Fact Sheet for IPDES Permit No. ID0021211

12/15/2020

Idaho Department of Environmental Quality (DEQ) proposes to reissue an Idaho Pollutant Discharge Elimination System (IPDES) Permit to discharge pollutants pursuant to the provisions of IDAPA 58.01.25 to:

City of Richfield Wastewater Treatment Facility
US Highway 26
Richfield, Idaho 83349

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Public Comment Start Date:	12/15/2020
Public Comment Expiration Date:	01/14/2021
Technical Contact:	Karen Jackson 208-373-0382 Karen.jackson@deq.idaho.gov

Purpose of this Fact Sheet

This fact sheet explains and documents the decisions the Idaho Department of Environmental Quality (DEQ) made in writing the Idaho Pollutant Discharge Elimination System (IPDES) permit for City of Richfield.

This fact sheet complies with IDAPA 58.01.25.108.02 of the Idaho Administrative Code, which requires DEQ to prepare a permit and accompanying fact sheet for public evaluation before issuing an IPDES permit.

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Acronyms

1Q10	1-day, 10 year low flow
7Q10	7-day, 10 year low flow
30Q5	30-day, 5 year low flow
30Q10	30-day, 10 year low flow
AML	Average Monthly Limit
BOD_5	Biochemical oxygen demand, five-day
BMP	Best Management Practices
°C	Degrees Celsius
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CV	Coefficient of Variation
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
DMR	Discharge Monitoring Report
EPA	U.S. Environmental Protection Agency
IDAPA	Refers to citations of Idaho administrative rules
IDWR	Idaho Department of Water Resources
I/I	Inflow and Infiltration
IPDES	Idaho Pollutant Discharge Elimination System
lbs/day	Pounds per day
LTA	Long Term Average
MDL	Maximum Daily Limit or Method Detection Limit
mgd	Million gallons per day
mg/L	Milligrams per liter
mL	Milliliters
O&M	Operations and maintenance
POC	Pollutant(s) of Concern
POTW	Publicly Owned Treatment Works
QAPP	Quality Assurance Project Plan
RPA	Reasonable Potential Analysis
RPMF	Reasonable Potential Multiplication Factor

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RPTE	Reasonable Potential To Exceed
SIU	Significant Industrial User
s.u.	Standard Units
TBEL	Technology Based Effluent Limits
TMDL	Total Maximum Daily Load
TRC	Total Residual Chlorine
TRE	Toxicity Reduction Evaluation
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
USGS	United States Geological Survey
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQC	Water Quality Criteria
WQS	Water Quality Standards

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1 Introduction

This fact sheet provides information on the permit for the Idaho Department of Environmental Quality (DEQ) Idaho Pollutant Discharge Elimination System (IPDES) permit for City of Richfield. This fact sheet complies with the Rules Regulating the Idaho Pollutant Discharge Elimination System Program (IDAPA 58.01.25), which requires DEQ to prepare a permit and accompanying fact sheet for public evaluation before issuing an IPDES permit.

DEQ proposes to reissue the IPDES permit for City of Richfield Publically Owned Treatment Works (Richfield POTW). To ensure protection of water quality and human health, the permit places conditions on the type, volume, and concentration of pollutants discharged from the facility to waters of the United States.

This fact sheet includes:

- A map and description of the discharge location;
- A listing of effluent limits and other conditions the facility must comply with;
- Documentation supporting the effluent limits;
- Technical material supporting the conditions in the permit; and
- Information on public comment, public hearing, and appeal procedures.

Terms used in this fact sheet are defined in Section 5, Definitions, of the permit.

Public Comment

The permit application, permit, and fact sheet describing the terms and conditions applicable to the permit are available for public review and comment during a public comment period. The public is provided at least 30 days to provide comments to DEQ. (IDAPA 58.01.25.109.01.c). Persons wishing to request a public meeting for this facility's permit must do so in writing within 14 calendar days of public notice being published that a permit has been prepared; requests for public meetings must be submitted to DEQ by 12/29/2020. Requests for extending a public comment period must be provided to DEQ in writing before the last day of the comment period. (IDAPA 58.01.25.109.02). For more details on preparing and filing comments about these documents, please see the IPDES guidance *Public Participation in the Permitting Process* at "*http://www.deq.idaho.gov/media/60178029/ipdes-public-participation-permitting-process-0216.pdf*". For more information, please contact the permit writer.

After the close of the public comment period, DEQ considers information provided by the public, prepares a document summarizing the public comments received, and may make changes to the permit in response to the public comments. (IDAPA 58.01.25.109.03). DEQ will include the summary and responses to comments in Appendix D of the final fact sheet. DEQ may request more information from the applicant in order to respond to public comments. After the public comment period and prior to issuing the final permit decision, DEQ will also provide the applicant an opportunity to submit additional information to address proposed changes and support the response to public comments. (IDAPA 58.01.25.109.02.h.). DEQ will assess the public comment in conjunction with any additional information received from the applicant and develop a proposed permit.

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The Environmental Protection Agency (EPA) may take up to 90 days from the publication of public notice of the permit to develop and document specific grounds for objections to a proposed permit. If EPA objects to a proposed permit DEQ must satisfactorily address the objections within the time period specified in the memorandum of agreement between EPA and DEQ (40 CFR 123.44). Otherwise, EPA may issue a permit in accordance with 40 CFR 121, 122, 124. If EPA issues the permit, any state, interstate agency, or interested person may request EPA hold a public hearing regarding the objection.

Permit Issuance

Following the public comment periods on a permit and after receipt of any comments on the proposed permit from EPA, DEQ will issue a final permit decision, the final permit, and the fact sheet. All comments received will be addressed in Appendix D of the final fact sheet and any resulting changes to the permit or fact sheet documented. A final permit decision means a final decision to issue, deny, modify, revoke and reissue, or terminate a permit (IDAPA 58.01.25.107.04.). The final permit and final fact sheet will be posted on the DEQ webpage. Response to comments will be located in the final fact sheet as an appendix.

The permit holder or applicant and any person or entity who filed comments or who participated in a public meeting on the draft permit may file a petition for review of a permit decision as outlined in Appendix C. The petition for review must be filed with DEQ's hearing coordinator within 28 days after DEQ serves notice of the final permit decision. (IDAPA 58.01.25.204.01). Any party that participated in the petition for review that is still aggrieved by the final IPDES action or determination has a right to file a petition for judicial review (IDAPA 58.01.25.204.26).

Documents are Available for Review

The IPDES permit and fact sheet can be reviewed or obtained by visiting or contacting the DEQ State office between 8:00 a.m. and 5:00 p.m., Monday through Friday at the address below. The application, permit, and fact sheet can also be found by visiting the DEQ website at "*http://www.deq.idaho.gov/news-public-comments-events/*."

DEQ
1410 N. Hilton St.
Boise, ID 83706
208-373-0502

The fact sheet and permits are also available at the DEQ Regional Office:

Twin Falls Regional Office
650 Addison Avenue West, Suite 110
Twin Falls, ID 83301

Disability Reasonable Accommodation Notice

For technical questions regarding the permit or fact sheet, contact the permit writer at the phone number or e-mail address at the beginning of this fact sheet. Those with impaired hearing or speech may contact a TDD operator at 1-800-833-6384 (ask to be connected to the permit writer

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at the above phone number). Additional services can be made available to a person with disabilities by contacting the permit writer.

2 Background Information

2.1 Facility Description

This fact sheet provides information on the IPDES permit for the following entity:

Table 1. Facility information.

Permittee	City of Richfield
Facility Physical Address	1568 East Highway 26, Richfield, ID 83349
Facility Mailing Address	P.O. Box 97, Richfield, ID 83349
Facility Contact	Jason Brauburger, City Maintenance Supervisor
Responsible Official	Tom Naylor, Mayor
Facility Location	Latitude: 43.045269° Longitude: -114.163703°
Receiving Water Name	Little Wood River
Outfall Location	Latitude: 43.043802° Longitude: -114.162964°
Permit Status	
Application Submittal Date	October 6, 2009
Date Application Deemed Complete	February 17, 2010

The City of Richfield owns and operates the Richfield POTW located in Richfield, Idaho. The collection system has no combined sewers. The facility serves a resident population of 414 based on their permit application. There are no major or minor industries discharging to the facility.

2.1.1 Facility Information

The design flow of the facility is 0.06 mgd (60,000 gallons per day). The treatment process consists of lagoons followed by chlorination used to treat domestic wastewater. Details about the wastewater treatment process are provided in Section 2.1.2, and a map showing the location of the treatment facility and discharge are included in Appendix A. The facility is a minor facility because of limited effluent discharge rate.

2.1.2 Treatment Process

A schematic of the treatment process is provided in Appendix A.

Raw wastewater from the collection system flows via gravity to a lift station. The lift station's wet-well houses two submersible two horsepower (hp) pumps. Operation of the pumps is controlled by float switches. Pumps alternate at the end of each pump cycle. Wastewater from the lift station is pumped through a four inch asbestos cement pressure main to a three-inch Parshall flume. Influent then flows via gravity to the lagoons.

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The POTW consists of two lagoons. The eastern lagoon, Cell #1, is an aerated lagoon and receives influent from the lift station. The lagoon is a one million gallon capacity bentonite lined aeration lagoon. Cell #1 uses six diffusers and two pontoon aerators. The western lagoon, Cell #2, is a facultative lagoon and receives wastewater from Cell #1. Cell #2 is a 0.9 million gallon capacity bentonite lined facultative polishing lagoon. The POTW uses sodium hypochlorite for disinfection. Treated wastewater travels through a 6,750 gallon chlorine contact chamber prior to being discharged to an oxbow of the Little Wood River, southwest of the POTW (November through April) or discharged to the City's Reuse facility (May through October)[1]. The wastewater flows through a series of baffles in the chlorine contact system to provide mixing and sufficient contact time. The effluent is de-chlorinated using sodium bisulfite (40% solution) before final discharge.

2.1.3 Permit History

The POTW was built in 1974 and discharged treated effluent to the Little Wood River, which has subsequently altered its channel leaving the discharge point in an oxbow lake; additional information is provided in 2.1.6. The pontoon aerators were added in 1988. The previous permit became effective on April 1, 2005 and expired March 31, 2010. An application was submitted to EPA on October 6, 2009 and deemed complete on February 17, 2010. The permit was subsequently administratively continued by EPA.

2.1.4 Compliance History

A compliance inspection was conducted by DEQ on behalf of EPA on August 16, 2016. The inspection encompassed the wastewater treatment process, records review, operation and maintenance, and the collection system. The inspection findings included permit limit exceedances; the facility was unable to provide their Operation and Maintenance (O&M) manual, and their Quality Assurance Project Plan (QAPP). The Richfield POTW sends compliance samples to Magic Valley Labs, Inc. in Twin Falls, ID.

DEQ reviewed effluent monitoring data since the last permit issuance (April 2005 – November 2019) to determine compliance. The data are summarized in the Table 2.

[1] The reuse permit LA-000048-03

Table 2. Effluent limit violations.

