total recoverable)	Yes	14	84.9	1.23	237.72	No	*	--	--	--	1000.00	--	--
Lead (total recoverable)	Yes	14	0.372	0.51	--	No Aquatic Water Quality Criteria							
Lead (dissolved)	Yes	14	0.372	0.51	0.63	No	*	--	--	48.44	1.89	--	--
Mercury (total)	Yes	13	0.0043	1.15	0.0120	No	*	--	--	2.40	0.012	--	--
Nickel (total recoverable)	Yes	15	1.83	0.43	--	No Aquatic Water Quality Criteria							
Nickel (dissolved)	Yes	15	1.83	0.43	2.745	No	*	--	--	331.65	36.87	--	--
Selenium (total	Yes	15	0.228	1.27	--	No Aquatic Water Quality Criteria							
Selenium (dissolved)	Yes	15	0.228	1.27	0.6156	No	*	--	--	13.00	4.60	--	--
Silver (total recoverable)	Yes	13	0.208	3.02	--	No Aquatic Water Quality Criteria							
Silver (dissolved)	Yes	13	0.0208	0.60	0.03952	No	*	--	--	1.87	0.10	--	--
Zinc (total recoverable)	Yes	13	49.6	0.23	--	No Aquatic Water Quality Criteria							
Zinc (dissolved)	Yes	13	49.6	0.23	64.48	No	*	--	--	84.65	84.65	--	--
Cyanide (total)	Yes	14	2.42	2.04	--	No Aquatic Water Quality Criteria							
Cyanide (free)	Yes	14	2.42	0.60	4.356	No	*	--	--	22.00	5.20	--	--
Total phenolic compounds	Yes	No Aquatic Water Quality Criteria											
Table 2: Volatile organic compounds													
Table 2: Acid-extractable compounds													
Pentachlorophenol	Yes	13	0	0	0	No	*	--	--	pH Data	pH Data	--	--
Table 2: Base-neutral compounds													
Table 3: Pesticides and PCBs													
Aldrin	Yes	15	0	0	0	No	*	--	--	3.00	na	--	--
BHC-gamma (Lindane)	Yes	15	0	0	0	No	*	--	--	0.95	0.08	--	--
Chlordane	Yes	15	0	0	0	No	*	--	--	2.40	0.00	--	--
Chloropyrifos	Yes	--	--	--	--	Data	*	--	--	0.08	0.04	--	--
Demeton	Yes	--	--	--	--	Data	*	--	--	na	0.10	--	--
DDT 4,4'	Yes	15	0	0	0	No	*	--	--	1.10	0.00	--	--
Dieldrin	Yes	15	0	0	0	No	*	--	--	0.24	0.06	--	--
Endosulfan alpha	Yes	15	0	0	0	No	*	--	--	0.22	0.06	--	--
Endosulfan beta	Yes	15	0	0	0	No	*	--	--	0.22	0.06	--	--
Endosulfan	Yes	--	--	--	--	Data	*	--	--	0.22	0.06	--	--
Endrin	Yes	15	0	0	0	No	*	--	--	0.09	0.04	--	--
Guthion	Yes	--	--	--	--	Data	*	--	--	na	0.01	--	--
Heptachlor	Yes	15	0	0	0	No	*	--	--	0.52	0.00	--	--
Heptachlor Epoxide	Yes	15	0	0	0	No	*	--	--	0.52	0.00	--	--
Malathion	Yes	--	--	--	--	Data	*	--	--	na	0.10	--	--
Methoxychlor	Yes	15	0	0	0	No	*	--	--	na	0.03	--	--
Mirex	Yes	--	--	--	--	Data	*	--	--	na	0.00	--	--
Parathion	Yes	--	--	--	--	Data	*	--	--	0.07	0.01	--	--
Toxaphene	Yes	15	0	0	0	No	*	--	--	0.73	0.00	--	--

Bear Creek Human Health Reasonable Potential Analysis (part 1)

RPA Run Information	
Facility Name:	City of Ashland
Permit Writer Name:	Schurbusch
Preparation Date:	4/2/2021
Outfall Number:	002 (Bear Creek)

Color Key:	"*" = Enter data
Intermediate Calc.s	"--" = Will calculate
Calculation Results	

Facility Information						
1. Do I have dilution values from a mixing zone study? (Yes/No)						Yes
2. If answered "No" to Question 1, then fill in the following table						
Eff. Flow Rate		MGD	N/A	Calculated dilution Factors		
Stream Flow: Harmonic M		CFS	N/A	Dilution @ Harmonic Mean		N/A
Stream Flow: 30Q5		CFS	N/A	Dilution @ 30Q5		N/A
% dilution at MZ		%	25%			
3. If answered "Yes" to Question			Dilution @ RMZ: harmonic mean flow			1.6
#1, then fill in dilution values			Dilution @ RMZ: 30Q5 flow			4.2
4. Please enter statistical			Confidence Level		%	95%
Confidence and Probablity			Probability Basis		%	95%
values (note: defaults already						
5. Is the water "fresh" or "salt"?			Fresh			
RPA Run Notes:						

			Identify Pollutants of Concern					In-Stream Conc.		Det. Reasonable Potential			
Pollutant Parameter	Evaluation Required?	Carcinogen Status	# of Sample	Effluent Conc.	Coefficent of Variation	Est. Max Eff. Conc.	RP at end of pipe?	Ambient Conc.	Max Total Conc. @ RMZ	WQ Crit: Water + Fish	WQ Crit: Fish	Is there Reasonable Potential to Exceed? (Yes/No)	
	(Yes/No)	(Yes/No)		(µg/l)	Default=0.6	(µg/l)	(Yes/No)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	Water + Fish	Fish
Table 1 Effluent Parameters for all POTWs w/a Flow > 0.1 MGD													
Nitrates-Nitrite	Yes	n	--	--	--	--	Data	*	--	10000	na	--	--
Table 2 Effluent Parameters for Selected POTWs													
Table 2: Metals (total recoverable), cyanide and total phenols								Use total recoverable data as surrogate.				Yes	
Antimony (total recoverable)	Yes	n	8	5.8	0.6	11.0086	Yes	0	2.62109	5.1	64	NO	NO
Arsenic (total recoverable)	Yes	y	14	0.0709	1.46832549	No Human Health Water Quality Criteria							
Arsenic (total inorganic)	Yes	Y	14	0.0709	1.46832549	0.16307	No	*	--	2.1	2.1	--	--
Copper (total recoverable)	Yes	N	42	9.78	0.495103438	10.5427	No	*	--	1300	na	--	--
Mercury (total)	Yes	N	13	0.0043	1.148926288	No Human Health Water Quality Criteria							
Methyl Mercury	Yes	N	13	0.0043	1.148926288	0.00922	Yes	*	--	na	0.00014	--	--
Nickel (total recoverable)	Yes	N	15	1.83	0.433208638	2.48056	No	*	--	140	170	--	--
Selenium (total recoverable)	Yes	N	15	0.228	1.270910033	0.468	No	*	--	120	420	--	--
Thallium (total recoverable)	Yes	N	12	0.0015	2.335496832	0.00506	No	0	0.0012	0.043	0.047	NO	NO
Zinc (total recoverable)	Yes	N	13	49.6	0.225658601	59.5962	No	*	--	2100	2600	--	--
Cyanide (total)	Yes	N	14	2.42	2.036317734	6.53933	No	*	--	130	130	--	--
Table 2: Volatile organic compounds													
Acrolein	Yes	N	3	0	0	0	No	*	--	0.88	0.93	--	--
Acrylonitrile	Yes	Y	15	0	0	0	No	*	--	0.018	0.025	--	--
Benzene	Yes	Y	15	0	0	0	No	*	--	0.44	1.4	--	--
Bromoform	Yes	y	15	0	0	0	No	*	--	3.3	14	--	--
Carbon Tetrachloride	Yes	Y	15	0	0	0	No	*	--	0.1	0.16	--	--
Chlorobenzene	Yes	N	15	0	0	0	No	*	--	74	160	--	--
Chlorodibromomethane	Yes	y	15	0	0	0	No	*	--	0.31	1.3	--	--
Chloroform	Yes	n	15	0.84	0.777567438	1.39097	No	*	--	260	1100	--	--
1,2-Dichlorobenzene (o)	Yes	n	15	0	0	0	No	*	--	110	130	--	--
1,3-Dichlorobenzene (m)	Yes	n	15	0	0	0	No	*	--	80	96	--	--
1,4-Dichlorobenzene (p)	Yes	n	15	0	0	0	No	*	--	16	19	--	--
Dichlorobromomethane	Yes	y	15	0	0	0	No	*	--	0.42	1.7	--	--
1,2-dichloroethane	Yes	y	15	0	0	0	No	*	--	0.35	3.7	--	--
1,2-trans-dichloroethylene	Yes	n	16	0	0	0	No	*	--	120	1000	--	--
1,1-dichloroethylene	Yes	n	16	0	0	0	No	*	--	230	710	--	--
1,2-dichloropropane	Yes	y	15	0	0	0	No	*	--	0.38	1.5	--	--
1,3-dichloropropene	Yes	y	--	--	--	--	Data	*	--	0.3	2.1	--	--
Ethylbenzene	Yes	n	15	0	0	0	No	*	--	160	210	--	--
Methyl Bromide	Yes	n	15	0	0	0	No	*	--	37	150	--	--
Methylene Chloride	Yes	y	15	0.1237	3.032023352	0.37834	No	*	--	4.3	59	--	--
1,1,2,2-tetrachloroethane	Yes	y	15	0.011	0	0.011	No	*	--	0.12	0.4	--	--
Tetrachloroethylene	Yes	y	16	0	0	0	No	*	--	0.24	0.33	--	--
Toluene	Yes	n	15	0.0896	3.872983346	0.30387	No	*	--	720	1500	--	--
1,1,2-trichloroethane	Yes	y	15	0	0	0	No	*	--	0.44	1.6	--	--
Trichloroethylene	Yes	y	16	0	0	0	No	*	--	1.4	3	--	--
Vinyl Chloride	Yes	y	15	0	0.6	0	No	*	--	0.023	0.24	--	--
Table 2: Acid-extractable compounds													
2-chlorophenol	Yes	n	15	0	0	0	No	*	--	14	15	--	--
2,4-dichlorophenol	Yes	n	15	0.584	2.41431882	1.61402	No	*	--	23	29	--	--
2,4-dimethylphenol	Yes	n	15	0	0	0	No	*	--	76	85	--	--
4,6-dinitro-o-cresol	Yes	n	12	0	0	0	No	*	--	9.2	28	--	--
2,4-dinitrophenol	Yes	n	12	0	0	0	No	*	--	62	530	--	--
Pentachlorophenol	Yes	y	13	0	0	0	No	0	0	0.15	0.3	NO	NO
Phenol	Yes	n	14	0	0	0	No	*	--	9400	86000	--	--
2,4,5-trichlorophenol	Yes	n	15	0	0	0	No	*	--	330	360	--	--
2,4,6-trichlorophenol	Yes	y	14	0	0	0	No	*	--	0.23	0.24	--	--

Bear Creek Human Health Reasonable Potential Analysis (part 2)

RPA Run Information	
Facility Name:	City of Ashland
Permit Writer Name:	Schurbusch
Preparation Date:	12/15/2020
Outfall Number:	002

Color Key:	"*" = Enter data
Intermediate Calc.s	"--" = Will calculate
Calculation Results	

Facility Information					
1. Do I have dilution values from a mixing zone study? (Yes/No)					Yes
2. If answered "No" to Question 1, then fill in the following table					
Eff. Flow Rate		MGD	N/A	Calculated dilution Factors	
Stream Flow: Harmonic M		CFS	N/A	Dilution @ Harmonic Mean	N/A
Stream Flow: 30Q5		CFS	N/A	Dilution @ 30Q5	N/A
% dilution at MZ		%	25%		
3. If answered "Yes" to Question #1, then fill in dilution values				Dilution @ RMZ: harmonic mean flow	1.6
				Dilution @ RMZ: 30Q5 flow	4.2
4. Please enter statistical Confidence and Probablity values (note: defaults already				Confidence Level %	95%
				Probability Basis %	95%
5. Is the water "fresh" or "salt"?			Fresh		
RPA Run Notes:					

			Identify Pollutants of Concern					In-Stream Conc.		Det. Reasonable Potential			
Pollutant Parameter	Evaluation Required?	Carcinogen Status	# of Sample	Effluent Conc.	Coefficent of Variation	Est. Max Eff. Conc.	RP at end of pipe?	Ambient Conc.	Max Total Conc. @ RMZ	WQ Crit: Water + Fish	WQ Crit: Fish	Is there Reasonable Potential to Exceed? (Yes/No)	
	(Yes/No)	(Yes/No)		(µg/l)	Default=0.6	(µg/l)	(Yes/No)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	Water + Fish	Fish
Table 2: Base-neutral compounds													
Acenaphthene	Yes	n	14	0	0	0	No	*	--	95	99	--	--
Anthracene	Yes	n	15	0	0	0	No	*	--	2900	4000	--	--
Benzidine	Yes	y	11	0	0	0	No	*	--	1.8E-05	0.00002	--	--
Benzo(a)anthracene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Benzo(a)pyrene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Benzo(b)fluoranthene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Benzo(k)fluoranthene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Bis(2-chloroethyl)ether	Yes	y	15	0	0	0	No	*	--	0.02	0.053	--	--
Bis(2-chloroisopropyl)ether	Yes	n	2	0	0	0	No	*	--	1200	6500	--	--
Chloromethyl Ether, bis	Yes	y	--	--	--	--	Data	*	--	2.4E-05	0.000029	--	--
Bis (2-ethylhexyl)phthalate	Yes	y	14	0.291	2.382	0.847	NA	*	--	0.2	0.22	--	--
Butylbenzyl phthalate	Yes	n	15	0.382	3.873	1.296	No	*	--	190	190	--	--
2-chloronaphthalene	Yes	n	13	0	0	0	No	*	--	150	160	--	--
Chrysene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Di-n-butyl phthalate	Yes	n	15	0	0	0	No	*	--	400	450	--	--
Dibenzo(a,h)anthracene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
3,3-Dichlorobenzidine	Yes	y	14	0	0	0	No	*	--	0.0027	0.0028	--	--
Diethyl phthalate	Yes	n	15	0	0	0	No	*	--	3800	4400	--	--
Dimethyl phthalate	Yes	n	15	0	0	0	No	*	--	84000	110000	--	--
2,4-dinitrotoluene	Yes	y	15	0	0	0	No	*	--	0.084	0.34	--	--
1,2-diphenylhydrazine	Yes	y	--	--	--	--	Data	*	--	0.014	0.02	--	--
Fluoranthene	Yes	n	15	0	0	0	No	*	--	14	14	--	--
Fluorene	Yes	n	14	0	0	0	No	*	--	390	530	--	--
Hexachlorobenzene	Yes	n	15	0	0	0	No	*	--	2.9E-05	0.000029	--	--
Hexachlorobutadiene	Yes	y	15	0	0	0	No	*	--	0.36	1.8	--	--
Hexachlorocyclopentadiene	Yes	n	15	0	0	0	No	*	--	30	110	--	--
Hexachloroethane	Yes	y	14	0	0	0	No	*	--	0.29	0.33	--	--
Indeno(1,2,3-cd)pyrene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Isophorone	Yes	n	15	0	0	0	No	*	--	27	96	--	--
Nitrobenzene	Yes	n	15	0	0	0	No	*	--	14	69	--	--
N-nitrosodimethylamine	Yes	y	15	0	0	0	No	*	--	0.00068	0.3	--	--
N-nitrosodi-n-propylamine	Yes	y	15	0	0	0	No	*	--	0.0046	0.051	--	--
N-nitrosodiphenylamine	Yes	y	14	0	0	0	No	*	--	0.55	0.6	--	--
Pentachlorobenzene	Yes	n	14	0	0	0	No	*	--	0.15	0.15	--	--
Pyrene	Yes	n	14	0	0	0	No	*	--	290	400	--	--
1,2,4-trichlorobenzene	Yes	n	30	0.157	5.477225575	0.2918	No	*	--	6.4	7	--	--
Tetrachlorobenzene,1,2,4,5	Yes	n	14	0	0	0	No	*	--	0.11	0.11	--	--
Table 3: Pesticides and PCBs													
Aldrin	Yes	y	15	0	0	0	No	*	--	5E-06	0.000005	--	--
BHC-Technical	No	y	--	--	--	--	--	*	--	0.0014	0.0015	--	--
BHC-alpha	Yes	y	15	0	0	0	No	*	--	0.00045	0.00049	--	--
BHC-beta	Yes	y	15	0	0	0	No	*	--	0.0016	0.0017	--	--
BHC-gamma (Lindane)	Yes	n	15	0	0	0	No	*	--	0.17	0.18	--	--
Chlordane	Yes	y	15	0	0	0	No	*	--	8.1E-05	0.000081	--	--
DDD 4,4'	Yes	y	15	0	0	0	No	*	--	3.1E-05	0.000031	--	--
DDE 4,4'	Yes	y	15	0	0	0	No	*	--	2.2E-05	0.000022	--	--
DDT 4,4'	Yes	y	15	0	0	0	No	*	--	2.2E-05	0.000022	--	--
Dieldrin	Yes	y	15	0	0	0	No	*	--	5.3E-06	0.0000054	--	--
Endosulfan alpha	Yes	n	15	0	0	0	No	*	--	8.5	8.9	--	--
Endosulfan beta	Yes	n	15	0	0	0	No	*	--	8.5	8.9	--	--
Endosulfan Sulfate	Yes	n	15	0	0	0	No	*	--	8.5	8.9	--	--
Endrin	Yes	n	15	0	0	0	No	*	--	0.024	0.024	--	--
Endrin Aldehyde	Yes	n	15	0	0	0	No	*	--	0.03	0.03	--	--
Heptachlor	Yes	y	15	0	0	0	No	*	--	7.9E-06	0.0000079	--	--
Heptachlor Epoxide	Yes	y	15	0	0	0	No	*	--	3.9E-06	0.0000039	--	--
Methoxychlor	Yes	n	15	0	0	0	No	*	--	100	na	--	--
Toxaphene	Yes	y	15	0	0	0	No	*	--	2.8E-05	0.000028	--	--
Total PCBs (Sum of PCB Aroclors)	Yes	y	--	--	--	--	Data	*	--	6.4E-06	0.0000064	--	--

