CLACKAMAS COUNTY BOARD OF COUNTY COMMISSIONERS
Sitting as the Governing Body of Water Environment Services

Policy Session Worksheet

Presentation Date: November 10, 2020 **Approximate Start Time:** 3:00pm

Approximate Length: 30 minutes

Presentation Title: Boring WRRF Facilities Plan

Department: Water Environment Services

Presenter: Lynne Chicoine, PE BCEE Capital Program Manager

Other Invitees: Greg Geist, Director or Chris Storey, Assistant Director

WHAT ACTION ARE YOU REQUESTING FROM THE BOARD?
Adoption of Facilities Plan and Approval of Recommended Plan

BACKGROUND & ISSUES:
The facility was constructed in 1986 and serves 60 connections. Flows and loads have exceeded its capacity. The facility is in poor condition and requres a significant investmetn to restore reliable operation. Finally, the facility was originally designed for conventional secondary treatment (BOD and TSS removal), but now must meet a year round ammonia limit and summertime temperature limit. NPDES limits cannot be met 9 months of the year requiring WES staff to haul influent flow to the nearest WES manhole from January through April. From June through October, onsite irrigation avoids or reduces discharge.

A Facilities Plan was prepared to evaluate alternatives for meeting NPDES permit limits for the next 20 years.

FINANCIAL IMPLICATIONS:
The Recommended Plan's estimated life cycle cost is $5.3M. The plan's estimated $4.9M capital cost is funded and included in the WES FY 20-25 Capital Improvement Plan.

Are these items in your current budget? ☒ YES ☐ NO*

What is the funding source? Rate Funded

STRATEGIC PLAN ALIGNMENT
This aligns with several of WES' Strategic Goals:

1. Optimizes Operation
2. Builds Strong Infrastructure

LEGAL/POLICY REQUIREMENTS:
NPDES Permit will no longer be required.

PUBLIC/GOVERNMENTAL PARTICIPATION:
WES Citizens Advisory Committee has approved the below recommendation of the Boring Facilities Plan.

OPTIONS:

A. Pump Flow to City of Sandy - Difficult to permit and likely higher cost to rate payers.
B. Upgrade to Tertiary Treatment Plant - Higher life cycle cost and no regulatory flexibility.
C. LOSS System - Higher life cycle cost and likely not permittable.
D. Minimally Upgrade Existing Facility - Comparable life cycle cost; still will not meet NPDES permit.
E. Decommission and replace with a pump station - convey flow to an existing WES manhole so flow is treated at either Kellogg Creek or Tri-City WRRF; provides the highest regulatory certainty with a relatively low life cycle cost.

RECOMMENDATION:
D. Minimally Upgrade Existing Facility - Comparable life cycle cost; still will not meet NPDES permit.

ATTACHMENTS: Boring Facilities Plan (Murraysmith Engineers, 2020)
SUBMITTED BY: Lynne Chicoine, PE BCEE WES Capital Program Manager

Division Director/Head Approval _____

Department Director/Head Approval GG

County Administrator Approval _____

For information on this issue or copies of attachments,
please contact Lauren Haney at 503-742-4591

Technical Memorandum

Date:	August 7, 2020
Project:	Boring WRRF Facility Plan
To:	Lynne Chicoine, Capital Program Manager Darren Eki, Wastewater Plant Operations Supervisor
From:	Adam Crafts, PE, Project Manager Jason Flowers, PE, PhD, Project Engineer Justin Moman, PE, Staff Engineer
Re:	Boring Existing WRRF Evaluation

RENEWAL DATE: 12/31/2020

Section **1**

Section 1

Introduction

1.1 Introduction & Purpose

Clackamas County Water Environment Services (WES) owns and operates the Boring Water Resource Recovery Facility (WRRF) serving the City of Boring (Boring), located in Northwest Oregon between the Portland metropolitan area and Mount Hood. This Facility Plan includes a high level WRRF evaluation of the existing facility, alternatives evaluation, and recommended capital improvements for a 20-year planning horizon.

The primary focus of the document is to address issues related to the facility's treatment capacity and potential NPDES Permit excursions for Ammonia-Nitrogen (Ammonia-N) and temperature during the summer. The Facility Plan will provide a recommendation for a pathway for upgrades to the WRRF. This plan is not intended to conform entirely to Oregon Department of Environmental Quality (DEQ) WWTP guidelines for preparing facility plans in Oregon, but specific elements developed as part of the project will meet DEQ requirements, such as the flow and load projections.

1.2 Boring Wastewater System Overview

The WRRF provides wastewater collection and treatment for approximately 60 connections in Boring. The treatment facility was constructed in 1986, with a service area of approximately 80 acres. The wastewater collection system is comprised of 4,439 linear feet of gravity sewer and 16 manholes. Wastewater is collected by smaller mainlines and conveyed to the Boring WRRF via a trunk sewer located along Highway 212 and SE Richey Road.

The wastewater is treated at the existing WRRF in a process that includes treatment in two aerated lagoons followed by filtration and chlorine disinfection. The disinfection system is currently being converted to UV disinfection. The Boring WRRF NPDES Permit allows the WRRF to discharge year-round to the North Fork of Deep Creek, which is a tributary of the Clackamas River. During the summer months, treated effluent is utilized for irrigation on the WRRF site to help reduce the thermal impact to the creek.

Figure 1-1 illustrates the WRRF's current service area and the components of the wastewater collection and treatment system. An aerial photo of the existing WRRF is shown in Figure 1-2. A site plan is included in Section 4.

Figure 1-1
Study Area and System Overview Map

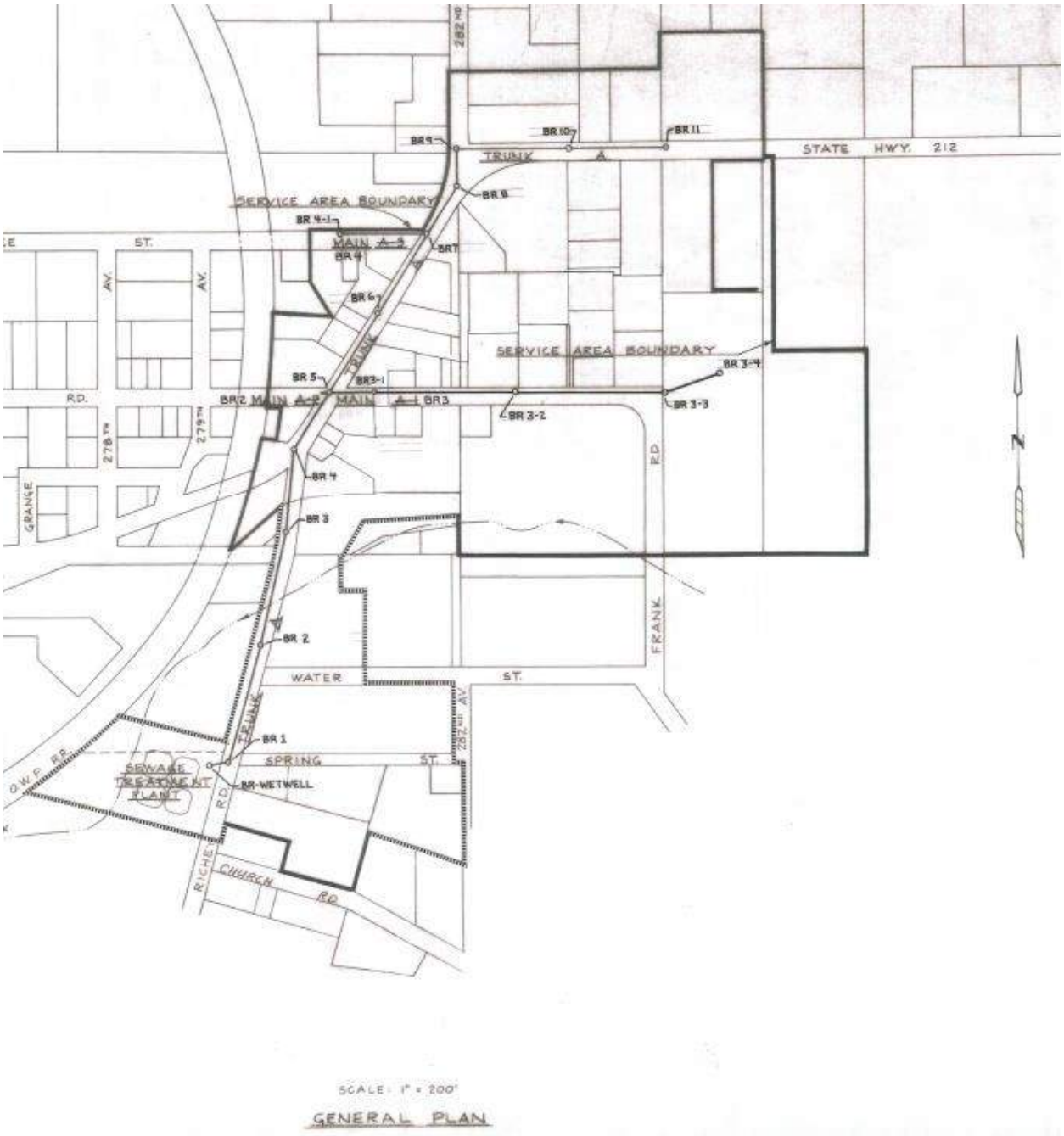

Figure 1-2
WRRF Aerial Photo

1.3 Scope of Work

Murraysmith's Scope of Work for the Boring WRRF Facility Plan includes the following elements:

- Reparation of current and projected flows and loads for a 20-year planning horizon;
- Review of regulatory and NPDES Permit requirements for the Boring WRRF discharge to the North Fork of Deep Creek;
- Preparation of current and future WRRF flows and loads for a 20-year planning horizon;
- Existing facility capacity and condition assessment;
- Development and evaluation of alternatives; and
- Preparation of a Recommended Plan, Capital Improvement Program (CIP) and implementation next steps for the preferred alternative.
- Development of a WRRF Facility Plan generally conforming to DEQ requirements for the planning horizon, including review of regulatory requirements, development of flow and load projections, existing facility evaluation, alternatives evaluation, and identification of

the Recommended Plan for future upgrades to meet NPDES Permit requirements for the 20-year planning horizon.

- Seismic evaluations, detailed structural analysis, and geotechnical investigations are not included in this scope of work.

1.4 Organization of the Facility Plan

The Facility Plan is organized in one volume and includes an Executive Summary, 6 sections and 3 appendices. Table 1-1 outlines the content of the sections and Table 1-2 outlines the content of the appendix.

Table 1-1
Section Organization

Section Identifier	Title	Description
1	Introduction	Summarizes purpose, scope, and organization of the Facility Plan.
2	Flow and Load Projections	Documents existing and projected flows in the collection system and wastewater characterization at the WRRF. Defines terminology related to various design flows measures.
3	Regulatory Requirements	Reviews the regulatory requirements related to collection, treatment, and discharge of wastewater, including review of current NPDES permit and compliance evaluation.
4	Existing WRRF Evaluation	Summarizes the existing WRRF evaluation, code review, and capacity evaluation.
5	Basis of Planning	Develops the alternatives evaluation methodology, including non-monetary criteria and lifecycle costs.
6	Alternatives Evaluation and Recommended Plan	Develops and evaluates alternatives for addressing deficiencies identified at the Boring WRRF, including recommended plan and next steps.

Table 1-2
Appendix Organization

Appendix Identifier	Title and Description
A	Boring WRRF NPDES Permit
B	Oregon NOAA Atlas 2 Volume 10 Precipitation Frequency Isopluvial Maps
C	Photo Log

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Section **2**

Section 2

Flow and Load Projections

2.1 Introduction

This section of the Facility Plan documents the existing and projected flows in the wastewater collection system and wastewater characterization for the Boring WRRF. The flow projections consider existing and future customers within the project study area and highlight potential growth within the Urban Growth Boundary (UGB) for the time period ending in the year 2040.

In this section, the current flow characteristics were developed using the Guidelines from the Making Wet-Weather and Peak Flow Projections for Sewage Treatment in Western Oregon [DEQ Guidelines] (Oregon Department of Environmental Quality 1996).

The summary of loads in this section focuses on the mass load of biochemical oxygen demand (BOD) and total suspended solids (TSS) into the WRRF. Current mass loads will be calculated using recent historical influent data for TSS and BOD. The 2040 load projections will be scaled from the current loads using a per capita basis analysis and anticipated growth capacity within the UGB.

2.2 Definitions

Evaluation Period: The updated flow projections for the WRRF are based on Discharge Monitoring Reports (DMRs) from January 2016 through October 2018.

Wet Weather Season: For the purpose of the flows and load characteristics, the wet weather season is from November 1 through April 30 of the following year based on the dates established in the Boring WRRF NPDES permit.

Dry Weather Season: For the purpose of the flows and load characteristics, the dry weather season is from May 1 through October 31 based on the dates established in the Boring WRRF NPDES permit.

Average Annual Flow (AAF): The average daily WRRF flow for the calendar year, including the wet and dry seasons.

Average Dry Weather Flow (ADWF): The average daily WRRF flow from May 1 through October 31.

Average Wet Weather Flow (AWWF): The average daily WRRF flow from November 1 through April 30.

Maximum Month Dry Weather Flow (MMDWF): The WRRF flow associated with a 10-year return rainfall event during the dry weather season.

Maximum Month Wet Weather Flow (MMWWF): The WRRF flow associated with a 5-year return rainfall event for the wettest month during the wet weather season.

Peak Daily Average Flow (PDAF): The WRRF flow associated with a 5-year return, 24-hour rainfall event during a period with high groundwater and saturated soils. The design annual 5-year return, 24-hour rainfall event in the City of Boring is 3.8 inches, as published in Oregon NOAA Atlas 2 Volume 10 Precipitation Frequency Isopluvial Maps (**Appendix B**).

Peak Week Flow (PWF): The peak flow that occurs 1/52 of the time or 1.9 percent probability.

Peak Instantaneous Flow (PIF): The highest peak WRRF flow attained during a 5-year peak day flow event.

2.3 DEQ Guidelines Flow Estimation Method

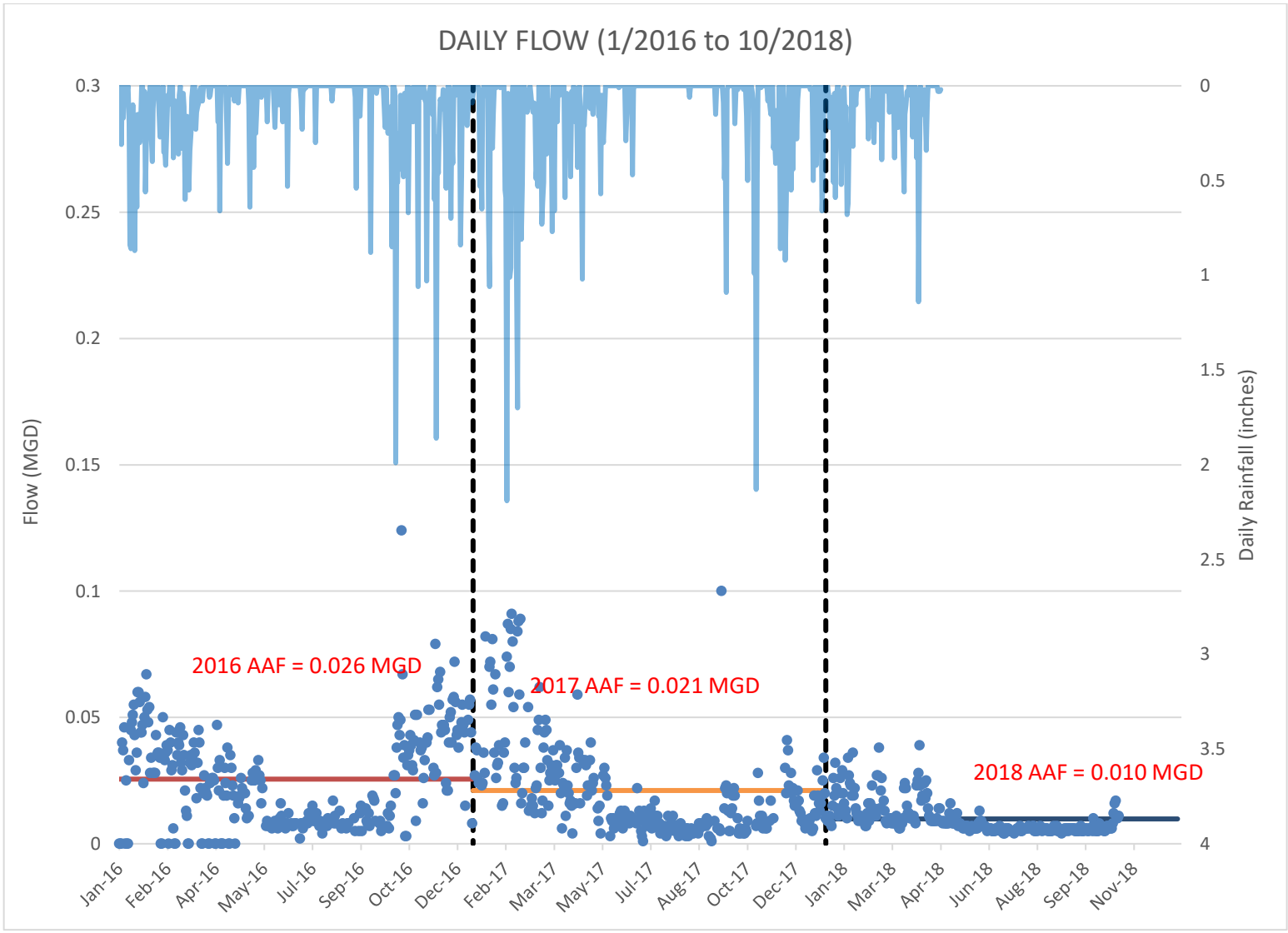
Flow characteristics were calculated using the DEQ Guidelines. The following sections summarize the methods and results from this analysis.

2.3.1 Existing Wastewater Flows

2.3.1.1 Daily Influent Flow Analysis

Daily influent flow from January 2016 through October 2018 was plotted to review trends and is shown on **Figure 2-1**. Along with daily flow, the graph shows average annual flow. As can be seen, the flows have decreased over the 3-year period.

Figure 2-1
Boring WRRF Influent Flow (January 2016 through October 2018)



2.3.1.2 Existing WRRF Average Annual, Wet and Dry Weather Flows

Using historical WRRF influent flow rates provided by WES the existing annual average flow (AAF), the average dry weather flow (ADWF) from May-October, and the average wet weather flow (AWWF) from November through April during the study period from 2016-2018 was calculated. As presented in **Table 2-1**, the current AAF, ADWF, and AWWF for the Boring WRRF based on the plant influent flow data is **0.0.019 MGD**, **0.011 MGD**, and **0.027 MGD**, respectively.

Table 2-1
Boring WRRF 2016-2018 Flow History

Season	Year	Average Influent (MGD)
Annual	2016	0.026
	2017	0.021
	2018	0.010
	Average (2016-2018)	**0.019**
Dry Weather (May 1 - Oct 31)	2016	0.016
	2017	0.011
	2018	0.007
	Average (2016-2018)	**0.011**
Wet Weather (Nov 1 - Apr 30)	2016	0.032
	2016-17	0.030
	2017-18	0.015
	Average (2016-2018)	**0.027**

2.3.1.3 Existing WRRF Maximum Month Flows

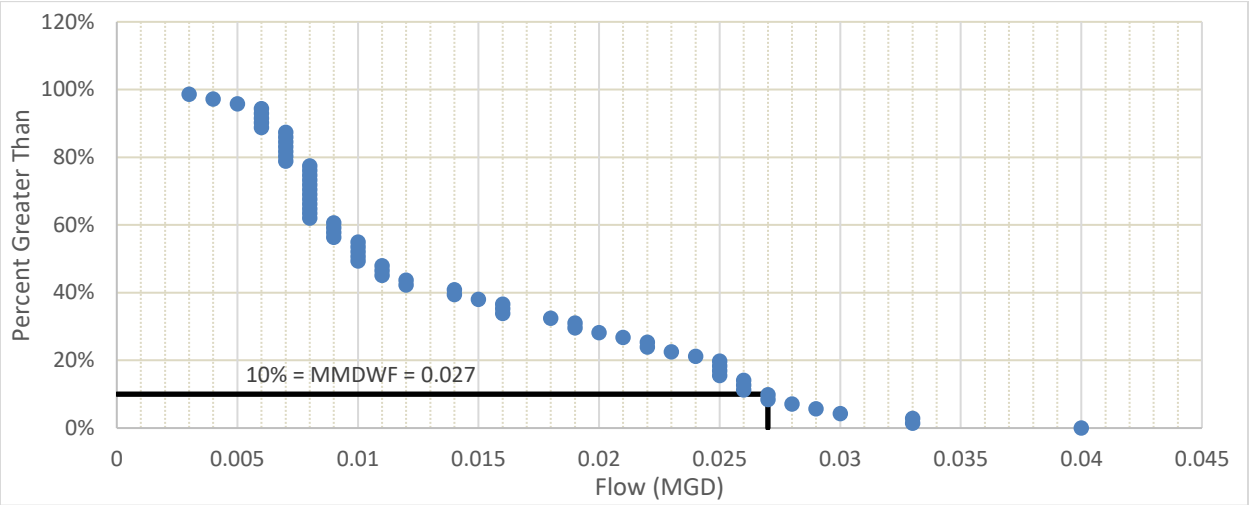
DEQ guidelines developed for Western Oregon suggest a method to calculate maximum month flows for wet and dry weather based on the probability of exceeding a design storm event. Current maximum monthly flows for the dry and wet weather season were then estimated as outlined in the DEQ Guidelines.

2.3.1.3.1 Maximum Month Dry Weather Flow

WRRF dry weather season flows during the evaluation period were tabulated and sorted from highest to lowest flow and the events were ranked according to the percentage of monthly dry weather flow events greater than the individual event. The percentile of each event was then plotted versus plant flow. Using DEQ definitions regarding plant reliability for the dry weather season, the flow event with a 10 percent exceedance probability based on the rankings was selected as the current MMDWF. **Figure 2-2** is a graph of the actual plant flow events sorted and plotted against percentile of flow events greater.

Based on this methodology, the existing MMDWF for the Boring WRRF is **0.027 MGD**.

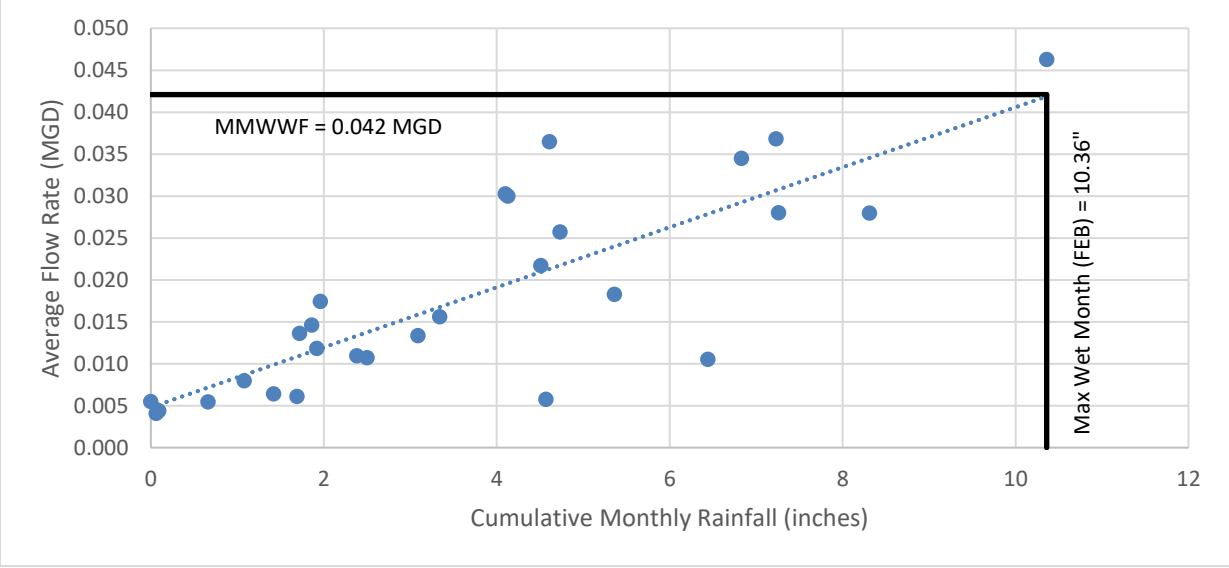
Figure 2-2
Boring WRRF Dry Weather Flow vs. Ranked Flow Percentile



2.3.1.3.2 Maximum Month Wet Weather Flow

Current MMWWF was estimated following DEQ Guidelines by plotting monthly WRRF flows for the wet season using data from the wet weather seasons between 2016 and 2018 versus total monthly rainfall. A statistical trendline was then developed based on the plot. The maximum monthly accumulation of rainfall, 10.36 inches, occurred in February 2017. Based on the extrapolated trendline equation, the current MMWWF for the Boring WRRF is 0.042 MGD, as shown on Figure 2-3.

Figure 2-3
Boring WRRF Wet Weather Flow vs. Monthly Precipitation

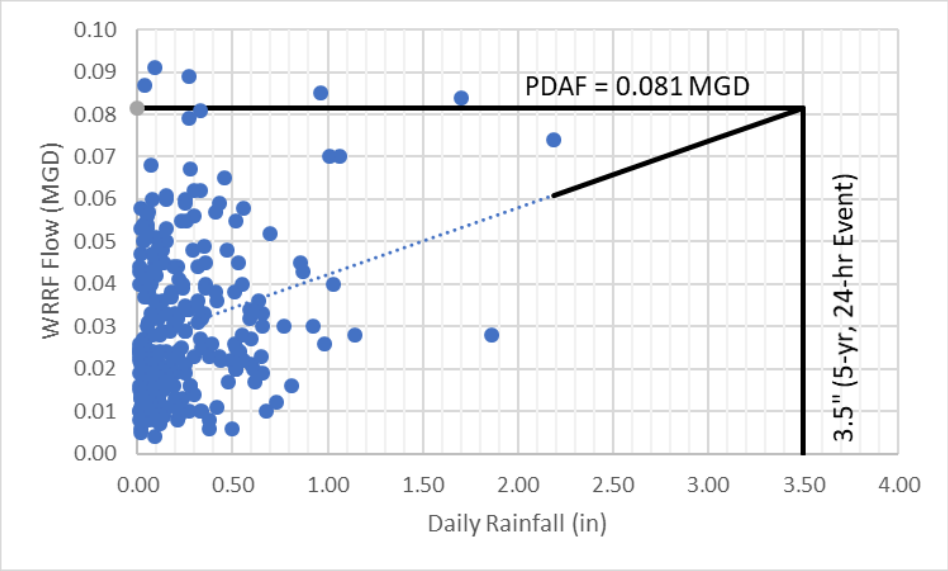


2.3.1.4 Existing WRRF Peak Daily Average Flow

The current Boring WRRF PDAF was estimated by evaluating specific WRRF flows and rainfall events during the evaluation period. The peak rainfall event used to estimate the current WRRF PDAF was 3.7 inches which is the annual 5-year return, 24-hour rainfall event for the City of Boring from Oregon NOAA Atlas 2 rainfall isopluvial maps.

Figure 2-4 is a graph of Boring WRRF peak flow events from 2016 through 2018. Based upon the evaluation, the estimated current Boring WRRF PDAF is 0.081 MGD.