Parameter Exceeding Permit Limits	Limit	Units	Number of Instances (2005 – 2019)	Number of Instances (2015 – 2019)
BOD_5	Weekly Average	lb/day	1	0
BOD_5	Percent Removal	%	1	0
TSS	Monthly Average	mg/L	21	6
TSS	Monthly Average	lb/day	9	4
TSS	Weekly Average	mg/L	13	3
TSS	Weekly Average	lb/day	2	1
TSS	Percent Removal	%	9	2
pH	Maximum	s.u.	3	1
pH	Minimum	s.u.	1	0
E. coli	Instantaneous Maximum	cfu/100/ml	9	3
TRC	Monthly Average	mg/L	3	0
TRC	Monthly Average	lb/day	5	3
TRC	Daily Maximum	mg/L	2	0
TRC	Daily Maximum	lb/day	5	2

2.1.5 Sludge/Biosolids

The EPA Region 10, under the authority of the CWA, issues separate sludge-only permits for the purpose of regulating biosolids. Permits for sludge management are independent of IPDES discharge permits and must be obtained from EPA. The IPDES program will take over permitting of sludge/biosolids in July 2021. In addition, sludge management plans must be submitted to DEQ and must follow the procedures in IDAPA 58.01.16.

2.1.6 Outfall Description

The Richfield POTW discharges to wetlands situated in an oxbow channel that is directly adjacent to and hydrologically connected with the Little Wood River, approximately 500 feet southwest of the POTW. The oxbow is approximately 8,000 sq. feet and can go dry in the summer due to a natural bank made by the river when it changed its course away from the oxbow. The outfall is submerged below the water level.

2.1.6.1 Outfall History

The Richfield POTW outfall historically discharged directly into the Little Wood River. Since the construction of the POTW, the river has meandered away from the outfall. See Figure 1A and 1B, below. The oxbow is now occupied by wetlands that are adjacent to and hydrologically connected with the Little Wood River.

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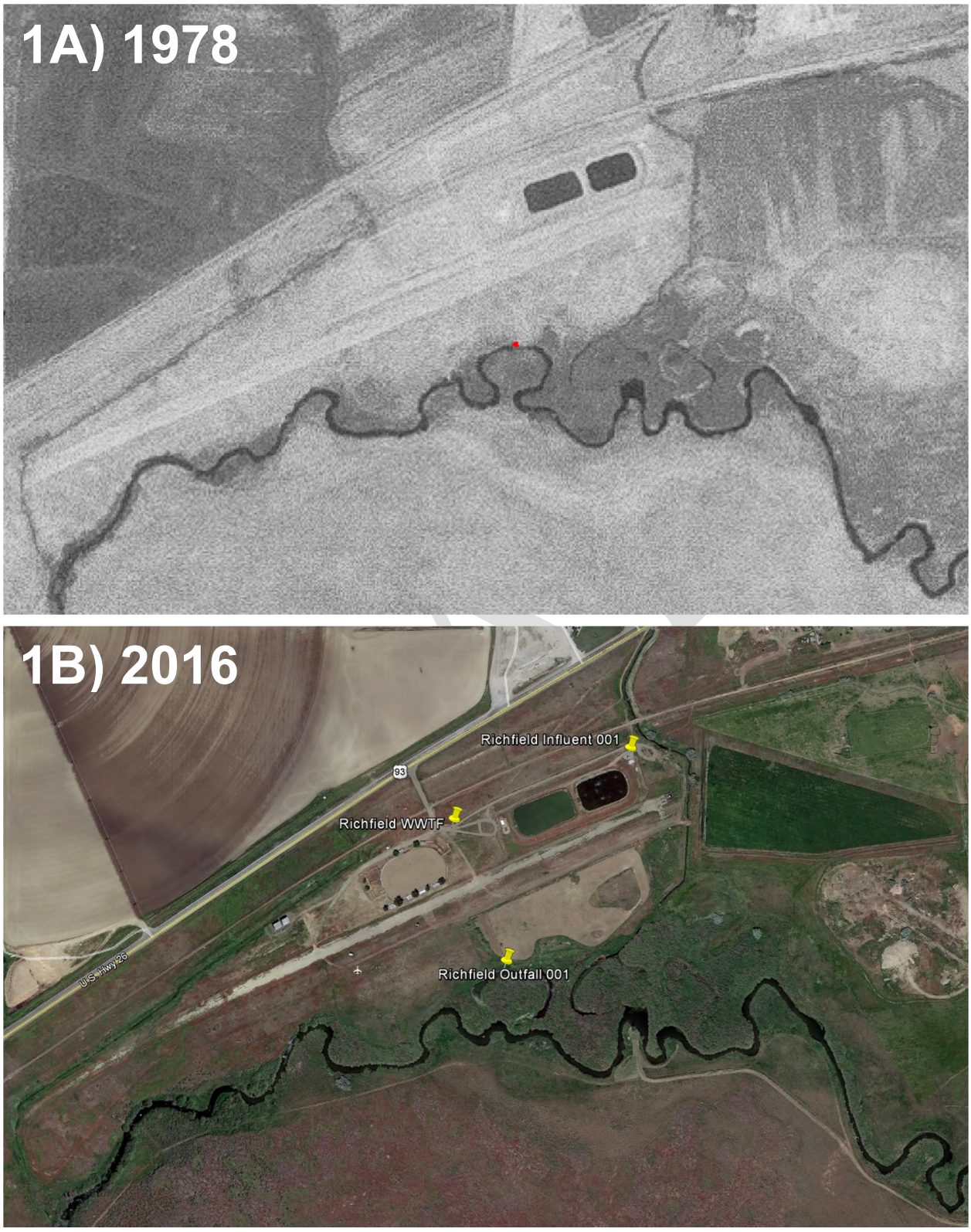


Figure 1. Historical Migration of Little Wood River, and Outfall Location

2.1.7 Wastewater Influent Characterization

The Richfield POTW reported the concentration of influent pollutants in Discharge Monitoring Reports (DMRs) and results are characterized in Table 3. The tabulated data represents the quality of the influent wastewater since the previous permit's issuance from April 2005 to November 2019.

Table 3. Wastewater influent characterization (2005-2019).

Parameter	Units	# of Samples	Average Value	Maximum Value
BOD_5 (2005 – 2019)	mg/L	78	242	690
TSS (2005 – 2019)	mg/L	77	209	1,220
BOD_5 (2015 – 2019)	mg/L	24	304	690
TSS (2015 – 2019)	mg/L	24	246	1,220

2.1.8 Wastewater Effluent Characterization

The Richfield POTW reported the effluent pollutant concentrations in DMRs and results are characterized in Table 4 and Table 5. The tabulated data in Table 4 represents the quality of the effluent discharged from (April 2005 – November 2019). The tabulated data in Table 5 represents the quality of the effluent discharged from (April 2015 – November 2019).

Table 4. Wastewater effluent characterization (2005-2019).

Parameter	Units	# of Samples	Average Values	Maximum Values
BOD_5 Monthly	mg/L	81	16	45
BOD_5 Monthly	lb/day	81	5.5	23
BOD_5 Weekly	mg/L	81	16	45
BOD_5 Weekly	lb/day	81	6.0	49
BOD_5 Removal	%	81	91.9	63 (minimum)
TSS Monthly	mg/L	81	42	121
TSS Monthly	lb/day	81	12.7	36
TSS Weekly	mg/L	81	42	121
TSS Weekly	lb/day	81	13.2	50
TSS Removal	%	80	77.8	40 (minimum)
TRC Monthly	mg/L	78	0.13	0.54
TRC Daily Maximum	mg/L	63	0.06	2.2
TRC Individual data	mg/L	119	0.03	2.2
E. coli Geomean	#/100mL	81	6	107
E. coli Instantaneous Maximum	#/100mL	81	153	2420
Ammonia as N[a]	mg/L	6	23	34.8
Dissolved Oxygen	mg/L	6	4.2	3 (minimum)
Total Phosphorus as P[a]	mg/L	6	6	12.3
Parameter	**Units**	**# of Samples**	**Minimum Value**	**Maximum Value**
pH	standard units	162	5.86	9.41

a. Data only collected in 2006

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Table 5. Wastewater effluent characterization (2015-2019).

Parameter	Units	# of Samples	Average Values	Maximum Values
BOD_5 Monthly	mg/L	24	12	40
BOD_5 Monthly	lb/day	24	4.4	23
BOD_5 Weekly	mg/L	24	12	40
BOD_5 Weekly	lb/day	24	4.3	22
BOD_5 Removal	%	24	95.5	82 (minimum)
TSS Monthly	mg/L	24	39	100
TSS Monthly	lb/day	24	13	36
TSS Weekly	mg/L	24	39	100
TSS Weekly	lb/day	24	14	50
TSS Removal	%	24	82	40 (minimum)
TRC Monthly	mg/L	21	0.009	0.035
TRC Daily Maximum	mg/L	6	0.007	.002
TRC Individual data	mg/L	63	0.04	2.2
E. coli Geomean	#/100mL	24	9	107
E. coli Instantaneous Maximum	#/100mL	24	90	1010
Parameter	**Units**	**# of Samples**	**Minimum Value**	**Maximum Value**
pH	standard units	105	5.86	9.41

2.2 Description of Receiving Water

The Richfield POTW discharges to the Little Wood River in the Little Wood Subbasin (HUC 17040221) Water Body Unit US-1 (Assessment Unit ID17040221SK001_05). At the point of discharge, the Little Wood River is protected for the following designated uses (IDAPA 58.01.02.150.23 US-1):

- Cold water aquatic life
- Primary contact recreation

According to DEQ's 2016 Integrated Report, this assessment unit (AU) is not fully supporting one or more of its assessed uses. The aquatic life use is not fully supported. Causes of impairment include an altered flow regime, total phosphorus (TP), sedimentation/siltation (TSS), and temperature. The contact recreation beneficial use is fully supported.

The outfall is located 0.75 river miles downstream of Main Street Bridge. For more information on the outfall see 2.1.6 Outfall Description in this document. Upstream point sources to the Little Wood River include the Carey POTW. Nearby non-point sources of pollutants include agriculture (grazing and cropping), irrigation diversions and returns, and roads. The Jim Byrns Slough discharges irrigation water into the Little Wood River between April and October each year. South of the Jim Byrnes Slough mouth is the Dietrich Canal intake. The intake diverts water from the Little Wood River April to October. Section 2.2.1 of this fact sheet describes any receiving water body impairments. The ambient background data used for this permit includes the following from NPDES permit required receiving water monitoring.

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Table 6. Ambient background data.

Parameter	Units	Percentile	Value
Temperature	°C	Maximum*	11
pH	Standard units	Minimum – Maximum*	7.4-8.4
Ammonia	mg/L	90th	0.213

*Maximum value used because n<20 (n=9). The ambient background data used for this permit was sourced from facility monitoring.

2.2.1 Water Quality Impairments

Water bodies not supporting existing or designated beneficial uses must be identified as water quality limited, and a total maximum daily load (TMDL) must be prepared for those pollutants causing impairment (IDAPA 58.01.02.055.02). A central purpose of TMDLs is to establish wasteload allocations (WLAs) for point source discharges, which are set at levels designed to help restore the water body to a condition that supports existing and designated beneficial uses. Discharge permits must contain limits that are consistent with the assumptions and requirements of WLAs that have been assigned to the discharge in an EPA-approved TMDL (IDAPA 58.01.25.06.vii(2)).