Ashland Cr Outfall – Aquatic Life Reasonable Potential Analysis
(prior to the Bear Creek outfall completion)

RPA Run Information	
Facility Name:	City of Ashland
Permit Writer Name:	Schnurbusch
Preparation Date:	1/0/1900
Outfall Number:	002
Determination Date:	12/15/20

Color Key:	"*" = Enter data
Intermediate Calc.s	"--" = Will calculate
Calculation Results	

Facility Information					
1. Are there dilution #'s from mixing zone study? (Yes/No)					yes
2. Is the receiving waterbody fresh water? (Yes/No)					yes
3. If Question 1 = "No", then fill in the following table					
Eff. Flow Rate		MGD	N/A	Calculated dilution Factors	
Stream Flow: 7Q10		CFS	N/A	Dilution @ ZID	N/A
Stream Flow: 1Q10		CFS	N/A	Dilution @ MZ	N/A
% dilution at ZID		%	10%		
% dilution at MZ		%	25%		
4. If answered "Yes" to Question #1, then fill in dilution values			Dilution @ ZID (7Q10 from study)		1
			Dilution @ MZ (1Q10 from study)		1
5. Enter Water Hardness. Use average hardness during critical (usually low-flow period). Effluent default is 25 mg/L.			Effluent	mg/L $CaCO_3$	68
			Up-stream	mg/L $CaCO_3$	61
			ZID boundary	mg/L $CaCO_3$	68
			MZ boundary	mg/L $CaCO_3$	68
6. Please enter statistical Confidence and Probablity values (note: defaults already entered)			Confidence Level	%	99%
			Probability Basis	%	95%

Pollutant Parameter	Evaluation Required?	Identify Pollutants of Concern: # of Sample	Highest Effluent Conc.	Coefficent of Variation	Est. Max Eff. Conc.	RP at end of pipe?	Determine In-Stream Conc.: Ambient Conc.	Max Total Conc. @ ZID	Max Total Conc. @ RMZ	Det. Reasonable Potential: WQ Crit: 1 Hour (CMC)	WQ Crit: 4 Day (CCC)	Is there Reasonable Potential to Exceed? (Yes/No): Acute	Chronic
	(Yes/No)		(µg/l)	Default=0.6	(µg/l)	(Yes/No)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)		
Table 1 Effluent Parameters for all POTWs w/a Flow > 0.1 MGD													
Nitrates-Nitrite	Yes	Evaluation will occur with DO analysis											
Table 2 Effluent Parameters for Selected POTWs													
Hardness (Total as CaCO3)	Yes	Must be collected for metals criteria calculation. Submit data to the fields at the top of the spreadsheet											
Table 2: Metals (total recoverable), cyanide and total phenols									Use total recoverable data as surrogate.	yes			
Arsenic (total recoverable)	Yes	14	1.12	1.47	--	No Aquatic Water Quality Criteria							
Arsenic (Dissolved)	Yes	14	1.12	1.47	3.472	No	*	--	--	340.00	150.00	--	--
Arsenic (total inorganic)	Yes	14	1.12	1.47	3.472	No	*	--	--	340.00	150.00	--	--
Cadmium (total recoverable)	Yes	15	0.0017	0.65	0.00302	No	*	--	--	2.54	--	--	--
Cadmium (dissolved)	Yes	15	0.0017	0.65	0.00302	No	*	--	--	--	0.20	--	--
Chromium (total recoverable)	Yes	15	0.866	1.74	--	No Aquatic Water Quality Criteria							
Chromium III (dissolved)	Yes	15	0.866	1.74	2.8578	No	*	--	--	1314.72	62.84	--	--
Chromium VI (dissolved)	Yes	15	0.866	1.74	2.8578	No	*	--	--	16.00	11.00	--	--
Copper (total recoverable)	Yes	42	9.78	0.50	--	No Aquatic Water Quality Criteria							
Copper (dissolved)	Yes	42	9.78	0.50	11.736	No	*	--	--	See BLM	See BLM	--	--
Iron (total recoverable)	Yes	14	84.9	1.23	237.72	No	*	--	--	--	1000.00	--	--
Lead (total recoverable)	Yes	14	0.372	0.51	--	No Aquatic Water Quality Criteria							
Lead (dissolved)	Yes	14	0.372	0.51	0.63	No	*	--	--	49.97	1.95	--	--
Mercury (total)	Yes	13	0.0043	1.15	0.0120	No	*	--	--	2.40	0.012	--	--
Nickel (total recoverable)	Yes	15	1.83	0.43	--	No Aquatic Water Quality Criteria							
Nickel (dissolved)	Yes	15	1.83	0.43	2.745	No	*	--	--	338.56	37.64	--	--
Selenium (total	Yes	15	0.228	1.27	--	No Aquatic Water Quality Criteria							
Selenium (dissolved)	Yes	15	0.228	1.27	0.6156	No	*	--	--	13.00	4.60	--	--
Silver (total recoverable)	Yes	13	0.208	3.02	--	No Aquatic Water Quality Criteria							
Silver (dissolved)	Yes	13	0.0208	0.60	0.03952	No	*	--	--	1.95	0.10	--	--
Zinc (total recoverable)	Yes	13	49.6	0.23	--	No Aquatic Water Quality Criteria							
Zinc (dissolved)	Yes	13	49.6	0.23	64.48	No	*	--	--	86.42	86.42	--	--
Cyanide (total)	Yes	14	2.42	2.04	--	No Aquatic Water Quality Criteria							
Cyanide (free)	Yes	14	2.42	0.60	4.356	No	*	--	--	22.00	5.20	--	--
Total phenolic compounds	Yes	No Aquatic Water Quality Criteria											
Table 2: Volatile organic compounds													
Table 2: Acid-extractable compounds													
Pentachlorophenol	Yes	13	0	0	0	No	*	--	--	pH Data	pH Data	--	--
Table 2: Base-neutral compounds													
Table 3: Pesticides and PCBs													
Aldrin	Yes	15	0	0	0	No	*	--	--	3.00	na	--	--
BHC-gamma (Lindane)	Yes	15	0	0	0	No	*	--	--	0.95	0.08	--	--
Chlordane	Yes	15	0	0	0	No	*	--	--	2.40	0.00	--	--
Chloropyrifos	Yes	--	--	--	--	Data	*	--	--	0.08	0.04	--	--
Demeton	Yes	--	--	--	--	Data	*	--	--	na	0.10	--	--
DDT 4,4'	Yes	15	0	0	0	No	*	--	--	1.10	0.00	--	--
Dieldrin	Yes	15	0	0	0	No	*	--	--	0.24	0.06	--	--
Endosulfan alpha	Yes	15	0	0	0	No	*	--	--	0.22	0.06	--	--
Endosulfan beta	Yes	15	0	0	0	No	*	--	--	0.22	0.06	--	--
Endosulfan	Yes	--	--	--	--	Data	*	--	--	0.22	0.06	--	--
Endrin	Yes	15	0	0	0	No	*	--	--	0.09	0.04	--	--
Guthion	Yes	--	--	--	--	Data	*	--	--	na	0.01	--	--
Heptachlor	Yes	15	0	0	0	No	*	--	--	0.52	0.00	--	--
Heptachlor Epoxide	Yes	15	0	0	0	No	*	--	--	0.52	0.00	--	--
Malathion	Yes	--	--	--	--	Data	*	--	--	na	0.10	--	--
Methoxychlor	Yes	15	0	0	0	No	*	--	--	na	0.03	--	--
Mirex	Yes	--	--	--	--	Data	*	--	--	na	0.00	--	--
Parathion	Yes	--	--	--	--	Data	*	--	--	0.07	0.01	--	--
Toxaphene	Yes	15	0	0	0	No	*	--	--	0.73	0.00	--	--

Ashland Creek Human Health Reasonable Potential Analysis (part 1)
(prior to the Bear Creek outfall completion)

RPA Run Information	
Facility Name:	City of Ashland
Permit Writer Name:	Schurbusch
Preparation Date:	12/15/2020
Outfall Number:	002

Color Key:	"*" = Enter data
Intermediate Calc.s	"--" = Will calculate
Calculation Results	

Facility Information						
1. Do I have dilution values from a mixing zone study? (Yes/No)						Yes
2. If answered "No" to Question 1, then fill in the following table						
Eff. Flow Rate		MGD	N/A	Calculated dilution Factors		
Stream Flow: Harmonic M		CFS	N/A	Dilution @ Harmonic Mean		N/A
Stream Flow: 30Q5		CFS	N/A	Dilution @ 30Q5		N/A
% dilution at MZ		%	25%			
3. If answered "Yes" to Question #1, then fill in dilution values				Dilution @ RMZ: harmonic mean flow		1
				Dilution @ RMZ: 30Q5 flow		1
4. Please enter statistical Confidence and Probablity values (note: defaults already				Confidence Level	%	95%
				Probability Basis	%	95%
5. Is the water "fresh" or "salt"?			Fresh			
RPA Run Notes:						

			Identify Pollutants of Concern					In-Stream Conc.		Det. Reasonable Potential			
Pollutant Parameter	Evaluation Required?	Carcinogen Status	# of Sample	Effluent Conc.	Coefficent of Variation	Est. Max Eff. Conc.	RP at end of pipe?	Ambient Conc.	Max Total Conc. @ RMZ	WQ Crit: Water + Fish	WQ Crit: Fish	Is there Reasonable Potential to Exceed? (Yes/No)	
	(Yes/No)	(Yes/No)		(µg/l)	Default=0.6	(µg/l)	(Yes/No)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	Water + Fish	Fish
Table 1 Effluent Parameters for all POTWs w/a Flow > 0.1 MGD													
Nitrates-Nitrite	Yes	n	--	--	--	--	Data	*	--	10000	na	--	--
Table 2 Effluent Parameters for Selected POTWs													
Table 2: Metals (total recoverable), cyanide and total phenols									Use total recoverable data as surrogate.			Yes	
Antimony (total recoverable)	Yes	n	8	5.8	0.6	11.0086	Yes	0	11.0086	5.1	64	YES	NO
Arsenic (total recoverable)	Yes	y	14	0.0709	1.46832549	No Human Health Water Quality Criteria							
Arsenic (total inorganic)	Yes	Y	14	0.0709	1.46832549	0.16307	No	*	--	2.1	2.1	--	--
Copper (total recoverable)	Yes	N	42	9.78	0.495103438	10.5427	No	*	--	1300	na	--	--
Mercury (total)	Yes	N	13	0.0043	1.148926288	No Human Health Water Quality Criteria							
Methyl Mercury	Yes	N	13	0.0043	1.148926288	0.00922	Yes	*	--	na	0.00014	--	--
Nickel (total recoverable)	Yes	N	15	1.83	0.433208638	2.48056	No	*	--	140	170	--	--
Selenium (total recoverable)	Yes	N	15	0.228	1.270910033	0.468	No	*	--	120	420	--	--
Thallium (total recoverable)	Yes	N	12	0.0015	2.335496832	0.00506	No	0	0.00506	0.043	0.047	NO	NO
Zinc (total recoverable)	Yes	N	13	49.6	0.225658601	59.5962	No	*	--	2100	2600	--	--
Cyanide (total)	Yes	N	14	2.42	2.036317734	6.53933	No	*	--	130	130	--	--
Table 2: Volatile organic compounds													
Acrolein	Yes	N	3	0	0	0	No	*	--	0.88	0.93	--	--
Acrylonitrile	Yes	Y	15	0	0	0	No	*	--	0.018	0.025	--	--
Benzene	Yes	Y	15	0	0	0	No	*	--	0.44	1.4	--	--
Bromoform	Yes	y	15	0	0	0	No	*	--	3.3	14	--	--
Carbon Tetrachloride	Yes	Y	15	0	0	0	No	*	--	0.1	0.16	--	--
Chlorobenzene	Yes	N	15	0	0	0	No	*	--	74	160	--	--
Chlorodibromomethane	Yes	y	15	0	0	0	No	*	--	0.31	1.3	--	--
Chloroform	Yes	n	15	0.84	0.777567438	1.39097	No	*	--	260	1100	--	--
1,2-Dichlorobenzene (o)	Yes	n	15	0	0	0	No	*	--	110	130	--	--
1,3-Dichlorobenzene (m)	Yes	n	15	0	0	0	No	*	--	80	96	--	--
1,4-Dichlorobenzene (p)	Yes	n	15	0	0	0	No	*	--	16	19	--	--
Dichlorobromomethane	Yes	y	15	0	0	0	No	*	--	0.42	1.7	--	--
1,2-dichloroethane	Yes	y	15	0	0	0	No	*	--	0.35	3.7	--	--
1,2-trans-dichloroethylene	Yes	n	16	0	0	0	No	*	--	120	1000	--	--
1,1-dichloroethylene	Yes	n	16	0	0	0	No	*	--	230	710	--	--
1,2-dichloropropane	Yes	y	15	0	0	0	No	*	--	0.38	1.5	--	--
1,3-dichloropropene	Yes	y	--	--	--	--	Data	*	--	0.3	2.1	--	--
Ethylbenzene	Yes	n	15	0	0	0	No	*	--	160	210	--	--
Methyl Bromide	Yes	n	15	0	0	0	No	*	--	37	150	--	--
Methylene Chloride	Yes	y	15	0.1237	3.032023352	0.37834	No	*	--	4.3	59	--	--
1,1,2,2-tetrachloroethane	Yes	y	15	0.011	0	0.011	No	*	--	0.12	0.4	--	--
Tetrachloroethylene	Yes	y	16	0	0	0	No	*	--	0.24	0.33	--	--
Toluene	Yes	n	15	0.0896	3.872983346	0.30387	No	*	--	720	1500	--	--
1,1,2-trichloroethane	Yes	y	15	0	0	0	No	*	--	0.44	1.6	--	--
Trichloroethylene	Yes	y	16	0	0	0	No	*	--	1.4	3	--	--
Vinyl Chloride	Yes	y	15	0	0.6	0	No	*	--	0.023	0.24	--	--

Ashland Creek Human Health Reasonable Potential Analysis (part 2)

(prior to the Bear Creek outfall completion)