Figure 2-4
Boring WRRF Peak Flow Events vs. Daily Precipitation



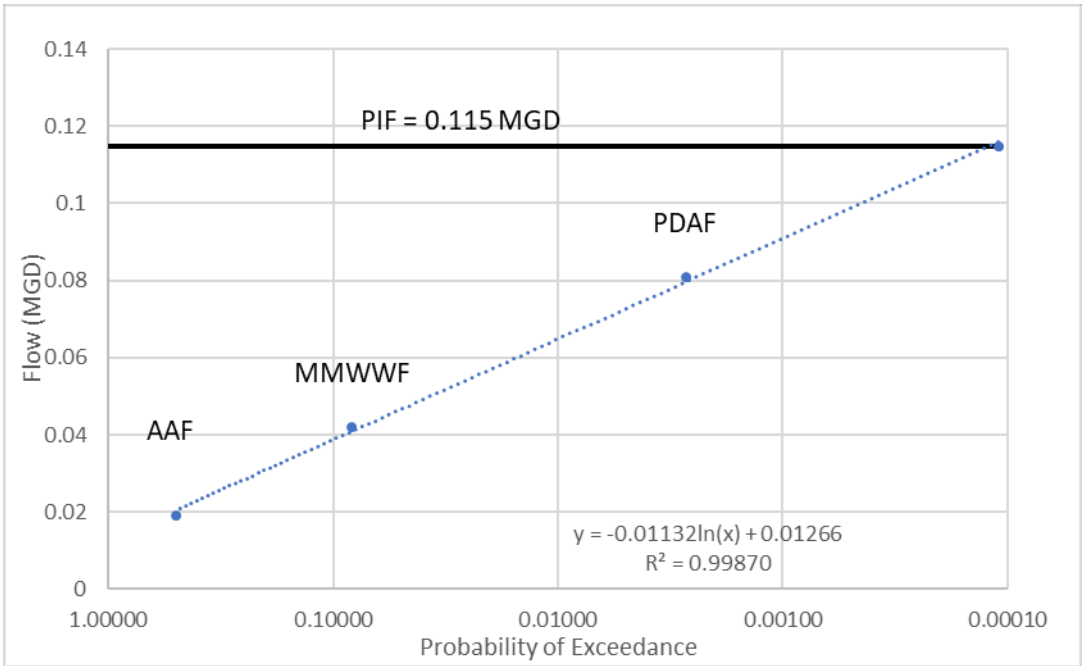
2.3.1.5 Existing WRRF Peak Instantaneous Flow

The existing PIF was estimated using the statistical probability procedure specified in the DEQ Guidelines. The procedure is an analytical evaluation assuming certain exceedance probabilities for design flow events:

- The exceedance probability for the AAF is 50 percent. The AAF used to determine the current PIF was 0.019 MGD.
- The exceedance probability for the MMWWF is 8.3 percent. The MMWWF used to determine the current PIF was 0.042 MGD.
- The exceedance probability for the PDAF is 0.166 percent. The PDAF used to determine the current PIF was 0.081 MGD.
- The exceedance probability for the PIF is 0.011 percent.

Figure 2-5 is a probability chart used to estimate the current PIF. The AAF, MMWWF, PWF, and PDAF were plotted, and the current PIF was estimated by extrapolation. Based on the evaluation, the current PIF for the City of Boring WRRF is 0.115 MGD.

Figure 2-5
Boring WRRF Flow vs. Event Probability



2.3.1.6 Existing WRRF Peak Instantaneous Flow

In accordance with the DEQ Guideline, the existing per capita flow factors are used to project estimated future flows. The per capita flow rates were determined assuming 60 service connections with 2.5 persons per connection. The 2040 projections have been estimated at two additional connections based on the availability of land and expectations for development within the UGB. The projections are shown below in Table 2-2.

2.3.2 Design Flow Summary

Boring WRRF design flows as determined by the methods discussed above are summarized in Table 2-2.

Table 2-2
Summary of 2018 and 2040 Design Flows

Flow Event	2018 Flow (MGD)	Peaking Factor	Per capita Flow Rate (gpcpd)	2040 Flow (MGD)
AAF	0.019	1	127	0.020
ADWF	0.011	0.58	73	0.011
AWWF	0.027	1.42	180	0.028
MMDWF	0.027	1.42	180	0.028
MMWWF	0.042	2.22	281	0.044
PDAF	0.081	4.26	281	0.082
PIF	0.115	6.04	281	0.116

Note: The per capita flow rate was based on 60 service connections assuming 2.5 persons per connection. The maximum month (MMWWF) per capita water consumption was used for the peak day (PDAF) and peak instantaneous (PIF) flow contributions

2.4 Wastewater BOD and TSS Loads

Wastewater loads to a treatment plant are used to evaluate different treatment alternatives and to determine the required treatment capacities. For this evaluation, WRRF DMRs were analyzed for the evaluation period for monthly average and maximum month influent BOD_5 and TSS concentrations and mass loads. The per capita loading factors for the Boring WRRF were calculated in the same way as the per capita flow rates described above.

As shown in **Table 2-3** average BOD_5 concentrations are approximately 310 milligrams per liter (mg/l) for the summer and 265 mg/l for the winter season, whereas current average TSS concentrations are approximately 390 mg/l in the summer and 490 mg/l in the winter.

Table 2-3
Current and 2040 BOD_5 and TSS Loads

Parameter	Current Average			2040 Average
	Concentration (mg/l)	Load (ppd)	Load Factor (ppcd)	Load (ppd)
Dry Weather (May 1 through October 31)				
BOD_5	310	20	0.13	21
TSS	390	24	0.16	25
Wet Weather (November 1 through April 30)				
BOD_5	265	69	0.46	71
TSS	490	116	0.77	120

Note: The projected growth does not appreciably increase the 2040 monthly average loads.

2.5 WRRF Wastewater Characterization

Boring WRRF staff completed a sampling and testing program to characterize the influent as well as to understand performance throughout the treatment plant. This data was used to evaluate the ability of different alternatives to satisfy current and anticipated regulatory requirements. Table 2-4 contains a summary of the sampling and testing program used to develop in-plant influent water quality characteristics.

Table 2-4
Wastewater Water Quality Characteristics Sampling

Location	Parameters Sampled
Raw Influent	BOD, Soluble BOD, Chemical Oxygen Demand (COD) Soluble COD, Total Kjeldahl Nitrogen (TKN), Ammonia, Nitrite, Nitrate + Nitrite, alkalinity, pH TSS, Dissolved Oxygen (DO)
Primary and Secondary Lagoon	COD, Ammonia, TKN, Nitrite, Nitrite + Nitrate, pH, TSS, DO
Effluent	BOD, Carbonaceous BOD, COD, Ammonia, TKN, Nitrite, Nitrite + Nitrate, Alkalinity, pH, chlorine residual, TSS

A summary of minimum, maximum and average concentrations for samples collected and tested from August 2018 through November 2018 are included in Table 2-5 below.

Table 2-5
Wastewater Water Quality Characteristics

Parameter	Average Concentration (mg/l)	Minimum Concentration (mg/l)	Maximum Concentration (mg/l)
Raw Influent			
Biochemical Oxygen Demand (BOD)	346	300	400
Soluble BOD	187	46	280
Chemical Oxygen Demand (COD)	638	528	765
Soluble COD	327	200	480
Total Kjeldahl Nitrogen (TKN)	55	46	62
Ammonia	35	30	42
Nitrite	0.4	0.0	2.8
Nitrate + Nitrite	0.7	0.0	4.5
alkalinity	251	217	266
pH	7.6	7.0	8.5
TSS	203	152	244
Dissolved Oxygen (DO)	1.4	0.1	3.7
Primary Lagoon			
COD	176	102	280

Parameter	Average Concentration (mg/l)	Minimum Concentration (mg/l)	Maximum Concentration (mg/l)
Ammonia	1.9	0.1	5.4
TKN	12	11	13
Nitrite	3.5	0.1	9.9
Nitrite + Nitrate	16	11	21
pH	7.1	6.8	7.7
TSS	99	20	195
DO	2.9	1.4	4.6
Secondary Lagoon			
COD	113	67	183
Ammonia	0.2	0.1	0.4
TKN	6.5	3.7	12
Nitrite	0.2	0.0	0.3
Nitrite + Nitrate	21	20	22
pH	7.5	7.1	8.8
TSS	87	26	212
DO	4.3	2.2	6.0
Effluent			
BOD	2.8	0.9	6.6
Carbonaceous BOD	2.7	1.5	6.3
COD	20	15	28
Ammonia	0.1	0.1	0.2
TKN	1.0	0.7	1.4
Nitrite	0.0	0.0	0.0
Nitrite + Nitrate	20	19	23
Alkalinity	52	40	63
pH	7.5	6.8	8.8
TSS	1.4	1.0	2.0

2.6 References

National Oceanic and Atmospheric Administration. 1973. *NOAA Atlas 2, Precipitation-Frequency Atlas of the Western United States, Volume X – Oregon*.

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Section **3**

Section 3

Regulatory Requirements

This section summarizes the current and potential future regulatory requirements for the Boring WRRF. Included are the following elements:

- Review of current National Pollutant Discharge Elimination System (NPDES) Permit;
- Permit Compliance Evaluation and Findings;
- Biosolids Management Regulations; and
- Other Water Quality Standards and Considerations.

3.1 Regulatory Requirements – Boring WRRF

This section of the Facility Plan includes a discussion of the NPDES Permit for the Boring WRRF and Biosolids Management.

3.1.1 Boring WRRF Current NPDES Permit

The Oregon DEQ has been delegated authority from the EPA to enforce the Clean Water Act (CWA) to regulate the discharge of treated effluent from wastewater treatment plants through the NPDES program. Oregon NPDES permit requirements are included in OAR Chapter 340, Division 45 (OAR 340-45), whose purpose is to "prescribe limitations on discharge of wastes and the requirements and procedures for obtaining NPDES and WPCF permits from the Department of Environmental Quality." NPDES permit limits must comply with Oregon water quality standards and biosolids management regulations included in OAR Chapter 340, Division 41 (OAR 340-041) and OAR Chapter 340, Division 50 (OAR 340-050), respectively.

The Boring WRRF was originally designed to treat for BOD and TSS. Ammonia and temperature limits were not included in the original NPDES permit, and no upgrades have been made to treat for these specific parameters. The Boring WRRF NPDES Permit #100968 was renewed March 1, 2016, allowing the discharge of treated effluent to the North Fork of Deep Creek year-round. A copy of the Boring WRRF NPDES Permit is included as Appendix A. The NPDES Permit will expire on February 28, 2021. The Boring WRRF is referred to as Boring Sewage Treatment Plant in the permit, but for the purpose of this Facility Plan, the facility will be referred to as the Boring WRRF.

Table 3-1 is a summary of waste discharge limitations for the Boring WRRF Outfall 001 from November 1 – April 30 (Wet Weather) as contained in the Boring WRRF NPDES Permit.

Table 3-1
Outfall 001 NPDES Wet Weather BOD & TSS Waste Discharge Limits[a]

	Monthly Average Concentration (mg/L)	Weekly Average Concentration (mg/L)	Monthly Average Load[b] (lb/day)	Weekly Average Load[b] (lb/day)	Daily Maximum Load[b] (lb)
BOD_5	20	30	3.4	5.0	6.8
TSS	20	30	3.4	5.0	6.8

Notes:
(a) From current Boring WRRF NPDES Permit #100968 for File Number 16592.
(b) Mass load limits are based upon an average dry weather design flow of 0.02 MGD.
mg/L = Milligrams per liter
lb/ day = Pounds per day

Table 3-2 summarizes the waste discharge limitation for the Boring WRRF Outfall 001 from May 1 – October 31 (Dry Weather).

Table 3-2
Outfall 001 NPDES Dry Weather CBOD & TSS Waste Discharge Limits[a]

	Monthly Average Concentration (mg/L)	Weekly Average Concentration (mg/L)	Monthly Average Load[b] (lb/day)	Weekly Average Load[b] (lb/day)	Daily Maximum Load[b] (lb)
$CBOD_5$	10	15	1.7	2.5	3.4
TSS	10	15	1.7	22	3.4

Notes:
(a) From current Boring WRRF NPDES Permit #100968 for File Number 16592.
(b) Mass load limits are based upon WWTP average dry weather design flow of 0.02 MGD.
mg/L = Milligrams per liter
lb/ day = Pounds per day

In addition, **Table 3-3** summarizes additional parameters in the permit which are required to be met year-round.

Table 3-3
Outfall 001 NPDES Additional Parameters

Parameter	Limitation
E. Coli Bacteria	Must not exceed 126 organisms per 100 mL monthly log mean. No single sample shall exceed 406 organisms per 100 mL.
pH	Must not be outside the range of 6.0 to 9.0
BOD_5 or $CBOD_5$, and TSS Removal Efficiency	Must not be less than 85% monthly average for BOD5 or CBOD5, and TSS
Total Residual Chlorine	Must not exceed a daily maximum limit of 0.02 mg/L and an average monthly limit of 0.01 mg/L
Ammonia	Must not exceed a daily maximum limit of 11.5 mg/L and average monthly limit of 5.0 mg/L.
Excess Thermal Load Limits	Must not exceed 0.333 million kcal/day (June 16 – October 14) Must not exceed 0.357 million kcal/day (October 15 – June 15)

3.1.2 NPDES Regulatory Compliance Evaluation Summary

Based on an evaluation of monthly Discharge Monitoring Reports (DMR) for the Boring WRRF from January 2016 – October 2018 submitted to DEQ, there were no exceedances for BOD or TSS based on the listed effluent concentration, mass discharged, or percent removal criteria. In addition, the effluent pH was within the permitted pH range within the period evaluated. Several ammonia exceedances were reported during that time period. In total, there were four monthly averages that had ammonia levels greater than 5 mg/L, but reported ammonia levels never exceeded the daily maximum concentration of 11 mg/L. Ammonia limits exceedances only occur during the winter and are likely due to the additional flow and colder water slowing nitrification.

As stated earlier, the regulatory limit for total residual chlorine is 0.01 mg/L average monthly limit and 0.02 mg/L daily maximum limit in the NPDES permit. One sample exceeded the daily maximum limit at a concentration of 1.2 mg/L, but the remaining results were lower than the method detection level (0.05 or 0.1 mg/L, depending on the sample date). While the detection limits were higher than the effluent limit in the permit, the NPDES permit does allow for 0.1 mg/L to be the compliance evaluation level when the total residual chlorine limitation is lower than 0.1 mg/L. Therefore, with the exception of one sample, the Boring WRRF consistently meets the total residual chlorine effluent limits. Lastly, an analysis of the effluent *E. Coli* levels recorded in the DMRs did not show any exceedances during the time period investigated.

Because the projected growth within the service area is anticipated to be minimal (the addition of two houses is assumed for the purposes of preparing future flows and loads), the total flow into the plant is not expected to increase significantly from current flow conditions. However, it should be noted that current flows are much higher than the original WRRF design criteria, as discussed in Section 4 of this Facility Plan.

3.1.3 NPDES Temperature Compliance Evaluation

The receiving stream for the Boring WRRF is the North Fork of Deep Creek. Deep Creek is a Core Cold-Water Habitat for Salmon and Steelhead Rearing between October 15th and June 15th based on OAR 340-041-0028 Figure 340 A: Fish Use Designations for the Willamette Basin, Oregon and Figure 340B. **Table 3-4**, below, shows the Applicable Stream Temperature Criteria for the Boring WRRF.

Table 3-4
Temperature Compliance Criteria

	June 16 – Oct 14	October 15 – June 15
Applicable Stream Temperature Criteria	60.8 °F (16.0 °C) 7-day average maximum cold water protection	55.4 °F (13.0 °C) 7-day average maximum cold water protection, Salmon and Steelhead Spawning
OAR	340-041-0028 (4)(b)(11)(a)&(c)	340-041-0028 (4)(a)(11)(b)

3.1.3.1 NPDES Excess Thermal Load Evaluation

As shown in Table 3-3, the 2016 NPDES permit specifies an Excess Thermal Load (ETL) of no greater than 0.333 million kcal/day for June 16th through October 14th and 0.357 million kcal/day for October 15th through June 15th. The ETL calculated based on the 7-day average flow rate and the 7-day average of maximum daily effluent temperatures. The equation below shows the calculation for the permit.

$$ETL_{7DayAvg} = \left(Temperature(°F)_{Effluent} - Temperature(°F)_{stream}\right) * Q_{Effluent_{7DayAvg}} * 8.34\frac{lb}{gal} * 0.2520\frac{kcal}{BTU}$$

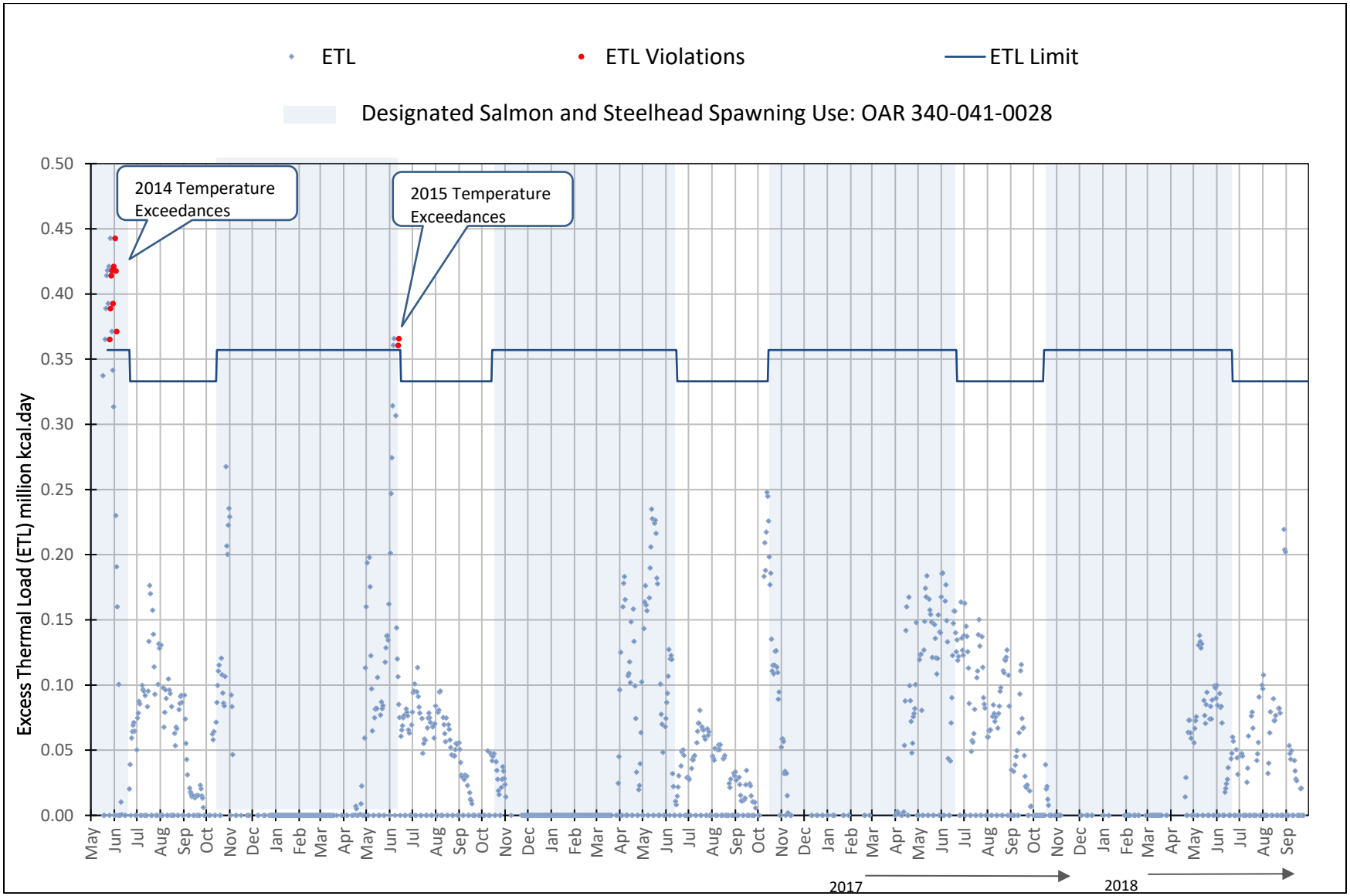
Based on this permit criteria, the WRRF facility recorded an ETL greater than the allowable limits in May and June of 2014 and in June of 2015. All ETL limit exceedances were reported as required by the NPDES permit. According to the 2016 Boring Permit Evaluation Report, WES received a warning letter due to an ETL exceedance on September 17, 2014. **Figure 3-1** presents a graph showing Boring WRRF ETL for the past five years beginning in May 2014. The graph shows some ETL exceedances in 2014 and 2015, but it appears the collection system rehabilitation and onsite irrigation at the facility has allowed the facility to maintain compliance with the ETL limits over the past 3 years. Continued on-site irrigation will provide compliance with effluent temperature requirements at the Boring WRRF, if flows do not increase substantially in the future.

3.1.4 Oregon Dilution Rule Compliance Evaluation

The Statewide Narrative Criteria (OAR 340-041-0007) restricts discharge to a receiving stream if the Effluent BOD concentration divided by the ratio of receiving stream flow to effluent flow is greater than one. Based on the observed flow rate of 1 cubic foot per second (cfs) in the North

Branch of Deep Creek in October, as noted in the 2016 NPDES Permit Evaluation and Fact Sheet for the Boring WRRF, it is not believed that the facility should have any issue meeting these criteria.

Figure 3-1
Temperature Compliance Evaluation per 2010 NPDES Permit Excess Thermal Load (ETL) Limits



3.2 Biosolids Management

According to the 2016 Water Environment Services Biosolids Management Plan (BMP), there are two mechanisms in which biosolids are removed from the Boring WRRF. First, when the sand filters become clogged with sediment from the lagoon, which is reported to occur every week during the winter, the top one to four inches of sand is removed. Also, every year operators completely refurbish the sand filter. When sand is removed, it is stockpiled onsite, tested, and used as clean fill when testing confirms that reuse is appropriate. Otherwise, the sand is landfilled.

Secondly, about once every 2-3 years, biosolids are removed from the lagoons and hauled to another WES facility for processing as approved in the current NPDES permit. At those facilities, WES currently operates a Class B biosolids beneficial use program via agricultural land application. In accordance with 40 CFR Part 503 and OAR 340-050 pathogen reduction and vector attraction reduction for biosolids is performed prior to land application.

Considering space limitations and limited growth expected at the Boring WRRF site, there is no plan on changing the current biosolids management plan for the site.

3.2.1 Other Water Quality Standards and Considerations

Potential future regulatory requirements that may impact the Boring WRRF discharge to the North Fork of Deep Creek in the future include:

- Clean Water Act Section 303(d) List
- Three Basin Rule, OAR 340-041-003
- Toxic Substances Criteria, OAR 340-041-0033

3.2.1.1 Clean Water Act Section 303(d) List

In 2014, Oregon DEQ submitted Oregon's 2012 Integrated Report and 303(d) list to EPA. In December 2016, EPA approved most of the submitted 303(d) list, but had a few required modifications. Several Category 5 pollutants (meaning that a TMDL is needed) are in the approved 303(d) list for the North Fork of Deep Creek, including biological criteria, chlorpyrifos, dieldrin, ammonia, dissolved oxygen, and guthion. Evaluating treatment options to meet potential effluent limits for these criteria is outside the scope of this report. Future TMDLs may ultimately contain additional regulatory requirements for the Boring WRRF after the current NPDES Permit expires on February 28, 2021.

3.2.1.2 Three Basin Rule (OAR 340-041-003)

In 1996, Oregon DEQ established the Three Basin Rule which states that existing facilities with NPDES permits for discharge into the Clackamas River Sub-basin may not be granted increases in their permitted mass load limitations. Considering growth in Boring is expected to be extremely limited, this is not anticipated to have an impact on the treatment requirements.

3.2.1.3 Toxic Substances Criteria (OAR 340-041-0033)

Oregon DEQ has established allowable acute and chronic concentrations of Toxic Substances in fresh and marine waters for protection of aquatic life and human health. These concentrations are summarized in Table 30 in OAR-340-041-8033. The criteria can be used to establish discharge limits for toxic substances based on both effluent and stream concentrations using the reasonable potential analysis developed by the Oregon DEQ. This analysis is outside the scope of this report, and data is not currently available for concentrations of these substances in the Boring WRRF effluent.

3.3 References

Clackamas County Service District #1. 2016. Water Environment Services Biosolids Management Plan

State of Oregon Department of Environmental Quality. 2010. NPDES Permit Evaluation and Fact Sheet

State of Oregon Department of Environmental Quality. 2012. Oregon's 2012 Integrated Report. https://www.oregon.gov/deq/wq/Pages/2012-Integrated-Report.aspx

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Section **4**

Section 4

Existing WRRF Evaluation

4.1 Introduction

An evaluation of the existing WRRF was performed to identify any deficiencies. This section summarizes Murraysmith's field evaluation and condition assessment of the Boring WRRF conducted by Murraysmith. The WRRF handles domestic wastewater flows from approximately 60 connections in the City and is evaluating necessary upgrades.

4.2 Existing WRRF Evaluation Overview

Murraysmith completed an onsite evaluation of the major unit processes to identify specific areas for improvements, which are summarized in the sections that follow. Recommendations are provided to address challenges impacting facility operations along with maintenance upgrades necessary to keep the WRRF in good working condition.

This section includes:

- Existing WRRF Capacity Evaluation;
- Condition Assessment;
- Recommendations and Findings; and
- Summary and Conclusions.

The Existing Process Schematic is shown on Figure 4-1, and the existing WRRF Site Plan is shown on Figure 4-2 below.

Figure 4-1
Existing Water Reclamation Facility Schematic

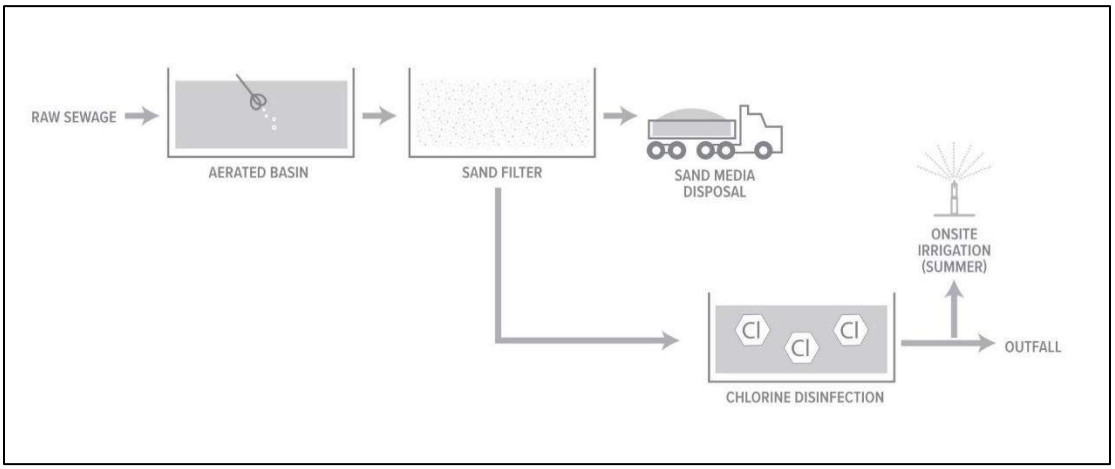
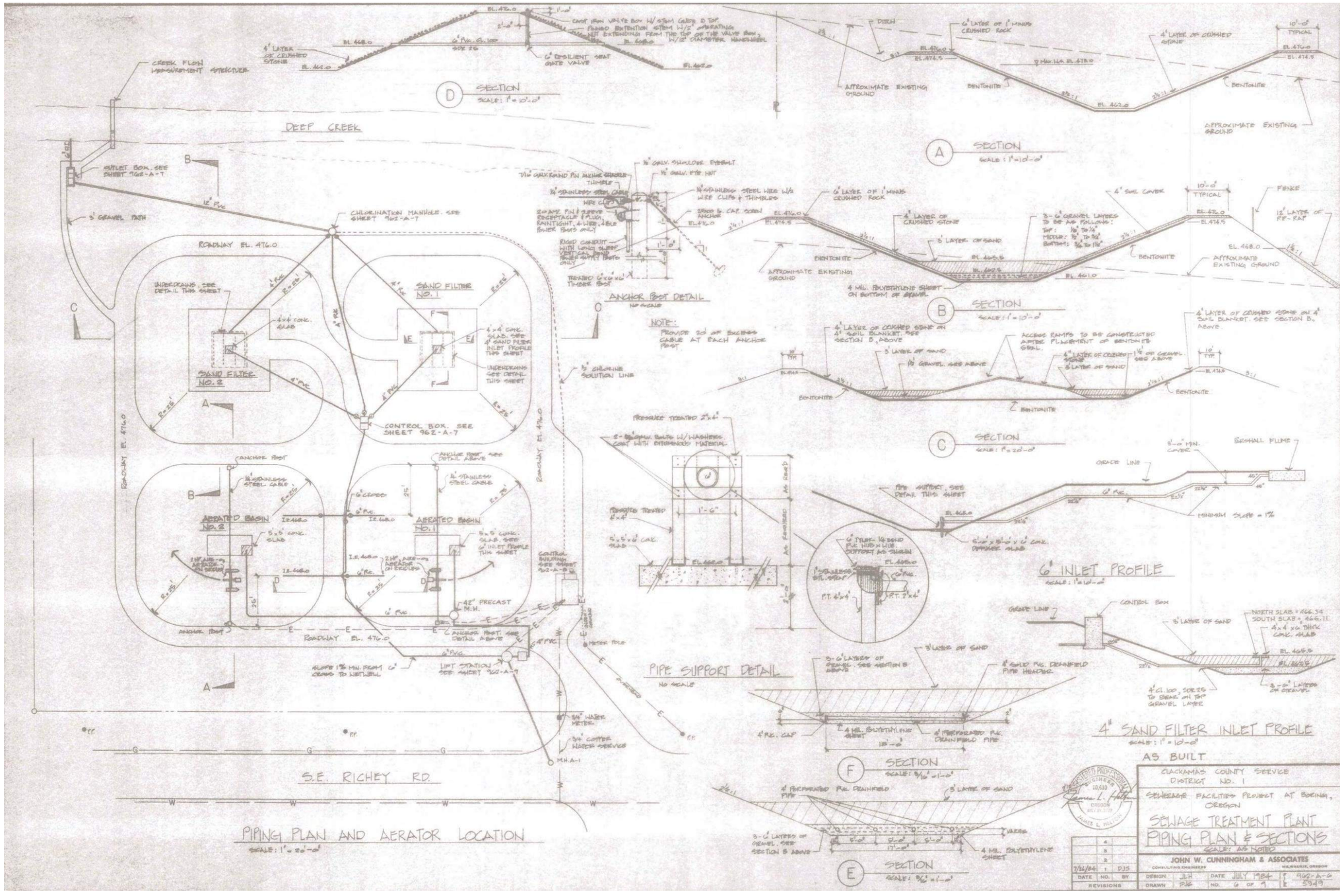


Figure 4-2
Existing WRRF Site Plan



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The evaluation culminates in a list of recommended upgrades at the existing WRRF to maintain facility performance, simplify operations, and assure compliance with the current NPDES Permit requirements as summarized in Section 3 of this Facility Plan. The list of recommended WRRF upgrades will be further developed to include costs as part of the WRRF unit process evaluations.