The EPA-approved *Little Wood River Subbasin Assessment and TMDL* (DEQ 2005) establishes WLAs for TP, TSS, and temperature for the Little Wood River. The portion of the TMDL affecting the POTW is Little Wood River #4[2], spanning from Richfield to the confluence with the Big Wood River. These WLAs are designed to meet narrative and numeric criteria and ultimately help restore the water body to a condition that supports existing and beneficial uses. The effluent limits and associated requirements contained in the permit are set at levels that are consistent with the TMDL.

2.2.2 Critical Conditions

The low flow conditions of a water body are used to determine water quality-based effluent limits (WQBELs). In general, Idaho's water quality standards (WQS) require criteria be evaluated at the following low flow design conditions (See IDAPA 58.01.02.210.03) as defined in Table 7. The 1Q10 represents the lowest one day flow with a recurrence frequency of once in 10 years. (IDAPA 58.01.02.210.03.b.i). The 7Q10 represents lowest average seven consecutive day flow with a recurrence frequency of once in 10 years. (IDAPA 58.01.02.210.03.b.iii). The 30Q5 represents the lowest average 30 consecutive day flow with a recurrence frequency of once in five years. The harmonic mean is a long-term mean flow value calculated by dividing the number of daily flow measurements by the sum of the reciprocals of the flows. (IDAPA 58.01.02.210.03.b.v). The 30Q10 represents the lowest average 30 consecutive day flow with a recurrence frequency of once in 10 years.

The Richfield POTW discharges to a wetland situated in a non-flowing oxbow adjacent to and hydrologically connected with the Little Wood River. Because of the limited surface area of the oxbow and the lack of flow, the critical low flows for the permit are set to 0 cfs.

The USGS gage 13151000 was historically (1911 to 1972) placed in town approximately 2.5 miles upstream of the WWTF outfall. There is one major intake (Jim Byrns Slough) and one

[2] AUs ID17040221SK002_05, ID17040221SK001_05, ID17040221SK001_05a, ID17040221SK001_05b,

major diversion (Dietrich Canal) between the gage and the outfall. Flow data from the Little Wood River, slough, and canal, collected by Water District 37 gages, were used in conjunction with USGS gage 13151000 data to calculate main stem critical low flows in the Little Wood River at the Richfield POTW outfall.

In May 1909, construction work on the Dietrich Canal was started and in November 1909, water ran in the Dietrich Canal for the first time. Data prior to 1940 were not used because the Little Wood River Dam was not constructed until 1939 (Big Wood Canal Company, ND, Bureau of Reclamation, 2012). Based on impacts the canal and dam would have had on the stream's hydrography, data prior to 1940 were not representative of the current state of the water body and were not used to calculate main stem critical low flows. Lowest historic flows occurred in April, May, and June.

The Jim Byrns slough typically discharges into the Little Wood River from May to September. The Jim Byrns Slough can discharge as early as April. The lowest flows from the slough overlapping with the permittees discharge season (April) are 0 cfs.

The Dietrich Canal typically diverts from the Little Wood River from April through September, sometimes through October. The high canal diversion flow of 90 cfs (90^{th} percentile) from the Little Wood River overlaps with the permittees discharge season (April).

Little Wood River flow data collected upstream from the Jim Byrns slough and Diethrich canal were available from April through September from 2003 through 2019. No flow data were available during months other than April, when the permittee discharges.

This permit uses historical USGS data (1940 – 1972) to calculate the seasonal critical low flows for months without recent data (November through March). The critical low flows for April are calculated using more recent Water District 37 data for the Little Wood River, subtracting the Dietrich Canal diversion flow on the corresponding day, adding the Jim Byrns flow on the corresponding day, and running low flow statistics on the result. All negative results (n=6) were assumed to be 0 cfs.

If the permittee chooses to reconnect to the Little Wood River main stem, the critical low flow values in Table 7 will be used.

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Table 7. Low flow design conditions.

Criteria	Flow Condition	Critical Flow at Oxbow Lake (cfs)	Critical Flow at Mainstem November through March (cfs)	Critical Flow at Mainstem April Only (cfs)
Acute aquatic life	1Q10	0	57	0
Chronic aquatic life	7Q10	0	79	4.6
Non-carcinogenic human health criteria and chornic ammonia	30Q5	0	113	30
Carcinogenic human health criteria	harmonic mean flow	0	114	-

2.3 Pollutants of Concern

DEQ may identify pollutants of concern (POC) for the discharge based on, but not limited to, those which:

- Have a technology-based limit (TBEL)
- Have an assigned WLA from a TMDL
- Had an effluent limit in the previous permit
- Are present in the effluent monitoring data reported in the application, DMRs, or special studies
- Are expected to be in the discharge based on the nature of the discharge
- Are impairing the beneficial uses of the receiving water

To determine POCs for further analysis, DEQ evaluated all pertinent and available information such as the permit application, previous DMRs, raw discharge data provided by the facility, TMDLs and the facility's industrial user surveys. The wastewater treatment process for this facility includes aerated and facultative lagoons and chlorination. Pollutants expected in the discharge from a facility with this type of treatment are:

- TSS
- BOD_5
- *E. coli* bacteria
- TRC
- pH
- Ammonia, total as N
- Phosphorus, total as P
- Temperature

3 Effluent Limits and Monitoring

Table 8 presents the effluent limits and monitoring requirements in the 2005 permit. Table 9 and Table 10 present the effluent limits and monitoring requirements in the 2020 permit. Table 11 presents interim limits and monitoring requirements in the 2020 permit.

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Table 8. 2005 Permit - Effluent Limits and Monitoring Requirements.

Parameter	Effluent Limits				Monitoring Requirements		
	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Instantaneous Maximum Limit	Sample Location	Sample Frequency	Sample Type
Flow, mgd	—	—	—	—	Effluent	5/week	Measured
BOD_5	45 mg/L	65 mg/L	—	—	Influent and Effluent	1/month	Grab
	23 lb/day	33 lb/day	—	—			
TSS	45 mg/L	65 mg/L	—	—	Influent and Effluent	1/month	Grab
	23 lb/day	33 lb/day	—	—			
E. coli[a,b]	126/100 mL	—	—	406/100 mL	Effluent	5/month	Grab
Chlorine, Total Residual [b,c,d]	0.03 mg/L	—	0.08 mg/L	—	Effluent	1/week	Grab
	0.02 lb/day	—	0.04 lb/day	—			
Dissolved Oxygen, mg/L [e]	—	—	—	—	Effluent	1/month	Grab
Total Phosphorus as P, mg/L [e]	—	—	—	—	Effluent	1/month	Grab
Total Ammonia as N, mg/L [e]	—	—	—	—	Effluent	1/month	Grab

a. The average monthly *E. coli* count must not exceed a geometric mean of 126/100 ml based on a minimum of five samples taken every 35 days within a calendar month.
b. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation.
c. The average monthly and maximum daily concentration limits for chlorine are not quantifiable using EPA approved test methods. The permittee will be in compliance with the effluent limits for chlorine provided the average monthly and maximum daily total chlorine residual levels are at or below the compliance evaluation level of 0.1 mg/L, and average monthly and maximum daily loadings are at or below 0.05 lbs/day.
d. Chlorine effluent limits shall become effective April 1, 2008 in accordance with the conditions of the Compliance Schedule, below.
e. Monitoring shall be conducted once per month starting in January 2006 and lasting for one year.

The 2005 permit also included the following limits:

- The pH range shall be between 6.5 - 9.0 standard units. The Permittee shall monitor for pH once per week. Sample analysis shall be conducted on a grab sample from the effluent.
- 65% Removal Requirements for BOD_5 and TSS: For each month, the monthly average effluent concentration shall not exceed 35 percent of the monthly average influent concentration. Percent removal of BOD_5 and TSS shall be reported on the Discharge Monitoring Reports (DMRs). The monthly average percent removal shall be calculated from the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month. Influent and effluent samples shall be taken over approximately the same time period.
- Chlorine Schedule of Compliance:
    - The permittee must achieve compliance with the chlorine limitations of Part I.A.1. (Table 1), by April 1, 2008. In the interim the following effluent limits must be met:
      Average Monthly Limit: 0.5 mg/L
      Maximum Daily Limit: 0.75 mg/L

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Table 9. 2020 Permit - Effluent Limits and Monitoring Requirements for Discharge to the Little Wood River Oxbow Lake.

Parameter	Discharge Period	Units	Effluent Limits						Monitoring Requirements		Reporting Period (DMR Months)
			Monthly Average	Weekly Average	Monthly Geometric Mean	Instan-taneous Minimum	Instan-taneous Maximum	Daily Maximum	Sample Type	Sample Frequency	
Biochemical Oxygen Demand (BOD_5)	11/01 to 04/30	mg/L	39	59	—	—	—	—	Grab[a]	2/month	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
		lb/day	20	30	—	—	—	—	Calculation[b]		
BOD_5 Percent Removal	11/01 to 04/30	%	81 (minimum)	—	—	—	—	—	Calculation[c]	1/month	
Total Suspended Solids (TSS)[d]	11/01 to 04/30	mg/L	45	65	—	—	—	—	Grab[a]	2/month	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
		lb/day	23	33	—	—	—	—	Calculation[b]		
TSS Percent Removal	11/01 to 04/30	%	65 (minimum)	—	—	—	—	—	Calculation[c]	1/month	
E. coli [e, f, g]	11/01 to 04/30	#/100 ml	—	—	126	—	—[f]	—	Grab[a]	5/month	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
pH	11/01 to 04/30	std. units	—	—	—	6.5[g]	9.0[g]	—	Grab[a]	2/week	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
Phosphorus, Total as P[d, i]	11/01 to 04/30	mg/L	—	—	—	—	—	—	Grab[a]	2/month	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
		lb/day	3.9	—	—	—	—	—	Calculation[b]		
Total Residual Chlorine (TRC)[i, j]	11/01 to 04/30	mg/L	0.004[h]	—	—	—	—	0.013[g, h]	Grab[a]	1/week	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
		lb/day	0.002[h]	—	—	—	—	0.007[h]	Calculation[a]		
Ammonia, Total as N[i]	11/01 to 04/30	mg/L	1.2	—	—	—	—	3.0[g]	Grab[a]	1/week	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
		lb/day	0.6	—	—	—	—	1.5	Calculation[a]		

a. A grab sample is an individual sample collected over a 15-minute period or less.
b. Calculation means figured concurrently with the respective sample, using the following formula: Concentration (in mg/L) X Flow (in mgd) X Conversion Factor (8.34) = lb/day
c. % Removal= ([Influent](mg/L)-[Effluent](mg/L))/([Influent](mg/L))×100%

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Braces "[ ]" indicate concentration of the attribute contained inside

d. This parameter has a seasonal load limit from a TMDL.
e. Idaho's water quality standards for primary contact recreation include a single sample value of 406 #/100 ml. Exceedance of this value indicates likely exceedance of the 126 #/100 ml average monthly effluent limit. If this value is exceeded at any point within the month, the facility should consider collecting more than the 5 samples per month required in this permit to determine compliance with the monthly geometric mean according to IDAPA 58.01.02.251.01.a.
f. The average monthly *E. coli* bacteria counts must not exceed a geometric mean of 126 #/100 ml based on a minimum of five samples taken every 3 – 7 days within a calendar month.
g. Exceedance of a maximum daily limit, instantaneous maximum limit, or instantaneous minimum limit requires 24-hour reporting in accordance with 2.2.7. For *E. coli*, the maximum daily threshold that triggers 24-hour reporting is 406 #/100 ml. Please see 2.2.7 for additional 24-hour reporting requirements
h. The limits for chlorine are not quantifiable using EPA-approved analytical methods. The minimum level (ML) for chlorine is 50 µg/L for this parameter. DEQ will use 50 µg/L as the compliance evaluation level for this parameter. The permittee will be compliance with the total residual chlorine limits if the average monthly and maximum daily concentrations are less than 50 µg/L and the average monthly and maximum daily mass loadings are less than 0.025 lbs/day. For purposes of calculating the monthly averages, see Section 2.2.2 of this permit.
i. This parameter has a compliance schedule.
j. This parameter has an interim limit.