			Identify Pollutants of Concern					In-Stream Conc.		Det. Reasonable Potential			
Pollutant Parameter	Evaluation Required?	Carcinogen Status	# of Sample	Effluent Conc.	Coefficent of Variation	Est. Max Eff. Conc.	RP at end of pipe?	Ambient Conc.	Max Total Conc. @ RMZ	WQ Crit: Water + Fish	WQ Crit: Fish	Is there Reasonable Potential to Exceed? (Yes/No)	
	(Yes/No)	(Yes/No)		(µg/l)	Default=0.6	(µg/l)	(Yes/No)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	Water + Fish	Fish
Table 2: Acid-extractable compounds													
2-chlorophenol	Yes	n	15	0	0	0	No	*	--	14	15	--	--
2,4-dichlorophenol	Yes	n	15	0.584	2.41431882	1.61402	No	*	--	23	29	--	--
2,4-dimethylphenol	Yes	n	15	0	0	0	No	*	--	76	85	--	--
4,6-dinitro-o-cresol	Yes	n	12	0	0	0	No	*	--	9.2	28	--	--
2,4-dinitrophenol	Yes	n	12	0	0	0	No	*	--	62	530	--	--
Pentachlorophenol	Yes	y	13	0	0	0	No	0	0	0.15	0.3	NO	NO
Phenol	Yes	n	14	0	0	0	No	*	--	9400	86000	--	--
2,4,5-trichlorophenol	Yes	n	15	0	0	0	No	*	--	330	360	--	--
2,4,6-trichlorophenol	Yes	y	14	0	0	0	No	*	--	0.23	0.24	--	--
Table 2: Base-neutral compounds													
Acenaphthene	Yes	n	14	0	0	0	No	*	--	95	99	--	--
Anthracene	Yes	n	15	0	0	0	No	*	--	2900	4000	--	--
Benzidine	Yes	y	11	0	0	0	No	*	--	1.8E-05	0.00002	--	--
Benzo(a)anthracene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Benzo(a)pyrene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Benzo(b)fluoranthene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Benzo(k)fluoranthene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Bis(2-chloroethyl)ether	Yes	y	15	0	0	0	No	*	--	0.02	0.053	--	--
Bis(2-chloroisopropyl)ether	Yes	n	2	0	0	0	No	*	--	1200	6500	--	--
Chloromethyl Ether, bis	Yes	y	--	--	--	--	Data	*	--	2.4E-05	0.000029	--	--
Bis (2-ethylhexyl)phthalate	Yes	y	14	0.291	2.382	0.847	NA	*	--	0.2	0.22	--	--
Butylbenzyl phthalate	Yes	n	15	0.382	3.873	1.296	No	*	--	190	190	--	--
2-chloronaphthalene	Yes	n	13	0	0	0	No	*	--	150	160	--	--
Chrysene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Di-n-butyl phthalate	Yes	n	15	0	0	0	No	*	--	400	450	--	--
Dibenzo(a,h)anthracene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
3,3-Dichlorobenzidine	Yes	y	14	0	0	0	No	*	--	0.0027	0.0028	--	--
Diethyl phthalate	Yes	n	15	0	0	0	No	*	--	3800	4400	--	--
Dimethyl phthalate	Yes	n	15	0	0	0	No	*	--	84000	110000	--	--
2,4-dinitrotoluene	Yes	y	15	0	0	0	No	*	--	0.084	0.34	--	--
1,2-diphenylhydrazine	Yes	y	--	--	--	--	Data	*	--	0.014	0.02	--	--
Fluoranthene	Yes	n	15	0	0	0	No	*	--	14	14	--	--
Fluorene	Yes	n	14	0	0	0	No	*	--	390	530	--	--
Hexachlorobenzene	Yes	n	15	0	0	0	No	*	--	2.9E-05	0.000029	--	--
Hexachlorobutadiene	Yes	y	15	0	0	0	No	*	--	0.36	1.8	--	--
Hexachlorocyclopentadiene	Yes	n	15	0	0	0	No	*	--	30	110	--	--
Hexachloroethane	Yes	y	14	0	0	0	No	*	--	0.29	0.33	--	--
Indeno(1,2,3-cd)pyrene	Yes	y	15	0	0	0	No	*	--	0.0013	0.0018	--	--
Isophorone	Yes	n	15	0	0	0	No	*	--	27	96	--	--
Nitrobenzene	Yes	n	15	0	0	0	No	*	--	14	69	--	--
N-nitrosodimethylamine	Yes	y	15	0	0	0	No	*	--	0.00068	0.3	--	--
N-nitrosodi-n-propylamine	Yes	y	15	0	0	0	No	*	--	0.0046	0.051	--	--
N-nitrosodiphenylamine	Yes	y	14	0	0	0	No	*	--	0.55	0.6	--	--
Pentachlorobenzene	Yes	n	14	0	0	0	No	*	--	0.15	0.15	--	--
Pyrene	Yes	n	14	0	0	0	No	*	--	290	400	--	--
1,2,4-trichlorobenzene	Yes	n	30	0.157	5.477225575	0.2918	No	*	--	6.4	7	--	--
Tetrachlorobenzene,1,2,4,5	Yes	n	14	0	0	0	No	*	--	0.11	0.11	--	--
Table 3: Pesticides and PCBs													
Aldrin	Yes	y	15	0	0	0	No	*	--	5E-06	0.000005	--	--
BHC-Technical	No	y	--	--	--	--	--	*	--	0.0014	0.0015	--	--
BHC-alpha	Yes	y	15	0	0	0	No	*	--	0.00045	0.00049	--	--
BHC-beta	Yes	y	15	0	0	0	No	*	--	0.0016	0.0017	--	--
BHC-gamma (Lindane)	Yes	n	15	0	0	0	No	*	--	0.17	0.18	--	--
Chlordane	Yes	y	15	0	0	0	No	*	--	8.1E-05	0.000081	--	--
DDD 4,4'	Yes	y	15	0	0	0	No	*	--	3.1E-05	0.000031	--	--
DDE 4,4'	Yes	y	15	0	0	0	No	*	--	2.2E-05	0.000022	--	--
DDT 4,4'	Yes	y	15	0	0	0	No	*	--	2.2E-05	0.000022	--	--
Dieldrin	Yes	y	15	0	0	0	No	*	--	5.3E-06	0.0000054	--	--
Endosulfan alpha	Yes	n	15	0	0	0	No	*	--	8.5	8.9	--	--
Endosulfan beta	Yes	n	15	0	0	0	No	*	--	8.5	8.9	--	--
Endosulfan Sulfate	Yes	n	15	0	0	0	No	*	--	8.5	8.9	--	--
Endrin	Yes	n	15	0	0	0	No	*	--	0.024	0.024	--	--
Endrin Aldehyde	Yes	n	15	0	0	0	No	*	--	0.03	0.03	--	--
Heptachlor	Yes	y	15	0	0	0	No	*	--	7.9E-06	0.0000079	--	--
Heptachlor Epoxide	Yes	y	15	0	0	0	No	*	--	3.9E-06	0.0000039	--	--
Methoxychlor	Yes	n	15	0	0	0	No	*	--	100	na	--	--
Toxaphene	Yes	y	15	0	0	0	No	*	--	2.8E-05	0.000028	--	--

CITY OF ASHLAND

Water Quality Trading Plan

Developed with assistance from The Freshwater Trust
for compliance with NPDES Permit No. 101609

TABLE OF CONTENTS

CITY OF ASHLAND
WATER QUALITY TRADING PLAN

INTRODUCTION

The City of Ashland intends to pursue water quality trading (WQT) as a strategy for satisfying the thermal discharge limits in the City's Clean Water Act (CWA) NPDES permit. According to U.S. Environmental Protection Agency (EPA) and Oregon Department of Environmental Quality (DEQ) policies and regulations, Ashland is eligible to trade as a NPDES permit holder.[1] As described in the following section, Ashland's temperature trade is eligible.[2] The Bear Creek watershed is water quality limited for temperature issues related to the salmonid life cycle,[3] and so is an eligible waterbody where trading may occur. As described in the following sections of this Trading Plan, the BMP Ashland will implement for credit generation is quantifiable and has sufficient BMP quality standards.[4] Therefore, the City of Ashland is eligible to engage in water quality trading in conformance with Oregon's regulations as further detailed in this Trading Plan. A summary on the regulatory framework supporting trading in Oregon is provides additional context in Exhibit A.

The following subsections describe how this Trading Plan aligns with each of the required components of a trading plan, as described in OAR 340-039-0025(5). To better assist in explaining how these components fit together, this Trading Plan describes some of the -0025(5) requirements out of order.

OAR 340-039-0025(5)(A): TEMPERATURE TRADING

Pursuant to the trading rule, a trading plan must identify "the parameter for which water quality trading is proposed." The trading rule authorizes trading for temperature.[5] This Trading Plan is designed to help Ashland meet its temperature reduction obligation.

OAR 340-039-0025(5)(C): TRADING AREA

Pursuant to the trading rule, a trading plan must include a "description of the trading area including identification of the location of the discharge to be offset, its downstream point of impact, if applicable, where trading projects are expected to be implemented, and the relationship of the trading projects to beneficial uses in the trading area." According to the 2003 EPA Trading Policy, trades should occur within the same watershed or area covered by a TMDL to ensure that the benefits of trades affect the same waterbody where the discharge is occurring.[6] A trading area must encompass "a watershed or other hydrologically-connected geographic area, as defined within a water quality management plan adopted for a TMDL, trading framework or trading plan. A trading area must encompass the location of the discharge to be offset, or its downstream point of impact, if applicable, and the trading project to be implemented."[7] Trading areas must also be consistent with TMDL water quality management plans (WQMP), where they exist, and may be established in water quality trading frameworks.[8]

In summary, Oregon rules require that a trading area: 1) identify the location of discharge to be offset, 2) identify a downstream point of impact (if applicable), and 3) describe the relationship between trading projects

---

[1] OR. ADMIN. RULES 340-039-0015(1).
[2] OR. ADMIN. RULES 340-039-0015(2).
[3] Or. Dep't of Envtl. Quality, Integrated Report (2018/2020), www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx.
[4] *See* sections in this Trading Plan on OAR 340-039-0025(5)(d), (f).
[5] OR. ADMIN. RULES 340-039-0015(2)(a).
[6] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1610 (Jan. 13, 2003), *available at* https://www.gpo.gov/fdsys/pkg/FR-2003-01-13/html/03-620.htm; OAR 340-039-0040(1).
[7] OR. ADMIN. RULES 340-039-0005(5).
[8] OR. ADMIN. RULES 340-039-0035(2) (trading areas must be consistent with any applicable TMDL water quality management plan).

and beneficial uses. In addition, the trading area 4) must encompass a watershed or other hydrologically-connected geographic area, as defined within a water quality management plan adopted for a TMDL, trading framework or trading plan, and 5) must also be consistent with TMDL water quality management plans (WQMP), where they exist. Consistent with these requirements, Ashland's trading area focuses on the upper Bear Creek watershed, above Bear Creek river mile 4. A map of the trading area is included in this Trading Plan as Exhibit B.

Ashland's trading area encompasses Ashland's discharge and the point of maximum impact identified by DEQ in the Bear Creek temperature TMDL.[9] The trading area also has a strong relationship between trading projects and beneficial uses in the watershed. Because the Bear Creek watershed is listed for temperature impairments related to cold-water species life stages,[10] riparian revegetation trading projects will be directly linked to improving conditions for temperature-based beneficial uses. The trading area covers the watershed/ hydrologically connected area covered by the current Oregon temperature TMDL for the Bear Creek subbasin. This trading area is also consistent with the Bear Creek TMDL water quality management plan (WQMP): the Bear Creek TMDL WQMP[11] speaks to better management of riparian areas, as well as habitat improvement for salmonids—both of which are affirmatively addressed in this Trading Plan. Additionally, a focus on the upper Bear Creek watershed will help Ashland pursue more projects closer to city limits.

OAR 340-039-0025(5)(D): BMPS

Pursuant to the trading rule, a trading plan must include a "description of the water quality benefits that will be generated, the BMPs that will be used to generate water quality benefits, and applicable BMP quality standards." A BMP is defined as "in-water or land-based conservation, enhancement or restoration actions that will reduce pollutant loading or create other water quality benefits. BMPs include, but are not limited to, structural and nonstructural controls and practices and flow augmentation."[12] A BMP quality standard must include "specifications for the design, implementation, maintenance and performance tracking of a particular BMP that ensure the estimated water quality benefits of a trading project are achieved, and that allow for verification that the BMP is performing as described in an approved trading plan."[13]

The BMP that will be used to generate water quality benefits under this Trading Plan is riparian restoration in the Bear Creek watershed trading area. Riparian restoration will block thermal loading into the Bear Creek watershed (see next subsection on Credits for more detail on the calculation methodology). The BMP quality standard for riparian restoration projects include the following components:

- Sites will be designed, implemented, monitored, verified and tracked consistent with Willamette Partnership February 16, 2016 Performance Standards for Riparian Revegetation (Exhibit C of this Trading Plan).[14] Sites will be legally protected for the duration of the credit project life (e.g., private leases, or appropriate encumbrances if on publicly owned land).
- In accordance with maintenance plans developed at the outset of credit projects, sites will be visited regularly for maintenance, especially in early "establishment" years. During site establishment,

[9] Or. Dep't of Envtl. Quality, Bear Creek Watershed TMDL, Section II: temperature, at 45, fig. 11 and 12 (2007).
[10] The proposed outfall location in Bear Creek is designated for year-round salmon and trout migration and rearing use per OAR 340-041-0028(4)(c), Figure 271A, and are designated for spawning use during October 15 – May 15 per OAR 340-041-0028(4)(a), Figure 271B.
[11] OR. ADMIN. RULES 340-039-0035(2) (noting that trading areas must be consistent with any applicable TMDL water quality management plan). Or. Dep't of Envtl. Quality, Bear Creek Watershed Total Maximum Daily Load, ch. II, Water Quality Management Plan (2007), *available at* www.deq.state.or.us/WQ/TMDLs/docs/roguebasin/middlerogue/bearcreek/tmdlchp2wqmp.pdf. The Bear Creek TMDL is scheduled for replacement in 2026 to update the temperature standards, which will likely also result in a replacement WQMP. Or. Dep't of Envtl. Quality, Temperature TMDL Replacement Project (2020), www.oregon.gov/deq/wq/tmdls/Pages/tmdlreplacement.aspx. This process is not likely to change the geographic area and the general management goals for Bear Creek though.
[12] OR. ADMIN. RULES 340-039-0005(1).
[13] OR. ADMIN. RULES 340-039-0005(2).
[14] Willamette Partnership, Performance Standards for Riparian Vegetation (2016), *available at* http://willamettepartnership.org/wp-content/uploads/2014/06/Performance-Stds-for-Rip-Reveg_2016-02-16.pdf.

minimum maintenance on most sites will usually include one spring ring spray, one summer mow or cut and one fall spot spray. At some sites, irrigation supported by water rights may be an appropriate option during the first several years. Inter-planting may also be needed. Once a site has become established, maintenance activities will continue, but will likely occur at less frequent intervals.

Details on the performance tracking and verification aspects of the BMP quality standards are described below in the subsections corresponding with OAR 340-039-0025(5)(G) verification, and (H) tracking/reporting.

OAR 340-039-0025(5)(F): CREDITS

Pursuant to the trading rule, a trading plan must include a "description of the credits needed to meet water quality-based requirements of an NPDES permit or 401 water quality certification, including: (A) Quantity and timing: The number of credits needed and any credit generation milestones, including a schedule for credit generation; (B) Methods used: How credits will be quantified, including the assumptions and inputs used to derive the number of credits; and (C) Duration of credits: A description of the length of time credits are expected to be used.

Quantity and Timing

The calculation of Ashland's credit need and timing is a three-step process: 1) calculate projected thermal load exceedances for each period of concern in a year and which portions of those monthly exceedances would be addressed by trading; 2) identify the maximum projected exceedance for which the trading program will be designed to offset; and 3) apply programmatic ratios.

First, Ashland identified its projected excess thermal load exceedance(s) throughout the year. A facility's thermal exceedance is equal to: (*Facility Excess Thermal Load*) – (*Excess Thermal Load Limit*), or ETL – ETLL, where:

- ***ETL*** = (Flow $_{\text{effluent (cfs)}}$) x (°C $_{\text{effluent}}$ – °C $_{\text{Temperature Criteria}}$[15]) x (Conversion Factor)
- ***ETLL*** = (Flow $_{\text{river (cfs)}}$ + Flow $_{\text{effluent (cfs)}}$) x (HUA[16]) x (Conversion Factor)

Ashland evaluated multiple potential changes to facility operations to address both near- and far-field thermal impacts and DEQ concluded that near- and far-field thermal impacts could be mitigated by a combination of the planned outfall relocation and the use of trading to offset thermal loads. Ashland's Outfall Relocation Study established the current and projected future ETLs discharged from the Ashland WWTP based on historic effluent flow and temperature and projected future effluent flows.[17] Based on Bear Creek 7Q10 flows, projected 2040 projected effluent flows, the biologically based numeric criteria, and the HUA, DEQ developed the ETLLs. With this information, Ashland calculated the ETL exceedances for different time periods throughout the year based on projected 2040 facility design flows. Table 1 illustrates the projected far-field thermal exceedances that will need to be addressed by trading. The ETL exceedances provided in Table 1 are conservative estimates based on a combination of monthly critical conditions. These values represent a combination of the 7Q10 low streamflow conditions, the maximum 7-day average daily maximum (7DADM) effluent temperature that has historically occurred each month and the 2040 projected effluent flow during that monthly period. Thus, Table 1 provides estimates of the maximum ETL exceedances that could occur on a single day of ETL reporting each month under critical conditions. This approach was previously shown to be more conservative than the application of actual

---

[15] In *Northwest Environmental Advocates v. EPA (NWEA II)*, the Oregon federal district court set aside NCC as a standard, holding that it unlawfully supplanted the BBNC in violation of 40 C.F.R. § 131.11(b)(2). Nw. Envtl. Advocates v. U.S. Envtl. Protection Agency, 855 F.Supp.2d 1199, 1217 (D. Or. 2012). Removal of the NCC from Oregon regulations leaves Oregon with the biologically based numeric criteria (BBNC) temperature standard. Therefore, the applicable BBNC temperature criteria was used to calculate Ashland's ETL.

[16] OR. ADMIN. RULES 340-041-0028(12)(b)(B). DEQ regulations allow for a human use allowance (HUA) in setting temperature permit limits, providing that insignificant additions of heat are authorized by DEQ in waters that exceed the applicable temperature criteria. This addition is known as the "human use allowance" (HUA). The calculation of a HUA differs depending on whether a TMDL exists for a waterbody. The court in *NWEA II* explicitly upheld the legality of the HUA provision. 855 F.Supp.2d at 1218, note 8.