In terms of overall condition, the Boring WRRF is a challenging facility due to its current treatment performance, required level of operator attention, and remote location. The WRRF has had ongoing challenges in meeting permit conditions and requires significant maintenance.

4.3 Existing WRRF Capacity Evaluation

This section of the Facility Plan documents the equipment, hydraulic, and process capacity of the existing WRRF. The WRRF was not originally designed for nitrification, and no major treatment upgrades to the WRRF have been performed to expand beyond the original design capacity. The following sections will evaluate both the liquids and solids handling capacity based on the 2018 influent flow characteristics presented in Section 2 and identify areas where there are deficiencies. Based on the original design criteria listed on the WRRF design drawings, onsite observations, manufacturer's data and available records, the process capacity and existing equipment of each of the unit processes is listed in Table 4-1.

Table 4-1
Design Capacity of Unit Processes and Existing Equipment at Boring WRRF

System	Data/Type
Influent Design Characteristics	
Flow	18,200 GPD
Influent BOD	29.2 lb/Day (192 mg/L)
Equivalent Population	172 @ 0.17 lb/Capita-Day
Influent Lift Station	
Flow Meter	
Type	Area/Velocity Radar
Manufacturer	Hach
Model	FloDar
Installation Location	Channel
Structure	
Wet Well	60" I.D. Precast Concrete
Vent	3"
Baffle Plate	Galvanized Steel
Pipe within vault	2 lines – 4" Ductile Iron
Submersible Pumps	
Manufacturer	Unknown
Model	Unknown
Type	Submersible

System	Data/Type
Submersible Pumps (cont'd)	
Quantity	2
Capacity	120 GPM
Valve Vault	
Vault	Precast Utility Vault
Check Valve Type	4" Check with Lever and Spring
Check Valve Quantity	2
Isolation Valve Type	4" Gate with Handwheel
Valve Quantity	3
Pipe from Vault	1 line – 4" PVC
Electrical and Controls	
Remote Communications/SCADA	Radio Telemetry
Secondary Treatment	
Diversion Structure	
Structure	42" Precast Manhole
Pipe	2 lines – 6" PVC
Aerated Basins	
Number of Basins	2
Basin Volume (Each)	160,800 Gallons
Depth	11 ft.
Detention Time (Each)	8.84 Days
Surface Aerators	
Type	Aspirating Aerators – Floating
Manufacturer	Unknown
Model	Unknown
Quantity	1 per Basin
Motor	3 HP, 9-8.4/4.2 Amps, 1760 RPM, 60 Hz, 3-Phase, Class F
Decanters	
Type	Floating
Manufacturer	Unknown
Model	Unknown
Quantity	1 per Basin
Algae Control Devices	
Type	Floating Ultrasonic
Manufacturer	Unknown
Model	Unknown
Quantity	3 per Basin
Basin Transfer Piping	
Type	6" PVC
Control Valve	1 – 6" Gate Valve
Control Valve Operation	Manual Wheel

System	Data/Type
Effluent Piping	
Type	6" PVC
Control Valve	2 – 6" Gate Valve
Control Valve Operation	Manual Wheel
Tertiary Sand Filters	
Splitter Box	
Influent Pipe	1 – 6" PVC
Influent Control Valves	3 – 4" Shear Gates
Influent Control Valve Operation	Manual Push/Pull Rods
Effluent Pipe	3 – 4" PVC
Effluent Control Valves	3 – 4" Gate Valves
Effluent Control Valve Operation	Manual Wheel
Sand Filter Basins	
Quantity	2
Surface Area (Each)	1,600 SF (0.037 Acres)
Loading Rate (Each)	500,000 Gallons/Acre-Day (18,500 GPD)
Effective Sand Size	0.20 – 0.30 mm
Estimated Filter Run Before Cleaning	100 Days
Effluent Pipe	
Collection Pipe	4 – 4" Perforated PVC (per Basin)
Effluent Pipe	4" PVC (per Basin)
Effluent Control Valves	See Chlorination Manhole
Disinfection & Dechlorination Systems	
Chlorination Manhole	
Structure	48" – Precast Concrete
Influent Control Valves	2 – 4" Gate Valves (1 per Sand Filter)
Influent Control Valve Operation	Manual Wheel
Chlorine Contact Chamber	
Disinfection Chemical	Sodium Hypochlorite
Storage Capacity	55 Gallons
Contact Chamber	12" Pipe, 130 LF
Contact Volume	764 Gallons
Detention Time	60 Minutes @ 18,200 GPD
Sodium Hypochlorite Chemical Feed Pump	
Manufacturer	Pulsafeeder
Model	Pulsatron Series E Plus
Type	Electronic metering pump
Quantity	1
Output	24 GPD, 3.78 LPH
Maximum Pressure	100 PSI, 7 bar
Electrical	115 VAC, 50/60 Hz, 6 amps, 1 phase

System	Data/Type
Dechlorination Contact Chamber	
Dechlorination Chemical	Sodium Bisulfite
Storage Capacity	55 Gallons
Contact Chamber	Weir Tank
Contact Volume	300 Gallons
Dechlorination Chemical Feed Pump	
Manufacturer	Pulsafeeder
Model	Pulsatron Series E Plus
Type	Electronic metering pump
Quantity	1
Output	24 GPD, 3.78 LPH
Maximum Pressure	100 PSI, 7 bar
Electrical	115 VAC, 50/60 Hz, 6 amps, 1 phase
Effluent Flow Meter	
Weir Plate Type	V-notch
Weir Plate Size	22-1/2 degree notch, 45 degree bevel
Sensor Type	Transducer
Sensor Manufacturer	Unknown
Sensor Model	Unknown
Datalogger	Wheel Chart
Autosampler	
Type	Hach Company, AWRS Sampler, 115 V, 4.2 Amps
Effluent Control Valve	
Type	12” - Unknown
Operation	Manual
Electrical and Controls	
Remote Communications/SCADA	Radio Telemetry – Effluent Temperature
Irrigation System	
Flow	24.8 GPM
Pump	
Manufacturer	Berkeley
Model	UK
Type	Centrifugal
Quantity	1
Motor	2.5 HP, 115/230 V, 3450 RPM, 1-Phase
Spray Heads	
Quantity	Unknown
Type	Unknown
Controller	
Type	Timer
Operation	Manual

The WRRF has an influent design flow of 0.018 MGD, which was originally based on the intermittent use of the sand filters. Current flows listed in Table 2-2 indicate that the current MMWWF is 0.047 MGD. To accommodate this flow rate, the sand filters are being utilized continuously, resulting in frequent fouling at high flows and significant effort by operators is required to maintain flows. Conveyance between unit processes is by gravity and there are no known issues with flow restrictions due to conveyance pipe sizing within the WRRF. Likewise, there are no known issues with the influent pumps being undersized.

The influent design criteria loading for the WRRF is 29 pounds per day (ppd) BOD at a concentration of 192 mg/L. Utilizing both aerated basins, a hydraulic retention time (HRT) of 17.68 days was projected to reduce BOD to 13 mg/L with tertiary filtration reducing BOD to <10 mg/L. The current average monthly wet weather BOD load is 69 ppd at a concentration of 265 mg/L. At the current MMWWF, the HRT is reduced to 6.77 days when both aerated basins are utilized. Operator observations indicate that the aerated basins are not completely mixed by the existing aerator, which further reduces the WRRF capacity.

The reduced HRT due to higher flows suggests that the original design BOD reductions cannot be met in the aerated basins and must be achieved in the sand filters. The increased loading in the raw influent introduces additional challenges for the WRRF to maintain performance. Furthermore, the WRRF was not originally designed for nitrification and the performance limitations due to operating above design capacity have resulted in permit limit exceedances for ammonia from late December to April/May when temperatures are lower.

Chlorine contact time is reduced from 60 minutes to 23 minutes at the MMWWF. The DMRs do not indicate that the current disinfection system is inadequate, and the new UV system will address disinfection capacity.

4.4 Condition Assessment

Murraysmith engineers visited the WRRF to assess existing conditions on the 17th of December 2018 and the 27th of January 2019. The investigation included the liquids stream, solids handling, electrical equipment, and select structural components throughout the facility. The team walked the plant to ascertain manufacturing information, design data, and condition of mechanical equipment. Due to ongoing operations and lack of redundancy, structures, basins and the filters could not be drained for inspection.

Condition assessment field notes and photos were collected and are included as Appendix C for reference. Information gathered from the assessment was used to develop a list of recommended improvements needed to keep the facility in good working order, optimize performance and improve operations and maintenance.

4.4.1 Existing Wastewater Collection System

Based on operator input, it is recommended that improvements to the collection system infrastructure, potentially including efforts to reduce infiltration and inflow beyond work done in recent years be evaluated further and considered as part of the WRRF upgrades. A detailed collection system evaluation is beyond the scope of this Boring WRRF Facility Plan.

4.4.2 Existing Boring WRRF

The Boring WRRF has had no significant upgrades since its construction in 1986. A discussion of major WRRF components are summarized below and described in detail in the sections that follow.

- General Electrical: Main power distribution and SCADA system;
- General Site: Site security, site structures and miscellaneous site utility systems;
- Headworks and Preliminary Treatment: Influent pump station;
- Secondary and Tertiary Treatment: Aerated basins, splitter box, and sand filter;
- Disinfection and Outfall: Hypochlorite injection system, outfall, effluent sampling, flow monitoring, and onsite irrigation; and
- Solids management.

4.4.2.1 General Electrical

4.4.2.1.1 Main Power Distribution

The facility is served by a 240-volt, 3-phase, 4-wire electrical power distribution system. The utility service entrance is along the access road by the main gate via overhead line. The facility power distribution system consists of the utility service entrance, metering, main disconnect, aerator starters, lighting transformers, wet well power panel, alarm panel, timers, and 120/208-volt lighting panels. The distribution equipment appears to be original to the facility construction and is located in the control building. Modifications to expand electrical service have been performed, but no major upgrades were reported.

4.4.2.1.2 SCADA System

No facility-wide SCADA system is currently in place at the facility. Limited connectivity exists in the form of radio communication to the Tri-Cities facility for effluent temperature data monitoring. Subsequent recommendations in this evaluation are intended to improve plant operations through connectivity and automated controls. These recommendations are contingent upon establishing a facility-wide SCADA system to assist operators in facility management.

4.4.2.2 General Site

The following section describes the condition of appurtenances within the site that are not directly associated with the unit processes required for treatment.

4.4.2.2.1 Site Security

Plant security is currently minimal. There is a uniform fence surrounding the plant and onsite lighting. The natural foliage surrounding the plant is dense except along Richey Road. The current gates are in good condition. The entry gate must be manually unlocked when operators and other personnel enter the facility. The outfall gate must also be manually unlocked, but the area adjacent to this gate is inherently less secure due to its isolation from readily observable areas. There are currently no security cameras onsite.

4.4.2.2.2 Site Structures

There are several structures onsite that support the day-to-day operation of the WRRF. The control building, constructed of CMUs, contains the site electrical distribution panels, lab equipment, and miscellaneous storage in one room. A second room contains a sodium hypochlorite drum and injection equipment. An adjacent metal carport structure provides covered storage for a small tractor and trailer. A wood-framed, open-sided shed roof is located over the outfall structure and provides cover for equipment and operators. A prefabricated enclosure is located adjacent to the outfall structure and houses the dechlorination equipment. A prefabricated enclosure at the headworks houses an autosampler.

All structures were observed to be in good condition and no structural issues were immediately apparent. It was observed that the lab/electrical/storage room in the control building was crowded. While a building code review was not performed as part of this condition assessment, Murraysmith noted that improvements to this area could be made to promote safe and efficient working conditions for operators.

4.4.2.2.3 Miscellaneous Site Utility Systems

WRRF utility systems include potable water and electrical service. Utilities enter the site along the access road. Water and electrical supply are installed in a trench along the perimeter road. Spigots and outlet boxes are currently located at the aerated basin diversion manhole, splitter box, chlorination manhole, and outfall structure.

These systems afford the operators flexibility in their day to day operations, and they allow for clean conditions at the plant.

4.4.2.3 Headworks and Preliminary Treatment

The facility does not currently have preliminary treatment. Influent wastewater is pumped directly from the influent pump station to the aerated basins by two submersible pumps through a vault

containing a tee and check valves. The pumps are original and potentially at the end of their useful life.

A bar rack is shown on the original design drawings but was marked for deletion prior to construction. Operators report that a ragging issue is present in the pump station wet well that requires regular maintenance of the influent pumps.

No grit removal issues were reported, and it is assumed that grit that collects in the aerated basins is removed during periodic maintenance.

The influent flow meter is reported to be an area/velocity radar sensor that was installed in an open channel prior to the influent pump station in October 2017. There are no reported issues with its operation. Influent flows are transmitted to the Tri-City WRRF via radio telemetry.

4.4.2.4 Secondary and Tertiary Treatment

Secondary and tertiary treatment at the WRRF consists of two aerated basins and two sand filters. Plant influent is transferred from the lift station wet well, sequentially through the aerated basins, and to the sand filters.

4.4.2.4.1 Aerated Basins

The aerated basins are located on the east side of the facility adjacent to SE Richey Road. The unit process is comprised of two basins (Aerated Basins 1 and 2, as labeled on the design drawings) and are operated in series. Aerated Basin 1 is located in the northeast corner of the site, and Aerated Basin 2 is located in the southeast corner. The basins are constructed of a bentonite liner covered with crushed stone. Retractable covers shade the basins during summer months and limit thermal loading discharged to Deep Creek.

Each basin is equipped with a floating aspirator that provides mixing while aerating the basin. The aspirator motors were reported to have been replaced in or about 2016 and are believed to be in good working order. Operators report that a twelve to eighteen inches thick sludge blanket accumulates behind the aspirators, but no accumulation is observed in front of the aspirators. This condition indicates the basins are not completely mixed. The design drawings place the aspirators toward the edge of the basin to generate a rotating flow. The aspirators are currently placed toward the centerline of the basins and are periodically rotated to distribute the sludge blanket.

The basins are connected by a 6-inch diameter pipe with a control valve for transfer between the basins. Sections of 6-inch effluent pipe (each with a control valve) extend into each basin with a cross from which effluent could be directed either to the sand filters or recycled to the influent pump station using a control valve. Flow currently enters Aerated Basin 2 through the 6-inch diameter pipe mounted to a concrete slab in the center of the basin. Mixed liquor is then transferred to the sand filters. The basins, piping, and valves described above are reported to be in good condition.

In addition, each basin is equipped with three ultrasonic algae control devices that were reported to be due for replacement. Decanting floats, referred to as "dolphins" by the operators, are located in each basin to draw effluent from the upper portion of the water column and retain solids in the basins. The decanters are reported to be in good condition currently, but the flotation and fittings deteriorate over time and require periodic maintenance. Ammonia exceedances discussed in Section 3 are presumed to be the result of insufficient solids retention time (SRT) in the basins. The decanters likely improve SRT but are likely insufficient, even when working correctly, to enhance nitrification.

4.4.2.4.2 Splitter Box

Original to the design, a concrete splitter box is located between the aerated basins and the sand filters. A partition wall containing three shear gates divides the splitter box into influent and effluent chambers, allowing operators to control the water level in the aerated basins. Three gate valves in the effluent chamber enable flow to be directed independently to either sand filter or to the chlorination manhole. The concrete structure was observed to be in fair condition. The gates and valves require replacement.

4.4.2.4.3 Sand Filters

The sand filters are located on the west side of the facility adjacent to Deep Creek and are original. The unit process is comprised of two filter basins that are operated in parallel. Sand Filter 1 is located in the northwest corner of the site, and Sand Filter 2 is located in the southwest corner. The filters are constructed of a bentonite liner covered with crushed stone. The inlet pipe to each filter is routed through an approximately 3-foot sand layer to a vertical discharge pipe in the center of the filter. A polyethylene liner is maintained beneath the sand layers. Perforated drain piping is embedded in the filter media bed and connected to an effluent header leading to the chlorination manhole. Retractable covers shade the sand filters during summer months to limit thermal loading discharged to Deep Creek.

Operators report that the sand filters require significant maintenance to prevent fouling, especially during the wet weather season, and are sometimes inaccessible due to high water levels or freezing conditions. Approximately one inch of sand is replaced weekly during a routine cleaning and the sand bed is completely refurbished annually.

4.4.2.5 Disinfection and Outfall

4.4.2.5.1 Disinfection and Dechlorination

The existing sodium hypochlorite disinfection system is comprised of a 55-gallon sodium hypochlorite drum and a single metering pump located in the Control Building. Sodium hypochlorite is routed through an underground line and injected into the chlorination manhole. Contact time is provided in a 12-in pipe conveying effluent from the chlorination manhole to the dechlorination weir tank. Sodium bisulfite is injected into the weir tank to dechlorinate treated

effluent prior to discharge. Staff reports that it is difficult to handle chemical totes on the site given the location of the Chlorination Building.

All equipment appears to be in good condition. Both chemicals are injected at a rate set manually by operators to the facility effluent flow, which may fluctuate due to changes in head pressure on the manual effluent control valve which is a function of head on the filters. As effluent flow increases, so does the potential for insufficient disinfection if the chemical feed rate is not adjusted. As effluent flow decreases, so does the potential to discharge excessive chlorine residual. To further complicate matters, flow is sometimes discharged intermittently to meet the permitted thermal load. As a result of an exceedance in 2018, WES is installing a UV system to eliminate chemical handling and the potential for over- or under-dosing hypochlorite.

4.4.2.5.2 Outfall, Effluent Sampling, and Flow Monitoring

Flow to the outfall structure is controlled by a manual valve, as described above, which is set by operators based on current and anticipated conditions. Final effluent passes through the dechlorination tank and into an outlet box equipped with a 22.5-degree V-notch weir plate to measure flow to the outfall. Flow rates are measured using a transducer. This weir has the capacity to measure flow up to 0.3 MGD, although the inaccuracy of flow measurement with v-notch weirs can be as great as 5 to 15 percent. The transducer is reported to be less than three years old, but accuracy is reduced at lower flow rates. This could be related to the equipment design (transducers are less accurate near the boundaries of their design range), but the root cause is unclear without further investigation.

A 5-gallon bucket is situated beneath the weir plate discharge to hold a sufficient volume of final effluent from which a sample can be collected. The autosampler tube is secured in the bucket, which is continuously flushed. The Hach autosampler was observed to be in good condition and no operational issues have been reported. Effluent temperature is monitored and transmitted to the Tri-City WRRF via radio telemetry.

The outfall pipe is original to the facility. Operators reported that the outfall is in good condition and is inspected annually.

4.4.2.5.3 Onsite Irrigation

An irrigation system is installed along the perimeter fence to allow treated effluent to be diverted from the outfall to irrigate on-site vegetation during periods when thermal loading to Deep Creek is limited. The irrigation pump is operated manually and diverts effluent from the outfall at a rate of 25 gpm. A timer is present to control runtime, but operators reported that it is not used due to unreliable function. The system was otherwise observed to be in good condition. The age of the pump and system was not immediately available.

4.4.2.6 Solids Management

The WRRF solids are retained in the aerated basins or captured in the sand filters. The basins are reported to be dredged every two to three years to remove grit and maintain capacity in the basins.

Sand removed from the sand filters is stockpiled onsite until removal, which occurs approximately every two years. The used sand is removed following analysis. The stockpiled sand is not contained.

4.5 Summary and Conclusions

The Boring WRRF requires several upgrades to resolve issues related to treatment performance and excessive operator labor requirements. Fundamentally, the WRRF is operating beyond its original design capacity for both flows and loads. Specific issues related to individual unit processes are summarized below.

- Electrical and Instrumentation: No SCADA system is present, preventing automation of unit processes.
- Headworks and Influent Pumping: There is no existing preliminary treatment to screen out rags and debris, which clog the influent pumps and increase required maintenance.
- Aerated Basins: Mixing, solids retention, and nitrification require improvement to the aerated basins to accommodate current flows and loads.
- Splitter Box: Control valves and gates require replacement.
- Tertiary Sand Filters: The sand filters are prone to fouling and require significant maintenance.
- Disinfection and Outfall: Disinfection metering and facility discharge cannot be adequately controlled by operators to account for variable conditions in the facility. The effluent flow meter requires calibration and is not connected to SCADA.

4.5.1 References

Health Research, Inc, Health Education Services Division. (2014) 10 States Standards: Recommended Standards for Wastewater Facilities. Retrieved October 18, 2018 from http://10statesstandards.com/wastewaterstandards.pdf

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Section **5**

Section 5

Basis of Planning

5.1 Alternative Evaluation Methodology

This section summarizes the methodology for evaluating and selecting alternative(s) to be included in the Recommended Plan. The alternatives and costs will be based on the future flow projections. Alternatives will be developed for the overall WRRF operational structure to resolve issues related to effluent quality, unit process deficiencies, and maintenance requirements.

5.2 Non-Monetary Alternative Evaluation Methodology

The recommended approach to alternatives evaluation uses cost effectiveness and non-economic factors including those factors which WES considers most important (e.g. regulatory risk).

5.2.1 Scoring Procedure

Alternatives are evaluated using a matrix-based approach incorporating non-monetary evaluation criteria. Scores to select the preferred alternative for WES are calculated by ranking each alternative relative to others and assigning a relative importance, or weighting, to each criterion. The alternative with the highest score represents the preferred alternative from a non-monetary perspective for WES. The scoring equation is as follows:

$$Score = \sum_{Criteria} (Rank * Weighting)$$

5.2.1.1 Rank

Alternatives are ranked from best to worst based on the number of alternatives being evaluated. An evaluation of four alternatives will have rankings for each criterion from 5 (best) to 1 (worst).

5.2.1.2 Weighting

The weighting factor is a percentage-based multiplier allowing WES to place greater emphasis on specific criterion of greater importance for WES. All Evaluation Criteria and Weightings are developed with input from WES staff and total to 100 percent.

5.3 Non-Monetary Evaluation Criteria

Evaluation criteria used in the alternatives evaluation will include the following:

- Constructability
- Regulatory Flexibility
- Expandability
- Ease of Operation and Maintenance
- Public Acceptance

Following is an introductory description of non-monetary criteria in the alternatives' evaluation along with the weighting factor in parentheses.

5.3.1 Constructability (20%)

Constructability relates to the construction complexity and potential issues associated with constructing the proposed alternative and meeting critical deadlines. For example, construction of an upgraded treatment facility while operating the existing WRRF would be complex and require bypass pumping, hauling, and seasonal restrictions. Acquisition of substantial acreage could require close coordination with private property owners, making the facility potentially more difficult to construct for various reasons.

5.3.2 Regulatory Flexibility (20%)

Regulatory flexibility is the ability of an alternative to meet effluent discharge limits in the future should limits become more restrictive. Examples could include stricter temperature limits or compliance with metals limits. Some alternatives have a higher risk relative to long term compliance.

5.3.3 Expandability (20%)

Expandability is the ability of an alternative to accommodate growth in the service area.

5.3.4 Ease of Operation and Maintenance (20%)

This criterion addresses the complexity of the alternative to operate and maintain. An alternative that includes more unit processes or processes with which staff are not familiar or require frequent attention would receive a lower score for this criterion. The relative staffing requirements for the alternatives are reflected in their life cycle costs.

5.3.5 Public Acceptance (20%)

This criterion is a measure of the likelihood of acceptance of the alternative by the public in the Boring service area. Alternatives which improve the appearance of the WRRF and/or do not require a new site or additional property would have a higher score for this criterion.

5.4 Development of Estimated Costs of Alternatives

The alternatives will be compared on the basis of their life cycle costs, or the total present worth of the sum of their capital and annual costs. Costs are presented in 2020 dollars.

Capital costs are those costs associated with constructing facilities and appurtenances required for each alternative. Capital improvements may include treatment plant upgrades, pumping facilities, pipelines, and discharge facilities. Recommended facilities are sized for projected 2040 flow and load projections.

Construction cost estimates were prepared to American Association of Cost Engineers (AACE) Class 5 estimate standards for planning-level evaluations with a range of accuracy of -30 percent to +45 percent. Construction costs for each alternative were estimated based on recent construction costs for similar facilities, published standard construction cost data, and the Engineer's experience on similar projects. Standard mark-ups applied to conceptual construction cost estimates are summarized in Table 5-1.

Table 5-1
Applied Mark-ups for Conceptual Cost Estimates

Item	Mark-up as Percent of Construction Cost
Escalation per Year to Midpoint of Construction	3%
General Conditions (incl. Mobilization)	10%
Construction Contingency[1]	30%
Engineering/Surveying/Legal/Administrative	25%

1: Construction contingency for pipeline options was calculated at 20%

Annual costs include costs to operate and maintain the required facilities. Annual O&M costs include personnel, energy (electricity and natural gas), chemicals, groundwater monitoring, maintenance, and other miscellaneous costs. The Net Present Value of annual O&M costs for were calculated based on the following criteria:

- Labor Rate: $75/hour
- Energy Rate: $0.06/kilowatt-hour (kWh)
- Discount Rate: 3.5 percent
- Evaluation Period: 20 years
- Residual Value: $0

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Section **6**

Section 6

Alternatives Evaluation and Recommended Plan

6.1 Introduction

The purpose of this section is to further develop and evaluate additional wastewater treatment alternatives considering the limitations of the current site and discharge. The alternatives consider both on-site and off-site solutions. The evaluation also takes into consideration non-monetary criteria and life cycle costs including energy, major replacement, and labor.

6.2 Overview of Alternatives Considered

Four alternatives were developed to further evaluate wastewater treatment and conveyance requirements for the build-out planning horizon, including:

Alternative A – Abandon existing WRRF and pump to another facility for treatment.

Alternative B – Convert the existing WRRF to a conventional activated sludge (CAS) facility with cloth media filters. Continue on-site irrigation in summer months.

Alternative C – Abandon the existing WRRF and pump to a new large onsite sanitary system (LOSS). It is assumed that the LOSS will be located within a one-mile radius from the existing WRRF.

Alternative D – Rehabilitate the existing WRRF. Minimally upgrade facilities for reliability and provide sludge recirculation. Continue on-site irrigation in summer months.