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Table 10. 2020 Permit - Effluent Limits and Monitoring Requirements for Discharge to the Mainstem Little Wood River .

Parameter	Discharge Period	Units	Effluent Limits						Monitoring Requirements		Reporting Period (DMR Months)
			Monthly Average	Weekly Average	Monthly Geometric Mean	Instan-taneous Minimum	Instan-taneous Maximum	Daily Maximum	Sample Type	Sample Frequency	
Biochemical Oxygen Demand (BOD_5)	11/01 to 04/30	mg/L	39	59	—	—	—	—	Grab[a]	2/month	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
		lb/day	20	30	—	—	—	—	Calculation[b]		
BOD_5 Percent Removal	11/01 to 04/30	%	81 (minimum)	—	—	—	—	—	Calculation[c]	1/month	
Total Suspended Solids (TSS)[d]	11/01 to 04/30	mg/L	45	65	—	—	—	—	Grab[a]	2/month	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
		lb/day	23	33	—	—	—	—	Calculation[b]		
TSS Percent Removal	11/01 to 04/30	%	65 (minimum)	—	—	—	—	—	Calculation[c]	1/month	
E. coli [e, f, g]	11/01 to 04/30	#/100 ml	—	—	126	—	—[f]	—	Grab[a]	5/month	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
pH	11/01 to 04/30	std. units	—	—	—	6.5[g]	9.0[g]	—	Grab[a]	2/week	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
Phosphorus, Total as P[d, i]	11/01 to 04/30	mg/L	—	—	—	—	—	—	Grab[a]	2/month	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
		lb/day	3.9	—	—	—	—	—	Calculation[b]		
Total Residual Chlorine (TRC)[i, j]	04/01 to 04/30	mg/L	0.004[h]	—	—	—	—	0.013[g, h]	Grab[a]	1/week	Monthly (April)
		lb/day	0.002[h]	—	—	—	—	0.007[h]	Calculation[a]		
Ammonia, Total as N[i]	04/01 to 04/30	mg/L	2.7	—	—	—	—	3.0[g]	Grab[a]	1/week	Monthly (April)
		lb/day	1.3	—	—	—	—	1.5	Calculation[a]		

a. A grab sample is an individual sample collected over a 15-minute period or less.
b. Calculation - Calculated means figured concurrently with the respective sample, using the following formula: Concentration (in mg/L) X Flow (in mgd) X Conversion Factor (8.34) = lb/day
c. % Removal= ([Influent](mg/L)-[Effluent](mg/L))/([Influent](mg/L))×100%, Braces "[ ]" indicate concentration of the attribute contained inside
d. This parameter has a seasonal load limit from a TMDL.

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e. Idaho's water quality standards for primary contact recreation include a single sample value of 406 #/100 ml. Exceedance of this value indicates likely exceedance of the 126 #/100 ml average monthly effluent limit. If this value is exceeded at any point within the month, the facility should consider collecting more than the 5 samples per month required in this permit to determine compliance with the monthly geometric mean according to IDAPA 58.01.02.251.01.a.
f. The average monthly *E. coli* bacteria counts must not exceed a geometric mean of 126 #/100 ml based on a minimum of five samples taken every 3 – 7 days within a calendar month.
g. Exceedance of a maximum daily limit, instantaneous maximum limit, or instantaneous minimum limit requires 24-hour reporting in accordance with 2.2.7. For *E. coli*, the maximum daily threshold that triggers 24-hour reporting is 406 #/100 mL. Please see 2.2.7 for additional 24-hour reporting requirements
h. The limits for chlorine are not quantifiable using EPA-approved analytical methods. The minimum level (ML) for chlorine is 50 µg/L for this parameter. DEQ will use 50 µg/L as the compliance evaluation level for this parameter. The permittee will be compliance with the total residual chlorine limits if the average monthly and maximum daily concentrations are less than 50 µg/L and the average monthly and maximum daily mass loadings are less than 0.025 lbs/day. For purposes of calculating the monthly averages, see Section 2.2.2 of this permit.
i. This parameter has a compliance schedule.
j. This parameter has an interim limit.

Table 11addresses Outfall 001, discharges to the oxbow lake of the Little Wood River; Outfall 002 represents potential discharges to the main stem Little Wood River.

Table 11. Pollutants with interim effluent limits for Outfall 001 and Outfall 002.

Parameter	Interim Limit Period	Units	Effluent Limits		Monitoring Requirements		Reporting Period (DMR Months)
			Monthly Average	Daily Maximum	Sample Type	Sample Frequency	
Total Residual Chlorine (TRC) Outfall 001[a]	11/01 to 04/31	mg/L	0.03[b]	0.08[c]	Grab[d]	1/week	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
		lb/day	0.02[b]	0.04	Calculation[e]		
Total Residual Chlorine (TRC) Outfall 002[a]	04/01 to 04/31	mg/L	0.03[b]	0.08[c]	Grab[d]	1/week	Monthly (Apr)
		lb/day	0.02[b]	0.04	Calculation[e]		

a. This parameter has a compliance schedule.
b. The limits for chlorine are not quantifiable using EPA-approved analytical methods. The minimum level (ML) for chlorine is 50 µg/L for this parameter. DEQ will use 50 µg/L as the compliance evaluation level for this parameter. The permittee will be compliance with the total residual chlorine limits if the average monthly and maximum daily concentrations are less than 50 µg/L and the average monthly and maximum daily mass loadings are less than 0.025 lbs/day.
c. Exceedance of a maximum daily limit, instantaneous maximum limit, or instantaneous minimum limit requires 24-hour reporting in accordance with 2.2.7. Please see 2.2.7 for additional 24-hour reporting requirements
d. A grab sample is an individual sample collected over a 15-minute period or less
e. Calculation - Calculated means figured concurrently with the respective sample, using the following formula: Concentration (in mg/L) X Flow (in mgd) X Conversion Factor (8.34) = lb/day

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3.1 Basis for Effluent Limits

Regulations require that effluent limits in an IPDES permit must be either technology-based or water quality-based.

TBELs are set according to the level of treatment that is achievable using available technology. TBELs are based upon the treatment processes used to reduce specific pollutants. TBELs are set by the EPA and published as a regulation. DEQ may develop a TBEL on a case-by-case basis (40 CFR 125.3, IDAPA 58.01.25.302, and IDAPA 58.01.25.303).

WQBELs are calculated so the effluent will comply with the Surface Water Quality Standards (IDAPA 58.01.02) or the National Toxics Rule (40 CFR 131.36) applicable to the receiving water.

DEQ must apply the most stringent of the TBEL and WQBEL limits to each POC (IDAPA 58.01.25.302.06). These limits are described below.

3.2 Technology-Based Effluent Limits

IDAPA 58.01.25.302 requires that IPDES permits include applicable TBELs and standards, while 40 CFR 125.3(a)(1) states that TBELs for POTWs must be based on secondary treatment standards or as specified in 40 CFR 133. The following section explains secondary treatment effluent limits for the conventional pollutants discharged by POTWs: 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. These effluent limits are given in 40 CFR 133 and are outlined in Table 12.

Table 12. Secondary treatment effluent limits (40 CFR § 133).

Parameter	30-day average	7-day average
BOD_5	30 mg/L	45 mg/L
TSS	30 mg/L	45 mg/L
Removal for BOD_5 and TSS (concentration)	85% (minimum)	—
pH	within the limits of 6.0 - 9.0 s.u.	

The facility meets the three requirements for equivalent to secondary treatment listed under 40 CFR § 133.101(g). 40 CFR § 133.101(g) states:

"Facilities eligible for treatment equivalent to secondary treatment. Treatment works shall be eligible for consideration for effluent limitations described for treatment equivalent to secondary treatment (§ 133.105), if:

(1) The BOD_5 and SS effluent concentrations consistently achievable through proper operation and maintenance (§ 133.101(f)) of the treatment works exceed the minimum level of the effluent quality set forth in §§ 133.102(a) and 133.102(b),

(2) A trickling filter or waste stabilization pond is used as the principal process, and

(3) The treatment works provide significant biological treatment of municipal wastewater. Significant biological treatment (§133.101(k)) is defined as the use of an aerobic or anaerobic biological treatment process in a treatment works to consistently achieve a 30-day average of a least 65 percent removal of BOD_5"

40 CFR § 133.101(f), in turn, defines "*effluent concentrations consistently achievable through proper operation and maintenance*" as follows:

(1) For a given pollutant parameter, the 95th percentile value for the 30-day average effluent quality achieved by a treatment works in a period of at least two years, excluding values attributable to upsets, bypasses, operational errors, or other unusual conditions, and (2) a 7-day average value equal to 1.5 times the value derived under paragraph (f)(1) of this section.

The minimum effluent limits for equivalent to secondary treatment from 40 CFR § 133.105(a) and 40 CFR § 133.105(b) are listed in Table 13.

Table 13. Equivalent to secondary treatment effluent limits (40 CFR § 133.105).

Parameter	30-day average	7-day average
BOD_5	45 mg/L	65 mg/L
TSS	45 mg/L	65 mg/L
Removal for BOD_5/cBOD_5 and TSS (concentration)	65% (minimum)	—
pH	within the limits of 6.0 - 9.0 s.u.	

The rationale for how Richfield's POTW meets the three criteria are explained below:

Rationale for meeting condition (1) from 40 CFR § 133.101(g) above:

To meet condition (1), the 95th percentile of the Monthly Averages for BOD_5 and TSS must be greater than 30 mg/l. The 95th percentile of the monthly average for BOD_5 is 39 mg/L (greater than 30 mg/L) and, 1.5 times the 95th percentile of monthly averages is 58.5 mg/l (greater than 45 mg/L). The BOD_5 concentrations meet the requirements for condition (1). The facility also meets the criteria for TSS at the 95th percentile is 97 mg/l (i.e., more than 30 mg/l); and, 1.5 times the 95th percentile of monthly averages is 145.5 mg/l (more than 45 mg/l).