[17] CH2M Hill, Ashland WWTP Outfall Relocation Study, Section 4, Table 4-12 (August 2017).

historic daily flow and temperature data providing additional conservatism to the estimated maximum ETL excess to address via WQT.[18]

Table 1. Projected maximum excess thermal loads (ETL) and ETL exceedances under monthly critical conditions using 2040 design flows.

Period	Biological Temperature Criteria (°C)	Excess Thermal Load Limit (million kcal/day)	Excess Thermal Load (million kcal/day)	Remaining ETL Excess to Address via WQT (ETL - ETLL)
Jan 15 – Feb 14	13	5.1	0.3	N/A
Feb 15 – Mar 14	13	5.4	17.9	12.5
Mar 15 – Apr 14	13	5.6	22.0	16.4
Apr 15 – May 14	**13**	**5.0**	**72.5**	**67.5**
May 15 – Jun 14	18	6.4	31.8	25.4
Jun 15 – Jul 14	18	6.3	56.4	50.1
Jul 15 – Aug 14	18	7.0	67.4	60.4
Aug 15 – Sep 14	18	7.7	68.2	60.5
Sep 15 – Oct 14	18	2.8	49.9	47.1
Oct 15 – Nov 14	13	2.0	63.0	61.0
Nov 15 – Dec 14	13	3.1	44.2	41.1
Dec 15 – Jan 14	13	4.4	13.6	9.2

Second, Ashland identified maximum projected exceedance for which the trading program will be designed to offset. As noted in Table 1, the largest ETL excess is projected to occur in the April 15 to May 14 period (67.5 million kcal/day). As such, this represents the exceedance that will be addressed via trading. Within the April 15 to May 14 time period, ETL excesses have historically been greatest between May 7 and May 14, with the single greatest excess occurring on May 14.[19] Ashland will therefore calculate project thermal benefits using solar radiation conditions for May 14, as discussed in the "Methods Used" section of this Plan.

Third, programmatic ratios must be applied to the maximum projected exceedance so as to identify the total credit need for that period. In this instance, 67.5 million kcal/day of need from riparian shade projects has been identified for the April 15 to May 14 period. As discussed in a later section of this Plan on "Trading Ratios," Ashland will apply a temporal lag ratio to this "base" exceedance.

Methods Used

Ashland will estimate thermal benefits[20] from riparian restoration projects using version 8 of DEQ's Shade-a-

[18] CH2M Hill, Ashland WWTP Outfall Relocation Study, Section 4, Figure 4-1 and 4-2 (August 2017).

[19] Daily ETL Limits and ETL excess were calculated with historic data collected between 2004 and 2014, including daily effluent flows, effluent temperatures, and Bear Creek flows. Calculations were performed according to methodology described in DEQ's *Temperature Water Quality Standard Implementation - A DEQ Internal Management Directive*, April 2008.

[20] The term *thermal benefit* refers to the reduction in thermal loading. In this analysis, thermal benefit is due to a reduction in incoming solar radiation that results from the implementation of a revegetation project. Thermal benefits represent the expected environmental benefits from implementing an action. The environmental benefit provided by a project serves as the foundation of a water quality credit; however, the environmental benefits are not always fully "usable" as water quality credits. That is, not all water quality benefits from an action can necessarily be claimed as offset credits to meet compliance obligations. This is because there may be uncertainty about the underperformance or failure of a restoration project, or other uncertain factors in the watershed. As a result, trading policies typically set aside a portion of a project's measured or modeled water quality benefits to account for uncertainty in the form of a ratio or discount factor. *See* National Network on Water Quality Trading, Building a Water Quality Trading Program: Options and Considerations (2015), *available at* from http://willamettepartnership.org/wp-content/uploads/2015/06/BuildingaWQTProgram-NNWQT.pdf.

lator model. Shade-a-lator is a module of the Heat Source model,[21] a stream assessment tool used by DEQ. Heat Source was developed in 1996 as a master's thesis at Oregon State University in the Departments of Bioresource Engineering and Civil Engineering. DEQ currently maintains the Heat Source methodology and software. Ashland will use an additional tool to complete the modeling: TTools. TTools is an ArcGIS extension that is also used and maintained by DEQ. TTools is used to sample geospatial data and assemble high-resolution inputs necessary to run the Heat Source model.

To determine the potential reduction in solar loading (e.g., thermal benefits) that result from riparian planting projects, Ashland will compare current site conditions[22] (the solar load that reaches the surface of the stream under current conditions) to a future conditions scenario that assumes vegetation conditions (tree height and canopy density) at maturity (described later in this subsection). The difference in the incoming solar load (expressed in kilocalories per day) between the two scenarios represents the net thermal benefits generated from a riparian revegetation project.

The modeling process for each scenario at a site will include multiple physical characteristics of the credit site, including: the upstream and downstream boundaries of the modeled stream reach, water surface area (based on the wetted width of the stream), local topography, bank slope, stream orientation, and geographic location (latitude and longitude). All parameters representing these physical characteristics of sites will be assumed to be the same in the current condition and future condition scenarios.

The future conditions scenario incorporates the vegetation conditions (tree height and canopy density) expected under the post-implementation conditions. Based on available information, Ashland will apply a future condition scenario for Shade-a-lator modeling to reflect the anticipated future vegetation conditions.[23] Planting plans are expected to include a high diversity of native trees and shrubs that will contribute to riparian ecological function and stream health. Ashland will base the vegetation parameters of the future conditions scenario on other trading planting projects in the Rogue River Basin and reference site surveys, including the riparian revegetation projects implemented for the City of Medford's water quality trading program in the Rogue River Basin. Some overstory species planted at riparian revegetation trading projects in the Rogue River watershed have included: big leaf maple (*Acer macrophyllum*), black cottonwood (*Populus trichocarpa*), ponderosa pine (*Pinus ponderosa*), and white alder (Alnus rhombifolia). Therefore, if a project includes this species mix, the future conditions Shade-a-lator parameters would use mature tree heights for these species and associated density values based on system potential vegetation for the Bear Creek watershed identified in the Bear Creek temperature TMDL modeling.[24] Depending on the species mix at a particular site, the specific Shade-a-lator parameters might be

---

[21] Boyd & Kasper, Analytical Methods for Dynamic Open Channel Heat and Mass Transfer: Methodology for the Heat Source Model Version 7.0 (2003), *available at* http://www.deq.state.or.us/wq/TMDLs/tools.htm. DEQ has posted this document on its website as a resource for generally describing the math and assumptions used in Heat Source. While the document explicitly covers Heat Source version 7 (and therefore Shade-a-lator version 7), the math and assumptions in version 7 are mostly the same as version 8, and so DEQ considers this document appropriate for summarizing both versions 7 and 8.

[22] Multiple input datasets are used to characterize the current conditions at a potential project site. Aerial photography or light detection and ranging (LiDAR) data will be used to establish current conditions and to highlight the potential riparian areas available for project implementation. This process involves digitizing the areas of interest, evaluating the current vegetation conditions, and then modeling the current, pre-project incoming thermal load. These conditions are incorporated into a modeling scenario that quantifies the incoming solar load that reaches the surface of the stream given the current vegetation conditions.

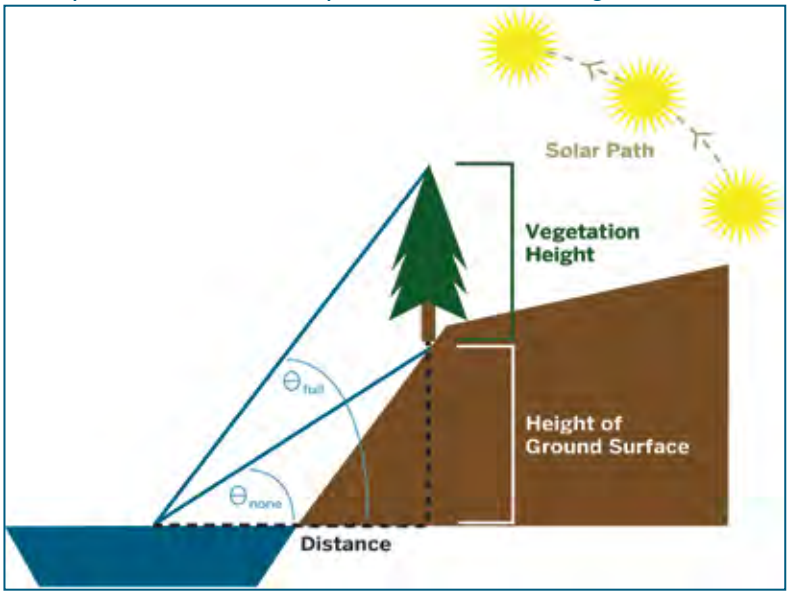
[23] The characteristics of the future conditions that are represented by the model parameters are the future vegetation height and future canopy density. In the Shade-a-lator model, the canopy density parameter represents the lateral attenuation of solar radiation as it passes through the riparian canopy.

[24] Or. Dep't of Envtl. Quality, Bear Creek Watershed TMDL, Ch. 1, 34 (2007) (discussing the relevant tree species associated with system potential vegetation). Height and density model parameters are described in Appendix A to the temperature TMDL. Or. Dep't of Envtl. Quality, Bear Creek Watershed TMDL, Appendix A: Bear Creek Watershed Temperature Assessment, at 16-18 (2007). Ashland will use a density value of 75% for the time periods within the growing season, from May 15 to October 14, to reflect a full tree canopy. This is based on an average of the shade densities for two main habitat types. *See* Or. Dep't of Envtl. Quality, Bear Creek Watershed TMDL,

different, but in all instances, those parameters will be consistent with the system potential vegetation characteristics associated with the species planted at a site.

For both scenarios, the model then calculates the sun angle every 25 meters (these calculation points are referred to as "nodes") along the center of the modeled stream reach for every model time step (once per minute). At each node, the model calculates the total load of incoming solar radiation by considering the physical characteristics surrounding the node and the characteristics of the vegetation present on the streambanks (Figure 1). The difference in the incoming solar load (expressed in kilocalories per day) between the two scenarios represents the net thermal benefits generated from a riparian revegetation project.

Figure 1: A cross-section schematic of the physical characteristics included in Shade-a-lator modeling. When the sun angle is less than Θ_{none} all incoming solar radiation is blocked by the local topography. When the sun angle is greater than Θ_{full} all incoming solar radiation reaches the surface of the stream. When the sun angle is between Θ_{none} and Θ_{full} the vegetation present attenuates a portion of the incoming solar radiation.



As Figure 1 shows, the sun angle is a key parameter in the Shade-a-lator model. As such, the time of the year also affects the sun angle and the associated incoming solar radiation that reaches the surface of the stream. The time of the year also affects the length of the day, and thus the overall total potential incoming solar radiation. Due to these two factors, the modeling time period is a key model parameter. As described above, the period with the greatest maximum ETL excess that must be addressed through riparian shade is from April 15 to May 14 (Table 1), and the historical date of greatest ETL excess during this period is May 14. Therefore, Ashland will calculate project thermal benefits using solar radiation conditions for May 14 so that the timing of a facility's potential excess thermal load aligns with the period of benefit from riparian revegetation projects.

Credit Duration

Credit duration, commonly known as credit life, refers to the "length of time credits are expected to be used."[25] This refers to the period between when a credit becomes usable as an offset and when the credit is no longer

---

Appendix D: Bear Creek Watershed Riparian Shade Assessment Report (May 2000). A reduced density value of 36% is appropriate to model winter conditions, a period when riparian shade is primarily provided by evergreen species. This figure is based on a literature review that suggested deciduous forest leaf-off canopy density is about 48% of the leaf-on canopy density. *See e.g.*, O. Fathizadeh, et al., *A Seasonal Evaluation of the Reformulated Gash Interception Model,* 409 FOREST ECOLOGY & MGMT. 601 (2018), https://doi.org/10.1016/j.foreco.2017.11.058; H. Yang, et al., *Seasonal Variations of Leaf and Canopy Properties Tracked by Ground-based NDVI Imagery,* 7 Scientific Reports 1267 (2017), www.nature.com/articles/s41598-017-01260-y.

[25] OR. ADMIN. RULES 340-039-0025(5)(f)(C).

valid. Credits are considered valid for use after the restoration action has been implemented and verified as functioning. Because Ashland's water quality trading program uses actions that take time to realize full benefits, restoration projects must be as effective and durable as alternative technology solutions. Therefore, verification and ongoing monitoring and maintenance of project sites are integral parts of the trading program's credibility. The 2003 EPA Trading Policy provides that "credits may be generated as long as the pollution controls or management practices are functioning as expected" and may be used to comply with an annual, seasonal, or monthly NPDES permit limit once they have been generated.[26] In the 2019 update to the 2003 EPA Trading Policy, EPA highlighted the need to "clarify and expand the range of policy options available for states" and encouraged policy choices that would "provide greater long term regulatory certainty."[27] Oregon rules also require that the trading plan detail how credits are quantified, taking into account the underlying assumptions and inputs used to derive the credit quantities.[28] In addition, the Oregon rule definition of a credit identifies the need to specify the period of time over which water quality benefits will be generated.[29]

This Trading Plan adopts both a minimum credit life consistent with the rules, and the appropriate start date for the credit life. In defining these key aspects of credit life, Ashland looked to Oregon precedent, as well as the 2003 and 2019 EPA trading policies. With respect to a minimum credit life, the City of Medford program uses an average 20-year credit life, protected by long-term leasehold interests in the nonpoint source properties where the restoration occurs.[30] Clean Water Services likewise uses a minimum 20-year credit life in its temperature management plan.[31] Consistent with the 2003 EPA Trading Policy and these previous program precedents in Oregon, the credits Ashland produces from riparian vegetation projects will have a minimum 20-year credit life, with the option to extend those credits beyond the minimum life for as long as the shade sites continue to function as expected. This approach is consistent with the minimum period for which these projects are expected to function,[32] the 2003 EPA Trading Policy, and EPA's 2019 recommendations for accelerating the adoption of WQT programs as a key strategy for investing in conservation.

With respect to an appropriate credit start date, because credit life defines how long credits can be "used" and Ashland did not use credits for compliance until the new permit issued, the credit life of any pre-permit projects begins on the date Ashland received its renewed NPDES permit. The minimum 20-year credit life did not start when the pre-permit project was implemented or initially certified, but rather when Ashland received the permit, and started using the credits from those sites to comply with thermal load limits in its permit. This approach is consistent with EPA's 2019 Trading Policy update, which aims to reward early adopters.[33] For

---

[26] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. at 1612.

[27] Memorandum from David Ross, EPA Assistant Administrator, Water Quality Trading Policy to Promote Market-Based Mechanisms for Improving Water Quality, at 3 (Feb. 6, 2019), *available at* www.epa.gov/sites/production/files/2019-02/documents/trading-policy-memo-2019.pdf.

[28] OR. ADMIN. RULES § 340-039-0025(5)(f)(B).

[29] OR. ADMIN. RULES § 340-039-0005(3) ("Credit: A measured or estimated unit of trade for a specific pollutant that represents the water quality benefit a water quality trading project generates at a location *over a specified period of time*, above baseline requirements and after applying trade ratios or any other adjustments.") (emphasis added).

[30] *See* Or. Dep't of Envtl. Quality, City of Medford National Pollutant Discharge Elimination System Waste Discharge Permit, No. 100985 (Dec. 13, 2011); City of Medford, Medford Regional Water Reclamation Facility Thermal Credit Trading Program Plan, at 9 (2011), *available at* http://www.deq.state.or.us/wq/trading/docs/MedfordThermalTrading.pdf.

[31] Clean Water Services, Thermal Load Management Plan, *available at* https://www.cleanwaterservices.org/media/1479/temperature-management-plan.pdf, PDF (February 28, 2005).

[32] A twenty-year credit life is likely under-representative of the lifetime and values expected from a healthy, diverse, functional riparian forest. *See* Philip Roni, et al., A Review of Stream Restoration Techniques and a Hierarchical Strategy for Prioritizing Restoration in Pacific Northwest Watersheds, 22 NORTH AMERICAN JOURNAL OF FISHERIES MGMT. 1, Tbl. 6 (2002) (noting that while it usually takes 5-20 years for riparian restoration to achieve response, the benefits of riparian replanting are expected to extend 10-50+ years, with a medium to high probability of success). Unlike most investments, the restoration investment underlying Ashland's water quality trading program appreciates over time into a self-sustaining solution, and so the site will likely continue to function beyond the 20-year credit life.

[33] Memorandum from David Ross, EPA Assistant Administrator, Water Quality Trading Policy to Promote Market-Based Mechanisms for Improving Water Quality, at 4 (Feb. 6, 2019).

projects implemented after Ashland received its permit, the project life and credit life will both start on the date of project certification.