6.2.1 Alternative A – Abandon Boring WRRF and Pump to Another WRRF

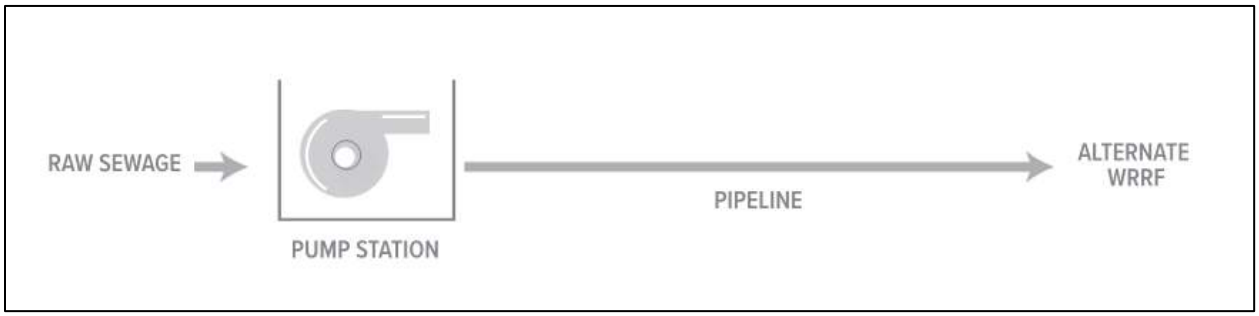
In this alternative, WES would abandon the existing Boring WRRF by demolishing and leaving in place the clay liners for the two lagoons and sand filters. The basins would be filled. If possible, excess soil stored south of the Tri-City WRRF would be used for fill. A new pump station would be constructed, and wastewater would be pumped to an alternate treatment facility. It is assumed that the pump station and force main would require 0.1 FTE for maintenance. Carbon towers at ARVs are assumed for odor control. Any revenue from potential sale of the property or outfall is not included in the evaluation. Two sub-alternatives for treatment are considered:

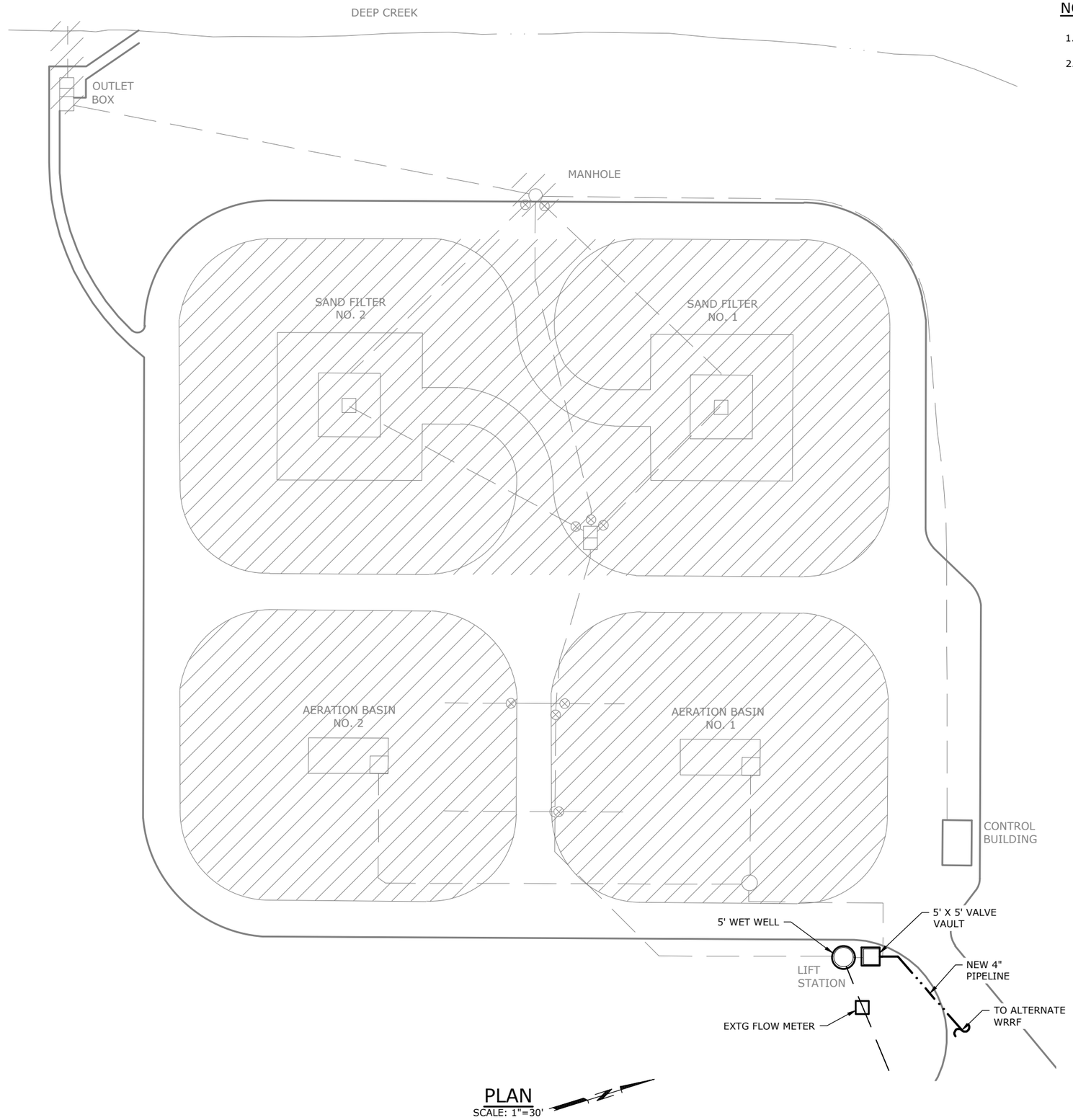
Alternative A.1 – The City of Sandy is currently planning to upsize their treatment capacity by constructing a second treatment facility and a permanent discharge to the Sandy River. In this alternative, WES would pump wastewater approximately 22,500 feet (four miles) to a Sandy WRRF. Cost of buy-in, if any, to the Sandy system and terms regarding the disposition of the collection system and ratepayers would need to be negotiated with the City of Sandy and are not included in alternative costs. Costs for this alternative include on-going maintenance, assuming continued WES ownership of the pump station.

Alternative A.2 – In this alternative, WES would pump wastewater approximately 31,800 feet (six miles) to a manhole in the gravity trunk line at 172nd Avenue. Treatment would be provided at a downstream WES facility.

Figure 6-1 shows a schematic of the proposed unit process for both sub-alternatives under Alternative A. Figure 6-2 shows the layout of the upgraded facility for both sub-alternatives under Alternative A.

Figure 6-1
Alternative A Process Schematic Diagram





PLAN
SCALE: 1"=30'

NOTES

1. FILL ABANDONED PIPES WITH CONTROL DENSITY FILL.
2. DEMOLISHED FEATURES TO BE BACKFILLED AND COMPACTED TO MATCH EXISTING GRADE.

LEGEND

- EXISTING FEATURE
- DEMOLISH
- NEW FEATURE
- EXISTING PROCESS PIPE
- EXISTING PROCESS PIPE TO BE ABANDONED
- NEW PROCESS PIPE

CLACKAMAS WATER ENVIRONMENT SERVICES

FIGURE 6-2

BORING WRRF — AUGUST 2020

ALTERNATIVE A ABANDON WRRF AND PUMP TO ANOTHER FACILITY

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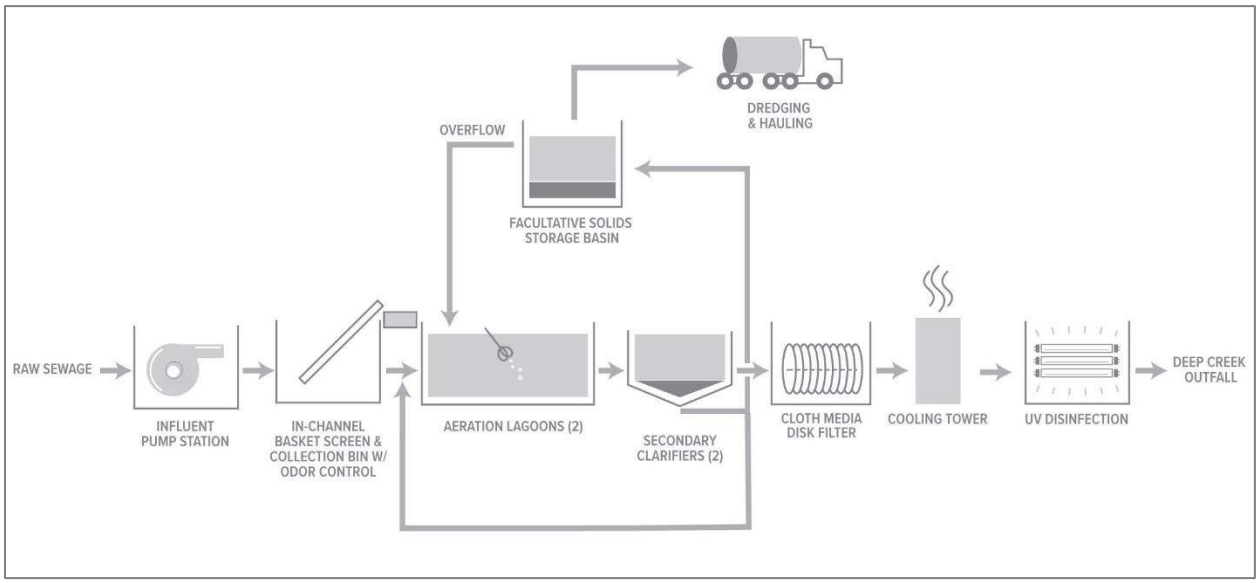
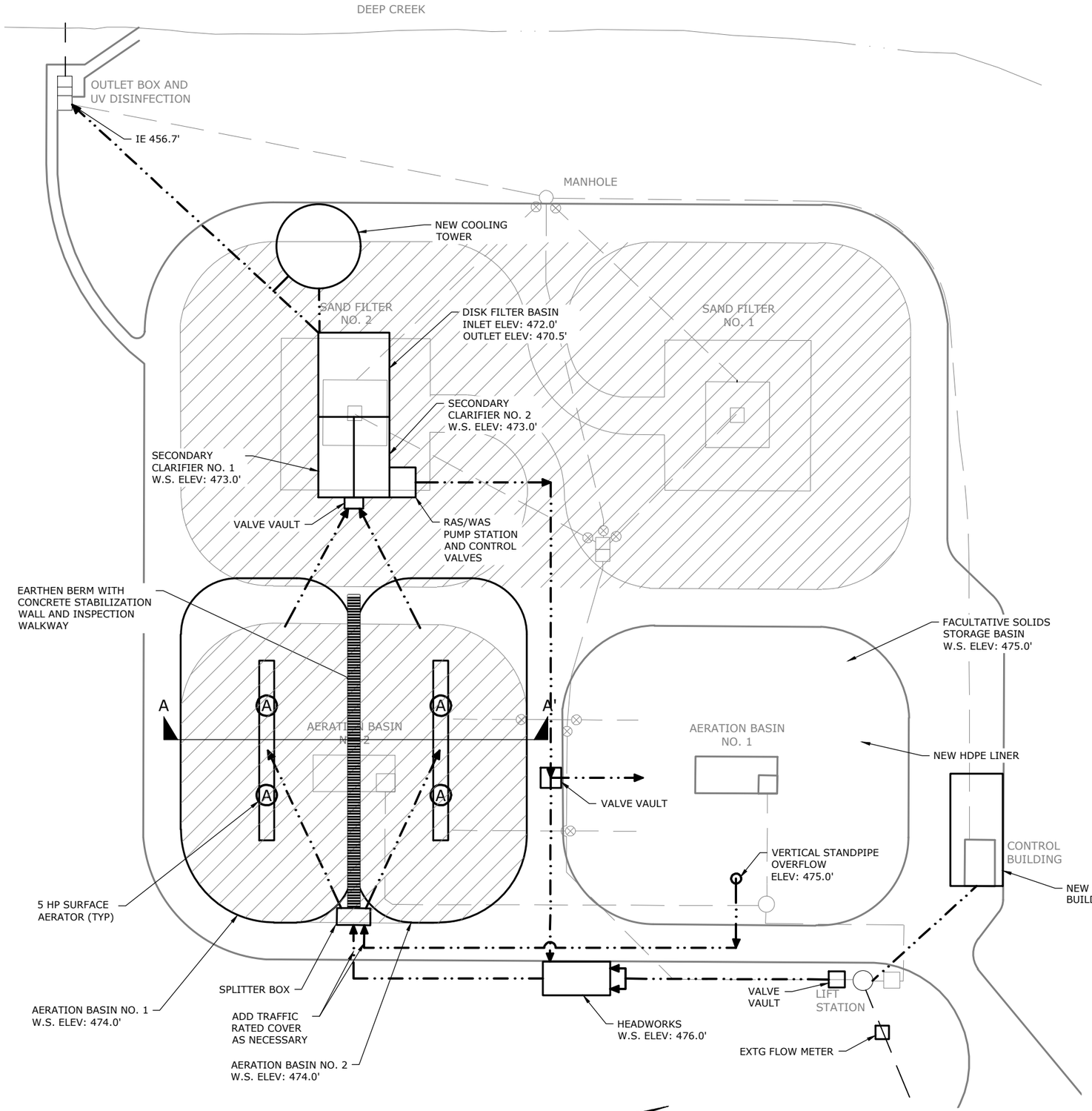
6.2.2 Alternative B – Convert WRRF to CAS Facility with Tertiary Filtration

In this alternative, the existing WRRF would be converted to a full scale two-train secondary treatment facility with tertiary filtration with replacement of the influent pumps, the addition of screening, conversion of one lagoon to two clay-lined aeration basins with surface aerators, and the installation of two secondary clarifiers and cloth media filters. The second lagoon would be used as a facultative, solids-storage and flow-equalization basin. The new UV system would remain, and a small administration building with an office, process lab, and electrical room would be constructed. It is assumed this facility would require one full-time operator and part-time maintenance staff. A cooling tower would be added to meet temperature requirements. The facultative, solids-storage basin would be emptied annually. Screenings would be hauled regularly. The analysis assumes flow would still be hauled half of the winter based on WES's experience in Winter 18/19.

Figure 6-3 shows a schematic of the proposed unit process upgrades. Figure 6-4 shows the layout of the upgraded facility for this alternative.

Figure 6-3
Alternative B Process Schematic Diagram





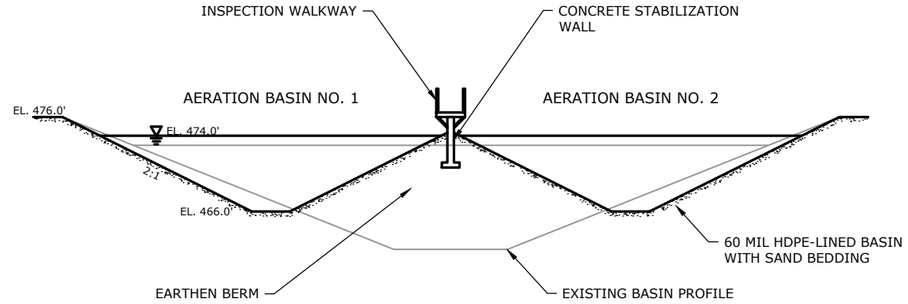
PLAN
SCALE: 1"=30'

NOTES

1. FILL ABANDONED PIPES WITH CONTROLLED DENSITY FILL.
2. DEMOLISHED FEATURES TO BE BACKFILLED AND COMPACTED TO MATCH EXISTING GRADE.
3. SUN SHADE COVERS NOT SHOWN.

LEGEND

- EXISTING FEATURE
- DEMOLISH
- NEW FEATURE
- EXISTING PROCESS PIPE
- EXISTING PROCESS PIPE TO BE ABANDONED
- NEW PROCESS PIPE
- (A) SURFACE AERATOR



SECTION A-A'
SCALE: 1"=16'

CLACKAMAS WATER ENVIRONMENT SERVICES

FIGURE 6-4

BORING WRRF

AUGUST 2020

ALTERNATIVE B CONVENTIONAL ACTIVATED SLUDGE CONVERSION

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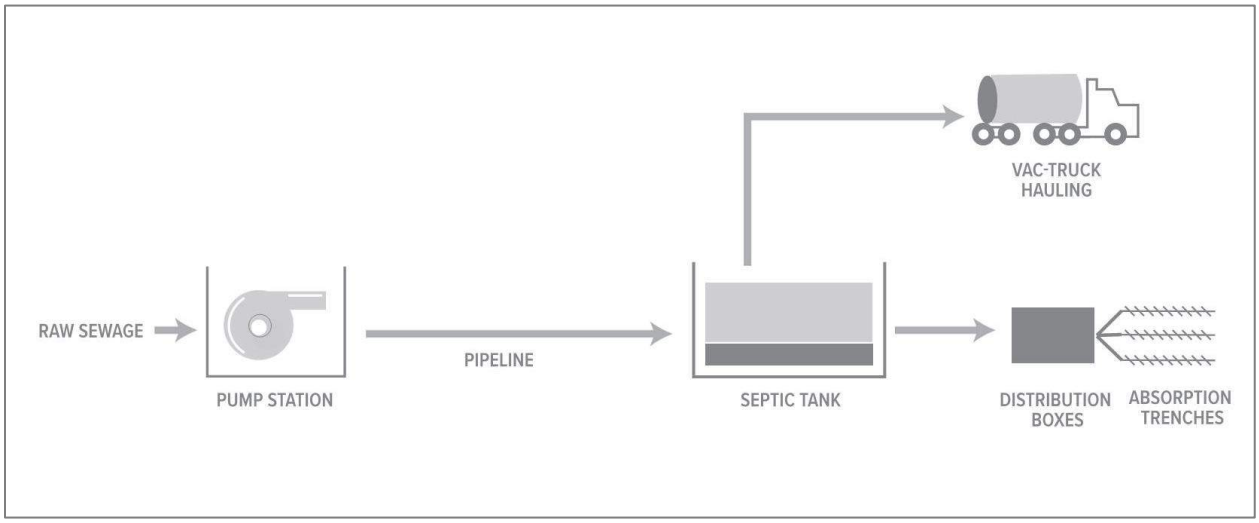
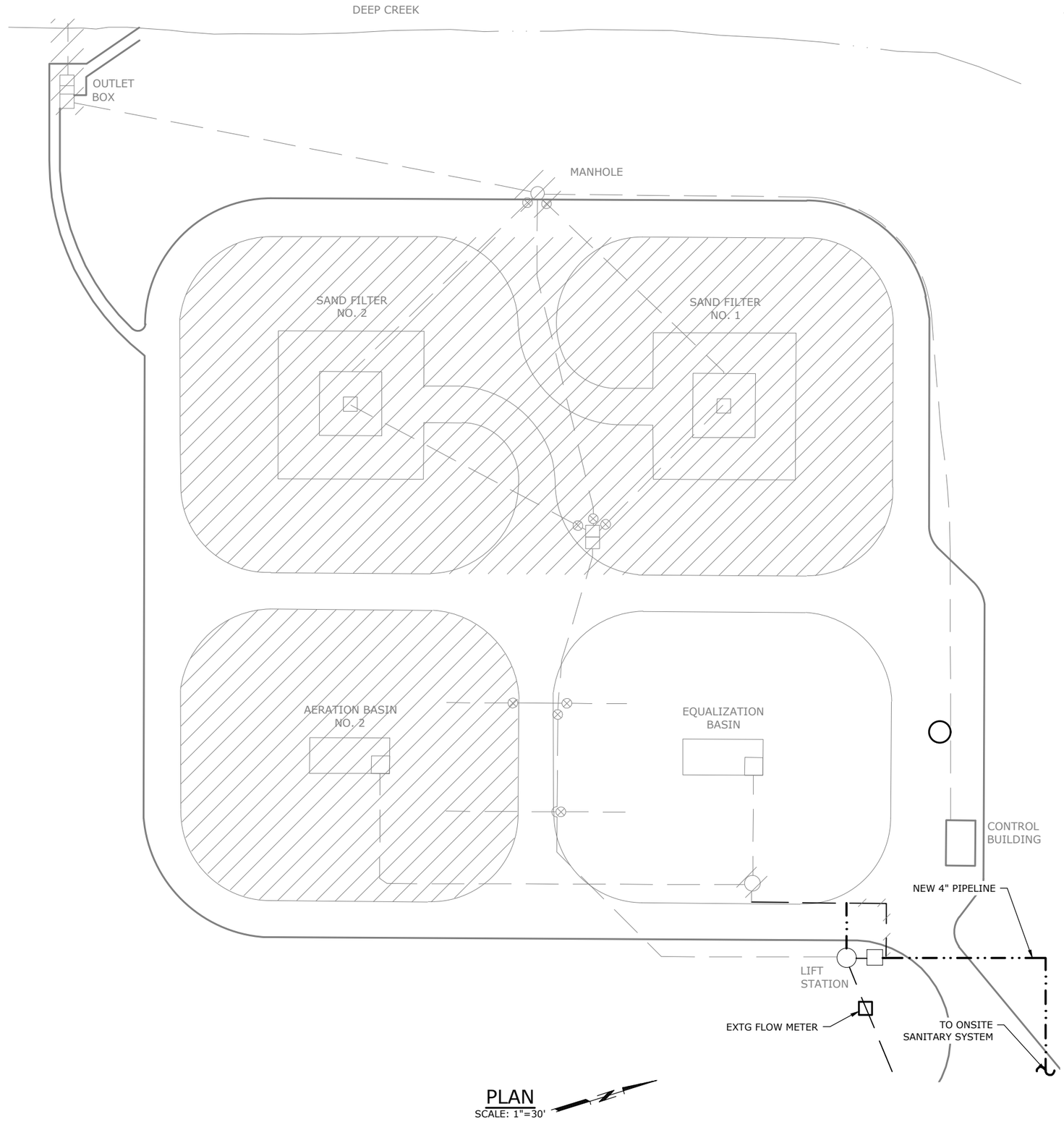
6.2.3 Alternative C – Abandon Boring WRRF and Pump to LOSS

In this alternative, the existing WRRF would be abandoned by demolishing and leaving in place the clay liners for one lagoon and the sand filters. The basins would be filled. If possible, excess soil stored south of the Tri-City WRRF would be used for fill. The liner of the second lagoon would be replaced and the lagoon would be used for equalization. The influent pump station would be repurposed with a station capable of pumping flow to a Large Onsite Sanitary System (LOSS) similar to the Fischer Forest Park facility. A one-mile-long force main is assumed. The NPDES permit could be converted to a WPCF permit continuing with the same discharge restrictions. However, regulatory uncertainties exist around groundwater protection and whether zoning laws would allow such a use. A conditional use permit would be required. Five vac-truck loads per year for solids removal and a 0.25 FTE are assumed.

Figure 6-5 shows a schematic of the proposed unit process upgrades. Figure 6-6 shows the layout of the upgraded facility for this alternative.

Figure 6-5
Alternative C Process Schematic Diagram





PLAN
SCALE: 1"=30'

NOTES

1. FILL ABANDONED PIPES WITH CONTROL DENSITY FILL.
2. DEMOLISHED FEATURES TO BE BACKFILLED AND COMPACTED TO MATCH EXISTING GRADE.
3. SEPTIC SYSTEM NOT SHOWN.

LEGEND

- EXISTING FEATURE
- DEMOLISH
- NEW FEATURE
- EXISTING PROCESS PIPE
- EXISTING PROCESS PIPE TO BE ABANDONED
- NEW PROCESS PIPE

CLACKAMAS WATER ENVIRONMENT SERVICES

FIGURE 6-6

BORING WRRF

AUGUST 2020

ALTERNATIVE C ABANDON WRRF AND PUMP TO LOSS

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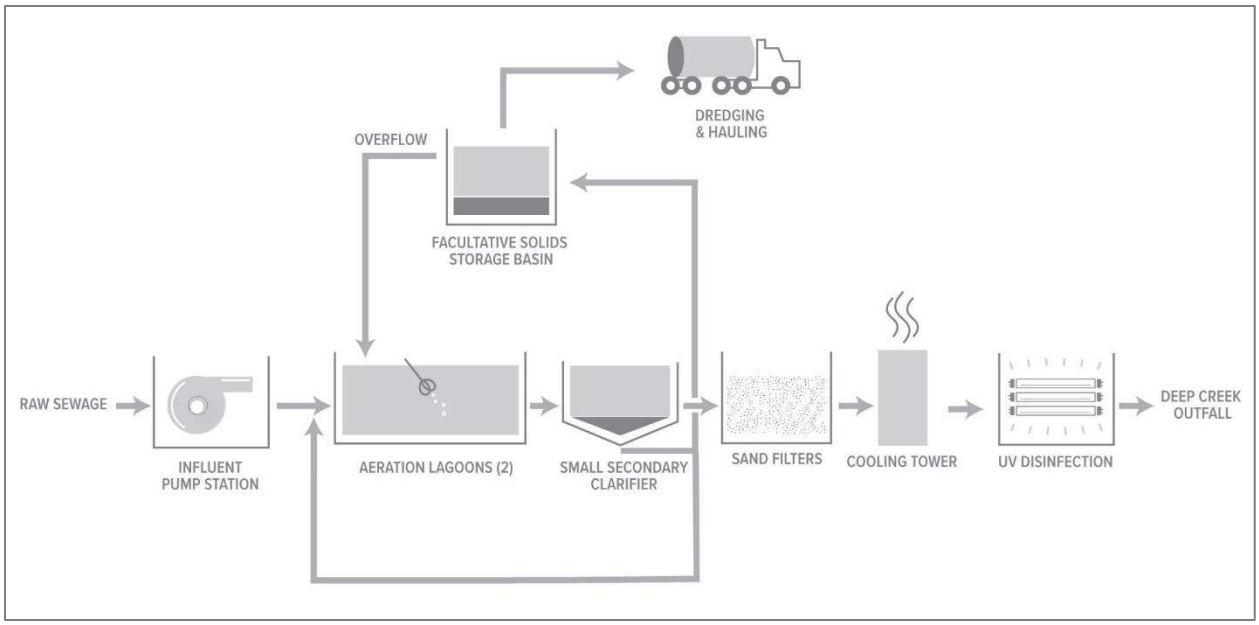
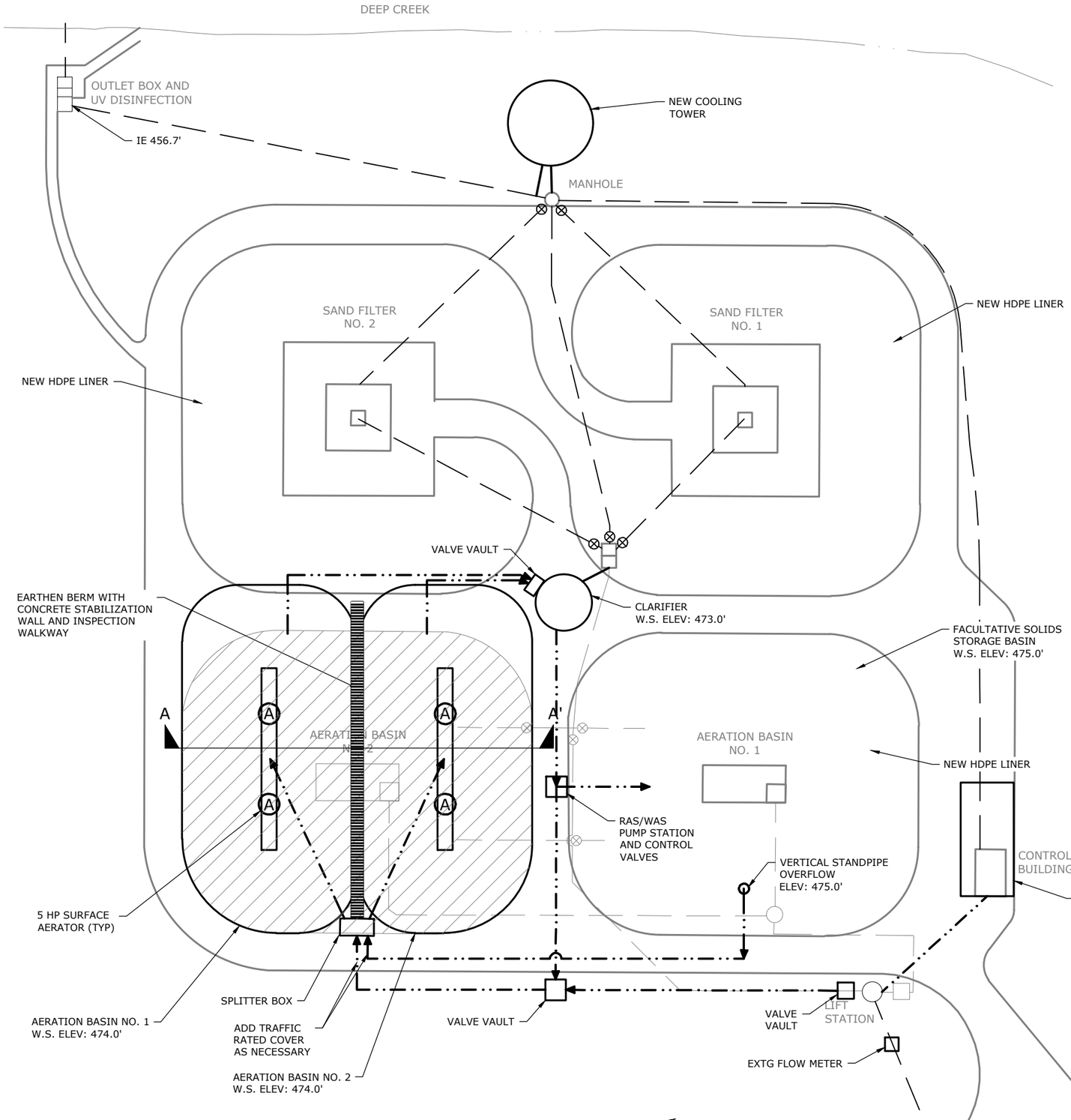
6.2.4 Alternative D – Rehabilitate the Existing WRRF

This alternative includes the minimum that must be done for the facility to meet permit year-round and provide reliable operation. The influent pumps and the liners of the two lagoons and sand filters would be replaced. Similar to Alternative B, one lagoon would be converted to two aeration basins with surface aerators and one lagoon would serve as a facultative solids storage and flow equalization basin. A small secondary clarifier would provide solids recirculation for nitrification. The new UV disinfection system would remain as would the discharge structure. A small administration building with process lab and electrical building would be constructed. A cooling tower would be added to meet temperature requirements. The facultative sludge lagoon would be emptied annually. The analysis assumes flow would still be hauled half of the winter based on WES's experience in Winter 18/19.