The facility does exceed the minimum level of effluent quality set forth in Sections 133.102(a) and 133.102(b), therefore the facility does meet criteria (1).

Rationale for meeting condition (2) from 40 CFR § 133.101(g) above:

The facility meets the condition (2) because the facility does utilize waste stabilization ponds as the principle process of treating waste waters.

Rationale for meeting condition (3) from 40 CFR § 133.101(g) above:

This condition is based on 40 CFR 133.101(k) (i.e., a 30-day average of a minimum of 65% reduction of BOD_5 is consistently attained). The facility meets the criteria because the facility has demonstrated by its previously submitted DMRs that it could consistently achieve the 65% percent removal rates for the Federal Equivalent to Secondary treatment limits for BOD_5 (see Table 4). This is demonstrated because for available DMRs April 2005 to November 2019, the

5th percentile of BOD_5 removal rates is 81%, which is greater than the 65% removal rate required by Treatment Equivalent to Secondary standard.

Due to the fact that all conditions in 40 CFR § 133.101(g) are met, the facility is eligible for the "treatment equivalent to secondary treatment" standards found in 40 CFR § 133.105. In order to adhere to "permit adjustments" listed in 40 CFR § 133.105(f), the limits for the City of Richfield WWTF are listed in Table 14 below.

Table 14. Analysis of Treatment Equivalent to Secondary Treatment.

BOD_5 Condition 1		**Condition 3**	**TSS Condition 1**	
BOD_5 Monthly Average	**BOD_5 Weekly Average**	**BOD % Removal**	**TSS Monthly Average**	**TSS Weekly Average**
95th percentile = 39 mg/L	58.5 mg/L	5th percentile = 81%	95th percentile = 97 mg/L	145.5 mg/L
To meet Treatment Equivalent to Secondary conditions (1) and (3) the data must show:				
>30 mg/L	Weekly average at least 1.5 times the monthly calculation (39.2 mg/L x 1.5=58.7 mg/L) must be greater than 45 mg/L	>65% removal	>30 mg/L	Weekly average at least 1.5 times the monthly calculation (97 mg/L x 1.5=145.5 mg/L) must be greater than 45 mg/L
Does data meet criteria (1) or (3) of Treatment Equivalent to Secondary Treatment?				
YES	YES	YES	YES	YES

40 CFR § 133.105 allows for "permit adjustments" that allow the permit writer to set more stringent limits than the minimum for equivalent to secondary. 40 CFR § 133.105(f) states:

> *"(f) Permit adjustments. Any permit adjustment made pursuant to this part may not be any less stringent than the limitations required pursuant to §133.105(a)-(e). Furthermore, permitting authorities shall require more stringent limitations when adjusting permits if:*
>
> *(1) For existing facilities the permitting authority determines that the 30-day average and 7-day average BOD_5 and SS effluent values that could be achievable through proper operation and maintenance of the treatment works, based on an analysis of the past performance of the treatment works, would enable the treatment works to achieve more stringent limitations, or*
>
> *(2) For new facilities, the permitting authority determines that the 30-day average and 7-day average BOD_5 and SS effluent values that could be achievable through proper operation and maintenance of the treatment works, considering the design capability of the treatment process and geographical and climatic conditions, would enable the treatment works to achieve more stringent limitations."*

Based on the above regulations and taking into account the DMR data from the last permit cycle the technology based effluent limits are as follows:

For BOD_5:

For BOD_5, the 95th percentile of the Average Monthly value was 39.2 mg/L, therefore, the AML is 39 mg/L.

The 95th percentile of the Average Weekly value was not available because only monthly samples were taken, therefore, the representative Average Weekly Limit would be the Average Monthly Limit times a factor of 1.5, as is consistent with 40 CFR § 133.101(f). Accordingly, the AWL = 39 mg/L x 1.5 = 58.7 mg/L, or 59 mg/L.

The 5th percentile of BOD_5 percent removal was 81% during the last permit cycle, which is higher than the minimum of 65% removal. Therefore, the required percent removal of 81 % removal is applied.

For TSS:

For TSS, the 95th percentile of the Average Monthly and Average Weekly value during the last permit cycle was greater than the equivalent to secondary standards, so the limits are the standards at 45 mg/L and 65 mg/L, respectively. The 5th percentile of TSS percent removal was less than the equivalent to secondary standard of 65%, so the percent removal requirement remains 65%.

3.2.1 Mass-Based Limits

IDAPA 58.01.25.303.06 requires that effluent limits be expressed in terms of mass, except under certain conditions. IDAPA 58.01.25.303.02 requires that effluent limits for POTWs be calculated based on the design flow of the facility. The mass-based limits are expressed in pounds per day and are calculated as follows:

Mass based limit (lb/day) = concentration limit (mg/l) × design flow (mgd) × 8.34[3]

Since the design flow for this facility is 0.06 mgd, the technology-based mass limits for:

BOD_5

Average Monthly Limit = 39.2 mg/l × 0.06 mgd × 8.34 = 20 lbs/day

Average Weekly Limit = 58.7 mg/l × 0.06 mgd × 8.34 = 30 lbs/day

TSS

Average Monthly Limit = 45 mg/l x 0.06 mgd x 8.34 = 23 lbs/day

Average Weekly Limit = 65 mg/l x 0.06 mgd x 8.34 = 33 lbs/day

[3] 8.34 is a conversion factor with units (lb ×L)/(mg × gallon×10^6)

3.3 Water Quality-Based Effluent Limits

3.3.1 Statutory and Regulatory Basis

Section 301(b)(1)(C) of the Clean Water Act (CWA) requires the development of limits in permits necessary to meet WQS. The IPDES regulation IDAPA 58.01.25.302.06 implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any WQS including narrative criteria for water quality. Effluent limits must also meet the applicable water quality requirements of affected States other than the State in which the discharge originates, which may include downstream States (IDAPA 58.01.25.103.03, IDAPA 58.01.25.302.06).

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and non-point sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. (IDAPA 58.01.25.302.06.a.ii). The limits must be stringent enough to ensure that WQS are met and must be consistent with any available TMDL WLA for the discharge. (IDAPA 58.01.25.302.06.a.vii). If there are no approved TMDLs that specify WLAs for this discharge, all of the WQBELs are calculated directly from the applicable WQS.

3.3.2 Reasonable Potential Analysis (RPA) and Need for Water Quality-Based Effluent Limits

DEQ uses the process described in the *Effluent Limit Development Guidance* (DEQ 2017) to determine whether there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria (WQC). To determine if there is reasonable potential for a given pollutant, DEQ compares the maximum projected receiving water concentration to the WQC for that pollutant. If the projected receiving water concentration exceeds the criterion, there is reasonable potential, and a WQBEL must be included in the permit.

In some cases, a dilution allowance or mixing zone is permitted. A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and within which certain water quality criteria may be exceeded (IDAPA 58.01.02.060). While the criteria may be exceeded within the mixing zone, the use and size of the mixing zone must be limited such that the water body as a whole will not be impaired, all designated uses are maintained and acutely toxic conditions are prevented.

The current facility's discharge point, Outfall 001, is not authorized a mixing zone, as it discharges to an oxbow lake of the Little Wood River.

If the facility reconnects to the main stem of the Little Wood River during the permit cycle (an option the facility is pursuing at the time this permit was written), the mixing zones for this facility's pollutants are summarized in Table 15. The calculated limits based on the size of the mixing zones do not impede receiving water beneficial uses. At the mixing zone percentages below and the corresponding limits, there are no reasonable potentials to cause or contribute an exceedance of WQS.

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According to the Idaho Mixing Zone Implementation Guidance, the type of mixing zone analysis required is based on a multitude of factors (see section 3.4 of the guidance). A mass balance analysis (Level 1 mixing zone analysis) is sufficient for facilities that have a dilution factor (see Equation 2) greater than or equal to 20 when using 25% of the critical low flow. The mixing zones authorized between November and March require a Level 1 analysis, as these dilution factors are greater than 20 and the facility is a minor facility.

Mixing zone analysis for discharge in April is more complex. The 1Q10 critical low flow for April is 0 cfs, thus no volume of water is allocated for mixing for ammonia or TRC for acute limits. For TRC chronic limits, the 7Q10 critical low flow of 4.6 cfs is used. The associated dilution factor is 13.4, triggering a Level 2 analysis (modeling using estimates). Since the discharge to the main stem Little Wood River does not exist yet, modeling is not appropriate. The chronic mixing authorization is reduced to 0% until the discharge pipe is constructed, model inputs are known, and mixing zone width can be evaluated with a Level 2 analysis. The 30Q5 of April flows was used for chronic ammonia limit development, and has a dilution factor of 81 at 25%. Level 1 mixing zone analysis for chronic ammonia is sufficient.

Table 15. Authorized mixing zones for Richfield POTW discharge to the main stem Little Wood River (Outfall 2).

Pollutant	Discharge Period	Authorized Mixing Zone (% of Critical Low Flow)			
		Aquatic Life		Human Health	
		Acute (1Q10)	Chronic (7Q10 or 30Q5)	Water and Fish (30Q5 or Harmonic Mean)	Fish Only (30Q5 or Harmonic Mean)
Ammonia, Total as N	11/01 to 03/31	9% of 57 cfs	9% of 113 cfs	NA	NA
Ammonia, Total as N	04/01 to 04/30	25% of 0 cfs	25% of 30 cfs	NA	NA
Total Residual Chlorine (TRC)	11/01 to 03/31	5% of 57 cfs	5% of 113 cfs	NA	NA
Total Residual Chlorine (TRC)	04/01 to 04/30	25% of 0 cfs	0% of 4.6 cfs	NA	NA

The RPA and WQBEL calculations were based on mixing zones shown in Table 15. The equations used to conduct the RPA and calculate the WQBELs are provided in Appendix B. If DEQ revises the allowable mixing zone before final issuance of the permit, the RPA and WQBEL calculations will be revised accordingly.

3.3.3 Reasonable Potential and Water Quality-Based Effluent Limits

The reasonable potential and WQBELs for specific parameters are summarized below. The calculations are provided in Appendix B.

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3.3.3.1 Ammonia, Total as N

Ammonia criteria are based on a formula that relies on the pH and temperature of the receiving water. Because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature, the criteria become more stringent as pH and temperature increase. The table below details the equations used to determine WQC for ammonia.

Table 16. Ammonia criteria.