OAR 340-039-0025(5)(B): BASELINE

Pursuant to the trading rule, a "trading plan must identify any applicable regulatory requirements from OAR 340-039-0030(1) that apply within the trading area and that must be implemented to achieve baseline requirements." Credits can only be generated from best management practices (BMPs) that result in water quality benefits above trading baseline requirements. Baseline is included within the trading rule to ensure that credits are not used to meet a regulatory obligation by more than one entity at any given time.[34] The 2003 EPA Trading Policy states that "pollutant reductions [should be] greater than those required by a regulatory requirement or established under a TMDL."[35] In developing its rule, Oregon went one step further and specifically defined "trading baseline" as the "pollutant load reductions, BMP requirements, or site conditions that must be met under regulatory requirements in place *at the time of trading project initiation*."[36] Regulatory requirements that are potentially applicable to trading projects include requirements stemming from NPDES permits, Oregon Department of Agriculture agricultural water quality management area rules, Oregon Board of Forestry rules, federal management plans or agreements between the state and a federal agency, CWA section 401 certifications, local ordinances, tribal laws or rules, compensatory mitigation projects, or any requirements derived from a TMDL by designated management agencies responsible for TMDL implementation.[37]

Therefore, when Ashland initiates a new trading project, it will assess and document whether any of the baseline requirements described in the rule affirmatively apply to the site(s), and explain how the specific baseline requirements apply (or not) to each individual site. If affirmative requirements do apply to BMP sites, baseline BMPs can be installed or deductions to site thermal benefit totals can be made to ensure that credit is not being taken for actions that otherwise are already required by these regulatory requirements. If no baseline obligations exist at the proposed trading project, the baseline obligation at these sites will be equal to current conditions. As part of credit verification, Ashland will evaluate each site to ensure that site-specific baseline requirements have been identified and considered in credit calculation. Below is an overview of how the current potential sources of baseline listed in the trading rule apply in the trading area:

ORS 340-039-0030(1)	BASELINE REQUIREMENT
(a) NPDES permit requirements	Ashland's permit does not require riparian restoration. There are no federal or state temperature technology-based effluent limits (TBELs).
(b) Rules issued by Oregon Department of Agriculture for an agricultural water quality management area under OAR chapter 603 division 095	Inland Rogue Agricultural Water Quality Management Program Rules, OAR 603-095-1400 et seq. OAR 603-095-1440(3)(a): "(a) Agricultural management of riparian areas shall not impede the development and maintenance of adequate riparian vegetation to control water pollution, provide stream channel stability, moderate solar heating, and filter nutrients and sediment from runoff. (b) This condition is not intended to prohibit riparian grazing where it can be done while managing for riparian vegetation required in OAR 603-095-1440(3)(a)." In addition, landowners must avoid excessive soil erosion (OAR 603-095-1440(2)), unnecessary returns from surface irrigation return flows (OAR 603-095-1440(4)) and discharge waste

[34] OR. ADMIN. RULES 340-039-0040(2)-(3).
[35] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. at 1610.
[36] OR. ADMIN. RULES 340-039-0005(6) (emphasis added).
[37] OR. ADMIN. RULES 340-039-0030.

ORS 340-039-0030(1)	BASELINE REQUIREMENT
	(OAR 603-095-1440(5)). If agricultural management of potential site is actively impeding the development and maintenance of adequate riparian vegetation, or associated with any of the other prohibited conditions, such management practice must stop before credit can be generated.
(c) Rules issued by Oregon Board of Forestry under OAR chapter 629 divisions 610-680	Will be applied if/when forestry-zoned sites are considered for implementation.
(d) Requirements of a federal land management plan, or an agreement between a federal agency and the state	These will be considered on a case-by-case basis, but will not apply unless recruited site is federally or state owned.
(e) Requirements established in a Clean Water Act Section 401 water quality certification	Only applies if Ashland is purchasing credits from land managed by an entity subject to a 401 certification. If such an entity is engaged as a potential seller of credits, Ashland will review the entity's 401 certification to ensure that the generated thermal benefits are not required by the certification.
(f) Local ordinances	Jackson County. Land Dev. Ord. § 8.6.4(A) (2020)[38]: existing vegetation and tree cover "will be retained" on land within 75 feet of the top of the Rogue River bank and within 50 feet of any Class 1 or 2 streams, except in certain narrowly prescribed, regulator-approved situations, including where non-native vegetation may be removed if being replaced with native vegetation. The City of Ashland's land use ordinance includes similar requirements to protect riparian areas, but does not affirmatively require restoration except when offsetting construction activities in protection zones. City of Ashland Land Use Ord. § 18.3.11 (2017).[39] Similar provisions exist in the Phoenix, Oregon Land Dev. Code § 3.7.2 (2017),[40] and the City of Talent, Oregon Municipal Code § 18.3.11 (2020).[41]
(g)Tribal laws, rules, or permits	None that Ashland is aware of as a general matter, but will confirm on site-by-site basis.
(h) Other applicable rules affecting nonpoint source requirements	None that Ashland is aware of as a general matter, but will confirm on site-by-site basis.
(i) Projects completed as part of compensatory mitigation, or projects required under a permit or approval issued pursuant to Clean Water Act section 404, or a supplemental environmental project used to settle a civil penalty	Ashland will be acting pursuant to its NPDES permit obligations, not a supplemental environmental project (SEP) or settlement. If a potential project site is already hosting a CWA 404 or SEP project, Ashland will have the burden to demonstrate the proportion of the CWA 402 trading site that is additional, and ensure the mitigation portion of the project site is excluded from the WQT credit total.

[38] This document can be found here: https://jacksoncountyor.org/ds/PDFs?EntryId=37627.
[39] This document can be found here: www.codepublishing.com/OR/Ashland/#!/LandUse/18.3.11.html#18.3.11.110.
[40] This document can be found here: www.phoenixoregon.gov/sites/default/files/fileattachments/building/planning/page/354/pldc.pdf.
[41] This document can be found here: https://talent.municipal.codes/TMC.

ORS 340-039-0030(1)	BASELINE REQUIREMENT
imposed under OAR chapter 340 division 012 or the Clean Water Act	
(j) Regulatory requirements a designated management agency establishes to comply with a DEQ-issued TMDL, water quality management plan or another water pollution control plan adopted by rule or issued by order under ORS 468B.015 or 468B.110.	INLAND ROGUE BASIN LOCAL ADVISORY COMM. & OR. DEP'T OF AGRIC., INLAND ROGUE AGRICULTURAL WATER QUALITY MANAGEMENT AREA PLAN 12 (May 2010)[42] ("Agricultural activities that eliminate the possibility of natural regeneration of trees and shrubs along waterways are not allowed. … [N]ear-stream riparian management [is limited] to seasons and practices that enhance growth of grasses, shrubs, and trees canopy….").

OAR 340-039-0025(5)(E): TRADING RATIOS

Pursuant to the trading rule, a trading plan must include a "description of applicable trading ratios, the basis for each applicable trading ratio, including underlying assumptions for the ratio, and a statement indicating whether those ratios increase or decrease the size of a credit obligation or the number of credits generated from an individual trading project." The Oregon trading rule requires the use of at least one ratio in a trading plan, and a description of the assumptions underlying the ratio decisions.[43] Trading ratios are "a numeric value used to adjust the number of credits generated from a trading project, or to adjust the number of credits that a credit user needs to obtain."[44] The 2007 EPA trading toolkit suggests that ratios may be necessary to address a number of factors such as delivery, location, equivalency, uncertainty, and retirement.[45] Oregon's water quality trading rule notes that trading ratios may be used to account for attenuation of water quality benefits, BMP uncertainties, other types of risk, time lag, priority area incentives, or credit retirements.

Depending on the BMP(s) implemented, the applicable ratio(s) will change. To date, in Oregon riparian shade restoration trading programs, DEQ has approved a 2:1 trading ratio to account for the time lag.[46] Based on the 20-year credit life associated with these projects, this ratio is meant to account for the temporal lag in thermal benefits between planting (Year 0) and when the planted trees reach full shade-producing heights (Year 20). The logic supporting this ratio is meant to track riparian vegetation growth curves. For example, a growth curve[47] for Black Cottonwood (*Populus trichocarpa*)—a native species regularly planted by riparian restoration practitioners in Oregon that has a growth pattern representative of riparian plantings in the area—shows that with average regional conditions, Black Cottonwoods have grown to 9 feet tall after just one year; 23 feet tall after five years; 43 feet tall after ten years; and 81 feet tall after twenty years.[48] So by year 10, approximately half of the

[42] This document can be found here: www.oregon.gov/ODA/shared/Documents/Publications/NaturalResources/InlandRogueAWQMAreaPlan.pdf.
[43] OR. ADMIN. RULES 340-039-0025(5)(e).
[44] OR. ADMIN. RULES 340-039-0005(10).
[45] U.S. EPA, Water Quality Trading Toolkit for Permit Writers, 30–32, EPA 833-R-07-004 (Aug. 2007, updated June 2009) ("There is not set limit for how high a trading ratio can be. Trading ratios depend on the specific circumstances in the watershed").
[46] *See* Or. Dep't of Envtl. Quality, City of Medford National pollutant Discharge Elimination System Waste Discharge Permit, No. 100985 (Dec. 13, 2011), *available at* http://www.deq.state.or.us/wq/trading/docs/MedfordNpdesPermit.pdf; Or. Dep't of Envtl. Quality, Clean Water Services National Pollutant Discharge Elimination System Watershed-based Waste Discharge Permit, Nos. 101141, 101142, 101143, 101144 and MS4 (draft Apr. 2016).
[47] Growth curves (a.k.a. site index curves) are established through observation and measurement of species growth, over time, given specific site conditions. *See* U.S. Forest Service Pacific Northwest Research Station, PNW-RN-533, Site Index Equations and Mean Annual Increment Equations for Pacific Northwest Research Station Forest Inventory and Analysis Inventories, 1985-2001 (2002).
[48] E.B. Peterson et al., B.C. Ministry of Forests, Black Cottonwood and Balsam Poplar Managers' Handbook for British Columbia, Forestry Canada, at 46 (1996), *available at* http://www.for.gov.bc.ca/hfd/pubs/docs/Frr/Frr250.htm.

anticipated future thermal benefits will have been achieved at the site, which supports use of a 2:1 ratio. The mix of species and height classes at a particular site makes identification of an exact ratio difficult, and so the 2:1 ratio attempts to generally convert overall growth trends and timelines into an administrative mechanism.

Ashland will use the typical 2:1 trading ratio to account for time lag for all projects implemented after the new NPDES permit is issued. For those project sites implemented prior to the issuance of the permit, a trading ratio of 1.9:1 will apply.49 These trading ratios are justified because many of Ashland's potential project sites are on narrow stream reaches, meaning that a few years of successful growth could result in meaningful shade production much earlier than on wider streams. Moreover, DEQ's 2016 WQT Internal Management Directive contemplates potential ratio reductions associated with taking early action: "[L]ower ratios are appropriate if the permittee is implementing BMPs well in advance of the anticipated compliance obligation or if water quality benefit is delivered in advance of when the credit is needed."[50] This approach also aligns with EPA's 2019 update to its trading policy, which "encourages early adoption of pollutant reduction practices … [to] broaden and strengthen the marketplace for buyers and sellers, resulting in larger scale resource improvements over time."[51]

OAR 340-039-0025(5)(G): MONITORING

Pursuant to the trading rule, a trading plan must include a "description of the following: (A) Proposed methods and frequency of trading project BMP monitoring; and (B) Proposed methods and frequency of how water quality benefits generated by a trading project will be monitored." In addition, an entity that engages in trading must submit an annual report that includes all of the elements described in OAR 340-039-0017(3).

Ashland will submit an annual report that includes all of the elements described in OAR 340-039-0017(3). In addition to submitting that annual monitoring report, Ashland's monitoring schedule is consistent with the Willamette Partnership's February 16, 2016 Performance Standards for Riparian Revegetation (Exhibit C of this Trading Plan).[52] Consistent with that protocol, a specific combination of the following three types of monitoring approaches will be applied throughout the life of each riparian restoration project to ensure that the project continues to function as expected as it relates to the performance metrics identified in the document:

> **Quantitative monitoring**: project developer implements vegetation monitoring protocol by sampling random plots on site; implements repeat photo monitoring at full set of on-the-ground camera points; reports on full suite of performance standards.
>
> **Qualitative monitoring**: on-site, rapid, but standardized, qualitative review of site condition and progress toward performance metrics accompanied by subset of repeat photos from on-the-ground camera points used in quantitative years. The same set of camera points will be repeated in all qualitative monitoring years.
>
> **Remote monitoring**: remote sensing information to provide visual evidence that site still exists; e.g., a current year aerial image or LiDAR taken during growing season to document site persistence.

To remain consistent with Willamette Partnership approaches, Ashland will monitor sites according to the schedule in Table 3:

---

[49] Pre-permit project sites will still have to comply with all requirements in the permit and this Trading Plan.
[50] Or. Dep't of Envtl. Quality, Water Quality Trading Internal Management Directive, at 20 (updated Mar. 31, 2016), *available at* http://www.deq.state.or.us/wq/pubs/imds/WQTradingIMD.pdf.
[51] Memorandum from David Ross, EPA Assistant Administrator, Water Quality Trading Policy to Promote Market-Based Mechanisms for Improving Water Quality, at 4 (Feb. 6, 2019).
[52] Willamette Partnership, Performance Standards for Riparian Vegetation (2016), *available at* http://willamettepartnership.org/wp-content/uploads/2014/06/Performance-Stds-for-Rip-Reveg_2016-02-16.pdf.

Table 3. Dispersal of monitoring and reporting approaches over the life of a project.

1 Site: Monitoring Approach	Completed Growing Seasons After Planting and Initial Verification										
	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Quantitative Monitoring	ü	ü		ü		ü					ü
Qualitative Monitoring			ü		ü		ü		ü		
Remote Monitoring[53]								ü		ü	
Continued	**Completed Growing Seasons After Planting and Initial Verification**										
	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	
Quantitative Monitoring					ü					ü	
Qualitative Monitoring		ü					ü				
Remote Monitoring	ü		ü	ü		ü		ü	ü		

In addition to this standard site monitoring, if projects are damaged by causes beyond the reasonable control of the City (e.g., wildlife, flood, vandalism), Ashland will report that damage to DEQ consistent with the terms of its permit. Ashland will report such incidents to DEQ within 90 days of learning of the damage, and the report will include: 1) a description of the event, including an assessment of the damage; 2) a plan for addressing the damage (natural restoration and/or active replanting of the site is allowed if continued maintenance of the site is expected to provide a reasonable potential for the long term restoration of the shading function of the site in an ecologically appropriate manner; replacement with an alternative site or sites may also be pursued); and 3) a schedule for implementing the remediation plan. Damage to a project due a cause beyond the reasonable control of the City will not in and of itself constitute a violation of its permit, the credits from damaged project sites will remain valid so long as Ashland demonstrates to DEQ that the sites will be restored or alternative solutions will be implemented within a reasonable timeframe. This approach is consistent with the approach outlined in the City of Medford's permit.[54]

OAR 340-039-0025(5)(H): TRADING PLAN PERFORMANCE VERIFICATION

Pursuant to the trading rule, a trading plan must include a "description of how the entity will verify and document for each trading project that BMPs are conforming to applicable quality standards and credits are generated as planned."

The Oregon trading rules require that an entity using trading verify and document that BMPs conform to quality standards, and that the credits are tracked and made available for the public.[55] To be consistent with the Oregon

[53] In the event that remote information is not available for a monitoring year designated for remote monitoring, the qualitative monitoring approach can instead be used for that year. If this occurs, a later year designated as qualitative monitoring may be monitored remotely so long as that change does not result in more than two consecutive years of only remote monitoring.

[54] Or. Dep't of Envtl. Quality, City of Medford National Pollutant Discharge Elimination System Waste Discharge Permit, No. 100985, Schedule D(7)(b)(v) (Dec. 13, 2011).

[55] "Credits may be used for compliance with NPDES permit requirements … once implementation of BMPs has been verified as consistent with applicable BMP quality standards according to OR. ADMIN. RULES 340-039-0025(5)(h)." OR. ADMIN. RULES 340-039-0040(5)."

water quality trading rule, Ashland's verification approach conforms to the Willamette Partnership's standards for verification.[56]

Specifically, after a site has been implemented, a third-party verifier will conduct a full verification review, including administrative review of the site's eligibility, technical review of credit calculation, and confirmation via a site visit that a project has been implemented consistent with the BMP quality standards included in this trading plan. Until a site is "established" (around project Year 5), verifiers will review monitoring reports and attest that the site does not appear at risk of failure. At later milestones in the project (specifically Years 5, 10 and 15), a third-party verifier will confirm that the site is continuing to mature and develop on a trajectory that is materially consistent with the as built site and quality standards. In the years between these milestone verifications, verifiers will continue to review annual monitoring reports and provide attestation that the site does not appear at risk of failure. At the close of a project's full life, a third-party verifier will conduct a final verification, including a review of originally estimated credit calculation versus a final credit calculation, a comparison of predicted Year 20 site conditions versus actual Year 20 site conditions, and an on-site visit to confirm that Year 20 quality standards have been met.

OAR 340-039-0025(5)(I): TRACKING AND REPORTING

Pursuant to the trading rule, a trading plan must include a "description of how credit generation, acquisition and usage will be tracked and how this information will be made available to the public."