Figure 6-7 shows a schematic of the proposed unit process upgrades. Figure 6-8 shows the layout of the upgraded facility.

Figure 6-7
Alternative D Process Schematic Diagram





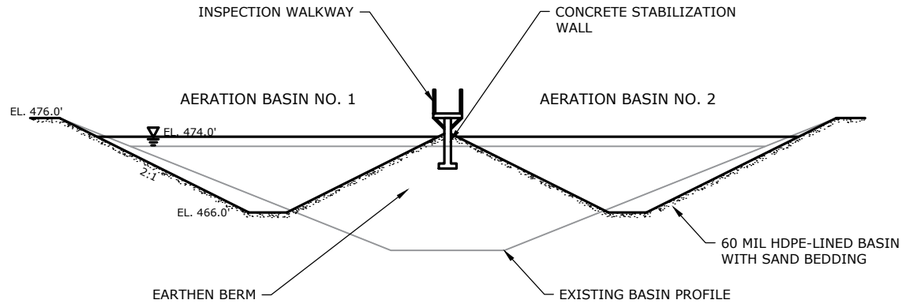
PLAN
SCALE: 1"=30'

NOTES

1. FILL ABANDONED PIPES WITH CONTROLLED DENSITY FILL.
2. DEMOLISHED FEATURES TO BE BACKFILLED AND COMPACTED TO MATCH EXISTING GRADE.
3. SUN SHADE COVERS NOT SHOWN.

LEGEND

- EXISTING FEATURE
- DEMOLISH
- NEW FEATURE
- EXISTING PROCESS PIPE
- EXISTING PROCESS PIPE TO BE ABANDONED
- NEW PROCESS PIPE
- (A) SURFACE AERATOR



SECTION A-A'
SCALE: 1"=16'

CLACKAMAS WATER ENVIRONMENT SERVICES

FIGURE 6-8

BORING WRRF

AUGUST 2020

ALTERNATIVE D EXISTING WRRF REHABILITATION

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6.3 Non-Monetary Comparison of Alternatives

A summary of alternative scoring based on the evaluation criteria described in Section 5 of this Facility Plan for the four alternatives is provided in Table 6-1 below.

Table 6-1
Non-Monetary Evaluation of Alternatives

Alternative	Constructability	Regulatory Flexibility	Expandability (growth)	Ease of Operation and Maintenance	Public Acceptance	Total
Weight	20%	20%	20%	20%	20%	
A. Install Pump Station A.1 To Sandy A.2 To WES	Can be constructed without interference with operation of existing facility	Can easily accommodate change in regulations. No additional facilities required.	Can easily accommodate growth	Simple to operate	Will eliminate a treatment plant.	
Score	5	5	5	5	5	5.0
B. Conventional Activated Sludge Facility	Will need to provide temporary treatment or haul during construction.	May/may not be adaptable to stricter regulations.	Growth will require additional facilities. Not expandable on existing site.	Highest O&M complexity compared to other alternatives.	New facilities slightly more acceptable to public	
Score	2	3	2	2	3	2.4
C. Pump to LOSS	Can be constructed without interference with existing facility. Regulatory and permitting hurdles are high. Land availability is unknown.	Not adaptable to stricter regulations.	Will require purchase of additional land. Land availability is unknown.	Relatively simple to operate. Will require some attention at LOSS site.	May be unacceptable to public to take land for this purpose. Will require land use approval.	
Score	3	1	2	4	3	2.6
D. Rehabilitate Existing Facility	Will need to provide temporary treatment or haul during construction.	May/may not be adaptable to stricter regulations.	Growth will require additional facilities. Not expandable on existing site.	Similar to Alternative B. No HW, but sand filter requires regular attention.	Unattractive site.	
Score	2	2	2	1	2	1.8

6.4 Monetary Comparison of Alternatives

A summary of capital costs for the four alternatives is provided in Table 6-2 below.

Table 6-2
Alternatives A – D Overall Cost Summary

Total	ALT A.1	ALT A.2	ALT B	ALT C	ALT D
Construction	$3,600,000	$4,900,000	$2,800,000	$5,600,000	$1,300,000
Annual/Repair & Replacement	$400,000	$400,000	$4,600,000	$1,000,000	$3,700,000
Total	**$4,000,000**	**$5,300,000**	**$7,400,000**	**$6,600,000**	**$5,000,000**

6.5 Recommended Plan

Based on non-monetary and cost comparisons, Alternative A is recommended for implementation. The present worth cost of Alternative A.1, converting the Boring WRRF to a pump station and pumping to a City of Sandy facility is the lowest of all alternatives evaluated. It does not include any negotiated costs with the City of Sandy and assumes WES continues to own and operate the pump station. The cost difference between Alternatives A.1 and A.2 in this evaluation is the construction cost of the force main, and the distance to a City of Sandy facility is significantly less than the distance to an existing WES manhole.

Alternative A has a higher initial cost than either rehabilitating or upgrading the existing Boring WRRF (Alternatives B and D) but has a significantly lower annual cost. Beyond 20 years, the life-cycle cost of Alternative A will be lower than Alternatives B and D. Abandoning the WRRF and pumping wastewater to an alternate facility also carries the least risk of any alternative evaluated, as is reflected in the non-monetary scoring. Because the existing Boring WRRF is unable to meet its NPDES Permit requirements for a portion of the year, it is recommended that WES embark on implementation of this recommendation as soon as is practical to avoid continued hauling costs exceeding $100,000/year.

Appendix

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT

Oregon Department of Environmental Quality
Northwest Region – Portland
700 NE Multnomah St., Suite 600
Telephone: 503-229-5263

Issued pursuant to ORS 468B.050 and The Federal Clean Water Act (The Clean Water Act)

ISSUED TO:

Clackamas County Service District No. 1
Boring Sewage Treatment Plant
11525 SE McLoughlin Blvd.
Milwaukie, OR, 97222

SOURCES COVERED BY THIS PERMIT:

Type of Waste	Outfall Number	Outfall Location
Treated Wastewater	001	North Fork of Deep Creek 45.426831/-122.377124 R.M. 3.0

FACILITY LOCATION:

13305 SE Richey Road
Boring, OR, 97009

Treatment System Class: 1
Collection System Class: 1

RECEIVING STREAM INFORMATION:

WRD Basin: Willamette
USGS Sub-Basin: Clackamas
Receiving Stream name: North Fork of Deep Creek
LLID: 1224107453935-3.0

County: Clackamas

EPA REFERENCE NO.: OR-003139-9

Issued in response to Application No. 962653, received September 28, 2012. This permit is issued based on the land use findings in the permit record.

Tiffany Yelton-Bram, Water Quality Manager
Northwest Region

2/8/2016
Signature Date

3/1/2016
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 permit, or by Oregon statute or administrative rule, any other direct or indirect discharge of pollutants to waters of the state is prohibited.

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List of Tables

SCHEDULE A: WASTE DISCHARGE LIMITS

1. Outfall 001 – Treated effluent from outfall 001 must meet the following limits:

a. CBOD5 and TSS

i. May 1 – October 31. During this time period the permittee must comply with the limits in the following table:

Table A1: $CBOD_5$ and TSS Limits

Parameter	Average Effluent Concentrations, mg/L		Monthly Average lbs/day	Weekly Average lbs/day	Daily Maximum lbs
	Monthly	Weekly			
$CBOD_5$ (See Note 1)	10	15	1,7	2.5	3.4
TSS	10	15	1.7	2.5	3.4

ii. November 1 – April 30: During this time period the permittee must comply with the limits in the following table:

Table A2: BOD_5 and TSS Limits

Parameter	Average Effluent Concentrations, mg/L		Monthly Average lbs/day	Weekly Average lbs/day	Daily Maximum Lbs
	Monthly	Weekly			
BOD_5	20	30	3.4	5.0	6.8
TSS	20	30	3.4	5.0	6.8

iii. Additional information for the limits in Tables A1 and A2 above.

(A) The mass load limits are based on the average dry weather design flow of 0.02 MGD.

b. Additional Parameters.

Year-round

Other Parameters	Limitations
E. coli Bacteria	Must not exceed 126 organisms per 100 mL monthly log mean (same as geometric mean). No single sample shall exceed 406 organisms per 100 mL (See Note 2).
pH	Must not be outside the range of 6.0 to 9.0.
BOD_5 or $CBOD_5$, and TSS Removal Efficiency	Must not be less than 85% monthly average for BOD_5, $CBOD_5$ and TSS (See Note 3).
Total Residual Chlorine	Must not exceed a daily maximum limit of 0.02 mg/L and average monthly limit of 0.01 mg/L (See Note 4).
Ammonia NH_3-N	Must not exceed a daily maximum limit of 11.5 mg/L

	and an average monthly limit of 5.0 mg/L.
Excess Thermal Load (June 16-October 14)	Must not exceed 0.333 million kcal/day (See Notes 5 and 7).
Excess Thermal Load (October 15-June 15)	Must not exceed 0.357 million kcal/day (See Notes 6 and 7).

NOTES:

1. DEQ considers the $CBOD_5$ concentration limits to be equivalent to the minimum design criteria for BOD_5 specified in OAR 340-41. These limits and $CBOD_5$ mass limits may be adjusted (up or down) by permit action if more accurate information regarding $CBOD_5/BOD_5$ becomes available.
2. If a single sample exceeds 406 organisms per 100 mL, then five consecutive re-samples may be taken at one-hour intervals beginning within 28 hours after the original sample was taken. If the log mean of the five re-samples is less than or equal to 126 organisms per 100 mL, a violation shall not be triggered.
3. Percent removal is to be calculated on a monthly basis. Percent removal = ((BODinf – BODeff)/BODinf) x 100, where BODinf is the monthly average influent concentration in mg/L and BODeff is the monthly average effluent concentration in mg/L.
4. When the total residual chlorine limitation is lower than 0.10 mg/L, DEQ will use 0.10 mg/L as the compliance evaluation level (i.e., DEQ will consider daily maximum concentrations below 0.10 mg/L in compliance with the limitation).
5. For compliance purposes, the earliest 7-day averaging period to which the excess thermal load limit of 0.333 million kcal/day applies is June 16-22, and the latest 7-day averaging period to which it applies is October 8-14.
6. For compliance purposes, the earliest 7-day averaging period to which the excess thermal load limit of 0.357 million kcal/day applies is October 15-21, and the latest 7-day averaging period to which it applies is June 9-15.
7. When calculating the daily ETL, facility personnel must apply the following procedures, as applicable:

   - Calculate the ETL for each 7 day period. When the flow is zero, and there is no effluent temperature, the ETL for that day is zero ("0").
   - Monitor the discharge continuously, collecting at least one temperature reading each clock hour.
   - The daily maximum discharge temperature is the highest discharge temperature recorded during each day discharge occurs.
   - When there is no discharge for a calendar day, record effluent temperature as a blank.
   - Calculate the 7-day moving average effluent temperature, based on the previous 7 calendar days. When no discharge occurs, and the temperature is a blank, enter a blank into the average. The average temperature is only the average of the days when discharge occurred during the previous seven day period.
   - Calculate the 7-day moving average effluent flow, based on the previous seven calendar days. Include in the calculation days when the flow is zero ("0").
   - Calculate the 7-day ETL, using the 7-day average discharge temperature, and the 7-day average discharge flow, in the equation.

2. Regulatory Mixing Zone

Pursuant to OAR 340-041-0053, the permittee is granted a regulatory mixing zone as described below:

DEQ defines the RMZ as that portion of North Fork Deep Creek, which extends 50 feet downstream from the outfall. The zone of initial dilution (ZID) is defined as that portion of the allowable mixing zone that is within 5 feet of the outfall.

3. Outfall Inspection

During the year 2018, the permittee must inspect outfall 001 and submit a written report to DEQ within the same year regarding the integrity of the outfall. The report should include a description of the outfall as originally constructed, the condition of the current outfall, and a discussion of any repairs that the permittee would need to perform to return the outfall to its originally designed condition.

4. Groundwater Protection

The permittee may not conduct any activities that could cause an adverse impact on existing or potential beneficial groundwater uses. The permittee must manage and dispose all wastewater and process related residuals in a manner that will prevent violating the Groundwater Quality Protection Rules (OAR Chapter 340, Division 40).

5. Use of Recycled Water

The permittee does not currently operate a recycled water program and does not intend to do so during the term of this renewal permit.

6. Biosolids

CCSD No. 1 personnel remove biosolids from the Boring Sewage Treatment Facility on average once every four years. Facility personnel pump the solids from the lagoons and haul it to one of the WES facilities where it is added to the treatment system at the head works or into one of the pump stations. The Biosolids Management Plan (BMP) for the Boring facility is a part of the Clackamas County Service District's BMP. DEQ requires the CCSD No. 1 to update their BMP 6 months before removing sludge from the lagoons or at the time CCSD No. 1 updates their BMP for any of their other facilities.

SCHEDULE B: MINIMUM MONITORING AND REPORTING REQUIREMENTS

1. Monitoring and Reporting Protocols

a. Laboratory Quality Assurance and Quality Control

i. Laboratory Quality Assurance and Quality Control (QA/QC) – The permittee must develop and implement a written QA/QC program that conforms to the requirements of 40 CFR Part 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 a sample does not meet QA/QC requirements, the permittee must include the result in the discharge monitoring report (DMR) along with a notation (data qualifier) explaining how it does not meet QA/QC requirements, but the permittee must not use the result in any calculation required by the permit unless authorized by the DEQ permit inspector.

b. Reporting Procedures

i. Calculating Mass Loads

The permittee must calculate mass loads on a daily basis as follows:

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

2. Influent Monitoring and Reporting Requirements

The permittee must monitor influent at the junction box and just before lagoon no.1, and report results as listed below.

Table B1: Influent Monitoring

Item or Parameter	Time Period	Minimum Frequency	Sample Type/Required Action	Report
Total Flow (MGD)	Year-round	Daily	Measurement	Daily values
Flow Meter Calibration	Year-round	Annual	Verification (see Note a)	Annual Certification
BOD_5 and TSS (mg/L)	Year-round	1/month	24-hr composite	Daily values
pH (S.U.)	Year-round	2/week	Grab	Daily values

3. Effluent Monitoring and Reporting Requirements

The permittee must monitor effluent for Outfall 001 at the Outlet Box, and report results as listed below.

Table B2: Effluent Monitoring

Item or Parameter	Time Period	Minimum Frequency	Sample Type/Required Action	Report
Total Flow (MGD)	Year-round	Daily	Measurement	Daily values
Flow Meter Calibration	Year-round	Annual	Verification (see Note a)	Annual Certification
BOD_5, (mg/L)	Nov. 1-Apr. 30	Monthly	24 hour composite	Daily values Monthly average
TSS (mg/L)	Year-round	Monthly	24 hour composite	Daily values Monthly average
$CBOD_5$ (mg/L)	May 1 – Oct. 31	Monthly	24 hour composite	Daily values Monthly average
BOD_5 Mass Load (lb/day)	Nov. 1-Apr. 30	Monthly	Calculation	Daily values Monthly average Max daily value
TSS Mass Load (lb/day)	Year-round	Monthly	Calculation	Daily values Monthly average Max daily value
$CBOD_5$Mass Load (lb/day)	May 1 – Oct. 31	Monthly	Calculation	Daily values Monthly average Max daily value
BOD_5, Percent Removal (%)	Nov. 1-Apr. 30	Monthly	Calculation (See note b)	Monthly average
TSS Percent removal (%)	Year-round	Monthly	Calculation (See note b)	Monthly average
$CBOD_5$ Percent Removal (%)	May 1 – Oct. 31	Monthly	Calculation	
pH (S.U.)	Year-round	2/week	Grab	Daily values Maximum daily value Minimum daily value
Ammonia (NH_3-N, mg/L)	Year-round	Weekly	Composite	Daily values Monthly average Maximum daily value
Temperature (°C), Maximum Hourly Average	Year-round	2/week	Grab between 3 and 4 pm/or Continuous (see Note c)	Daily values Monthly average Monthly max
Temperature (°C), Average of Daily Maximums	Year-round	Weekly	Calculation of 7-day moving average (see Note d)	Daily values Monthly average Monthly max
Excess Thermal Load (Mkcal/day)	Year-round	Weekly	Calculation (see Note d)	Daily values

Item or Parameter	Time Period	Minimum Frequency	Sample Type/Required Action	Report
E. coli (#/100 ml)	Year-round	Weekly	Grab	Daily values Max daily value Monthly geometric mean Geometric mean of re-samples (if any)
Chlorine, Total Residual (mg/L)	Year-round	5 Days/Week, or when the plant is decanting, as appropriate	Grab	Daily values Monthly average Max daily value
For characterization purposes only: Alkalinity (mg/L, N. Fk. Deep Cr., upstream of Outfall 001)	Year-round	2/year	Grab (see Note e)	Daily values
For characterization purposes only: Solids pumped from Treatment	Year-round	Each Occurrence	Date, volume (gal.), percent solids, hauler, transfer point	Annual Report
For characterization purposes only: Storage Solids Lagoon Depth	Year-round	Annually	Representative Measurement	Annual Report

Notes:

a. When the annual flow meter calibration is completed, the inspection date must be recorded in the facility's log book. Any corrective action taken must also be discussed in the facility's log book. The facility's log book must be kept current for all permit parameters listed here and in the notes below. The log book must be made available for ODEQ inspection during site visits.

b. Monthly average percent calculated as follows: $100*(BOD_{in} - BOD_{out})/BOD_{in}$ where BOD_{in} and BOD_{out} are monthly averages

c. After two full years of temperature monitoring, and if approved in writing by the Department, monitoring may be waived for those months when the effluent temperature does not exceed the stream temperature standard.

d. The Maximum hourly effluent temperatures and the daily effluent flows shall be used to calculate the 7 day average excess thermal load, or ETL–7D. For monthly DMR submittals, the month in which the 7th daily value occurs shall be the month the average is reported. For example: The moving 7-day average for July 1st will include the six days from June 25-30 and will be reported with July's DMR. Calculate the ETL as follows:

   1. **ETL-7D (in Million kcal/day)** = (Weekly Average of daily maximum effluent temperatures in ^{0}F – applicable stream temperature criteria in ^{0}F) X (Weekly average of daily flow in MGD) X 8.34 #/gal X 0.2520 kcal/BTU.
   2. Applicable stream temperature criteria = 60.8 ^{0}F (June 16-October 14) and 55.4^{0}F (October 15- June 15).

   If the calculation results in a ETL-7D value less than zero, record the results as zero.

e. The permittee must take two alkalinity grab samples during the first year of the permit cycle. The permittee must take one sample between June 16- October 14, and one sample between October 15 and June 15. The permittee must take the two samples at least 2 months apart, upstream of outfall 001. The sampling location must have no side stream effects of visible flow from the banks.

4. Permit Application Monitoring Requirements

The renewal application for this permit requires 3 scans for the parameters listed in the table below. This data may be collected up to 4.5 years in advance of submittal of the renewal application. DEQ recognizes that some facilities may find it difficult to collect 3 scans that are representative of the seasonal variation in the discharge from each outfall within the permit renewal timeframe, and is therefore requiring that this monitoring be completed as part of compliance with this permit.

Table B3: Effluent Monitoring Required for NPDES Permit Application

(a minimum of 3 scans required)

Parameter*
Dissolved Oxygen
Total Kjeldahl Nitrogen (TKN)
Nitrate Plus Nitrite Nitrogen
Oil and Grease

* NOTE: All grab samples

5. Minimum Reporting Requirements

The permittee must report monitoring results as listed below.

Table B4: Reporting Requirements and Due Dates

Reporting Requirement	Frequency	Due Date (see note a.)	Report Form (unless otherwise specified in writing)	Submit To:
1. Table B1: Influent Monitoring 2. Table B2: Effluent Monitoring	Monthly	15th day of the month following data collection	DEQ-approved discharge monitoring report (DMR) form, electronic and hardcopy. (See Notes b. through and d.)	DEQ Regional Office
Wastewater solids annual report describing quality, quantity, and use or disposal of wastewater solids generated at the facility.	Annually	February 19	2 hard copies and electronic copy in DEQ-approved format	One each to: • DEQ Regional Office • DEQ Biosolids Program Coordinator
Inflow and infiltration report (see Schedule D, Section 1 for description)	Annually	February 1	1 hard copy and electronic copy in DEQ-approved format	DEQ Regional Office
Significant Industrial User Survey (see Schedule D, Section 6 for description)	Every 5 years	Within 2 months of permit effective date	1 hard copy and electronic copy in DEQ-approved format	DEQ Pretreatment Coordinator
Outfall Inspection Report (see Schedule D, Section 7 for description)	Every 5 years	3rd year of permit term	1 hard copy and electronic copy in DEQ-approved format	DEQ Regional Office

Reporting Requirement	Frequency	Due Date (see note a.)	Report Form (unless otherwise specified in writing)	Submit To:
Notes: a. For submittals that the permittee mails to DEQ, the postmarked date must not be later than the due date. b. The permittee must include on the DMRs the name, certificate classification, and grade level of each responsible principal operator, as well as identifying each system classification. Font size must not be less than 10 pt. c. The permittee must note on the DMRs equipment breakdowns and bypass events. d. DEQ anticipates implementing an electronic reporting system for DMRs. Once the electronic reporting system is in place, the permittee has up to six months to submit DMRs electronically. Until the electronic reporting system is in place, the permittee must submit a hard copy of the DMR.				

SCHEDULE D: SPECIAL CONDITIONS

1. Inflow and Infiltration

The permittee must submit to DEQ an annual inflow and infiltration report, as directed in Schedule B. 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 ambient monitoring.

2. Emergency Response and Public Notification Plan

The permittee must develop and maintain an Emergency Response and Public Notification Plan (the Plan) per Schedule F, Section B, and Conditions 7 & 8. The permit holder must develop the plan within six months of permit issuance and update the Plan annually to assure that telephone and email contact information for applicable public agencies are current and accurate. The permittee must keep an updated copy of the plan on file at the wastewater treatment 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. Exempt Wastewater Reuse at the Treatment System

The permittee is exempt from the recycled water use requirements in OAR 340-055 when the permittee uses recycled water at the wastewater treatment system for landscape irrigation or for in-plant processes at a wastewater treatment system, and all of the following conditions are met:

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

b. The permittee uses recycled water 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. DEQ considers contiguous property to the parcel of land upon which the treatment system is located to be the wastewater treatment system site if under the same ownership.

c. Spray or drift or both from the use does not occur off the site.

d. Public access to the site is restricted.

4. 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 monitor, report, and dispose of solids as required under the permit of the receiving facility.

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.

5. 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 that the permittee delegates the authority for establishing and executing the specific practice and procedures for operating the wastewater treatment system or wastewater collection system according to the system owner's policies and any permit requirements.

iii. "Shift Supervisor" means the operator that the permittee delegates authority 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 on page 1 of this permit.

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

d. The permittee's wastewater system may not be without the designated supervisor for more than 30 days. During this period, there must be another person available to supervise 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, if any, 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. 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 Street, Suite 600, Portland, OR 97232.

h. When compliance with item (e) 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. DEQ may grant a time extension for compliance with the requirements in response to a written request from the system owner. DEQ will not grant

an extension longer than 120 days unless the system owner documents the existence of extraordinary circumstances.

6. Industrial User Survey

The permittee must conduct an industrial user survey to determine the presence of any industrial users discharging wastewaters subject to pretreatment and submit a report on the findings to DEQ within 24 months of the permit effective date. The purpose of the survey is to identify whether there are any categorical industrial users discharging to the POTW, and assure regulatory oversight of these discharges to state waters. If the POTW has already completed a baseline IU Survey, the permittee must provide the survey results to DEQ within two months of the permit effective date. If there is no industrial user in the service area, then the permittee must submit a letter to DEQ, within two months of the permit's effective date, stating that there is no industrial user discharging to the POTW.

Guidance on conducting IU Surveys is available at the following web site:

http://www.deq.state.or.us/wq/pretreatment/docs/guidance/IUSurveyGuidance.pdf

After the permittee conducts an initial baseline IU Survey, the permittee must maintain the survey and have it available for DEQ inspection. Every 5 years from the effective date of the permit, the permittee must submit an updated IU survey.

7. Outfall Inspection

During the year 2018, the permittee must inspect outfall 001 and submit a written report to DEQ within the same year regarding the integrity of the outfall. The report should include a description of the outfall as originally constructed, the condition of the current outfall and a discussion of any repairs that would need to be performed to return the outfall to its originally designed condition.

SCHEDULE F: NPDES GENERAL CONDITIONS

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 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. The federal Clean Water Act provides for civil penalties not to exceed $37,500 and administrative penalties not to exceed $16,000 per day for each violation of any condition or limitation of this 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. The federal Clean Water Act provides for criminal penalties of not more than $50,000 per day of violation, or imprisonment of not more than 2 years, or both for second or subsequent negligent violations of this permit.

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 federal Clean Water Act provides for criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment of not more than 3 years, or both for knowing violations of the permit. In the case of a second or subsequent conviction for knowing violation, a person is subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

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.

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 use and disposal, approved under 40 CFR part 503 unless other test procedures have been specified in this permit.

C4. Penalties of 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 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.

D4. 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.

D5. 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 B7.
   (4) DEQ may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

D6. 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.

D7. 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.

D8. Signatory Requirements

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

D9. 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.

D10. 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. The sample must be collected and stored in accordance with 40 CFR part 136.
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.