Total ammonia nitrogen criteria (mg N/L):
Annual Basis
Based on IDAPA 58.01.02

INPUT	
1. Receiving Water Temperature (deg C):	10.2
2. Receiving Water pH:	8.32
3. Is the receiving water a cold water designated us	Yes
4. Are non-salmonid early life stages present or abs	Present
OUTPUT	
Total ammonia nitrogen criteria (mg N/L):	
Acute Criterion (CMC)	**3.03**
Chronic Criterion (CCC)	**1.47**

Acute Criteria Equation: Cold Water

$$CMC = \frac{0.275}{1+10^{7.204-pH}} + \frac{39.0}{1+10^{pH-7.204}}$$

Acute Criteria Equation: Warm Water

$$CMC = \frac{0.411}{1+10^{7.204-pH}} + \frac{58.4}{1+10^{pH-7.204}}$$

Chronic Criteria: Cold Water, Early Life Stages Present

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet MIN(2.85, 1.45 \cdot 10^{0.028(25-T)})$$

Chronic Criteria: Cold Water, Early Life Stages Absent

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet 1.45 \cdot 10^{0.028(25-T)})$$

Total ammonia nitrogen criteria (mg N/L):
Seasonal Basis - Season 1 (Nov-Mar)
Based on IDAPA 58.01.02

INPUT	
1. Receiving Water Temperature (deg C):	10.2
2. Receiving Water pH:	8.32
3. Is the receiving water a cold water designated us	Yes
4. Are non-salmonid early life stages present or abs	Present
OUTPUT	
Total ammonia nitrogen criteria (mg N/L):	
Acute Criterion (CMC)	**3.03**
Chronic Criterion (CCC)	**1.47**

Acute Criteria Equation: Cold Water

$$CMC = \frac{0.275}{1+10^{7.204-pH}} + \frac{39.0}{1+10^{pH-7.204}}$$

Acute Criteria Equation: Warm Water

$$CMC = \frac{0.411}{1+10^{7.204-pH}} + \frac{58.4}{1+10^{pH-7.204}}$$

Chronic Criteria: Cold Water, Early Life Stages Present

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet MIN(2.85, 1.45 \cdot 10^{0.028(25-T)})$$

Chronic Criteria: Cold Water, Early Life Stages Absent

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet 1.45 \cdot 10^{0.028(25-T)})$$

Total ammonia nitrogen criteria (mg N/L):
Seasonal Basis - Season 2 (April)
Based on IDAPA 58.01.02

INPUT	
1. Receiving Water Temperature (deg C):	10.2
2. Receiving Water pH:	8.32
3. Is the receiving water a cold water designated us	Yes
4. Are non-salmonid early life stages present or abs	Present
OUTPUT	
Total ammonia nitrogen criteria (mg N/L):	
Acute Criterion (CMC)	**3.03**
Chronic Criterion (CCC)	**1.47**

Acute Criteria Equation: Cold Water

$$CMC = \frac{0.275}{1+10^{7.204-pH}} + \frac{39.0}{1+10^{pH-7.204}}$$

Acute Criteria Equation: Warm Water

$$CMC = \frac{0.411}{1+10^{7.204-pH}} + \frac{58.4}{1+10^{pH-7.204}}$$

Chronic Criteria: Cold Water, Early Life Stages Present

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet MIN(2.85, 1.45 \cdot 10^{0.028(25-T)})$$

Chronic Criteria: Cold Water, Early Life Stages Absent

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet 1.45 \cdot 10^{0.028(25-T)})$$

Ammonia in effluent was sampled only in 2006. The RPA for ammonia with no mixing zone had potential to cause or contribute to a water quality exceedance. The RPA for discharge to the mainstem Little Wood River did not have potential to cause or contribute to an ammonia water quality exceedance from November through March. There was reasonable potential to exceed a water quality exceedance in April. See Appendix B for reasonable potential and effluent limit calculations for ammonia.

DEQ's *Effluent Limit Development Guidance* states that DEQ will use the 90th to 95th percentile of the ambient upstream receiving water temperature and pH to calculate ammonia criteria. Because the Little Wood River is not impaired for ammonia, DEQ determined that the 90th percentile temperature and pH were appropriate for the ammonia calculation.

A compliance schedule has been included in the permit to meet the new limit. No interim limits were developed as there was not enough data to create performance based limits.

3.3.3.2 E. coli

The Idaho WQS states that waters of the State of Idaho that are designated for recreation (primary or secondary) are not to contain *E. coli* bacteria in concentrations exceeding a geometric mean of 126 organisms per 100 ml based on a minimum of five samples taken every three to seven days over a 30-day period. A mixing zone is not appropriate for bacteria for waters designated for contact recreation. Therefore, the permit contains a monthly geometric mean effluent limit for *E. coli* of 126 organisms per 100 ml (IDAPA 58.01.02.251.01.a.).

The Idaho WQS also state that a water sample that exceeds certain "single sample maximum" values indicates a likely exceedance of the geometric mean criterion, although it is not, in and of itself, a violation of WQS. For waters designated for primary contact recreation, the "single sample maximum" value is 406 organisms per 100 mL (IDAPA 58.01.02.251.01.b.ii.). When a single sample maximum, is exceeded, additional samples should be taken to assess compliance with the geometric mean criterion.

Monitoring of the effluent five times per month will ensure compliance with the criterion can be assessed. If the single sample maximum is exceeded, the permittee may choose to monitor more frequently than the permit requires, ensuring adequate disinfection and compliance with permit effluent limits exists.

Regulations at IDAPA 58.01.25.303.04 require that effluent limits for continuous discharges from POTWs be expressed as average monthly and average weekly limits, unless impracticable. Additionally, the terms "average monthly limit" and "average weekly limit" are defined in IDAPA 58.01.25.010.06 and 07 respectively as being arithmetic (as opposed to geometric) averages. It is impracticable to properly implement a 30-day geometric mean criterion in a permit using monthly and weekly arithmetic average limits. The geometric mean of a given data set is equal to the arithmetic mean of that data set if and only if all of the values in that data set are equal. Otherwise, the geometric mean is always less than the arithmetic mean. Therefore, the permit monthly effluent limit is a geometric mean for *E. coli* of 126 organisms per 100 ml.

3.3.3.3 Chlorine, Total Residual

The Idaho WQS at IDAPA 58.01.02.210 establish an acute criterion of 19 µg/L and a chronic criterion of 11 µg/L for the protection of aquatic life. An RPA showed that the discharge from the facility to the oxbow lake would cause or contribute to a water quality exceedance (see Appendix B, Table 28). A RPA of discharge from the facility to the mainstem Little Wood River would only cause or contribute to a water quality exceedance in April (See Appendix B, Table 29). Because a Level 2 mixing zone analysis cannot be performed, no chronic mixing zone was authorized for April. Individual chlorine data were available from 2016 through 2019. See Appendix B for the reasonable potential and effluent limit calculations for chlorine.

A compliance schedule has been included in the permit to meet the new limit. The interim limits have been set to the previous permit limits.

3.3.3.4 pH

The Idaho WQS at IDAPA 58.01.02.250.01.a., require pH values of the receiving water to be within the range of 6.5 to 9.0. Mixing zones are generally not granted for pH; therefore the most stringent WQC (6.5 to 9.0) must be met before the effluent is discharged to the receiving water.

3.3.3.5 Temperature

The Little Wood River is impaired for temperature. The permittee did not receive an effluent temperature TMDL WLA based on flows because it does not discharge to the river during the time period in which cold water aquatic life (CWAL) temperature standards are exceeded (see page 166 of the Little Wood River Subbasin Assessment and TMDL, 2005). Routine monitoring of effluent and receiving water for temperature is included in this permit.

3.3.3.6 Phosphorus, Total as P

Total phosphorus has no numeric criteria; however, dischargers are required to meet narrative criteria in IDAPA 58.01.02.200.

The Little Wood River is impaired for TP, and the TMDL prescribes an average annual WLA of 1.84 lb/day for the City of Richfield (Table 74, page 172 of the Little Wood River TMDL).

The 2005 TMDL assigned a WLA of 1.84 lb/day to the Richfield WWTF based on the facility's design flow and an assumed average concentration of TP discharged to the receiving water (page 171 of the Little Wood River TMDL). The permit effluent limit for TP must be consistent with the assumption and requirements of the WLA (40 CFR § 122.44(d)(1)(vii)(B). DEQ confirmed that the WLA for TP was based on an average flow for an average concentration discharged. The 1.84 lb/day is incorporated as an average annual limit. A maximum daily limit was not included as it is not appropriate for nutrients with far field effects (see DEQ 2017, ELDG section 3.7.1.3). Using an assumed coefficient of variation (CV) of 0.6 for TP loads and the proposed sampling schedule of once per month, an average monthly limit (AML) load based on this WLA was calculated (Appendix B, Table 31). The AML for TP is 3.9 lb/day.

A compliance schedule has been included in the permit to meet the new limit. No interim limits were developed as there was not enough data to create performance based limits.

3.3.3.7 Total Suspended Solids (TSS)

The 2005 Little Wood River TMDL prescribes a sediment annual average WLA of 21.8 lb/day or 4.0 tons/year. The TBELs for concentration and removal rate for TSS are the TBELs from 40 CFR § 133.102 and have been included in the permit. The permit must consider mass limits derived from the Little Wood River TMDL and compare the mass limits to technology based mass limits. The text below demonstrates the TBELs are more stringent, and thus are the limits used in the permit.

The Little Wood River TMDL allocates 21.8 lb/day and 4.0 tons/year of sediment to the City of Richfield WWTF (Table 67, page 167, DEQ 2005). In translating the TMDL WLA into permit limits, the ELDG and TSD procedures were followed. The first step in developing limits is to determine the time frame over which the WLAs apply. The Little Wood River TMDL expresses

the WLA as an annual load (4.0 tons/year). The TSS WLA can be expressed as an annual average using the following calculation:

$$\frac{4.0\ ton}{1\ year} \times \frac{2000\ lb}{1\ ton} \times \frac{1\ year}{365\ days} = 21.8 \frac{lb}{day}$$

This number is incorporated directly into the permit as a seasonal average limit.
The NPDES regulations at 40 CFR §122.45(d) require that permit limits for POTWs be expressed as average monthly limits (AMLs) and average weekly limits (AWLs), unless impracticable. The WLA must be statistically converted to an AML and AWL (also see Table 30 in Appendix B).

Calculating AML:
The AML can be calculated by setting the seasonal average equal to the chronic Long Term Average (LTA_c).
TSS TMDL WLA = LTA = 21.8 lb/day

$$AML = LTA_m \times e^{(z_{95}\sigma_n - 0.5\sigma_n^2)}$$ *(from Equation 37 of the ELDG)*

Where:

CV = coefficient of variation = 0.56 (based on facility data from 2005 -2019)
n = 2 (number of samples in a month)
σ_4^2 = ln(CV^2/n +1) = ln(0.56^2/2 +1) = 0.146
σ_4 = 0.382
Z = percentile exceedance probability for AML (95%) = 1.645
AML = 21.8 × exp[(1.645 × 0.382) -(0.5 × 0.146)]
AML = 21.8 × 1.74 = 38 lb/day

Calculating the AWL:
The AWL is calculated by multiplying the AML by the following relationship (from Table 5-3 of the TSD):

$$\text{AWL} = AML \times \frac{e^{[Z_{AWL} \times \frac{\sigma_n}{4} - 0.5 \times \sigma_{n/4}^2]}}{e^{[Z_{AML} \times \sigma_n - 0.5 \times \sigma_n^2]}}$$

Where:
CV = 0.56 (based on facility data from 2005 -2019)
σ_4^2 = ln(CV^2/n +1) = ln(0.56^2/2 +1) = 0.146
σ_4 = 0.698
Z = percentile exceedance probability for AML (95%) = 1.645
n/4 = number of samples per week = 0.5
$\sigma_{n/4}^2$ = ln(CV^2/(n/4) +1) = ln(0.56^2/(2/4) +1) = 0.146
$\sigma_{n/4}^2$ = 0.698
Z_{AWL} = percentile exceedance probability for AWL (99%) = 2.326
Z_{AML} = percentile exceedance probability for AML (95%) = 1.645

$$\text{AWL} = 38 \times \frac{\exp[(2.326 \times 0.698) - (0.5 \times 0.146)]}{\exp[(1.645 \times 0.382) - (0.5 \times 0.146)]}$$

AWL = 87 lb/day

Limits derived from TBELs:

AML = 45 mg/L × 0.06 mgd × 8.34 = 23 lb/day

AWL = 65 mg/L × 0.06 mgd × 8.34 = 33 lb/day

Table 17. Comparison of TSS TBELs and WQBELs.