Transparency is critical to a credible trading program. For programs that involve restoration actions that last decades, a single location that serves as a clearinghouse for site-specific information—including project design documents, annual photo points, monitoring reports, and project performance information—is useful for both DEQ and external members of the public. Ashland will ensure that: 1) individual thermal benefits and transactions are accounted for and can be tracked, 2) program implementation progress can be tracked, and 3) sufficient information is provided related to individual project site trajectory (i.e., annual monitoring reports). Therefore, in addition to completing monitoring (as described above), submitting annual compliance reports and completing performance verification, Ashland will post credit information on a publicly accessible website, registry, or tracking tool in order to disclose project site- and program-level content and project successes. Ashland plans to utilize a third-party environmental credit registry to make this information publicly available.[57]

Credit information will also be reported to DEQ in Ashland's monthly Discharge Monitoring Reports (DMRs). All verified credits at the time of a DMR submission will be reported. Once Ashland has secured all necessary credits, that total amount of verified credits will be reported in DMRs for all subsequent months. DMRs are available for viewing on DEQ's website and provide another vehicle for reporting credit acquisition and usage to the public.

OAR 340-039-0025(6): ADAPTIVE MANAGEMENT

Pursuant to the trading rule, a trading plan must include a "description of how monitoring and other information may be used over time to adjust trading projects and under what circumstances." Significant program

[56] Willamette Partnership, Ecosystem Credit Accounting System Third Party Verification Protocol Version 1.0 (2009), *available at* http://willamettepartnership.org/publications/.

[57] Ashland will likely use MarkIt, an environmental credit registry, which is popular among environmental credit programs. The Electric Power Research Institute (EPRI) tracks the Ohio River Basin Nutrient Trading Program through Markit, as do the City of Medford and Port of St. Helens with their temperature compliance programs managed by The Freshwater Trust. Similarly, the MWMC uses Markit to register its SRF pilot program sites in order to track and report on progress toward achieving program goals, as well as to confirm that projects are in place and meeting quality standards for implementation.

amendments may require public review and comment, but other small changes will fall under the scope of adaptive management.[58]

Ashland recognizes the importance of long-term maintenance and monitoring of projects in order to ensure overall trading program, specific project success and ecological improvement in program areas. The three-tiered monitoring approach described above will allow for programmatic tracking and evaluation of progress toward thermal benefit needs. The multi-decadal timeframe of the anticipated trading program necessitates the ability to adapt implementation, maintenance, monitoring, and performance tracking practices to reflect new knowledge, technology, and information as it emerges. As technologies, BMP implementation, and monitoring practices evolve, it is expected that more efficient approaches or better knowledge about sources and methods to achieve program goals will also develop.

To adapt and improve the program over time, Ashland will conform to a five-year adaptive management cycle. A five-year review cycle provides a regular opportunity to review available data from the previous years of implementation, maintenance, and monitoring, and to incorporate new technologies and lessons learned through previous implementation cycles into BMP quality standards and guidelines, as well as monitoring, maintenance, and performance tracking protocols. Periodic review also affords transparency and quality control. A review period of five years allows enough time to properly evaluate: 1) progress toward overall programmatic goals, as well as 2) the effectiveness of maintenance approaches and monitoring protocols. Data on restoration projects, while limited, also suggests that there is the potential for substantial time lag in measuring the ecological effectiveness of watershed restoration, and so a five-year window provides more flexibility to appropriately collect and analyze these data.

OAR 340-039-0040(4): FINANCIAL ADDITIONALITY

Ashland received a Clean Water State Revolving Fund (SRF) Sponsorship Loan from DEQ in 2013. As stated in its application, Ashland intended to use a portion of the SRF funds to implement riparian shade projects to help it comply with its expected thermal load limits. Ashland's intent to use SRF funds to reimburse expenses associated with implementing, stewarding and monitoring temperature credit projects is relevant in two ways: financial additionality,[59] and project reimbursement eligibility.

Many trading programs, including Oregon's, include restrictions meant to ensure that the environmental benefit secured through the sale of a credit is in addition to what would have occurred without it. The Oregon rule specifically states that "credits generated under an approved trading plan may not include water quality benefits obtained with public conservation funds."[60] Therefore, the type of money used to purchase or develop credits

[58] In the City of Medford permit, DEQ notes that "significant amendments include changes in trading ratio, types of trades or trading metrics (for example, addition of an activity to a riparian shade restoration program that provides cooling or prevents heating but is not measured using a shading metric), or changes to trading parameters (for example, addition of nutrients to a thermal load credit program)." DEQ notes that "DEQ approval and public review is not required for trading agreements, specific project sites, or minor amendments to the program provided they are consistent with the overall direction and objectives of the permittee's DEQ-approved credit trading program." Or. Dep't of Envtl. Quality, City of Medford National Pollutant Discharge Elimination System Waste Discharge Permit, No. 100985, Schedule D(7)(a)(i)-(ii) (Dec. 13, 2011).

[59] To be additional, thermal benefits used to meet Ashland's thermal load exceedance should be generated from BMPs funded by and implemented by, or on behalf of, Ashland. BMPs that are currently funded by another source of "public conservation funds" are not considered financially "additional" because they are already occurring. Because these actions would have occurred in the absence of an Ashland trading program, Ashland could not track any of these benefits to count as offsets against its thermal load exceedance. Federal, state or local cost-share funds (e.g., "public conservation funds") may be used to supplement BMPs that are being funded by Ashland or to help meet baseline obligations. However, public conservation funds cannot be used to generate thermal benefits that would count toward meeting Ashland's ETL excess. In the event that other public conservation funds are used to supplement a thermal benefit-generating restoration project, it is Ashland's responsibility to demonstrate that none of those public conservation funds are used to generate thermal benefits used by the City for compliance.

[60] OR. ADMIN. RULES 340-039-0040(4).

does matter. The Oregon rule explicitly defines SRF loan funds as not being "public conservation funds"[61], meaning that trading projects funded by Ashland with these funds do not run the risk of violating Oregon's financial additionality obligations.[62]

[61] OR. ADMIN. RULES 340-039-0005(4) ("Public Conservation Funds: Public funds that are targeted to support voluntary natural resource protection or restoration. Examples of public conservation funds include United States Department of Agriculture (USDA) cost share programs, United States Environmental Protection Agency (EPA) section 319 grant funds, United States Fish and Wildlife Service Partners for Fish and Wildlife Program funds, State Wildlife Grants, and Oregon Watershed Enhancement Board restoration grants. Public funds that are not considered public conservation funds include: public loans intended to be used for water quality infrastructure projects, such as Clean Water State Revolving Funds, USDA Rural Development funds, and utility sewer storm water and surface water management fees.") (emphasis added).

[62] EPA regulations are silent on this issue. However, the 2014 statutory amendments to the Clean Water SRF program suggested a strong inclination toward green infrastructure. Relevant to green infrastructure investment under the SRF program, the 2014 Water Resources Reform and Development Act (2014 WRRDA), Pub. L. No. 113-121, 128 Stat. 1193 (2014), expanded the list of eligible projects, requires utility recipients of SRF loans to certify that the utility "has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation …" and updated the SRF definitions to incorporate by reference the definition of "treatment works" to include the acquisition of land "that will be an integral part of the treatment process" and for construction.

EXHIBIT A

REGULATORY BACKGROUND SUPPORTING TRADING IN OREGON

Over the last fifteen years, Oregon has led other states in utilizing innovative methods such as water quality trading to comply with the Clean Water Act (CWA). In 2001, the Oregon Legislature directed the Oregon Department of Environmental Quality (DEQ) to develop a water quality trading program in the Willamette River.[63] In 2003, the U.S. Environmental Protection Agency (EPA) also published its water quality trading policy (2003 EPA Trading Policy), which describes how point and nonpoint sources can participate in market-based approaches to meet water quality standards at a reduced cost. This policy supports water quality trading as a flexible approach to achieving water quality and environmental benefits that would otherwise not be attained under traditional regulatory approaches. The 2003 EPA Trading Policy explicitly endorsed trading for nutrients and sediment loads, and noted that other constituents can likely be traded if the trades have "the potential to improve water quality and achieve ancillary environmental benefits."[64]

Following the 2003 EPA Trading Policy, in 2004, DEQ issued a permit to Clean Water Services (CWS) that allowed for trading of thermal credits generated from riparian shade projects to assist two publicly owned treatment works (POTWs) in achieving NPDES permit compliance, and that allowed for the POTWs to generate thermal credits by releasing cold water from an upstream reservoir in order to satisfy the permittee's thermal obligation. Based on this applied experience, in 2007 and again in 2009, DEQ developed an Internal Management Directive (IMD) meant to help agency staff structure trades in NPDES permits. This expanded guidance coincided with additional guidance from EPA, including a 2007 toolkit for permit writers. In 2011, DEQ issued a permit to the City of Medford that allows for thermal trading between Medford's POTW and nonpoint sources that create thermal credits through riparian shade projects.

After ten years of experience with trading in the state, DEQ sought to formalize the lessons learned on trading. In 2013, EPA Region 10 joined water quality staff from Oregon, Idaho, and Washington, as well as other stakeholders, in a series of interagency workshops to study the existing water quality trading policies, practices, and programs from across the nation. The ultimate goal of this "Joint Regional Recommendations on Water Quality Trading" (JRR) undertaking was to build on lessons from other trading programs and make recommendations that would ensure future trading programs had "the quality, credibility, and transparency necessary to be consistent with the Clean Water Act." The end result of this endeavor was a non-binding recommendations document meant to help foster the efficient and consistent development of robust trading programs in the region.[65] This effort was then taken to the national level through the "National Network on Water Quality Trading", which ultimately produced an "Options and Considerations" document outlining the major items to consider when developing a trading program.[66]

Based in large part on the knowledge gained from these experiences, Oregon began crafting water quality trading regulations in 2014. In December 2015, after a year of comprehensive deliberation and stakeholder

---

[63] OR. REV. STAT. § 468B.555

[64] U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. 1608, 1610 (Jan. 13, 2003), *available at* https://www.gpo.gov/fdsys/pkg/FR-2003-01-13/html/03-620.htm.

[65] Willamette Partnership & The Freshwater Trust, Draft Regional Recommendations for the Pacific Northwest on Water Quality Trading (2014), *available at* http://willamettepartnership.org/our-stories/regional-recommendations-water-quality-trading/.

[66] National Network on Water Quality Trading, Building a Water Quality Trading Program: Options and Considerations (2015), *available at* http://willamettepartnership.org/wp-content/uploads/2015/06/BuildingaWQTProgram-NNWQT.pdf.

engagement, the Oregon Environmental Quality Commission (EQC) unanimously approved water quality trading rules (OAR 340 Division 039), which clarified the basic requirements of a viable trading program in Oregon. In March 2016, shortly after the EQC adopted the water quality trading rules, DEQ updated its IMD to complement the management directive and the changes brought about by the new rules. The following trading plan proposal for the City of Ashland is consistent with the rules and the intent of the updated 2016 water quality trading IMD.

CONSISTENCY WITH WATER QUALITY TRADING PURPOSE AND POLICY

OAR 340-039-0001: Purpose and Policy

"(1) Purpose. This rule implements ORS 468B.555 to allow entities regulated under the Clean Water Act to meet pollution control requirements through water quality trading. This rule establishes the requirements for water quality trading in Oregon. (2) Policy. The Oregon Department of Environmental Quality may approve water quality trading only if it promotes one or more of the following Environmental Quality Commission policies: (a) Achieves pollutant reductions and progress towards meeting water quality standards; (b) Reduces the cost of implementing Total Maximum Daily Loads (TMDLs); (c) Establishes incentives for voluntary pollutant reductions from point and nonpoint sources within a watershed; (d) Offsets new or increased discharges resulting from growth; (e) Secures long-term improvement in water quality; or (f) Results in demonstrable benefits to water quality or designated uses the water quality standards are intended to protect."

Ashland's water quality trading plan is consistent with several EQC policies articulated in the rule. Ashland's trading plan helps to establish voluntary incentives for nonpoint sources to reduce thermal loading within the Bear Creek watershed.[67] In addition, unlike traditional technological solutions for treatment facilities, the restoration investment underlying Ashland's water quality trading program will appreciate over time into a self-sustaining solution,[68] which helps secure long-term improvements in water quality. Moreover, in addition to creating cooler, shaded spaces in the river for fish, Ashland's trading solution will directly advantage beneficial uses in the watershed by supporting the recruitment of large wood that supports salmonid spawning, rearing and migration habitat.[69] In addition to these benefits, Ashland's trading plan is also likely to improve functional habitat for macro-invertebrate life, provide year-round shading of the waterbody (beyond the time periods when the restored ecosystem will provide shade credits), help minimize nutrient inputs, result in some floodplain restoration, and help control erosion.[70]

In addition to promoting several of the EQC policies articulated in the rule, Ashland's trading solution will likely help to foster a sustainable local economy.[71] Riparian plantings require a local workforce (excavators, operators, equipment suppliers, contractors, and maintenance and restoration professionals), plant stock and supplies are typically purchased from local nurseries, and project site leases provide an important income stream to local landowners. On average, 62 cents of every dollar spent on restoration has been shown to stay in the local rural economy, and every $1 million spent on riparian restoration creates approximately 23 jobs.[72] In addition, trading

---

[67] Ashland expects that some portion of its projects will be installed on private nonpoint source land. Ashland envisions that those landowners will be incentivized to participate in the program through financial mechanisms, including lease payments.

[68] The solution is "self-sustaining" because, for example, when a mature tree naturally falls (itself an ecosystem-benefiting event), riparian vegetation and/or another tree will naturally grow in its place, thus allowing the solution to function even in the absence of human intervention—something that is not possible for built solutions that require maintenance to function over time.

[69] Montgomery, D. R., Collins, B. D., Buffington, J. M., & Abbe, T. B. Geomorphic effects of wood in rivers, 37 Ecology and Management of Wood in World Rivers, 21–47 (2003).

[70] *See* M.D. Tomer & M.A. Locke, *The Challenge of Documenting Water Quality Benefits of Conservation Practices: A Review of USDA-ARS's Conservation Effects Assessment Project Watershed Studies*, 64 WATER SCIENCE & TECHNOLOGY 300, 303 (2011) (noting nutrient and erosion benefits of buffers); Scott W. Miller et al., *Quantifying Macroinvertebrate Responses to In-Stream Habitat Restoration: Applications of Meta-Analysis to River Restoration*, 18 RESTORATION ECOLOGY 8, 8 (2010) (noting benefits of heterogeneous riparian habitat).

[71] CITY OF ASHLAND, CLIMATE & ENERGY ACTION PLAN (Jan. 2017).

[72] Nielsen-Pincus, M., & Moseley, C. The Economic and Employment Impacts of Forest and Watershed Restoration. 21(2) Restoration Ecology, 207–214, 212 (2013).

yields energy use savings compared to technological solutions that require energy to operate—which reduces the release of airborne greenhouse gas pollutants and also aligns with Ashland's climate mitigation and adaptation goals.[73]

CONSISTENCY WITH WATER QUALITY TRADING OBJECTIVES

OAR 340-039-0003: Water Quality Trading Objectives

"Water quality trading authorized under this rule must: (1) Be consistent with anti-degradation policies; (2) Not cause or contribute to an exceedance of water quality standards; (3) Be consistent with local, state, and federal water quality laws; (4) Be designed to result in a net reduction of pollutants from participating sources in the trading area; (5) Be designed to assist the state in attaining or maintaining water quality standards; (6) Be designed to assist in implementing TMDLs when applicable; (7) Be based on transparent and practical Best Management Practices (BMPs) quality standards to ensure that water quality benefits and credits are generated as planned; and (8) Not create localized adverse impacts on water quality and existing and designated beneficial uses."

(1, 2, 4) Anti-degradation & Net Reduction in Pollutant Loading

Oregon's anti-degradation policy is found in OAR 340-041-0004. As stated in the 2016 Oregon water quality trading IMD, Oregon's anti-degradation policy generally prohibits the lowering of existing water quality.[74] In the 2003 EPA Trading Policy, EPA states that it "does not believe that trades and trading programs will result in 'lower water quality' as that term is used in 40 CFR § 131.12(a)(2) ... when the trades or trading programs achieve a no net increase of the pollutant traded and do not result in any impairment of designated uses."[75] In line with the 2003 EPA Trading Policy, the 2016 water quality trading IMD instructs DEQ staff to ensure that trades are designed to result in a net reduction of pollutants in the trading area as required in OAR 340-039-0003(4). In addition to ensuring this outcome, as described in the next subsection, it will be necessary to avoid localized impacts to designated uses.

(8) Avoidance of Localized Impacts on Fish

The cold water protection criteria in the Oregon water quality standards restricts the amount of warming above ambient conditions during spawning use periods. Because threatened salmonid species inhabit Bear Creek and the water body is designated as critical habitat, the cold water protection criteria in OAR 340-041-0028(11) apply. According to the 2008 DEQ Temperature Water Quality Standard Implementation IMD, the cold water protection criteria must be met at the location of the nearest physical spawning habitat downstream of the outfall, not at the edge of the mixing zone.[76] With the proposed relocated outfall into Bear Creek, complete mixing with the receiving stream flow is expected before the thermal plume reaches downstream spawning areas.[77]

---

[73] CITY OF ASHLAND, CLIMATE & ENERGY ACTION PLAN (Jan. 2017). In addition to reducing greenhouse gas emissions, restoration advances the City's goals of becoming carbon neutral and increasing the local ecosystem's resiliency to climate change. *See also* CITY OF ASHLAND, FINAL COMPREHENSIVE WATER MASTER PLAN (Apr. 2012).