Permit Evaluation Report

Oregon Department of Environmental Quality
Northwest Region Office
700 NE Multnomah Street, Suite 600
Portland OR 97232

Contact: David Cole

Permittee:	Clackamas County Service District No.1 Boring Sewage Treatment Facility 11525 SE McLoughlin Blvd. Milwaukie, OR 97222
Existing Permit Information:	File Number: 16592 Permit Number: 100968 Expiration Date: 3/31/2013 EPA Reference Number: OR-003139-9
Source Contact:	Doug Rumpel, 503-794-8050 Sewage Treatment Plant Operator
Facility Location:	13305 SE Richey Road Boring, Oregon Clackamas County
LLID:	1224107453935-3.0-D
Receiving Stream/Basin:	North Fork of Deep Creek Willamette Basin Clackamas Sub-Basin
Proposed Action:	Renew Permit Application Number: 962653 Date Received: September 28, 2012
Source Category:	NPDES Minor – Domestic
Sources Covered:	Treated Wastewater
Permit Type:	NPDES Domestic
Permit Writer:	David Cole Water Quality Specialist Northwest Region, Source Control Section Date Prepared: Feb. 5, 2016

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1.0 Introduction

The Department of Environmental Quality (DEQ) proposes to renew the National Pollutant Discharge Elimination System (NPDES) wastewater permit for Clackamas County Service District #1 (CCSD #1), Boring Sewage Treatment Facility, located at 13305 Richey Road, Boring, Oregon. This permit allows and regulates the discharge of treated wastewater to the North Fork of Deep Creek, a tributary of Deep Creek and ultimately the Clackamas River. The permit also allows CCSD #1 to transfer wastewater solids to one of Water Environment Service's facilities, where it is added to the treatment system at the headworks or into one of the pump stations.

The purpose of this permit evaluation report is to explain and provide justification for the permit.

The Federal Water Pollution Control Act of 1972 (also known as the Clean Water Act) and its subsequent amendments, as well as Oregon Revised Statutes (ORS 468B.050), require a NPDES permit for the discharge of wastewater to surface waters. This DEQ-proposed permit action complies with both federal and state requirements.

2.0 Permit History

2.1 Issuance, Renewal and Modifications

The expiration date for the current NPDES Permit was April 5, 2013. DEQ received renewal application number 962653 from CCSD #1 on September 28, 2012. Because the permittee submitted a renewal application to DEQ in a timely manner, the current permit will not expire until DEQ takes final action on the renewal application, as per OAR 340-045-0040.

2.2 Compliance History

Since DEQ issued the most recent permit on April 5, 2010, DEQ issued the following enforcement actions:

Table 1:

Enforcement Action During Most Recent Permit Period

Date	Enforcement Action	Cause
7/19/2011	Warning Letter	CBOD exceedances
11/15/2011	Warning Letter	NH_3 exceedances
12/7/2011	Warning Letter	BOD exceedance
3/21/2014	Preliminary Enforcement Notice	5/2012 – 7/2013 CBOD, BOD, NH_3 exceedances
9/17/2014	Warning Letter	Excess Thermal Load exceedance

In September of 2005 DEQ entered into a Mutual Agreement and Order (MAO) with CCSD #1 to address ammonia, temperature and chlorine permit limit exceedances. On February 1, 2011 the facility completed installation and start-up of the dechlorination unit, ahead of schedule. This completed the last milestone in the MAO. On December 15, 2014, DEQ issued a letter to CCSD #1, terminating the MAO.

DEQ conducted the most recent facility inspection on June 17, 2009. At the time of the inspection the facility was operating in compliance with its permit, with no violations noted. During the inspection DEQ personnel collected split samples of both the influent and effluent. Inter-laboratory results compared well, except for BOD and Total Phosphorus, where the Relative Percent Differences (RPDs)

were 41% and 63%, respectively. The DEQ lab considers absolute RPDs of ≤ 20% to be acceptable, but recognizes that the results of inter-laboratory split sampling can vary greatly. Because the plant was in compliance during the inspection, DEQ determined that re-sampling was unnecessary. DEQ plans to inspect the facility during federal fiscal year 2016 (Oct. 1, 2015 – Sept. 30, 2016).

Facility management has developed a temperature management plan to address the ETL exceedances that have occurred. Facility management intends to implement the plan in two phases: (1) short term improvement, and (2) long term improvement. The short term improvements involve a continuous temperature monitoring probe, communications infrastructure and a tablet. This equipment has been installed and will monitor effluent temperature so that personnel can calculate ETL in real time and better manage discharge to avoid exceeding their permit's ETL limits. Facility management plans to place this equipment into operation when effluent temperatures begin to increase after the wet weather flow season.

The long term improvement phase is to convert the facility from a batch discharge facility to a continuous discharge facility. The intent is to install a new package filter plant that will replace the existing slow sand filters. The advantages of this plan include the following:

- Eliminates temperature increases due to discharging effluent onto the warm sand in the slow sand filters.
- Continuous discharge minimizes the flow discharged each day on a 7-day per week basis, versus 5-days per week.
- Continuous discharge eliminates the need for two staff trips to the treatment plant each day, thereby minimizing the labor cost for plant operations.
- A package filter plant provides better discharge and disinfection control.

3.0 Proposed Revisions to Permit

Schedule A: The proposed permit clarifies Excess Thermal Load calculation procedures to be consistent with the applicable Willamette Basin TMDL.

4.0 Facility description

4.1 Wastewater Facilities Description

Water Environment Services (WES), a Department of Clackamas County, manages and operates the Boring Sewage Treatment Facility located in Boring, Oregon (see Figure 1). The facility treats wastewater and discharges it to the North Fork of Deep Creek in accordance with the National Pollutant Discharge Elimination system NPDES) Permit number 100968. The North Fork of Deep Creek flows into Deep Creek and ultimately the Clackamas River. The North Fork of Deep Creek is located in the Willamette Basin and is part of the Clackamas sub-basin.

The District's wastewater service area is mainly residential with some commercial establishments. The Boring Sewage Treatment Facility consists of one lift station, two aerated lagoons (in series), sand filters and chlorine disinfection. Influent flows by gravity to the wet well where a lift station pumps it to the primary lagoon. During the summer months shade tarps cover the lagoons. The tarps help to control algal bloom in the lagoons and minimize temperature gain. When the sand filters are in use, shade tarps help to reduce temperature impacts. The plant operator manually controls batch discharges. During the

summer months, the facility discharges three to four times per week, while during the winter months discharge may occur five to seven times per week. A flow meter, located at the outfall, measures effluent flow. Facility personnel calibrate the flow meter annually. See Figure 2 for a schematic flow diagram for the facility.

During the renewal permit cycle, the facility owners plan to implement improvements (see section 2.2 for details). These improvements include switching the current plant operations from batch discharge to continuous discharge. This change is part of the plan to eliminate ETL exceedances.

The facility has an average dry weather design flow of 0.02 MGD, and design loading of 29.2 lb of BOD. The average wet weather flow for the last two years averaged 0.029 and 0.027 MGD. Over this same time period the average dry weather flow averaged 0.011 and 0.010 MGD. The facility discharges to the North Fork of Deep Creek year round.

DEQ issued the first permit for this facility in 1985, when the CCSD No. 1 constructed a sewage treatment system to treat the domestic waste from the downtown area of Boring. DEQ renewed the permit in 1992, 2004, and 2010.

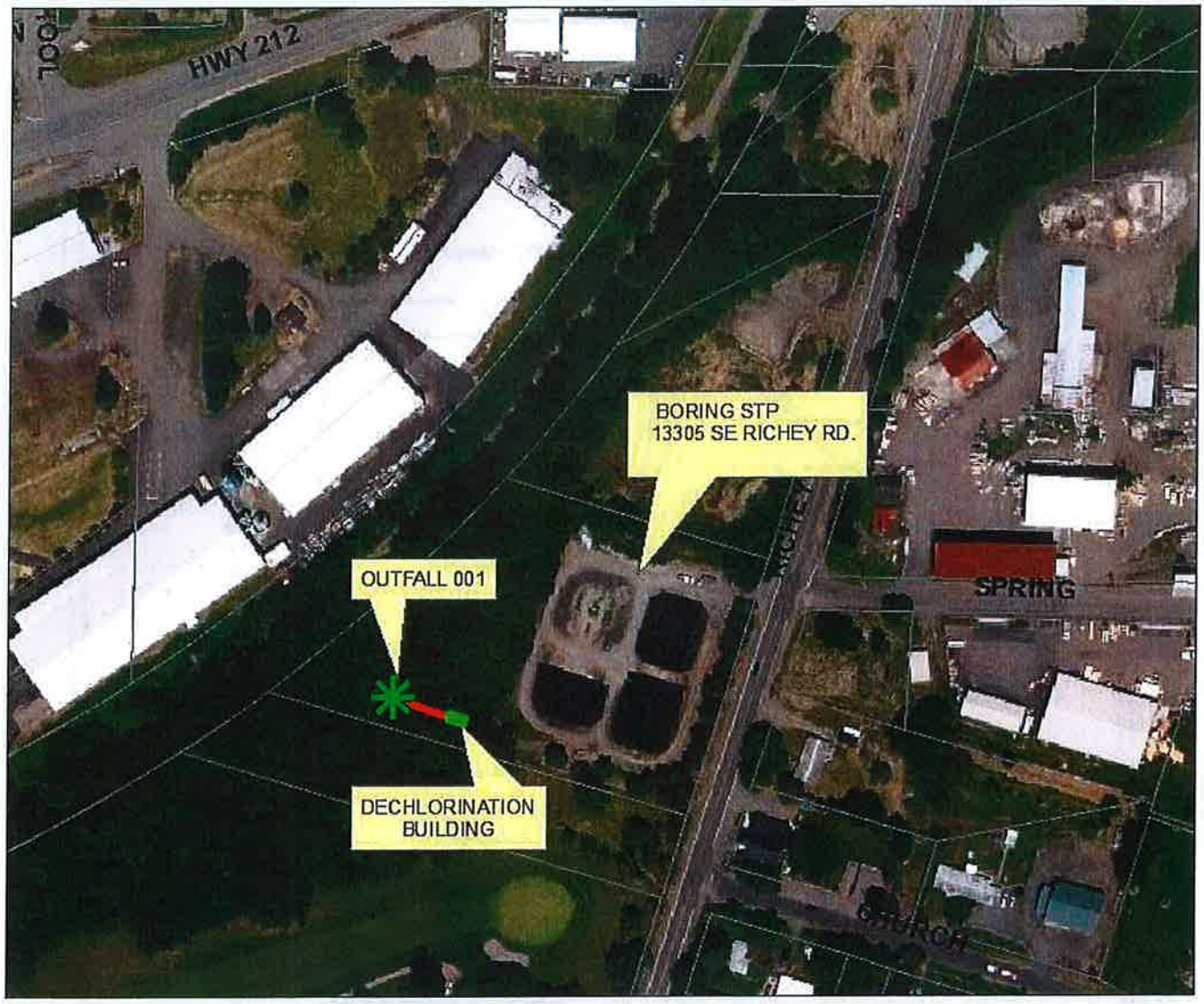


Figure 1: Facility Location

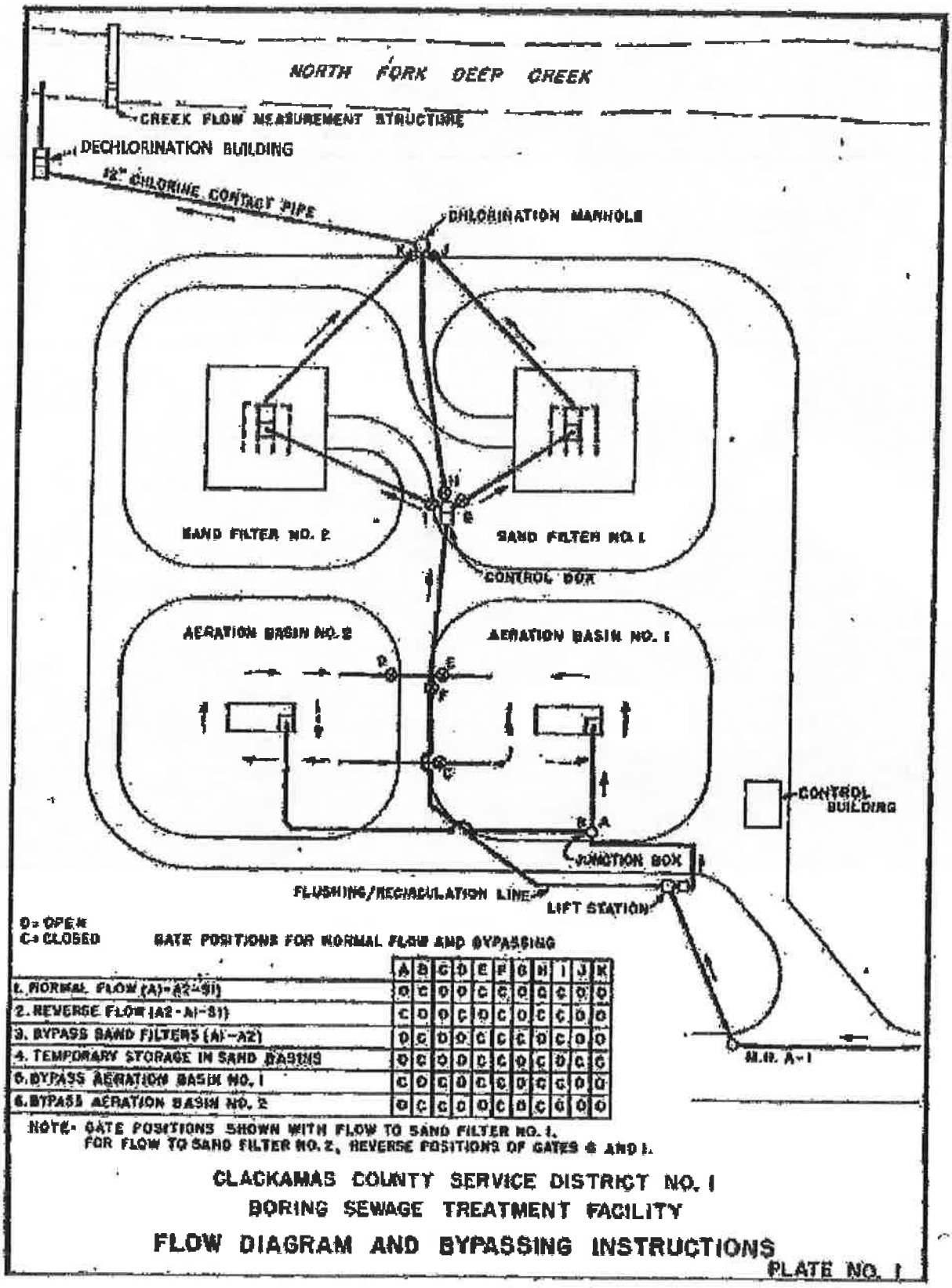


Figure 2. Schematic flow diagram for the facility. Note: the dechlorination system is located where the weir used to be. Facility personnel removed the weir several years ago to improve local fish passage.

4.2 Outfalls

The facility has one outfall, Outfall 001. It consists of a 6-inch pipe that extends beneath the stream bed, perpendicular to stream flow, and terminates about 6 feet off the left stream bank.

4.3 Sewage Collection System

The collection system consists of approximately 3,400 feet of 8" PVC pipe. The sewage flows by gravity to the wastewater treatment facility. The operator runs the plant to produce intermittent discharge. Most treatment occurs in the primary treatment cell, while the facility uses the secondary cell to hold treated effluent. Batch discharges of flow occur as necessary. During the summer months the facility may only need to discharge one day each week. In the winter, discharge may occur three or four days each week. The facility is currently meeting percent removal efficiencies and load limits.

The ratio of wet weather to dry weather flows measured at the treatment plant indicates how much infiltration & inflow enters the collection system. This information is summarized below.

Table 2: Average and Peak Flow Statistics for the Boring STP

Flow Statistic	Millions of Gallons/Day (MGD)	Ratio to Average Dry Weather Design Flow (ADWDF)
Average Dry Weather Design Flow (ADWDF)	0.02	1
Average Wet Weather Flow over last 2 years	0.027608	1.5
Highest Monthly Average over last 2 years (November 2012)	0.045633	2.5
Peak Daily Flow over last 2 years (December 2012)	0.135	7.4

As can be seen from this table, the collection system and treatment plant have a significant problem with I & I. The problem is not critical, but it is large enough that the facility needs to invest resources into reducing I&I.

DEQ recognizes that it is not practical to build and operate treatment plants and collection systems so as to eliminate any and all bypasses or overflows, and that at some point, attempts to do so represent a poor investment of public funds. Therefore, DEQ encourages communities to reduce the rate at which sanitary sewer overflows and bypasses occur. To this end, the permit requires the following:

- The municipality must develop a program to reduce I & I and submit an progress reports (see Schedule D, Condition 1).
- The municipality must develop and maintain an emergency response and public notification plan to cover bypass and SSO events (Schedule F, sections B.7 and B.8)
- The municipality must report all SSOs and bypasses (Schedule F, sections B.6, B.7 and B.8).

4.4 Recycled Water

The permit holder does not currently operate a recycled water program and does not intend to do so during the proposed permit cycle.

4.5 Wastewater Solids

CCSD No. 1 personnel remove biosolids from the Boring Sewage Treatment Facility on average once every four years. Facility personnel pump the solids from the lagoons and haul it to one of the WES facilities where it is added to the treatment system at the head works or into one of the pump stations. The Biosolids Management Plan (BMP) for the Boring facility is a part of the Clackamas County Service District's BMP. DEQ requires the CCSD No. 1 to update their BMP six months before removing sludge from the lagoons or at the time CCSD No. 1 updates their BMP for any of their other facilities.

4.5.1 Storage of Sewage Sludge

The facility stores sewage sludge in their wastewater lagoons and anticipates removing it during the current permit cycle. At current rates of accumulation, the operator estimates they will have to dredge the lagoons in 4 years.

4.5.2 Transfer and Disposal

The permit holder transfers sewage sludge to one of the District's other facilities.

4.5.3 Land Application

The permit holder does not currently land apply biosolids or produce biosolids for sale or distribution, and does not intend to do so during the proposed permit cycle.

4.5.4 Other Beneficial Reuse

The permit holder does not currently practice other types of beneficial reuse, such as energy recovery.

4.6 Storm Water

Storm water is not addressed in this permit. General NPDES permits for stormwater are not required for facilities with a design flow of less than 1 MGD.

4.7 4.7 Groundwater

The permit includes a condition in schedule A that prohibits any adverse impact on groundwater quality.

4.8 Industrial Pretreatment

The permittee does not have a DEQ-approved industrial pretreatment program. Based on current information, no industrial pretreatment program is needed.

5.0 Receiving Water

5.1 Flows

In October 2008, CH2MHill conducted a mixing zone study for the Boring STP's outfall. The study used three data sources as the basis for the report. These data sources include the following:

1. Flow data from site-specific stream cross-section and current velocity measurements collected in October 2008, using standard USGS stream gaging methods.
2. Flow data for the North Fork of Deep Creek that Boring STP personnel collected at a weir structure immediately upstream of the outfall. This data is only applicable to low flow periods because the notched-weir only provided flow measurements to the point where the notch was full and the stream flow crested the entire weir.
3. Flow data from an established USGS stream gage, located in another stream with similar characteristics (Kelley Creek, approximately 5 miles north of Deep Creek). The period of record used from the Kelley Creek station was from March 2000 to December 2008.

The impact of the Boring STP's discharge on the North Fork of Deep Creek is likely to be the greatest in the late summer and early fall when flows in the creek are lowest. This period is also known as the critical period.

DEQ evaluates the impact of a discharge on the receiving stream with respect to the flows likely to occur during the critical period. To standardize this analysis, DEQ makes use of four different flow statistics. Each is designed to work with a different type of water quality impact and associated water quality criteria. Table 2, below, summarizes these flow statistics and their application.

Table 3: Summary of Flow Statistics

Streamflow Statistic	What It Is	Potential Impacts[1] Statistic is Used to Analyze	Value for North Fork of Deep Creek (cfs)
1Q10	The lowest one day average flow with a recurrence frequency of once in 10 years.	Acute toxicity to aquatic life	0.23
7Q10	The lowest seven day average flow with a recurrence frequency of once in 10 years.	Chronic toxicity to aquatic life	0.24
30Q5	The lowest 30 day average flow with a recurrence frequency of once in 5 years.	Impacts to human health from toxics classified as non-carcinogens	1.0
Harmonic mean	Long term mean flow value calculated by dividing the number of daily flows by the sum of the reciprocals of those daily flows. The equation is: $\frac{n}{\Sigma 1/Q_{i-n}}$ where n = number of daily flows and Q = flow	Impacts to human health from toxics classified as carcinogens	3.4

[1]DEQ evaluates impacts with respect to pollutants for which DEQ has developed water quality criteria. More information may be found at http://www.deq.state.or.us/wq/standards/toxics.htm#

5.2 Designated Uses

The Clean Water Act, requires DEQ to identify the beneficial uses of every waterbody in Oregon. The intent of this requirement is to assure that the water quality standards DEQ develops are consistent with how the waterbody is used. DEQ-issued permits must in turn reflect the water quality standards that apply to the basins in which DEQ issues permits.

The Boring Sewage Treatment Facility discharges to the North Fork of Deep Creek in the Willamette Basin. The designated beneficial uses for Willamette Basin are listed in Table 340A (OAR 340-41), and include the following:

- public and private domestic water supply,
- industrial water supply,
- irrigation,
- livestock watering,
- resident fish and aquatic life,
- wildlife and hunting,
- fishing,
- boating,
- water contact recreation,
- aesthetic quality, and
- hydro power.

5.3 Receiving Stream Water Quality

Figure 340-A (OAR 340-041), Fish Use Designations for Willamette Basin, shows Deep Creek to be Core Cold Water Habitat. Figure 340B (OAR 340-041), Salmon and Steelhead Spawning Use Designations for Willamette Basin, shows salmon and steelhead spawning use in the vicinity of the outfall from October 15 through June 15. The 2006 Willamette Basin Total Maximum Daily Load (TMDL) classified the North Fork of Deep Creek as water quality limited for Temperature and Bacteria; and provides a temperature waste load allocation for the Boring Sewage Treatment Plant outfall. In 2012 EPA added several parameters to the TMDL for this water body. Table 4 below lists all the water quality limited parameters for the North Fork of Deep Creek.

Table 4: Water Quality Limited Parameters

Waterbody Name	River Mile	Parameter	Season
North Fork Deep Creek	0 to 9	Chlorpyrifos	Year Round
North Fork Deep Creek	0 to 9	Dieldrin	Year Round
North Fork Deep Creek	0 to 9	Guthion	Year Round
North Fork Deep Creek	0 to 6.6	Dissolved Oxygen	Spawning
North Fork Deep Creek	0 to 13.1	Temperature	Year Round
North Fork Deep Creek	0 to 9	Bacteria	Year Round

5.4 *Mixing Zone Analysis*

The proposed size of the regulatory mixing zone (RMZ) is the same as the previous permit. The RMZ is defined as that portion of North Fork Deep Creek, which extends 50 feet downstream from the outfall. The zone of initial dilution (ZID) is defined as that portion of the allowable mixing zone that is within 5 feet of the outfall.

For the proposed permit, Clackamas County Service District # 1 submitted a mixing zone study to DEQ that CH2MHill conducted on Outfall 001 of the Boring STP. The report is dated March 24, 2009. The CH2MHill field crew conducted the work on October 2nd and 3rd, 2008, during dry weather low stream flow conditions in the North Fork of Deep Creek. The field crew collected data on stream channel flow characteristics, environmental mapping, and dye tracer results. According to the report, the Boring STP outfall extends approximately 15 feet from the flow control structure on the treatment plant site. The outfall is buried and beneath the stream bed and terminates six feet off the left stream bank. The 6-inch outfall port invert elevation is about 3 inches below the immediate stream bed surface. Using dye injection and in-river tracer monitoring, the crew measured concentrations to characterize dilution at the ZID and RMZ boundaries. During this study, the crew calculated stream flow as 1.0 cfs, and the effluent flow at 0.05 mgd (million gallons per day). CH2MHill used CORMIX3 to perform the dilution modeling. The modeled dilution is 1.3 at the edge of the ZID, and 5.9 at the edge of the RMZ. DEQ used these dilutions in the permit evaluation.

Table 5: Water Quality Standards, Applicable Flow Rates and Dilutions

Water Quality Standards	Applicable River Flow Conditions	Applicable Effluent Flow Rate	Model-Predicted Dilution after Mixing
Aquatic Life, Freshwater Acute	0.23 cfs (1Q10)	Max. Daily: 0.133 MGD	1.3 at edge of ZID
Aquatic Life, Freshwater Chronic	0.24 cfs (7Q10)	Max. Monthly: 0.456 MGD	5.9 at edge of RMZ
Human Health, Non-Carcinogen	1.0 cfs (30Q5)	Avg. Dry Weather Design Flow: 0.02 MGD	5.9 at edge of RMZ
Human Health, Carcinogen	3.4 cfs (Harmonic Mean Flow)	Avg. Annual Flow: 0.018 MGD	5.9 at edge of RMZ

Explanation of terms:
ZID - Zone of Initial Dilution
RMZ - Regulatory mixing zone

DEQ used monthly DMR flow data from January 2013 through December 2014 (the last two calendar years) to populate the "Applicable Effluent Flow Rate" column in Table 5, above.

DEQ used the dilutions shown above to develop permit limits. Sections 7.2.1 and 7.2.2 describe the facility's permit limits in more detail.

6.0 Overview of Permit Development

6.1 *Types of Permit Limits*

Effluent limitations serve as the primary mechanism in NPDES permits for controlling pollutant discharges to receiving waters. Effluent limitations can be based on either the technology available to control the pollutants, or on limits that protect the water quality standards for the receiving water. These

two types of permit limits are referred to 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, a WQBEL must be placed in the permit. More explanation of each is provided below.

- TBELs:
    - The intent of TBELs is to require a minimum level of pollutant treatment, based on available treatment technologies, while allowing the discharger to use any available control technique to meet the limits.
    - TBELs for municipal treatment plants, also known as federal secondary treatment standards, have been developed for the following parameters: biochemical oxygen demand measured over 5 days (BOD5), total suspended solids (TSS), and pH. These are found in the Code of Federal of Federal Regulations (CFR) and are known as secondary treatment standards. The CFR also allows special considerations and exceptions to these standards for certain circumstances and types of treatment facilities such as lagoons.
- WQBELs:
    - The intent of WQBELs is to assure the water quality standards of a receiving stream are met. The water quality standards are developed to protect the beneficial uses of the receiving stream, such as swimming and fishing. In many cases TBELs are not restrictive enough to assure the receiving stream meets water quality standards. In these cases, WQBELs need to be established to protect the receiving stream.
    - Oregon is unique in that it has minimum design criteria for BOD and TSS that are only applicable to sewage treatment plants. These design criteria vary by watershed basin, and were developed to protect water quality in their respective basins. These are often times more stringent than the federal secondary treatment standards. When this is the case, the basin standards supersede the federal standards.

TBELs are likely to be the most stringent if the receiving stream is large relative to the discharge, and WQBELs are likely to be the most stringent when the receiving stream is small or does not meet water quality standards.

In some cases, both a TBEL and a WQBEL will be developed for a particular parameter. Permit writers must include the more stringent of the two in the permit.

Permit limits for bacteria are WQBELs when they are derived from the water quality standards found in OAR 340-041-0009 for freshwater, marine, and estuarine waters, or 40 CFR § 131.41 for coastal recreation waters. Bacteria limits are designed to protect human health when swimming or eating shellfish. Note: When enforcing permit limits, DEQ categorizes bacteria exceedances in OAR 340-012 as technology-based effluent limitation violations because bacteria violations are typically due to the failure of disinfection equipment.

Each time DEQ renews a permit, the permit writer evaluates the existing limits to see if they need to be modified as a result of changes to technology based standards or water quality standards that may have occurred during the permit term. Anti-backsliding provisions (described in CFR 122.44(l)) generally do not allow relaxation of effluent limits in renewed/reissued permits. DEQ must include the more stringent of the existing or new limits in the renewal permit.

6.2 Existing Permit Limits

The existing permit limits are as follows:

(a) Treated Effluent Outfall 001

1. May 1 - October 31:

Parameter	Average Effluent Concentrations Monthly	Weekly	Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs
$CBOD_5$ (See Note 1)	10 mg/L	15 mg/L	1.7	2.5	3.4
TSS	10 mg/L	15 mg/L	1.7	2.5	3.4

NOTE 1: DEQ considers $CBOD_5$ concentration limits equivalent to the minimum design criteria for BOD_5 specified in OAR Chapter 340, Division 41.

2. November 1 - April 30:

Parameter	Average Effluent Concentrations Monthly	Weekly	Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs
BOD_5	20 mg/L	30mg/L	3.4	5.0	6.8
TSS	20 mg/L	30 mg/L	3.4	5.0	6.8

* Average dry weather design flow to the facility equals 0.02 MGD. Mass load limits are based on previous permit.