Parameter	Average Monthly Limit (lb/day)	Average Weekly Limit (lb/day)
TBEL	23	33
WQBEL	38	87
Most Stringent	23	33

The TBELs will be used as limits in this permit. The TMDL WQBEL for the seasonal load will be included in this permit; however, if monthly limits are not exceeded during the discharge season, the seasonal limit will also not be exceeded.

3.4 Narrative Criteria

DEQ must incorporate the narrative criteria described in IDAPA 58.01.02.200 when it determines permit limits and conditions. Narrative WQC limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic attributes, or adversely affect human health.

The Idaho WQS require that surface waters of the State be free from floating, suspended, or submerged matter of any kind in concentrations impairing designated beneficial uses. The permit contains a narrative limitation prohibiting the discharge of such materials or any violation of narrative WQC.

3.5 Antidegradation

DEQ's antidegradation policy provides three levels of protection to water bodies in Idaho subject to Clean Water Act (CWA) jurisdiction (IDAPA 58.01.02.051).

- Tier I of antidegradation protection is designed to ensure that existing uses and the water quality necessary to protect those uses is maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). A Tier I review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.07).
- Tier II protection applies to any water bodies considered to be high quality waters (where the water quality exceeds levels necessary to support propagation of fish, shellfish, wildlife, and recreation in and on the water) and provides that water quality will be maintained and protected unless allowing for lower water quality is deemed by the state as necessary to accommodate important economic or social development in the area. In allowing any lowering of water quality DEQ must ensure adequate water quality to protect existing uses fully and must assure that there will be achieved the highest statutory and regulatory requirements for all new and existing point sources (IDAPA 58.01.02.051.02; 58.01.02.052.08).

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- Tier III protection applies to water bodies that have been designated by the Idaho Legislature as outstanding national resource waters and provides that water quality is to be maintained and protected (IDAPA 58.01.02.051.03; 58.01.02.052.09).

DEQ employs a water body by water body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier I protection for that use unless specific circumstances warranting Tier II protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).

According to DEQ's 2016 Integrated Report, this assessment unit (AU) is not fully supporting one or more of its assessed uses. The aquatic life use is not fully supported. Causes of impairment include an altered flow regime, total phosphorus (TP), sedimentation/siltation (TSS), and temperature. The contact recreation beneficial use is fully supported. As such, DEQ will provide Tier 1 protection (IDAPA 58.01.02.051.01) for the aquatic life use and Tier II protection (IDAPA 58.01.02.051.02) in addition to Tier I for the contact recreation use (IDAPA 58.01.02.052.05.c).

To determine whether degradation may occur, DEQ evaluated how the effluent limits proposed in this permit affect water quality for each pollutant that is relevant to the antidegradation tier and the cold water aquatic life and/or primary contact recreation use.

3.5.1 Protection and Maintenance of Existing Uses (Tier I Protection)

A Tier I review is performed for all new or reissued permits, applies to all waters subject to the jurisdiction of the Clean Water Act, and requires demonstration that existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected. In order to protect and maintain existing and designated beneficial uses, a permitted discharge must comply with narrative and numeric criteria of the Idaho WQS, as well as other provisions of the WQS.

Water bodies not supporting existing or designated beneficial uses must be identified as water quality-limited, and a TMDL must be prepared for those pollutants causing impairment. A central purpose of TMDLs is to establish wasteload allocations for point source discharges, which are set at levels designed to help restore the water body to a condition that supports existing and designated beneficial uses. Discharge permits must contain limits that are consistent with wasteload allocations in the approved TMDL.

Prior to the development of the TMDL, the WQS require the application of the antidegradation policy and implementation provisions to maintain and protect uses (IDAPA 58.01.02.055.04). The EPA-approved *Little Wood River Subbasin Assessment and Total Maximum Daily Load* (DEQ 2005) established WLAs for TP and TSS for the permittee. The effluent limits and associated requirements contained in the 2020 permit are set at levels that ensure compliance with the narrative and numeric criteria in the WQS and the wasteload allocations established in the *Little Wood River Subbasin Assessment and Total Maximum Daily Load*. Therefore, DEQ has determined the permit will protect and maintain existing and designated beneficial uses in the

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Little Wood River in compliance with the Tier I provisions of Idaho's WQS (IDAPA 58.01.02.051.01 and 58.01.02.052.07).

3.5.2 High-Quality Waters (Tier II Protection)

The Little Wood River is considered high quality for primary contact recreation. As such, the water quality relevant to primary contact recreation of the Little Wood River must be maintained and protected, unless a lowering of water quality is insignificant or is deemed necessary to accommodate important social or economic development (IDAPA 58.01.02.052.08).

To determine whether degradation will occur, DEQ must evaluate how the discharge will affect water quality for each pollutant that is relevant to primary contact recreation uses of the Little Wood River (IDAPA 58.01.02.052.06); these include *E. coli* and TP**.** Effluent limits are set in the 2020 permit for all these pollutants

For a reissued permit, the effect on water quality is determined by looking at the difference in water quality that would result from the activity or discharge as authorized in the 2020 permit and the water quality that would result from the activity or discharge as proposed in the reissued permit (IDAPA 58.01.02.052.06.a). For a new permit or license, the effect on water quality is determined by reviewing the difference between the existing receiving water quality and the water quality that would result from the activity or discharge as proposed in the new permit (IDAPA 58.01.02.052.06.a).

3.5.2.1 Pollutants with Limits in the Existing and Proposed Permit

For pollutants that are currently limited and will have limits under the reissued permit, the current discharge quality is based on the limits in the 2005 permit (IDAPA 58.01.02.052.06.a.i), and the future discharge quality is based on the 2020 permit limits (IDAPA 58.01.02.052.06.a.ii). For the City of Richfield permit, this means determining the permit's effect on water quality based upon the limits for pollutants with limits in both 2005 permit and the 2020 permit. Table 18 provides a summary of the 2005 permit limits and the 2020 permit limits.

Table 18. Antidegradation comparison for protection of the primary contact recreation.

Pollutant	Units	2005 Permit		2020 Permit		Degradation[a]
		Average Monthly Limit	Single Sample Limit	Average Monthly Limit	Single Sample Limit	
Pollutants with limits in both the 2005 and 2020 permit						
E. coli	#/100 mL	126	406	126	—	Yes - I[b]
Pollutants with new limits in the 2020 permit						
Phosphorus, Total as P	lb/day	Report	—	3.9	—	No
	lb/day	—	—	Seasonal Limit: 1.84		

a. No = No degradation, Yes - S = Increase in pollutant load or concentration resulting in significant degradation, Yes – I = Increase in pollutant load or concentration resulting in insignificant degradation
b. See Section 3.5.2.3.

Note that this antidegradation comparison applies to both discharge to the oxbow lake and the main stem of the Little Wood River.

3.5.2.2 New Permit Limits for Pollutants Currently Discharged

When new limits are proposed in a reissued permit for pollutants in the existing discharge, the effect on water quality is based upon the current discharge quality and the proposed discharge quality resulting from the new limits. Current discharge quality for pollutants that are not currently limited is based upon available discharge quality data (IDAPA 58.01.02.052.06.a.i). Future discharge quality is based upon proposed permit limits (IDAPA 58.01.02.052.06.a.ii).

The permit for City of Richfield includes new limits for total phosphorus. These limits were included in the permit to be consistent with the WLA in the approved *Little Wood River Subbasin Assessment and TMDL* (Table 31). The TP limits in the permit reflect a maintenance or improvement in water quality from current conditions and are consistent with the TMDL WLA. Therefore, no adverse change in water quality and no degradation will occur with respect to these pollutants.

3.5.2.3 E. coli

The reissued permit does not include the max daily limit of 406/100 mL for *E.coli* that was included in the previous permit. The Idaho WQS state that a water sample exceeding the single sample maximum values indicates a likely exceedance of the geometric mean criterion, although it is not a violation of WQS by itself. For waters designated for secondary contact recreation, the "single sample maximum" value is 406/100 mL (IDAPA 58.01.02.251.01.b.ii.). Removing the max daily limit does not affect the assimilative capacity of the river because the Idaho WQC for *E. coli* is a monthly geomean of 126/100 mL which is retained in this permit as the limit. Because the WQC for this particular parameter is a geometric mean and not an instantaneous concentration level, the maximum daily limit is only an indicator of the potential WQC and not a direct limit. DEQ concludes that removal of the instantaneous limit complies with the Tier II provisions of Idaho's WQS.

In addition, the existing discharge proposes no change in the discharge, does not affect the assimilative capacity of the river, and is therefore considered a non-degrading discharge. The resulting water quality effects comport with the state's anti-degradation policy.

3.6 Antibacksliding

Section 402(o) of the CWA and regulations at IDAPA 58.01.25.200 generally prohibit the renewal, reissuance, or modification of an existing IPDES permit that contains effluent limits, permit conditions, or standards that are less stringent than those established in the existing permit (i.e., antibacksliding) but provides limited exceptions. For explanation of the antibacksliding exceptions refer to section 4.1 of the Effluent Limit Development Guidance (DEQ 2017).

DEQ compared the effluent limits in the 2005 permit with the 2020 in Table 19 below.

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Table 19. Comparison of 2005 and 2020 effluent limits.