[74] Or. Dep't of Envtl. Quality, Water Quality Trading Internal Management Directive, at 9 (updated Mar. 31, 2016), *available at* http://www.deq.state.or.us/wq/pubs/imds/WQTradingIMD.pdf.

[75] Trading IMD, at 9 (quoting U.S. EPA, Water Quality Trading Policy, 68 Fed. Reg. at 1611).

[76] Or. Dep't of Envtl. Quality, Temperature Water Quality Standard Implementation – A DEQ Internal Management Directive, § 3.8 (2008), *available at* http://www.deq.state.or.us/wq/pubs/imds/Temperature.pdf.

[77] CH2M Hill, Ashland WWTP Outfall Relocation Study, Section 4.4.3 (August 2017).

Moreover, DEQ can only approve Ashland's potential trading program[78] if Ashland's discharge does not cause thermal plume impacts on salmonids prohibited under OAR 340-041-0053(2)(d).[79] According to draft analysis completed by CH2M Hill, Ashland's discharge has the reasonable potential to violate the spawning impairment portion of the thermal plume regulations.[80] Even with the proposed outfall relocation, CH2M determined that there is a reasonable potential for Ashland's discharge to still exceed the spawning impairment thermal plume regulation at the beginning and end of spawning period under current operations.[81] As such, in order to comply with these regulations and as a prerequisite for engaging in temperature trading as part of its compliance portfolio, Ashland must address this potential projected near-field thermal exceedance through either direct effluent cooling or effluent flow diversion away from the receiving stream. Ashland has evaluated a wide range of options for meeting expected temperature limits in its next NPDES permit, including relocation of the City's WWTP outfall from Ashland Creek to Bear Creek, treatment wetlands, time-appropriate cold water reservoir releases, and effluent dispersion. Ashland intends to utilize some combination of these near-field actions to satisfy the anticipated thermal plume regulations and can then use riparian shade projects to fulfill the portion of its permit obligation remaining after completing near-field improvements.[82]

(3) Consistent with Local, State, and Federal water quality laws

The proposed trading program is consistent with Oregon's anti-degradation policy, localized impact regulations, the Bear Creek watershed temperature TMDL, baseline regulations (described in detail later in this proposal), and the Oregon trading rule. In addition, all project work will be completed in accordance with applicable local, state, tribal and federal permit requirements. When the trading plan is incorporated into Ashland's NPDES permit, the expectation is that it will be done so consistent with the Clean Water Act.

(5,6) Designed to Assist State in Attaining Water Quality Standards and Implementing a TMDL

The 2007 Bear Creek watershed temperature TMDL allocated Ashland a wasteload allocation (WLA) of 0.1°C above the applicable criteria in Ashland Creek as well as at the point of maximum impact.[83] Ashland expects its discharge to exceed its thermal WLA (as well as its thermal load limit, once it has a thermal limit in a renewed NPDES permit). Ashland plans to rely on trading, among several other solutions, to address its thermal WLA exceedance. Therefore, trading is designed to assist Oregon in implementing the Bear Creek Temperature TMDL, which outlines the informational pathway to attaining temperature water quality standards.[84]

---

[78] *See* OR. ADMIN. RULES 340-039-0003(5)-(6).

[79] "Temperature mixing zones and effluent limits authorized under 340-041-0028(12)(b) will be established to prevent or minimize the following adverse effects to salmonids inside the mixing zone: (A) Impairment of an active salmonid spawning area where spawning redds are located or likely to be located. This adverse effect is prevented or minimized by limiting potential fish exposure to temperatures of 13 degrees Celsius (55.4 Fahrenheit) or more for salmon and steelhead, and 9 degrees Celsius (48 degrees Fahrenheit) or more for bull trout; (B) Acute impairment or instantaneous lethality is prevented or minimized by limiting potential fish exposure to temperatures of 32.0 degrees Celsius (89.6 degrees Fahrenheit) or more to less than 2 seconds); (C) Thermal shock caused by a sudden increase in water temperature is prevented or minimized by limiting potential fish exposure to temperatures of 25.0 degrees Celsius (77.0 degrees Fahrenheit) or more to less than 5 percent of the cross section of 100 percent of the 7Q10 low flow of the water body; the Department may develop additional exposure timing restrictions to prevent thermal shock; and (D) Unless the ambient temperature is 21.0 degrees of greater, migration blockage is prevented or minimized by limiting potential fish exposure to temperatures of 21.0 degrees Celsius (69.8 degrees Fahrenheit) or more to less than 25 percent of the cross section of 100 percent of the 7Q10 low flow of the water body."

[80] CH2M Hill, Ashland WWTP Outfall Relocation Study, Section 4.4.3 (August 2017).

[81] CH2M Hill, Ashland WWTP Outfall Relocation Study, Section 4.4.3 (August 2017).

[82] Pre-permit shade projects will in no way violate cold water criteria or thermal plume regulations. Therefore, this regulatory cluster will not apply to the City until Ashland receives a thermal limit in its NPDES permit, and the trading plan is incorporated into its permit.

[83] Or. Dep't of Envtl. Quality, Bear Creek Watershed Total Maximum Daily Load, Section 2, Temperature TMDL, at 46 (2007).

[84] TMDLs are "primarily informational tools" that "serve as a link in an implementation chain that includes federally regulated point source controls, state or local plans for point and nonpoint source pollutant reduction, and assessment of the impact of such measures on water quality, all to the end of attaining water quality goals for the nation's waters." Pronsolino v. Nastri, 291 F.3d 1123, 1129 (9th Cir. 2002).

(7) Based on transparent and practical BMPs quality standards

The proposed BMP quality standards are described later in this proposed trading plan.

Exhibit B
City of Ashland
Water Quality Trading Area

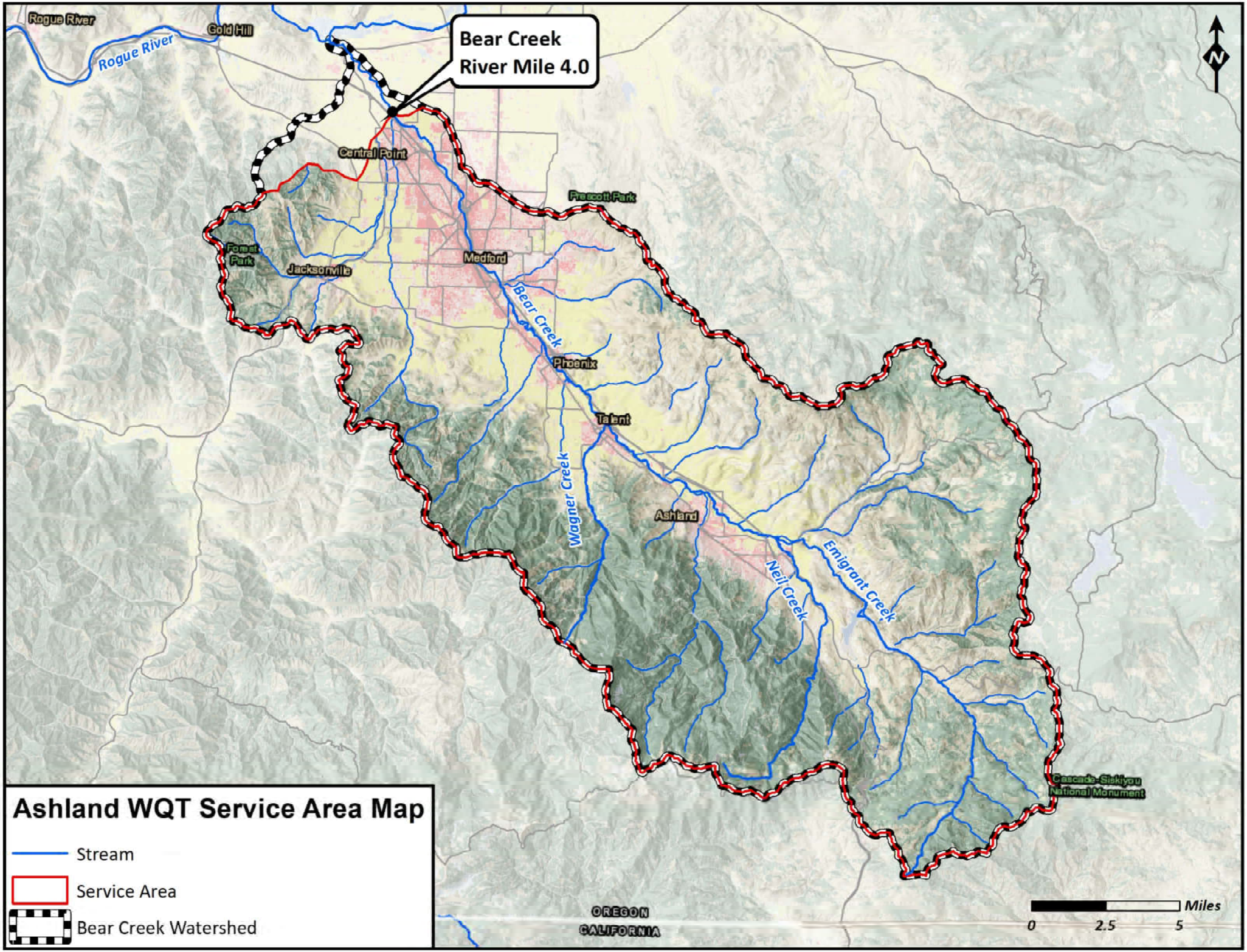

Rogue River
Gold Hill
Rogue River
Bear Creek
River Mile 4.0
Central Point
Prescott Park
Forest Park
Jacksonville
Medford
Bear Creek
Phoenix
Talent
Wagner Creek
Ashland
Neil Creek
Emigrant Creek
Cascade-Siskiyou National Monument
OREGON
CALIFORNIA
Miles
0
2.5
5
Ashland WQT Service Area Map
Stream
Service Area
Bear Creek Watershed

Exhibit C
Willamette Partnership
Performance Standards for Riparian Revegetation

WILLAMETTE PARTNERSHIP

Performance Standards for Riparian Revegetation

February 16, 2016

INTRODUCTION

The following is intended to serve as revised performance standards (Section I) and recommendations (Appendix A) for riparian restoration projects generating credits under the Willamette Partnership Ecosystem Credit Accounting System. The original standards were developed through collaboration with riparian restoration experts in the Willamette and Rogue Basins and have since been applied in those watersheds, as well as Oregon's John Day and North Coast watersheds. The standards have continued to evolve between their first application in 2011 and presently in 2016. Through that time, additional input and review was solicited from entities that operate throughout Oregon representing expertise in agricultural production, riparian restoration, and mitigation.

In 2015, Willamette Partnership engaged in robust discussions regarding how to more efficiently achieve a high level of confidence regarding riparian site condition through the use of revised performance standards. The metrics in this performance standard were selected to achieve four key criteria: 1) Science-based and credible; 2) Transparent and replicable; 3) Efficient and practical to apply; and 4) Applicable to a range of environmental conditions.

These revised performance criteria have been informed by reference site data from higher-quality riparian forests in multiple watersheds across Oregon, representing a range of ecoregions and precipitation patterns. Metric selection was also informed by experience monitoring credit-generating riparian revegetation projects in accordance with Willamette Partnership's 2011 draft riparian performance standards, review of relevant literature, and comparison to other riparian revegetation monitoring standards and programs. Documentation for the revisions incorporated herein is available upon request. Alternate criteria will be considered where supported by robust documentation of reference site conditions.

I. PERFORMANCE STANDARDS FOR RIPARIAN REVEGETATION PROJECTS GENERATING CREDITS

A. DEFINITIONS

Canopy Closure[1]: Canopy closure is an upward-looking point estimate of the coverage of a forest canopy, and may be measured in the field with a spherical densiometer (also called a mirror optometer) or by analyzing upward-looking hemispherical photographs.

Cover (or Absolute Cover)[1]:	Cover is a downward-looking measure of the percentage of the ground surface covered by living plant leaves and stems. Areas not covered by vegetation are counted as unvegetated substrate. Total cover may be greater than 100% if species are present in multiple strata (i.e., tree, shrub and herbaceous layers).
Cover (Canopy):	Absolute cover as viewed from above tree height.
Cover (Native Shrub and Vine):	Absolute cover as viewed from beneath tree height.
Hydrologic zones[2]:	Hydrozones, or hydrologic zones, are areas of relatively homogenous flood frequency, water table height, patterns of water transfer, and other hydrological characteristics, particularly those that affect plants.
Invasive Species:	A plant species should automatically be labeled as invasive if it appears on the current Oregon Department of Agriculture Noxious Weed list, plus known problem species including *Mentha pulegium* (pennyroyal) and *Elaeagnus angustifolia* (Russian Olive).
Project year:	Project year is measured as the number of completed growing seasons following initial verification, starting at 0.For example, where plantings are installed in the winter, the following fall would be considered the beginning of project year 1, because the plantings have gone through 1 spring and summer growing season.
Sampling:	Data will be collected using a standard random sampling method. Radial plots, rectangular plots, and belt transect methods are acceptable.
Shrub[3]:	A perennial woody plant that is usually multi-stemmed and normally grows to heights of 16 feet or less.
Tree[3]:	A perennial woody plant, usually with a single stem or few stems, that normally grows to a height greater than 16 feet.
Vine[3]:	A twining or climbing plant with relatively long stems. Vines may be herbaceous or woody.

B. PROJECT DESIGN

1. A project area includes the entire area, geospatially delineated, for which the Project Developer seeks shade credit. Project areas must border a river or stream with perennial flow.[4]

2. The Project Developer shall characterize reference sites to support project design.

---

[1] Jennings, Brown, and Sheil. 1999. Assessing forest canopies and understory illumination: canopy closure, canopy cover, and other measures. *Forestry*, Vol. 71, No.1, pp-59-73.

[2] Chen et al. 2010. GIS-based Spatial Hydrological Zoning for Sustainable Water Management of Irrigation Areas. International Environmental Modelling and Software Society (iEMSs) 2010 International Congress on Environmental Modelling and Software Modelling for Environment's Sake, Fifth Biennial Meeting, Ottawa, Canada.

[3] Definitions from USDA, http://plants.usda.gov/growth_habits_def.html.

[4] The ecological value of intermittent systems and their contribution toward watershed health is recognized; however, at this time, Willamette Partnership is not able to reflect the inherent ecological diversity in intermittent stream systems. Furthermore, Willamette Partnership is not aware of a method for developing reference sites for intermittent streams.

a. Reference Site Selection Requirements:
   i. Reference sites must be located within the same Fifth Field HUC (HUC5)[5] and be within 50% of the elevations of the highest and lowest anticipated project areas.[6]
   ii. As possible, reference sites should be consistent with the soils and/or substrate, hydrology, and geology of the project site.
   iii. Reference sites should support either a naturally regenerating or established appropriate vegetative community within the active riparian area of a river or stream, including the area within 75 feet of the river or stream, or otherwise to best reflect hydrozones at the site.
   iv. The reference site must extend over at least 10,000 contiguous square feet (0.23 acres) and be representative of the typical vegetation and substrate.
   v. Reference site riparian communities must support at least 5 native woody species, and trees must have an average minimum height of at least 10 feet, unless the typical mature plant community for the setting and substrate is documented otherwise.
   vi. Total cover of invasive species should not exceed 20%.
   vii. A minimum of two reference sites is required for each HUC5 in which projects are located.[7]

   The Project Developer must detail its reference site search and selection protocol, the process it went through in seeking references sites consistent with all of these criteria, and note how the best suitable sites were selected.

   If the Project Developer is unable to find a reference site consistent with all of these criteria, Willamette Partnership will approve use of alternate criteria where justified and documented.

b. Reference site data collection: The Project Developer must collect reference site data and identify site locations, as well as plots or transects where applicable, using GPS or GIS and a representative photo. Data from each survey must be maintained and made available upon request, and summary data should be provided in the Project Design.

   Data collected must include the following information for each reference site, at a minimum:
   - GPS coordinates and datum;
   - data collection date(s);
   - collector name;
   - percent cover of native shrubs and woody vines, by species;[8] *or* stem density of native shrubs and woody vines;
   - density of trees;
   - percent canopy cover or closure;
   - percent cover invasive woody species;
   - percent cover invasive herbaceous species;
   - woody plant species list; and
   - invasive species list and relative abundances.

The *Sample Riparian Revegetation Monitoring Protocol* (Appendix A. Section 3) and an associated *Sample Monitoring Data Collection Form* (available upon request) are provided as examples illustrating appropriate protocols for collecting data on reference conditions. Willamette Partnership understands that monitoring procedures will vary to suit the needs of each project or program. Additional examples of monitoring protocols can be found in the Willamette Partnership *Stewardship and Monitoring Plan Example*, available at http://willamettepartnership.org/market-

[5] www.oregon.gov/DSL/PERMITS/docs/huc5.pdf.
[6] This range is calculated as (lowest elevation – (lowest elevation* 0.5)) through (highest elevation + (highest elevation* 0.5)).
[7] Reference sites may be used for multiple restoration projects within the same HUC5.
[8] Including at least all species with cover >5%.

tools-rules/water-quality. If a Project Developer elects to use their own protocol, it should be made available to Willamette Partnership upon request.