Year-round

Other Parameters	Limitations
E. coli Bacteria	Must not exceed 126 organisms per 100 mL monthly geometric mean. No single sample shall exceed 406 organisms per 100 mL. (See Note 2)
pH	Must be within the range of 6.0 to 9.0
BOD_5 or $CBOD_5$, and TSS Removal Efficiency	Must not be less than 85% monthly average for BOD_5, $CBOD_5$ and TSS.
Total Residual Chlorine	Must not exceed a daily maximum limit of 0.02mg/L and average monthly limit of 0.01 mg/L
Ammonia NH_3-N	Must not exceed a daily maximum limit of 11.5 mg/L and an average monthly limit of 5 mg/L.
Excess Thermal Load (June 16-October 14)	Must not exceed a 7-day moving average of 0.333 million kcal/day.
Excess Thermal Load (October 15-June 15)	Must not exceed a 7-day moving average of 0.357 million kcal/day.

6.3 Overview of Whole Effluent Toxicity (WET) Analysis

After the permit writer has determined the appropriate TBEL or WQBEL permit limits (described in the previous section) for the facility, the permit writer must determine whether there is reasonable potential for the discharge to cause toxicity due to combinations of chemicals that may be present in the effluent.

After considering the steps in section 7.3, Appendix E, of the RPA IMD (Determining if there is a risk of aquatic toxicity), DEQ has determined that the renewal permit does not need to include a WET testing requirement.

6.4 Recycled Water

The current permit allows the facility to discharge year round. If the permittee chooses to divert effluent to be used as recycled water, they need to submit a Recycled Water Use Plan (RWUP) for DEQ review and approval, before the permittee may implement the plan.

6.5 Biosolids

Facility personnel remove biosolids from the facility's lagoons on average once every four years. Personnel pump the solids from the lagoons and truck them to one of the WES facilities where they are added to the treatment system at the head works or into one of the pump stations. The Biosolids Management Plan (BMP) for the Boring facility is a part of the Clackamas County Service District's BMP. DEQ rules require the facility operator to update the plan at least six months before removing sludge from the lagoons, or at the time the CCSD updates its BMP.

6.6 Anti-degradation

Oregon's Anti-Degradation Policy for Surface Waters, found in OAR 340-041-0004, requires DEQ to demonstrate that the discharge does not lower water quality from the existing condition.

DEQ has performed an antidegradation review for this discharge. The proposed permit contains the same discharge loadings as the existing permit. DEQ does not consider permit renewals with the same discharge loadings as the previous permit to lower water quality from the existing condition. DEQ is not aware of any information that existing limits do not protect the designated beneficial uses listed in Section 5.2. DEQ is also not aware of any existing uses present within the waterbody 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 (see Antidegradation Review Worksheet in Appendix A).

7.0 Permit Draft Discussion

7.1 Face Page

The face page provides information about the permittee, description of the wastewater, outfall locations, receiving stream information, permit approval authority, and a description of permitted activities. The permit allows discharge to the North Fork of Deep Creek within Schedule A limits and the following schedules. It prohibits all other discharges.

In accordance with state and federal law, NPDES permits will be effective for a fixed term not to exceed 5 years. Upon issuance, this permit will be effective for no more than 5 years.

DEQ evaluated the classifications for the treatment and collection systems (see Appendix B). DEQ considers the treatment system a Class 1 system and the collection system a Class 1 system. DEQ is not proposing any changes to the system classifications.

7.2 Permit Limit Derivation

7.2.1 Technology-Based Effluent Limits (TBELs)

TBELs must be met at the outfall. The applicable TBELs for this facility are the most stringent of the federal secondary treatment standards and the Oregon basin standards, adjusted as necessary for the type of treatment system.

The table below shows a comparison of the federal secondary treatment standards and Oregon basin standards and also lists bacteria standards. Basin standards and bacteria standards are not strictly speaking TBELs; however they function as such when they have to be met at the end of the pipe.

Table 6: Comparison of Federal Secondary Treatment and Basin Standards

Parameter	Federal Secondary Treatment Standards		Applicable Willamette Basin Standards (OAR 340-041-0345)
	30-Day Average	7-Day Average	Monthly Average
5-Day BOD	30 mg/L	45 mg/L	10 mg/L (May 1 – October 31), 30 mg/L (November 1 – April 30)
5-Day CBOD[1]	25 mg/L	40 mg/L	
TSS	30 mg/L	45 mg/L	
pH	6.0 – 9.0. (instantaneous)		6.5 – 8.5 Note: basin standards for pH do not have to be met at the outfall and can instead be met at the edge of the mixing zone.
% Removal	85% BOD5 and TSS		Not specified.

1. Federal regulations allow the replacement of BOD5 limits with CBOD5 (Carbonaceous BOD) limits. For wastewaters with significant nitrogen content, basing permit limitations on CBOD5 instead of BOD5 eliminates the impact of nitrification on discharge limitations and compliance determinations.

To summarize, the TBELs and applicable basin standards for Clackamas County Service District No. 1, Boring Sewage Treatment Facility, are as follows:

Table 7: Summary of Permit Limits* for CCSD No. 1, Boring STP

Effluent Parameter	Concentration		Percent Removal	Comments
	Monthly	Weekly		
BOD5	20	30	85	Nov. 1 – Apr. 30
CBOD5	10	15	85	May 1 – Oct. 31
TSS	10	15	85	May 1 – Oct. 31
TSS	20	30	85	Nov. 1 – Apr. 30
pH	Must not be outside the range of 6.0 and 9.0			This is equal to the basin standard for fresh waters.
E. coli	≤ 126 organisms per 100 ml (monthly geometric mean), and ≤ 406 organisms per 100 ml (single sample)			

Total Residual Chlorine	0.02 mg/L Daily Maximum 0.01 mg/L Monthly Average	When the total residual chlorine limitation is lower than 0.10 mg/L, the Department will use 0.10 mg/L as the compliance evaluation level (i.e. daily maximum concentrations below 0.10 mg/L will be considered in compliance with the limitation).
Ammonia NH_3-N	11.5 mg/L Daily Maximum 5.0 mg/L Monthly Average	
Excess Thermal Load	7-day moving average 0.333 Mkcal/day	June 16 – Oct. 14 (See Note 1).
Excess Thermal Load	7-day moving average 0.357 Mkcal/day	Oct. 15 – June 15 (See Note 2).

*The limits for BOD_5/$CBOD_5$ and TSS shown in this table are concentration-based limits.

NOTES

1. For compliance purposes, the earliest 7-day averaging period to which this excess thermal load limit applies is June 16-22, and the latest 7-day averaging period to which it applies is October 14-20.
2. For compliance purposes, the earliest 7-day averaging period to which this excess thermal load limit applies is October 15-21, and the latest 7-day averaging period to which it applies is June 15-21.

The following equation is used to develop the monthly average mass load:

Monthly Avg. Mass Load = POTW design flow x Conc.-based limit x Conversion factor

The weekly average and maximum daily mass loads are developed from the monthly average by multiplying by 1.5 and 2 respectively.

The Boring STP's summer mass load limits for BOD_5 and TSS are based on the flow of 0.02 MGD and a concentration of 10 mg/L. The summer calculations are:

- Monthly Average: 0.02 MGD x 10 mg/L x 8.34 = 1.7 lbs/day.
- Weekly Average: 1.7 lbs/day monthly average x 1.5 = 2.5 lbs/day.
- Daily Maximum: 1.7 lbs/day monthly x 2 = 3.4 lbs/day.

The facility's winter mass limits (monthly and weekly average and daily maximum) for BOD_5 and TSS are based on the flow of 0.02 MGD and a concentration of 20 mg/L. The winter calculations are:

- Monthly Average: 0.02 MGD x 20 mg/L x 8.34 = 3.4 lbs/day.
- Weekly Average: 3.4 lbs/day x 1.5 = 5.0 lbs/day.
- Daily Maximum: 3.4 lbs/day monthly x 2 = 6.8 lbs/day.

All mass load limitations are again rounded to two significant figures, consistent with the number of significant figures associated with flow measurements with this facility, and with the accuracy of BOD measurements of 10 or greater.

7.2.2 Water Quality-Based Effluent Limits

Once TBELs and applicable basin standards have been established for the treatment facility, WQBELs must be developed. DEQ has developed several tools for calculating WQBELs. The table below provides a summary of these tools.

Table 8: Summary of Tools to Calculate WQBELs

Parameter	Link to Analytical Tool/Description	Application
BOD	Streeter-Phelps D.O. Spreadsheet Use to perform a Streeter-Phelps analysis to see if discharge will result in a DO sag and/or violation of DO standard.	• For new dischargers. • For dischargers seeking a mass load increase.
pH	pH RPA Spreadsheet Use to perform a Reasonable Potential Analysis to see if the discharge has a reasonable potential to cause or contribute to violations of basin standards of pH.	• For facilities that have a mixing zone, to see if basin standards will be met at the edge of the mixing zone.
Temperature	Temperature RPA Spreadsheet XLSX Use to perform a Reasonable Potential Analysis to see if the discharge has a reasonable potential to cause or contribute to water quality standards violations for temperature.	• Use when facility does not already have a WLA for temperature.
Ammonia	For ammonia, chlorine and other toxics listed in tables 20, 33A, 33B and 40: Reasonable Potential Analysis Calculation Workbook, Domestic; Revision 3.1 (January 2013) Use to perform a Reasonable Potential Analysis to see if the discharge has a reasonable potential to cause or contribute to water quality standards violations for toxics.	Ammonia: • Use for facilities that discharge over 0.1 mgd, to insure no toxicity. • Use for facilities that have an ammonia limit when conditions have changed.
Chlorine		Chlorine: • Use for new facilities that do not have a limit for chlorine. • If a facility already has a limit, and conditions have changed, use limits tab of spreadsheet to re-calculate.

Parameter	Link to Analytical Tool/Description	Application
Other toxics listed in Tables 20, 33A, 33B and 40 of OAR 340-041		Other toxics: • Use for facilities that discharge over 1 mgd • Use for facilities where pollutant is known to be present.

As can be seen from the above table, WQBELs are generally developed as a result of a Reasonable Potential Analysis (described in more detail later in subsequent sections). An exception to this is when DEQ has developed a TMDL for the receiving stream. When there is a TMDL, DEQ must develop the permit limit(s) based on the wasteload allocation (WLA) developed for the facility as part of the TMDL.

7.2.2.1 General Discussion of Reasonable Potential Analysis

EPA has developed a methodology called Reasonable Potential Analysis (RPA) for determining if there is a reasonable potential for a discharge to cause or contribute to violations of water quality standards for a particular parameter. It takes into account effluent variability, available dilution (if applicable), receiving stream water quality and water quality standards for the protection of aquatic life and human health. If the RPA results indicate that there is a potential for the discharge to cause or contribute to exceedances of water quality standards, the methodology is then used to establish permit limits that will not cause or contribute to violations of water quality standards.

DEQ has adopted EPA's methodology for RPA, and has developed spreadsheets that incorporate this analysis.

The parameters for which a RPA must be performed will vary with the size and type of discharge. They are listed in the NPDES Permit Testing Requirements for Publicly Owned Treatment Works contained in Appendix J of 40 CFR Part 122. The relevant sections are reproduced below.

Table 9: Testing Requirements for Publicly-Owned Treatment Works

Pollutant List	Parameters for which RPA Needed
Table 1A – Effluent Parameters for All POTWs	pH, Temperature

Each of the parameters for which a RPA was performed is discussed in the sections below.

7.2.2.2 Reasonable Potential Analysis for pH

The pH of water is a measure of how acidic or basic a solution is. Water at a pH of 7.0, is neutral. Most aquatic organisms can only tolerate a narrow range around 7.0.

As indicated in the last section (7.2.1, Table 2), the applicable basin standard for the Boring STP's discharge to the North Fork of Deep Creek is 6.5 to 8.5. The Boring STP's current pH limits assure that the standard is met at the edge of the mixing zone. The current permit's evaluation report's pH RPA showed no potential. Since no substantial changes have occurred since DEQ issued the current permit, the proposed limits remain the same (6.0 to 9.0).

7.2.2.3 Reasonable Potential Analysis for Temperature

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 anthropogenic warming.

On September 21, 2006, DEQ issued the TMDL for the Willamette Basin. The North Fork of Deep Creek is a tributary of the Clackamas River, which, in turn, is a tributary of the Willamette River. The TMDL determined the following Waste Load Allocations for the facility:

- Core Cold Water 7Q10 WLA of 3.33×10^5 kcal/day for the period from June 16 through October 14.
- Spawning 7Q10 WLA of 3.57×10^5 kcal/day for the period from October 15 through June 15.

7.2.2.4 Reasonable Potential Analysis for Ammonia

Since the summer of 2005, facility personnel have been batch discharging into the secondary lagoon. This has had the effect of achieving a complete nitrogen cycle and reducing effluent ammonia levels to the point where the facility consistently meets the permit limit for ammonia. DEQ intends to retain the current ammonia limit in the proposed permit.

7.2.2.5 Reasonable Potential Analysis for Chlorine

DEQ uses the fresh water criteria for chlorine to calculate permit limitations. According to OAR 340-041, Table 33A, chlorine concentrations of 11 µg/L can result in chronic toxicity in fresh water, while 19 µg/L can result in acute chlorine toxicity in fresh water. Compliance with acute toxicity criteria is required at the edge of the Zone of Initial Dilution (ZID), and compliance with chronic toxicity criteria is required at the edge of the mixing zone.

Before issuing the current permit, DEQ conducted reasonable potential evaluation, based on a minimum dilution of 1.3 at the zone of initial dilution, and 5.9 at the edge of the mixing zone. The results of the RPA led DEQ to set water quality limits for chlorine for the current permit cycle to protect water quality.

In September of 2005 DEQ and CCSD No. 1 entered into a Mutual Agreement and Order to address chlorine and ammonia toxicity from the treatment plant's discharge beyond the edge of the mixing zone. On January 31, 2014, CCSD No. 1 submitted a statement from the operator, documenting that the dechlorination system installation had been completed, and that startup took place on February 1, 2011. Since the dechlorination system was installed, the facility has been able to meet its total chlorine residual permit limits. Therefore, DEQ intends to retain these limits in the proposed permit.

7.3 Schedule A. Waste Discharge Limits

The permit's Schedule A contains the proposed permit limits for the facility. Table A1 below lists the numeric limits in Schedule A. These limits are the result of the analyses described in Section 7.2.

Schedule A of the permit also addresses the fact that the permittee does not currently operate a recycled water program, nor do they intend to do so during the term of the renewal permit.

Schedule A – Waste Discharge Limits

The proposed effluent limits for Outfall 001 are as follows:

1. **Outfall 001 - Treated Effluent**
   a. $CBOD_5$,and TSS
      i. May 1 – October 31: During this time period the permittee must comply with the limits in the following table:

Table A1: $CBOD_5$ and TSS Limits

Parameter	Average Effluent Concentrations, mg/L		Monthly Average lbs/day	Weekly Average lbs/day	Daily Maximum lbs
	Monthly	Weekly			
$CBOD_5$ (See Note 1)	10 mg/L	15 mg/L	1.7	2.5	3.4
TSS	10 mg/L	15 mg/L	1.7	2.5	3.4

      ii. November 1 – April 30: During this time period the permittee must comply with the limits in the following table:

Table A2: BOD_5 and TSS Limits

Parameter	Average Effluent Concentrations, mg/L		Monthly Average lbs/day	Weekly Average lbs/day	Daily Maximum Lbs
	Monthly	Weekly			
BOD_5	20 mg/L	30 mg/L	3.4	5.0	6.8
TSS	20 mg/L	30 mg/L	3.4	5.0	6.8

* Average dry weather design flow to the facility equals 0.02 MGD. Mass load limits are based on previous permit.

   b. Additional Parameters. Permittee must comply with the limits in the following table (year round):

Table A3: Limits for Additional Parameters

Year-round	Limits
E. coli Bacteria	Must not exceed 126 organisms per 100 mL monthly geometric mean. Any single sample must not exceed 406 organisms per 100 mL. (See Note 2)
pH	Must be within the range of 6.0 to 9.0 S.U.
BOD_5 or $CBOD_5$, and TSS Removal Efficiency	Must not be less than 85% monthly average for BOD_5, $CBOD_5$ and TSS.
Total Residual Chlorine*	Must not exceed a daily maximum limit of 0.02 mg/L and average monthly limit of 0.01 mg/L
Ammonia NH_3-N	Must not exceed a daily maximum limit of 11.5 mg/L and an average monthly limit of 5 mg/L.

Year-round	Limits
Excess Thermal Load (June 16 – October 14)	Must not exceed a 7-day moving average of 0.333 million kcal/day.
Excess Thermal Load (October 15 - June 15)	Must not exceed a 7-day moving average of 0.357 million kcal/day.

* When the total residual chlorine limitation is lower than 0.10 mg/L, the Department will use 0.10 mg/L as the compliance evaluation level (i.e. daily maximum concentrations below 0.10 mg/L will be considered in compliance with the limitation).

Notes:

1. The $CBOD_5$ concentration limits are considered equivalent to the minimum design criteria for BOD_5 specified in OAR Chapter 340, Division 41.
2. Any single *E. coli* sample must not exceed 406 organisms per 100 mL; however, DEQ will not cite a violation of this limit if the permittee takes at least 5 consecutive re-samples at no greater than 4 hour intervals beginning within 28 hours after the original sample was taken and the geometric mean of the 5 re-samples is less than or equal to 126 *E. coli* organisms/100 mL.

7.3.1 Discussion of Permit Limits in Tables A1, A2 and A3

The limits in Tables A1, A2 and A3 are discussed in detail below, in the following order:

a. BOD_5, $CBOD_5$ and TSS
b. Bacteria
c. pH
d. Total Residual Chlorine
e. Ammonia NH3-N
f. Excess Thermal Load

a. BOD_5, $CBOD_5$ and TSS Concentration, Mass Load and Percent Removal Limits

BOD5, CBOD5 and TSS can be thought of as indicating the effluent's "strength". Section 7.2.1 described the development of concentration and mass limits for BOD5 or CBOD5 and TSS. These are basin standards that act as TBELs.

The permit requires a removal efficiency of 85%. The derivation of this removal efficiency was described in Section 7.2.1; and is consistent with the Code of Federal Regulations (40 CFR part 133.105).

b. Bacteria

Limits for bacteria are considered to be WQBELs. Since the Boring Sewage Treatment Facility discharges to freshwater, the permit limit for bacteria is based on *E. coli*. The proposed permit limits are based on the *E. coli* standard contained in OAR 340-041-0009(5). The proposed limits are 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 no greater than four hour intervals beginning within 28 hours after the original sample was taken.

c. pH

The derivation of pH limits is described in Section 7.2.2.2. DEQ developed these limits with respect to the basin standards, adjusted for dilution at the edge of the mixing zone and are therefore WQBELs.

d. Total Residual Chlorine

The facility uses chlorine to disinfect the effluent before discharging to the North Fork of Deep Creek. Although chlorine is an effective disinfectant, it is toxic to many aquatic organisms. To minimize the toxicity potential, the facility uses dechlorination equipment to reduce the presence of chlorine in the discharge. The current permit contains a limit for chlorine, where it is referred to as Total Residual Chlorine.

The RPA analysis described in Section 7.2 for chlorine resulted in permit limits of 0.01 mg/L as a monthly average, and 0.02 mg/L as a daily maximum.

When the total residual chlorine limitation is lower than 0.10 mg/L, DEQ will use 0.10 mg/L as the compliance evaluation level; that is, DEQ will consider daily maximum concentrations at or below 0.10 mg/L to comply with the limit. In cases where an effluent limit is below the analytic range of available methods, the Quantitation Limit becomes the default compliance level. This is consistent with the example provided in Appendix D of DEQ's RPA IMD. This IMD may be found at:

http://www.deq.state.or.us/wq/pubs/imds/rpaIMD.pdf

The permit does not contain a mass load limit for chlorine. The primary purpose for mass limits is to prevent water quality violations from cumulative effects of conservative pollutants. Mass-based limits are particularly important to control bioaccumulative pollutants. Chlorine is neither a conservative nor a bioaccumulative pollutant, since chlorine rapidly reacts with organic matter. Therefore, cumulative effects outside of the regulatory mixing zone are not a concern. The facility's mixing zone does not overlap any other mixing zones. Also, effluent limits calculations are based on critical low flow conditions without any allowance for degradation in the mixing zone. Under these conditions, mass-based limits, in addition to concentration-based limits under these conditions, are unnecessary to protect water quality.

e. Ammonia NH3-N

Ammonia is a substance normally found in wastewater. The wastewater treatment processes, particularly aeration and biological treatment, can convert a large portion of wastestream ammonia to nitrate and nitrite, but the treated effluent still contains some ammonia. After discharge, the continued process of oxidizing the ammonia removes dissolved oxygen from the receiving stream.

Unionized ammonia is also a toxic agent and may have to be limited to prevent toxicity. The water outside the boundary of the mixing zone must be free of constituents in concentrations that could cause chronic (sublethal) toxicity, while the water outside the ZID must be free of pollutants that will cause acute toxicity.

Finally, nitrogen compounds (including ammonia) are nutrients that can contribute to excessive biological growth, which in turn can cause water quality standards violations. These conditions could lead to visual or aesthetic impairment, or could cause excessive dissolved oxygen or pH fluctuations.

If ammonia is discharged at a level which will cause, has the reasonable potential to cause, or contribute to an excursion above any state water quality standard (either as a nutrient or to prevent dissolved oxygen depletion or toxicity), then the permit must have an ammonia limit.

During the development of the current permit, DEQ performed an ammonia RPA. The results of the RPA showed no reasonable potential for the facility's ammonia levels to violate water quality standards.

The permit does not contain mass load limits for ammonia. The primary purpose for mass limits is to prevent water quality violations from cumulative effects of conservative pollutants. Mass-based limits are particularly important to control bioaccumulative pollutants. Ammonia, like chlorine, is neither a conservative nor a bioaccumulative pollutant since microbes in the receiving stream rapidly oxidize ammonia into nitrate. Therefore, cumulative effects outside of the regulatory mixing zone are not a concern.

The facility's mixing zone does not overlap any other mixing zones. Also, effluent limits calculations are based on critical low flow conditions without any allowance for degradation in the mixing zone. Under these conditions, mass-based limits, in addition to concentration-based limits, are unnecessary to protect water quality.

The current permit has the following ammonia limits:

- Daily maximum limit of 11.5 mg/L.
- Monthly average limit of 5.0 mg/L.

DEQ intends to retain these limits in the proposed renewal permit.

f. Excess Thermal Load

The facility discharges to the North Fork of Deep Creek, which is a tributary of the Clackamas River. The Clackamas River is on DEQ's list of water quality limited water bodies, also known as the 303(d) list. The federal Clean Water Act requires that listed streams have TMDLs developed to determine appropriate pollutant limits for assuring that facility discharges meet water quality standards.

The Willamette Basin contains the Clackamas River. On September 21, 2006, DEQ issued the Willamette Basin TMDL. The TMDL assessed the facility's effluent temperature impacts during the full calendar year. The TMDL determined the Waste Load Allocations for the facility in the form of "excess thermal loads" (ETLs). These are as follows:

- June 16 – October 14: a 7-day moving average ETL of 0.333 million kcal/day. For compliance purposes, the earliest 7-day averaging period to which this excess thermal load limit applies is June 16-22, and the latest 7-day averaging period to which it applies is October 14-20.
- October 15 – June 15: a 7-day moving average ETL of 0.357 million kcal/day. For compliance purposes, the earliest 7-day averaging period to which this excess thermal load limit applies is October 15-21, and the latest 7-day averaging period to which it applies is June 15-21.

The current permit contains these limits. DEQ intends to retain these limits in the proposed renewal permit.

The equation for calculating the 7-day moving average ETL is:

> 7-day Moving Average Excess Thermal Load, in Million kcal/day = (7-day average effluent temperature in °F –applicable stream temperature criteria in °F) X (7-day average effluent flow in MGD) X 8.34 X 0.2520

Applicable stream temperature criteria = 60.8 °F (June 16-October 14) and
55.4°F (October 15- June 15)

The first 7-day period that must comply with the spawning criterion is the first 7 days after the date the spawning use designation begins, reported on the 7th day. Facility personnel must incorporate the following procedures, as applicable, when calculating the 7-day moving average ETL:

- Monitor the discharge continuously, collecting at least one temperature reading each clock hour that discharge occurs.
- The daily maximum discharge temperature is the highest discharge temperature recorded during each daily discharge period.
- When there is no discharge for a calendar day, record effluent temperature as a blank and record the effluent flow as zero ("0").
- Calculate the 7-day moving average effluent temperature, based on the previous 7 calendar days. For days where no discharge occurs, and the temperature has been recorded as a blank, enter a blank into the average. The average temperature is only the average of the days when discharge occurred during the previous seven day period.
- Calculate the 7-day moving average effluent flow, based on the previous seven calendar days. For days where no discharge occurs, and the flow has been recorded as a zero, include the zero in the calculation of the 7-day moving average flow. Calculate the 7-day moving average ETL, using the 7-day average effluent temperature, and the 7-day average effluent flow, in the equation.

DEQ performed a thermal plume review to determine if the facility's discharge has a potential for adversely affecting the receiving stream. The review showed no potential for such impact (see Appendix C).

7.3.2 Discussion of Other Schedule A Requirements

Schedule A contains no requirements in addition to those discussed in the previous section.

7.4 Schedule B – Minimum Monitoring and Reporting Requirements

Section 1 of Schedule B describes monitoring and reporting protocols for the permit and includes the following:

- Requirements to develop and implement a Quality Assurance/Quality Control (QA/QC) program.
- What to do if QA/QC requirements are not met.
- Requirements pertaining to reporting procedures. These include the following:
    - The correct use of significant figures
    - Calculating and reporting mass loads.

Schedule B also describes the minimum monitoring and reporting necessary to demonstrate compliance with permit conditions. DEQ's authority to require permittees to report periodically is included in ORS 468.065(5). Self-monitoring requirements are the primary means of assuring that facility discharges meet permit limits. Permittees may also need to monitor other parameters when insufficient data exist to establish a limit, but where there is a potential for a water quality concern.

DEQ has developed monitoring and reporting matrices that establish monitoring and reporting frequencies, based on a facility's size and complexity. These matrices are located on the following web pages:

- http://www.deq.state.or.us/wq/wqpermit/docs/TemplateGuidance/MonMatrix.pdf
- http://www.deq.state.or.us/wq/wqpermit/docs/ReportingMatrix.pdf

DEQ used these matrices to establish the monitoring and reporting requirements for the facility.

Monitoring requirements are found in the following tables:

- Table B1: Influent Monitoring
- Table B2: Effluent Monitoring
- Table B3: Biosolids Management
- Table B4: Receiving Stream Monitoring
- Table B5: Reporting Requirements and Due Dates

Each of these tables is discussed in more detail below.

Tables B1 and B2: Influent and Effluent Monitoring
These tables specify the parameters the permittee must monitor on a regular basis in the influent and effluent, along with associated monitoring frequencies, sample types and related reporting requirements.

Table B3: Biosolids Management
This table lists the monitoring requirements that pertain to biosolids, consistent with OAR 340-050-0035. The Biosolids Management Plan for the Boring facility is a part of the Clackamas County Service District's BMP. The permittee must update the BMP six months before removing sludge from the lagoons, or at the time that the CCSD updates the BMP.

Table B4: Receiving Stream Monitoring
This table specifies the monitoring the permittee must conduct in the receiving stream, upstream of the outfall.

Table B5: Reporting Requirements and Due Dates
This table summarizes for the permittee's convenience the information contained in the previously-listed tables.

7.5 Schedule D - Special Conditions

7.5.1 Inflow and Infiltration

As described in Section 4.3 on the sewage collection system, it is important for the permittee to assess and take steps to reduce the rate of infiltration and inflow of stormwater and groundwater into the sewer system. Consistent with this, Schedule D, Condition 1 of the permit requires the permit holder to undertake activities to track and reduce I & I in the sewer system.

Since the plant discharges intermittently, the winter period flow is has been slightly higher than the average dry weather flow of 0.02 MGD when discharging. However, this slight increase does not appear to be an immediate problem for the facility. The facility is currently meeting percent removal efficiencies and load limits.