3. Planting
    a. **Base plantings on reference site and professional judgment:** Plantings must be based on appropriate plant community determined by local reference sites. It is understood that Project Developers will also take into account conditions and species present at a restoration site and utilize their professional judgment when developing a site-specific planting plan.

    b. **Use local plant stock if available:** Unless otherwise unavailable, the Project Developer should use only woody plant materials grown from seed, cuttings, or other plant materials collected from natural populations growing within either the WWETAC Provisional Seed Zone for Conifer and Shrub Species[9] or the EPA Level III Ecoregion[10] containing the project area(s). Seed collection at extreme elevation should be avoided.

C. Performance Standards

1. **Monitoring:** The Project Developer shall submit monitoring reports that describe site condition, management actions taken, management actions anticipated, and overall progress toward the performance criteria below on an annual basis, or as described in the General Crediting Protocol. Sample monitoring reports are available upon request.

2. **Performance Criteria:** At the end of the 5th, 10th, 15th, and 20th project year, collected data must demonstrate that the project area meets the performance criteria shown in Table 1 below.

    Alternate project performance criteria will be considered where supported by robust documentation of reference site conditions. Review and approval of alternate criteria by Willamette Partnership and appropriate experts approved by Willamette Partnership should occur prior to initial project verification.

Table 1. Performance Criteria for Riparian Plantings

<table>
<tr><th rowspan="2">Criteria</th><th colspan="4">Performance criteria</th></tr>
<tr><th>Year 5</th><th>Year 10</th><th>Year 15</th><th>Year 20</th></tr>
<tr><td rowspan="2">EITHER:
1) Mean stem density of native shrubs and woody vines[11]

OR

2) Site average for combined native shrub and woody vine cover</td><td>Meets or exceeds 1600 live native woody stems per acre</td><td>80% of the native woody stem density identified at the end of the fifth growing season</td><td>70% of the native woody stem density identified at the end of the fifth growing season</td><td>Same as performance criteria for year 15</td></tr>
<tr><td colspan="4">Site average for combined native shrub and woody vine cover ≥ 25%</td></tr>
<tr><td>% canopy closure or cover</td><td>N/A</td><td>N/A</td><td colspan="2">≥ 25%</td></tr>
</table>

[9] The USDA's Western Wildland Environmental Threat Assessment Center (WWETAC) is in Prineville, Oregon, www.fs.fed.us/wwetac/.

[10] www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm.

[11] Mean woody stem density is determined by counting all live woody stems taller than six inches (regardless of vigor) by species within reference sites. Count multi-stem species (e.g., *Symphoricarpos, Rosa*) as one stem per square foot (1' x 1').

Native trees/acre	None	(Dry ecoregions)[12] ≥ 50 trees/acre (Wet ecoregions)[13] ≥ 100 trees/acre
Number of native woody species	At least 5 native woody species present	
Invasive woody and herbaceous cover	No greater than 20% cover invasive herbaceous species No greater than 10% cover invasive woody species	
Non-native woody and herbaceous cover	Take and document actions reasonably necessary to evaluate the risk posed to project site by non-native species, where they are problematic (e.g., *Phalaris arundinacea* (Reed canary grass), *Hedera helix* (English ivy), *Ilex aquifolium* (English holly)), taking the steps necessary to control those non-native species such that their presence does not prevent the successful establishment and propagation of native ecosystem characteristics and functions. This includes monitoring and reporting % cover of such species.[14]	

[12] For the purposes of this performance standard, EPA Level III ecoregions in Oregon that are considered to be "dry": Klamath Mountains, Blue Mountains, East Cascades, Columbia Basin, Northern Basin and Range.

[13] EPA Level III ecoregions in Oregon that are considered to be "wet": West Cascades, Willamette Valley, Coast Range.

[14] In particular, this standard is intended to address *Phalaris arundinacea*. *P. arundinacea* was considered for inclusion as an invasive species; however, given its pervasiveness in western Oregon and the evolving nature of science regarding its role in riparian function, Willamette Partnership has chosen to forego development of a quantitative standard at this time with the intention to reconsider its status within the standards by 2020.

APPENDIX A. VOLUNTARY GUIDANCE AND RECOMMENDATIONS FOR RIPARIAN REVEGETATION

1. CONSIDERATIONS FOR SUCCESSFUL RIPARIAN REVEGETATION

The following recommendations are based on the experience of riparian restoration professionals from Clean Water Services in Oregon's Tualatin River basin.

A. Hydrology: Consider the frequency and duration of water inundation and groundwater influences. Divide the planting area into hydrologic zones based on elevation and flood period. Most sites include one or more of the following planting zones with respect to hydrology during the growing season: Toe (Wet) - standing or flowing water/nearly constant saturation, anaerobic soils; Bank and Overbank(Moist) - periodically saturated, anaerobic and/or aerobic soils; Transition (Dry) - infrequent inundation/saturation, if any; aerobic soils.

B. Soils and substrate: Unless soils and/or site substrate is heavily compacted, tilling and disking disturb soils and are generally unnecessary for successful revegetation and may even encourage colonization by invasive species.

C. Weeds and Site Context: Consider site preparation and future maintenance needs in light of characteristics of current vegetation. Consider the current and potential influences of areas surrounding site (e.g., the introduction of propagules of non-native species) and select boundaries and all-season access points that facilitate maintenance.

D. Plant Materials: To the extent possible, all plant seed and material should be procured from nurseries that use sustainable practices defined by organizations like Salmon Safe, Food Alliance, NRCS, etc. NRCS Plant Materials Centers[15] provide resources to guide selection of plant materials. One to two-year old bare root seedlings yield excellent results at most sites. Bare root or containerized plants may be used, but the cost of transporting and planting containerized stock is typically higher. Cuttings from native *Salix, Populus, Cornus, Spiraea, Lonicera,* and other species can effectively supplement bare root plantings. *Salix, Populus,* and *Cornus sericea* will be most appropriate on steep streambanks. Consider genetic diversity amongst cuttings, repeated cuttings from the same individuals may not provide the same benefits in terms of habitat and resilience in the plant community. Native grass and forb seed can help with erosion and weed control. Small-stature native grasses are recommended to prevent excessive competition with planted trees and shrubs for moisture and sunlight. Bare root seedlings should be protected from freezing and drying during transport and planting.

E. Planting: Planting in curved rows at regular spacing intervals can facilitate maintenance. Planting season with bare root plants typically lasts from late January to mid-March in Western Oregon. Fall and spring plantings are also possible if using containerized stock. Plan to inter-plant at approximately 25 percent of original planting numbers in project year two. When considering plantings in the zones below the ordinary high water and on point bars, take into account the geomorphic processes of the stream or river system, as plantings in this area may disrupt sediment transport processes at the site and downstream. They are also at high risk of loss from scour.

F. Plant protection: Consider potential for herbivory by beaver, nutria, deer, elk and voles. Select species and orient planting to reduce losses. In grassy areas, consider spring ring spray for vole protection and moisture conservation. Voles will not likely girdle plants unless they are under the cover of grass. In areas with beaver activity, provide sufficient food supplies (willow) near den and slide access areas to concentrate herbivory activity. Consider supplemental plant material stocking during the fall months, when beaver are most active in rebuilding structures. Some professionals choose to protect existing large trees with a min 4' welded wire (or higher if site floods).

[15] http://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/pmc/

G. Maintenance: Visit site regularly. During site establishment, minimum maintenance on most sites includes one spring ring spray, one summer mow or cut and one fall spot spray. In irrigated riparian areas, with water rights, irrigation may be an appropriate option during the first two years. The need for irrigation can usually be avoided in a typical summer with proper plant selection and placement and good grass control (e.g., moisture conservation ring spray) around plants. In some locations, a 25% inter-plant of lost plants in project year two may be more cost-effective than irrigation.

H. Woody plant density recommendations: Although woody plant stem densities vary widely among Oregon plant communities, and should be confirmed through reference site data, the recommended range for planting on Willamette Valley riparian areas is between 2,000 and 2,600 stems per acre. Sample formulae for calculating densities are as follows:

Tree stems = square footage of planting area x 0.01

Shrub stems = square footage of planting area x 0.05

These formulae are intended to be used as a guide and stem density should be modified to reflect site conditions, localized reference conditions, restoration objectives, and target plant community types. For example, these values may need to be adjusted downward for low precipitation areas, local conditions may dictate planting density, or planting density may vary within the site.

2. Sample Reference Site Data Collection Protocols

Using the *Reference Site Data Form* (available upon request), collect data using a standard sampling methodology. At a minimum, radial plots, rectangular plots, and belt transect methodologies are acceptable.

- **Radial Plots:** Plots located at random to represent the reference sites. Location of plots should not be intended to maximize or minimize any particular metric. Random plot locations may be generated using GIS or other methods. Plots that fall within a stream or pond may be moved landward in a direction perpendicular to the stream or pond edge. Plot relocations and unique conditions should be noted on the data forms.
- **Rectangular Plots:** Rectangular macroplots with the long end oriented perpendicular to the stream (and crossing all the hydrozones).
- **Belt Transects:** 1m or wider belt transects oriented perpendicular to the stream and covering the entire riparian corridor within reference sites, as described in Roegner, G.C. et al. 2008. [16]

Count all live woody stems taller than 6" (regardless of vigor). Count multi-stem species (e.g., *Symphoricarpos*, *Rosa*) as one stem per square foot (1' x 1').

Estimate cover of native woody species, non-native woody species, invasive woody species, native herbaceous species, non-native herbaceous species, invasive herbaceous species, and unvegetated substrate within reference site plots or transects to the nearest 5%. Cover is defined as absolute cover and is measured as the percentage of the ground surface covered by living plant leaves and stems when viewed from above. Areas not covered by vegetation are counted as unvegetated substrate. Cover may be greater than 100% if species are present in multiple strata (i.e., tree, shrub and herbaceous layers). Indicate 'T' for Trace for species that cover less than 5% of the plot.

Reference Site Data Summary

The Project Developer should summarize reference site plot data for each program area or basin. In cases where alternate project performance criteria are being considered, this information will help establish the minimum revegetation standards against which the project(s) will be evaluated by the Verifier at the end of the fifth growing season following planting. The following table provides an example.

[16] Roegner, G.C. et al. 2008. *Protocols for Monitoring Habitat Restoration Projects in the Lower Columbia River and Estuary. Available at*: http://www.pnl.gov/main/publications/external/technical_reports/PNNL-15793.pdf.

Project Developer:			Date:
Collected by:			
HUC 5 (10 digit):			
Number of reference sites:			
Reference site locations			
	1	2	3
Latitude and longitude or address, attach map			
Elevation:			
Size:			
Number of reference plots or transects:			
Number of native woody species			

Reference site photos: Attach photos			
	Min	Max	Mean
Woody stem density/plot or transect; OR			
Combined native shrub and woody vine cover			
Native trees/acre			
Canopy cover or closure (%)			
Invasive herbaceous species cover (%)			
Invasive woody species cover (%)			

3. SAMPLE RIPARIAN REVEGETATION MONITORING PROTOCOL

The following method, which focuses on methods for measuring native woody stem density and native and invasive species cover, is for informational purposes. Additional examples of monitoring protocols are available in the Willamette Partnership *Stewardship and Monitoring Plan Example.*[17]

A. Plot Size and Location

Data will be collected using a standard sampling methodology. At a minimum, radial plots, rectangular plots, and belt transect methodologies are acceptable. Plots will be located randomly. Location of plots should not be intended to maximize or minimize any particular metric. Random plot locations may be generated using GIS or other methods. Plots that fall within a stream or pond may be moved landward in a direction perpendicular to the stream or pond edge. Plot relocations and unique conditions should be noted on the data forms.

- **Radial Plots:** Radial plots located at random to represent the planting area. **Rectangular Plots:** Rectangular macroplots with the long end oriented perpendicular to the stream (and **crossing all the h**ydrozones).
- **Belt Transects:** 1m or wider belt transects oriented perpendicular to the stream and covering the entire riparian corridor within reference sites, as described in Roegner, G.C. et al. 2008. [18]

The *Monitoring Data Form* is included as Table 3.

[17] *Stewardship and Monitoring Plan Template* and *Stewardship and Monitoring Plan Example* are available at: http://willamettepartnership.org/tools-templates

[18] Roegner, G.C. et al. 2008. *Protocols for Monitoring Habitat Restoration Projects in the Lower Columbia River and Estuary. Available at*: http://www.pnl.gov/main/publications/external/technical_reports/PNNL-15793.pdf.

B. Native Tree, Shrub and Woody Vine Stem Counts
Using the *Monitoring Data Form*, count all live woody stems taller than 6" (regardless of vigor) within plots. Count multi-stem species (e.g., *Symphoricarpos*, *Rosa*) as one stem per square foot (1' x 1'). The count should include both planted and non-planted vegetation. Note significant instances of low vigor, damage from animals and other apparent problems on the data sheet.

C. Native and Non-Native Species Cover
Estimate cover of native woody species, non-native woody species, invasive woody species, native herbaceous species, non-native herbaceous species, invasive herbaceous species, ground substrate within plots to the nearest 5%. Cover is defined as absolute cover and is measured as the percentage of the ground surface covered by live plant leaves and stems when viewed from above. Areas not covered by vegetation are counted as unvegetated substrate. Cover may be greater than 100% if species are present in multiple strata (i.e., tree, shrub and herbaceous layers). Indicate 'T' for Trace if a non-native species covers less than 5% of the plot.

D. Timing of Data Collection
Data collection should occur following the expression of seasonal plant growth and mortality and prior to leaf drop. In most areas this period will include the months of September and October. Data collected outside of this period are subject to additional review.

E. Determining Sample Size
Initial sample size may be determined using the minimum plot number in the table below or by using the sample size workbook available on the Oregon Department of State Lands website.[19]

Table 2. Sample summary of sampling plot size relative to site size.

Plot Size	Project Area/Minimum Plot Number[20]		
	Up to 2 acres	>2 to 5 acres	>5 acres
11.7' radius (3.57m)	9	17	25

F. Data Analysis and Reporting
Monitoring should yield data that provide 80% confidence that reported values are within ±10 units of the true population.[21] Plot or transect data should be summarized in following or similar format and the results compared to the eligibility standards.

[19] www.oregon.gov/DSL/PERMITS/docs/sample_size_workbook.xls in Oregon Department of State Lands' *Routine Monitoring Guidance for Vegetation* (Draft Sept 23, 2009).
[20] Where the use of minimum plot number will not yield statistically valid results, additional plot data will be required.
[21] Oregon Department of State Lands' *Routine Monitoring Guidance for Vegetation* (Draft Sept 23, 2009).

Table 3. Sample Monitoring Data Form

Project Developer:									Date:
HUC 5:	Project Area Name:								
Plot or Transect#	Number of woody species	Woody stem count per acre	% Native woody cover	% Non-native woody cover	% Invasive woody cover	% Native herbaceous cover	% Non-native herbaceous cover	% Invasive herbaceous cover	% unvegetated substrate
1									
2									
3…									
Total									
Mean (CIx = Y1-Y2)									
Standard Deviation									
Standard Error									
Low Estimate (Y1)									
High Estimate (Y2)									

CI= Confidence Interval, x = 80% confidence level, Y1 = low estimate, Y2 = high estimate
Standard Error is calculated as the Standard Deviation divided by the square root of the number of plots (n).
Y1 and Y2 are calculated as Mean ± (standard error * t-factor 80%).

4. Example Program Development Checklists

Pre-enrollment Checklist

WWETAC Provisional Seed Zones for Conifer and Shrubs	_____
EPA Level III Ecoregion and HUC 5 boundaries	_____
Preliminary program area(s) boundary mapped	_____
Land ownership assessed and mapped	_____
Landowner agreement drafted	_____
Existing and potential nursery capacity evaluated	_____
Existing and potential contractor capacity evaluated	_____
Range of site conditions evaluated	_____
Revegetation limiting factors/risk assessment	_____

Enrollment/Pre-implementation Checklist

Final program area boundary mapped	_____
Preliminary reference sites selected	_____
Preliminary project area(s) identified and mapped	_____
Landowner agreement(s) signed	_____
Reference site plot data collected and summarized	_____
Site prep, planting and maintenance practices established	_____
Monitoring plan developed	_____
Preliminary species list established	_____
Preliminary nursery list established	_____
Nursery stock type(s) selected	_____
Preliminary contractor list established	_____
Nursery (incl. seed) and cold storage contract(s) executed	_____
Revegetation contract(s) executed	_____

Implementation Checklist 1

Final project area(s) identified and mapped	_____
Project prescription(s) developed	_____
Project(s) prepared and inspected	_____
Project(s) planted and inspected	_____
Project(s) maintained and inspected	_____
15% implementation contingency in place for each project	_____

Implementation Checklist 2

Nursery contract(s) evaluated/modified as necessary	_____
Revegetation practices evaluated/modified as necessary	_____
Revegetation contract(s) evaluated/modified as necessary	_____
Monitoring data collected and analyzed	_____
Determination of acceptable progress or contingency plan	_____