7.5.2 Emergency Response and Public Notification Plan

Schedule F (General Conditions), condition B.8. requires all municipal wastewater treatment facilities to have an Emergency Response and Public Notification Plan. This condition requires the following:

a. Assure that the permittee is aware (to the greatest extent possible) of such events;
b. Assure notifying appropriate personnel and assure that they are immediately dispatched for investigation and response;
c. Assure immediate public notification, 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. Assure that appropriate personnel are aware of and follow the plan, and are appropriately trained;
e. Provide emergency operations; and
f. Assure that DEQ is notified of the public notification steps taken.

7.5.3 Recycled Water Use Plan

The facility discharges year-round. As such, it does not discharge recycled water. Therefore the facility does not need a RWUP.

7.5.4 Exempt Wastewater Reuse at the Treatment System

Schedule D exempts the permit holder from the recycled water requirements in OAR 340-055, when the facility uses recycled water for landscape irrigation at the treatment facility or for in-plant processes, such as in-plant maintenance activities. Landscape irrigation includes water applied to small-scale irrigation such as supplying supplemental irrigation to turf grass, shrubs, and ornamental trees. Landscape irrigation may include the irrigation of native vegetation along dikes, banks, and earthen impoundments around wastewater lagoons—especially as needed to reduce erosion and maintain structural integrity. Landscape irrigation does not include large-scale irrigation of pasture, hayfields, or native vegetation adjacent to wastewater the treatment facility (i.e., these activities are subject to OAR 340-055 and require a DEQ-approved recycled water use plan). The permittee must satisfy all of the conditions listed in Schedule D, (3)(a) through (3)(d), for an exempt use to be valid.

7.5.5 Wastewater Solids Transfers

CCSD No. 1 personnel remove biosolids from the Boring Sewage Treatment Facility on average once every four years. Facility personnel pump the solids from the lagoons and haul it to one of the WES facilities where it is added to the treatment system at the head works or into one of the pump stations. The Biosolids Management Plan (BMP) for the Boring facility is a part of the Clackamas County Service District's BMP. DEQ requires the CCSD No. 1 to update their BMP 6 months before removing sludge from the lagoons or at the time CCSD No. 1 updates their BMP for any of their other facilities.

7.5.6 Whole Effluent Toxicity (WET) Testing

As discussed is section 6.3, the permit holder is not required to conduct WET testing.

7.5.7 Operator Certification

DEQ rules require the permit holder to have a certified operator consistent with the size and type of treatment plant that the permit authorizes. The language in this section of the permit describes the

requirements relating to operator certification. An updated copy of the wastewater classification worksheet for the facility is attached as Appendix B.

7.5.8 Industrial User Survey

Standard permit conditions require the permittee to conduct an industrial user survey every five years. The purpose of the survey is to identify whether there are any categorical industrial users discharging to the POTW, and to assure regulatory oversight of these discharges to state waters. For facilities such as Boring that has no significant industrial users, DEQ has added the following condition to the permit's Schedule D (Special Conditions): "If there is no industrial user in the service area, the permittee must submit a letter to DEQ within two months of permit effective date, stating that there is no industrial user discharging to the POTW."

7.6 Schedule E - Pretreatment

The permittee does not have a DEQ-approved industrial pretreatment program. Based on current information, no industrial pretreatment program is needed.

7.7 Schedule F - NPDES General Conditions

These conditions are standard to all domestic NPDES permits and include language regarding operation and maintenance of facilities, monitoring and record keeping, and reporting requirements. In August 2009 DEQ substantially revised the General Conditions for all individual permits that DEQ issues. Since then, DEQ has made minor modifications. A summary of the changes includes the following:

- There are additional citations to the federal Clean Water Act and CFR, including references to standards for sewage sludge use or disposal.
- There is additional language regarding federal penalties.
- Bypass language has been made consistent with the Code of Federal Regulations and with other EPA Region 10 states.
- Reporting requirements regarding overflows are more explicit.
- Requirements regarding emergency response and public notification plans are more explicit.
- Language pertaining to duty to provide information is more explicit.
- Confidentiality of information is addressed.

8.0 Next Steps

8.1 Public Comment Period

The proposed NPDES permit will be made available for public comment for 35 days. DEQ will post on its website public notice and links to the proposed permit, and sent to subscribers to DEQ's pertinent public notice e-mail lists. DEQ will schedule a Public Hearing if 10 or more people, or if an authorized person representing an organization of at least 10 people, request it. If DEQ holds a public hearing, then DEQ will publish an additional public notice to advertise the public hearing.

8.2 Response to Comments

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. After

DEQ receives and evaluates comments, 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.

8.3 Modifications to Permit Evaluation Report and Fact Sheet

Depending on the nature of the comments and any changes made to the permit as result of comments, DEQ may modify this permit evaluation report and fact sheet. DEQ may also choose to update the permit evaluation report and fact sheet through memorandum or addendum. If DEQ makes substantive changes to the permit, then an additional round of public comment may occur.

8.4 8.4 Issuance

The DEQ mails the finalized, signed permit to the permittee. The permit is effective 20 days from the mailing date.

APPENDIX A: ANTIDEGRADATION REVIEW SHEET

Applicant: Clackamas County Service District No. 1.

1. What is the name of the surface water that receives the discharge? North Fork of Deep Creek.

Briefly describe the proposed activity: Domestic sewage treatment.

This review is for a: ☐ Renewal ☐ New

Go to Step 2.

2. Are there any existing uses associated with the water body that are not included in the list of designated uses? Example: DEQ's Fish Use Designation Maps identify the waterbody as supporting salmonid migration; however ODFW has determined that it also supports salmonid spawning.

☐ Yes. Identify additional use(s), the basis for conclusion, and the applicable criteria: Go to Step 3.

☐ No. Go to Step 3.

3. Was the analysis of the impact of the proposed activity performed relative to criteria applicable to the most sensitive beneficial use?

☐ Yes. Go to Step 4.

☐ No. Re-do analysis to develop permit limits using correct criteria, and modify permit as necessary. Go to Step 4.

4. Is this surface water an **Outstanding Resource Water** or **upstream** from an **Outstanding Resource Water**? Note: No waters in Oregon have been designated as Outstanding Resource Waters. OAR 340-041-0004(8)(a) contains criteria for designating such waters. Example: they are found in State or National parks.

☐ Yes. Go to Step 7 ☐ No. Go to Step 5.

5. Is this surface water a **High Quality Water**? A High Quality Water is one for which none of the pollutants are Water Quality Limited. To determine, go to the database at http://www.deq.state.or.us/wq/assessment/rpt2010/search.asp and under Listing Status, select "Water Quality Limited – All (Categories 4 and 5)".

☐ Yes. Go to Step 10. ☐ No. Go to Step 6.

6. Is this surface water a **Water Quality Limited Water**? To determine, use the same database query as Step 5.

☐ Yes. Go to Step 16. ☐ No. Go to Step 4 (you must answer "yes" to either question 4, 5, or 6)

Note: The surface water must fall into one of 3 categories: Outstanding Resource Water (Step 4), High Quality Water (Step 5), or Water Quality Limited Water (Step 6).

16. Will the proposed activity result in a lowering water quality in the **Water Quality Limited Water**? [see OAR 340-041-0004(3)-(5) for a description in rule of discharges that do not result in lowering of water quality or do not constitute a new and/or increased discharge or are otherwise exempt from anti-degradation review; otherwise see "Is an Activity Likely to Lower Water Quality?" in *Anti-degradation Policy Implementation Internal Management Directive for NPDES Permits and Section 401 Water Quality Certifications*.]

☐ Yes, go to Step 17.

☐ No, proceed with Permit Application. Permit writer should provide basis for determination in permit evaluation report: Go to Step 22.

22. On the basis of the Anti-degradation Review, DEQ recommends the following:

☐ Proceed with Application to Interagency Coordination and Public Comment Phase.

☐ Deny Application; return to applicant and provide public notice.

Action Approved

Review prepared by ☐ DEQ, go to DEQ info ☐ Other, go to Other info

DEQ info
Name: David Cole
Phone: 503-229-5011
Date Prepared: August 21, 2015
Please provide the following information and submit with the completed application form to:
Department of Environmental Quality
Water Quality Division—Surface Water Management
811 SW Sixth Avenue
Portland, Oregon 97204-1390

Name: Doug Rumpel, Wastewater Operations Supervisor
Name of Company: _Clackamas County Service District No. 1
Address: 11525 SE McLoughlin Blvd., Milwaukie, OR 97222
Phone: 503-794-8050
Fax: 503-742-4565
Email: DougRum@co.clackamas.or.us

APPENDIX B: OPERATOR CERTIFICATION CLASSIFICATION WORKSHEET

Oregon Department of Environmental Quality

Wastewater System Classification Worksheet for Operator Certification

STEP 1: Criteria for Classifying Wastewater Treatment Systems (OAR 340-049-0025)					
Wastewater System Common Name:	Boring Sewage Treatment Facility				
Location:	13305 Richey Road		Region:	NWR	
County:	Clackamas		Date:	11/26/2014	
Facility ID:	16592		Classified by:	David Cole	
Design ADWF (Influent MDG):	0.018		WWC Class:	Level 1	
Design Population*:	60 EDU's		WWT Class:	Level 1	
Design BOD (Influent lbs/day):	29.2		Total Points:	22	
Is this a change from a prior classification?	No				
1. Design Population		or Population Equivalent	172		
Based on: Flow (gallons/person/day)		BOD (pounds/person/day)	0.2		
Less than 750			0.5	0.5	
2. Average Dry Weather Flow (Design Capacity)					
Less than 0.075 MGD			0.5	0.5	
3. Unit Processes					
Preliminary Treatment and Plant Hydraulics					
Pump/Lift Station(s) (pumping of main flow)			2.0	2.0	
Secondary, Advanced, and Tertiary Treatment					
Stabilization Lagoons (2 or more cells with full aeration)			9.0	9.0	
Gravity Filtration Unit(s)			2.0	2.0	
Disinfection					
Liquid Chlorine Disinfection			2.0	2.0	
Dechlorination System			4.0	4.0	
4. Effluent Permit Requirements					
Minimum of 10 mg/L BOD and/or Total Suspended Solids			4.0	4.0	
6. Sampling and Laboratory Testing					
Sample for BOD, Total Suspended Solids (performed by outside lab)			2.0	2.0	
STEP 2: Complexity Reflected in OAR 340-049 0020(4)					
Note: This step may justify a higher classification. Points shown are given as guidance.					
Standby power			1.0 - 3.0	1.0	
			Total	27.0	

APPENDIX C: THERMAL PLUME WORKSHEET

Thermal Plume Limitations within the Mixing Zone Rule (OAR 340-041-0053)

Thermal Shock - 25 deg C at 5% of the stream cross section

Migration Blockage - 21 deg C at 25% of the stream cross section

Section 5.6 of Temperature IMD

Facility Nam Boring STP **Date:** Sep. 25. 2015

Enter data into white cells below:

7Q10 =	0.24	cfs
Ambient Temperature or Criterion =	13	°C
Effluent Flow =	0.135	mgd
Max Effluent Temperature =	22.1	°C
7 day Max Effluent Temperature =	20.3	°C

5% of 7Q10 =	0.0	cfs
5% dilution =	1	
25% of 7Q10 =	0.1	cfs
25% dilution =	1	dilution = (Qe+Qr)/Qe

Temperature at 5% cross section =	**21.61**	**°C**	**No Reasonable Potential**
Temperature at 25% cross section =	**18.67**	**°C**	**No Reasonable Potentia**
ΔT at 25% Stream Flow=	**5.67**	**°C**	

Equation used to calculate ΔT at edge of MZ

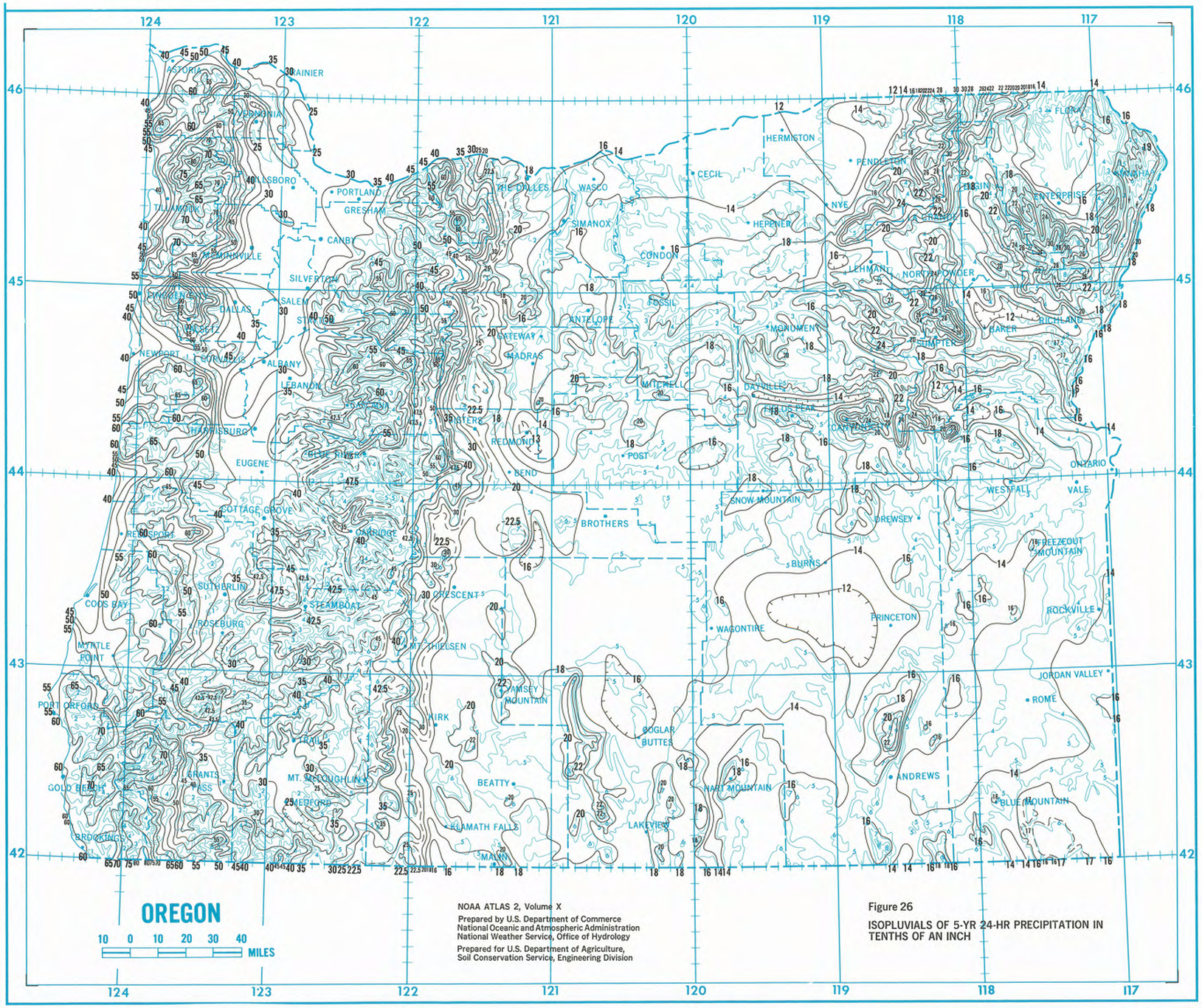
$$\Delta T_{mz} = \frac{T_e + (S-1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_{all} C_p \rho$$

Where:

Qe = Effluent Flow in mgd
S = Dilution
ΔT_{all} = Allowable temperature increase at edge of MZ (°C)
Cp = Specific Heat of Water (1 cal/g °C)
ρ = Density of Water (1 g/cm^3)
3785.41 = Flow conversion from mgd to m^3/day



NOAA ATLAS 2, Volume X

Prepared by U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Department of Agriculture,
Soil Conservation Service, Engineering Division

Figure 26

ISOPLUVIALS OF 5-YR 24-HR PRECIPITATION IN TENTHS OF AN INCH

Influent Lift Station

Valve Vault

Diversion Structure

Diversion Structure Interior

Aeration Basin #1

Aeration Basin #2

Aeration Basin Covers

Control Valves

Splitter Box

Splitter Control Valves

Splitter Box Upper Chamber

Splitter Box Lower Chamber

Splitter Box and Sand Filters

Sand Filter #1

Sand Filter #2

Chlorination Manhole

Chlorination Manhole Interior

Disinfection & Effluent Shed

Dechlorination Chamber

Radio, Flow Meter, and Autosampler

Effluent Weir

Autosampler

Radio Telemetry

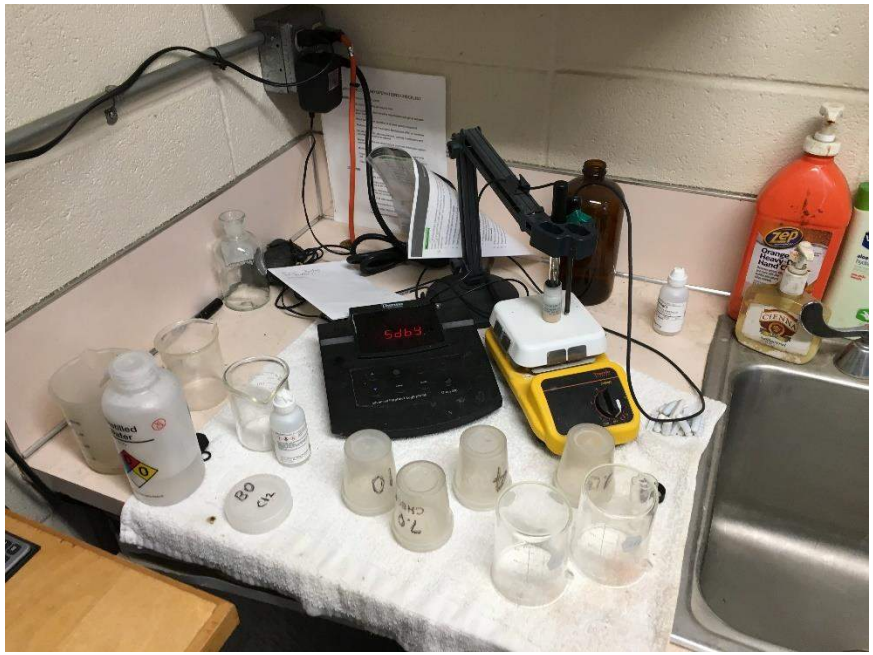
Outfall (Approximate Location)

WWRF Entrance and Control Building

WRRF Entrance and Influent Pump Station

Main Breaker

Influent Flow Meter



Laboratory Area

Supply Storage

Equipment Storage Pad and Cover

Onsite Sand Stockpile

CLACKAMAS
WATER ENVIRONMENT SERVICES

Policy Session
November 10, 2020

Boring WRRF Facilities Plan

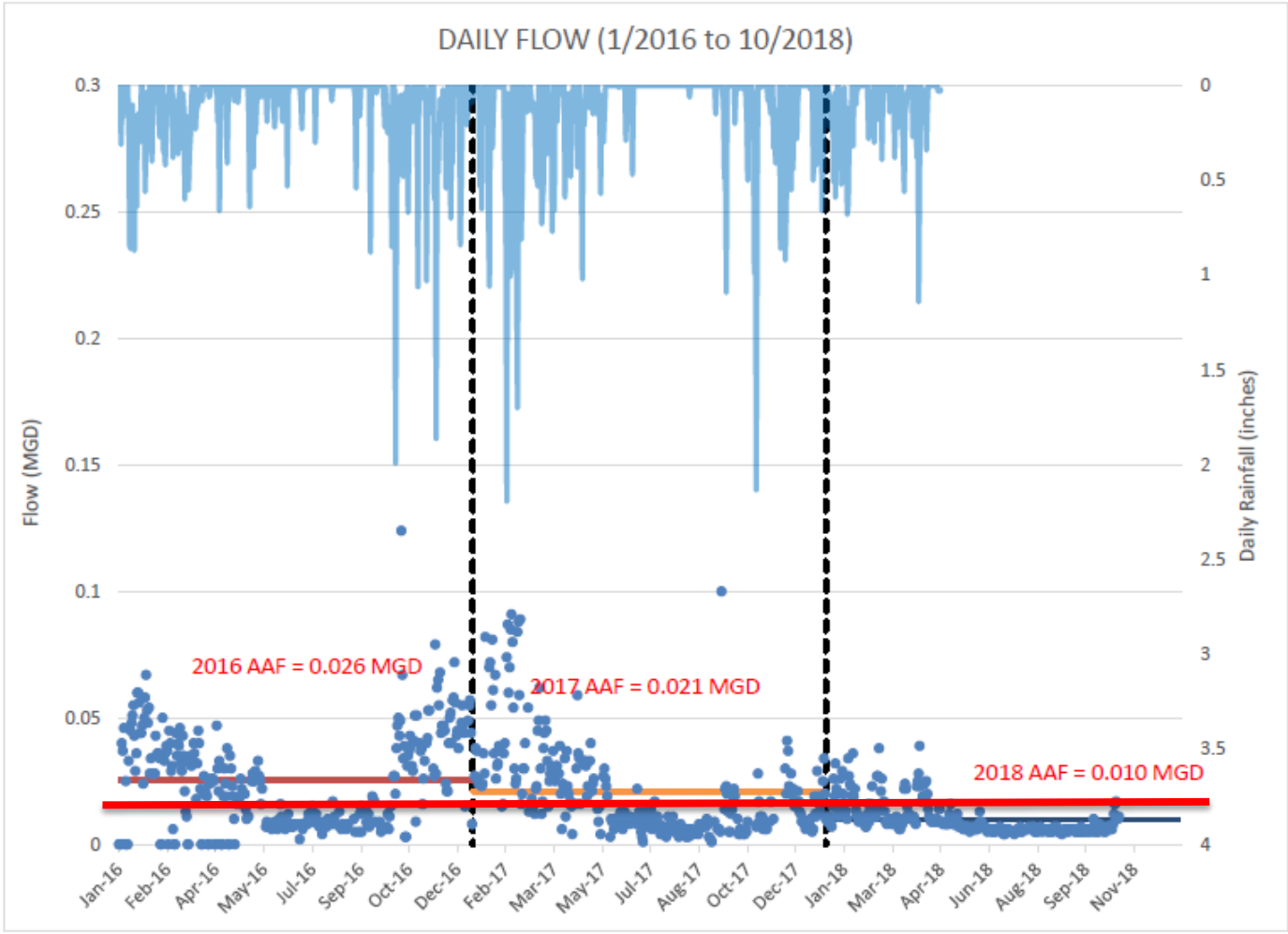
Lynne Chicoine, PE, BCEE
Capital Program Manger

Boring WRRF Background

- **Constructed in 1986**
- **Serves 60 households/connections**
- **Designed to removed BOD/TSS (secondary treatment)**

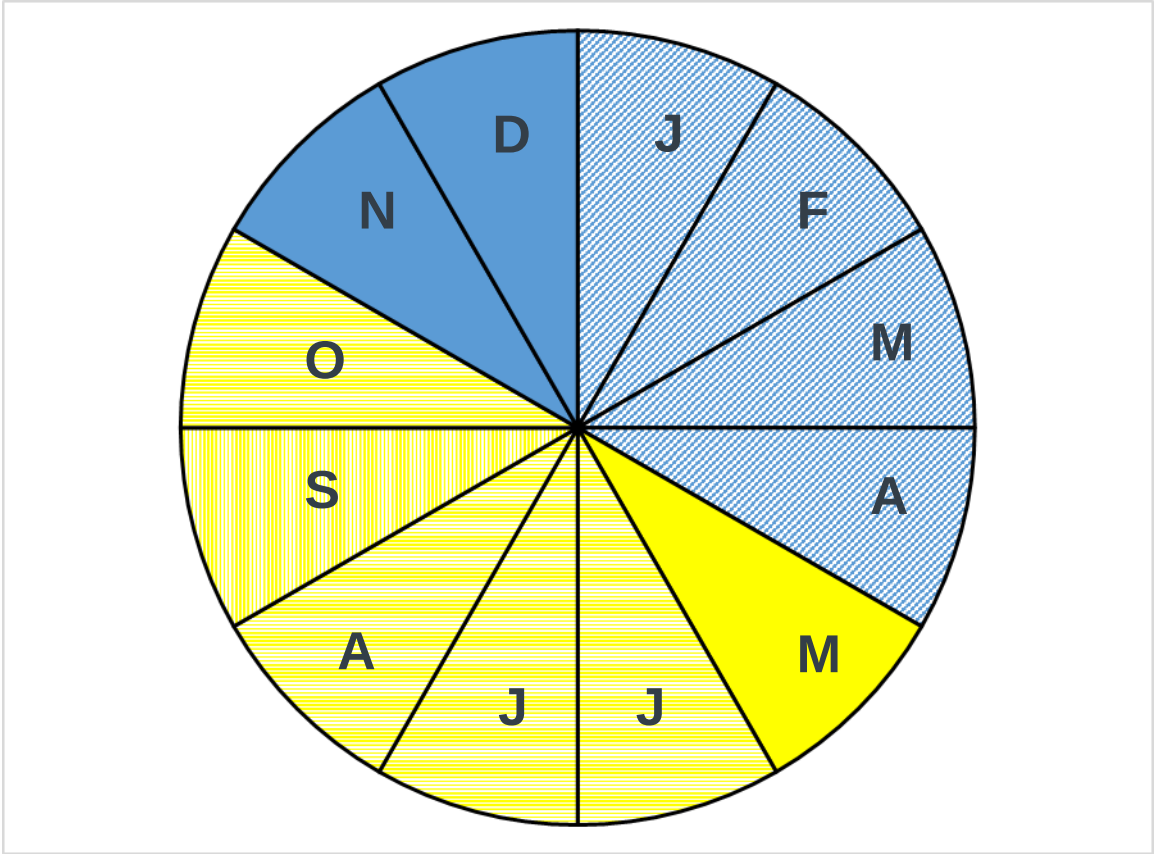
CLACKAMAS WATER ENVIRONMENT SERVICES

Figure 2-1
Boring WRRF Influent Flow (January 2016 through October 2018)



CLACKAMAS
WATER ENVIRONMENT SERVICES

Ammonia and Temperature Limits are Challenging



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Identify and Develop Alternatives

- **Alternative A** – Abandon existing WRRF and pump to another facility for treatment.
- **Alternative B** – Convert the existing WRRF to a conventional activated sludge (CAS) facility with cloth media filters. Continue on-site irrigation in summer months.
- **Alternative C** – Abandon the existing WRRF and pump to a new large onsite sanitary system (LOSS).
- **Alternative D** – Rehabilitate the existing WRRF. Minimally upgrade facilities for reliability and provide sludge recirculation. Continue on-site irrigation in summer months.

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Table 6-1
Non-Monetary Evaluation of Alternatives

Alternative	Constructability	Regulatory Flexibility	Expandability (growth)	Ease of Operation and Maintenance	Public Acceptance	Total
Weight	20%	20%	20%	20%	20%	
A. Install Pump Station A.1 To Sandy A.2 To WES	Can be constructed without interference with operation of existing facility	Can easily accommodate change in regulations. No additional facilities required.	Can easily accommodate growth	Simple to operate	Will eliminate a treatment plant.	
Score	5	5	5	5	5	5.0
B. Conventional Activated Sludge Facility	Will need to provide temporary treatment or haul during construction.	May/may not be adaptable to stricter regulations.	Growth will require additional facilities. Not expandable on existing site.	Highest O&M complexity compared to other alternatives.	New facilities slightly more acceptable to public	
Score	2	3	2	2	3	2.4
C. Pump to LOSS	Can be constructed without interference with existing facility. Regulatory and permitting hurdles are high. Land availability is unknown.	Not adaptable to stricter regulations.	Will require purchase of additional land. Land availability is unknown.	Relatively simple to operate. Will require some attention at LOSS site.	May be unacceptable to public to take land for this purpose. Will require land use approval.	
Score	3	1	2	4	3	2.6
D. Rehabilitate Existing Facility	Will need to provide temporary treatment or haul during construction.	May/may not be adaptable to stricter regulations.	Growth will require additional facilities. Not expandable on existing site.	Similar to Alternative B. No HW, but sand filter requires regular attention.	Unattractive site.	
Score	2	2	2	1	2	1.8

Life Cycle Cost Evaluation

Cost, 2020 $M	A1	A2	B	C	D
Capital	3.6	4.9	2.8	5.6	1.3
PW Annual/RR	0.4	0.4	4.6	1.0	3.7
Total, $M	4.0	5.3	7.4	6.6	5.0

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Life Cycle Cost Evaluation

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