Pollutant	Units	2005 Permit			2020 Permit			Change[a]
		Average Monthly Limit	Average Weekly Limit	Single Sample Limit	Average Monthly Limit	Average Weekly Limit	Single Sample Limit	
Pollutants with limits in both the 2005 and 2020 permit								
BOD_5	mg/L	45	65	—	39	59	—	MS
	lb/day	23	33	—	20	30	—	
	% removal	65	—	—	81	—	—	
TSS	mg/L	45	65	—	45	65	—	NC
	lb/day	23	33	—	23	33	—	
	% removal	65	—	—	65	—	—	
	lb/day	Seasonal load: —			Seasonal load: 21.8			MS
pH	standard units	6.5–9.0 all times			6.5–9.0 all times			NC
E. coli	no./100 mL	126	—	406	126	—	—	LS[b]
Pollutants with new limits in the 2020 permit								
Total Phosphorus	mg/L	—	—	—	Monitor	—	—	MS
	lb/day	—	—	—	3.9	—	—	
	lb/day	Seasonal load: —			Seasonal load: 1.84			MS
Discharge to oxbow of the Little Wood River: Pollutants with limits in both the 2005 and 2020 permit								
Ammonia, Total as N	mg/L	Monitor	—	—	1.2	—	3.0	MS
	lb/day	—	—	—	0.6		1.5	
TRC	mg/L	0.03	—	0.08	0.007		0.019	MS
	lb/day	0.02	—	0.04	0.004		0.010	
Discharge to mainstem of the Little Wood River: Pollutants with limits in the 2005 and 2020 permit								
Ammonia, Total as N (Nov - March)	mg/L	Monitor	—	—	Monitor	—	—	NC
	lb/day	—	—	—	—	—	—	
Ammonia, Total as N (April)	mg/L	Monitor	—	—	2.7	—	3.0	MS
	lb/day	—	—	—	1.3	—	1.5	
TRC (Nov – March)	mg/L	0.03	—	0.08	Monitor	—	Monitor	LS[c]
	lb/day	0.02	—	0.04	—	—	—	
TRC (April)	mg/L	0.03	—	0.08	0.007		0.019	MS
	lb/day	0.02	—	0.04	0.004		0.010	

a. MS = More stringent pollutant load or concentration limit, LS = Less stringent pollutant load or concentration limit, NC = No change in pollutant load or concentration limit.
b. See Section 3.6.1
c. See Section 3.6.2

An antibacksliding analysis was done for *E. coli* and TRC. The analysis for each of these parameters is detailed below.

3.6.1 E. coli

The 2005 permit contains a maximum daily limit (i.e., single sample limit) of 406/100 mL. This limit removal is allowed under antibacksliding exceptions in IDAPA 58.01.25.200.03.c since

- The use is attained (i.e. the receiving water is not impaired for *E. coli*); and
- The existing discharge proposes no change in the discharge and is therefore considered a non-degrading discharge. The resulting water quality effects comport with the state's anti-degradation policy (see Table 18).

3.6.2 Total Residual Chlorine – November through March Discharge Only

The 2005 permit fact sheet indicates that the RPA used 0.8 mgd (1.5 cfs) as the critical low flow for the oxbow lake for both the 1Q10 and 7Q10. If the facility were to reestablish discharge to the main stem of the Little Wood River, the critical low flows would change. The flow data from USGS gauge used for this permit has been online since 1911 and provided sufficient flow data to calculate critical low flows between November and March (1Q10 = 57cfs, 7Q10 = 79 cfs). Using these low flows, the RPA indicated adequate dilution at an appropriately sized mixing zone to meet WQS, and thus there is no reasonable potential to cause or contribute to an exceedance. The CWAL beneficial use receives Tier I protection, thus removing the limit is consistent with Idaho's antidegradation policy. This satisfies the antibacksliding in exception 58.01.25.200.03.c (CWA 303(d)(4)(B)), and the chlorine limit has been removed.

4 Monitoring Requirements

Idaho regulations IDAPA 58.01.02 and 58.01.25 require that monitoring be included in permits to determine compliance with effluent limits and other permit restrictions. Monitoring may also be required to gather data to assess the need for future effluent limits or to monitor effluent impacts on receiving water quality. Permittees are responsible for conducting the monitoring and reporting the results on monthly DMRs and in annual reports.

4.1 Influent Monitoring

Flow, TSS, and BOD_5 monitoring requirements are listed below in Table 20. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using the EPA-approved test methods (generally found in 40 CFR 136) or as specified in the permit.

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Table 20. Influent monitoring requirements.

Item or Parameter	Monitoring Period	Units	Sample Frequency	Sample Type	Report	Reporting Period (DMR Months)
Flow	11/01 to 04/30	mgd	5/week	Recorded	Monthly Average	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
BOD_5	11/01 to 04/30	mg/L	2/month	grab	Monthly Average	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
TSS	11/01 to 04/30	mg/L	2/month	grab	Monthly Average	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)

4.1.1 Influent Monitoring Changes from the 2020 Permit

Monitoring frequency for BOD_5 and TSS has been changed relative to the 2005 permit. Changes in monitoring are presented in Table 21, below.

Table 21. Changes in Influent monitoring frequency from 2005 permit.

Parameter	2005	2020 Permit	Rationale
Flow	NA	Daily	Not previously monitored/reported
BOD_5	1/month	2/month	Reflects effluent monitoring frequency
TSS	1/month	2/month	Reflects effluent monitoring frequency

4.2 Additional Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using the EPA-approved test methods (generally found in 40 CFR 136) or as specified in the permit.

Pollutants that must be monitored but do not have effluent limits are presented in Table 22, for discharges to the oxbow lake, and in Table 23, for discharges to the Little Wood River. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. The samples must be representative of the volume and nature of the monitored discharge. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

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Table 22. Additional effluent monitoring requirements for discharge to the Little Wood River Oxbow Lake.

Parameter	Monitoring Period	Units	Monthly Average	Intan-taneous Maximum	Intan-taneous Minimum	Maximum Daily Average	Daily Maximum	Sample Frequency	Sample Type	Reporting Period (DMR Months)
Flow	11/01 to 04/30	mgd	Report	—	—	—	Report	5/week	Recorded	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
E. coli[a]	11/01 to 04/30	#/100 mL	—	Report	—	—	—	5/month	Grab[b]	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
Temperature	11/01 to 04/30	°C	Report	—	—	Report[c]	—	5/week	Grab[b]	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
Dissolved Oxygen	11/01 to 04/30	mg/L	—	—	Report	—	—	1/week	Grab[b]	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)

a. Reporting is required within 24 hours of discovery of a single sample value greater than 406/100 ml. A value greater than this indicates likely exceedance of the geometric mean criterion, but is not by itself a violation of water quality standards or permit effluent limits
b. Grab means an individual sample collected over a 15 minute period or less.
c. Maximum of the daily averages for the reporting period (calendar month).

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Table 23. Additional effluent monitoring requirements for discharge to the mainstem Little Wood River.

Parameter	Monitoring Period	Units	Monthly Average	Intan-taneous Maximum	Intan-taneous Minimum	Daily Maximum	Maximum Daily Average	Sample Frequency	Sample Type	Reporting Period (DMR Months)
Flow	11/01 to 04/30	mgd	Report	—	—	—	Report	5/week	Recorded	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
E. coli[a]	11/01 to 04/30	#/100 mL	—	Report	—	—	—	5/month	Grab[b]	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
Temperature	11/01 to 04/30	°C	Report	—	—	Report[c]	—	5/week	Grab[b]	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
Dissolved Oxygen	11/01 to 04/30	mg/L	—	—	Report	—	—	1/week	Grab[b]	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
Ammonia, Total as N[d]	11/01 to 03/31	mg/L	Report	—	—	Report	—	1/week	Grab[a, b]	Monthly (Nov, Dec, Jan, Feb, Mar)
Total Residual Chlorine (TRC)	11/01 to 03/31	mg/L	Report	—	—	Report	—	1/week	Grab[a, b]	Monthly (Nov, Dec, Jan, Feb, Mar)

a. Reporting is required within 24 hours of discovery of a single sample value greater than 406/100 ml. A value greater than this indicates likely exceedance of the geometric mean criterion, but is not by itself a violation of water quality standards or permit effluent limits
b. Grab means an individual sample collected over a 15 minute period or less.
c. Maximum of the daily averages for the reporting period (calendar month).
d. Ammonia grab sampling must be contemporaneous with pH and temperature monitoring and occur when the effluent is at or near its daily maximum temperature, which usually occurs in the late afternoon.

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4.2.1 Effluent Monitoring Changes from the 2005 Permit

Monitoring parameters and frequencies have changed relative to the 2005 permit. Changes in monitoring are presented in Table 24 below.

Table 24. Changes in effluent monitoring frequency from 2005 permit.

Parameter	2005 Permit	2020 Permit	Rationale
Flow	5/week	5/week	No change
E. coli	5/month	5/month	No change
Temperature	—	5/week	The receiving water is impaired for temperature. No effluent temperature data are available.
Dissolved Oxygen	—	1/week	Not enough dissolved oxygen data were collected last permit cycle to evaluate dissolved oxygen reasonable potential to cause or contribute to water quality exceedance.
Discharge to the Main stem Little Wood River Changes			
Ammonia, Total as N	1/month	1/week	Monitoring frequency has increased to collect data for a more representative sample during the next RPA
TRC	1/week	1/week	No change

4.3 Receiving Water Monitoring

In general, receiving water monitoring may be required for POCs to assess the pollutant specific assimilative capacity of the receiving water. In addition, receiving water monitoring may be required for pollutants for which the WQC are dependent and to collect data for TMDL development if the facility discharges to an impaired water body.

Table 25 presents the receiving water monitoring requirements for the permit. City of Richfield should continue receiving water monitoring at the established locations. Receiving water monitoring results must be submitted with the DMR. Monitoring must occur, even if the facility is not discharging.

Table 25. Receiving water monitoring requirements.

Parameter	Units	Sample Frequency	Sample Type	Sample Type	Report
Temperature	°C	1/month	Recorded	Monthly Average, Maximum Daily Average	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
pH	Std. units	1/month	Grab[a]	Instantaneous Minimum, Instantaneous Maximum	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
Ammonia, Total as N[b]	mg/L	1/month	Grab[a]	Monthly Average, Daily Maximum	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)
Dissolved Oxygen	mg/L	1/month	Grab[a]	Monthly Average, Instantaneous Minimum	Monthly (Nov, Dec, Jan, Feb, Mar, Apr)

a. A grab sample is an individual sample collected over a 15-minute period or less.
b. Temperature and pH must be taken concurrently with total ammonia (as N) sampling

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4.3.1 Receiving Water Monitoring Changes from the 2005 Permit

Monitoring parameters and frequencies have changed relative to the 2005 permit. Changes in monitoring are presented in Table 26 below.

Table 26. Changes in receiving water monitoring frequency from 2005 permit.

Parameter	2005 Permit	2020 Permit	Rationale
Temperature	3x/year for 4 years	1/month	More data are necessary for reasonable potential analysis for ammonia.
pH	3x/year for 4 years	1/month	More data are necessary for reasonable potential analysis for ammonia.
Ammonia, Total as N	3x/year for 4 years	1/month	RPA was conducted with limited data available. More data are needed to conduct more thorough analysis.
Dissolved Oxygen	—	1/month	More data are necessary for reasonable potential analysis of dissolved oxygen.

4.4 Permit Renewal Monitoring

The permit renewal monitoring requires data collected to characterize the effect of the effluent on the Little Wood River. At a minimum, three samples of the final wastewater effluent for the parameters listed in Table 27 are required so that DEQ can assess the surface water impacts.

Table 27. Effluent monitoring required for all permit renewals.

Parameter	Units	Sample Type	Report
pH	s.u.	Grab	Minimum and maximum value
Flow	mgd	Grab	Maximum daily value, average daily value, number of samples
Temperature	°C	Grab	
BOD_5	mg/L	Grab	Maximum daily value, average daily value, analytical method and ML or MDL
TSS	mg/L	Grab	
E. coli	#/100 mL	Grab	

The permittee must conduct one permit renewal monitoring scan of the effluent according to the following schedule:

- 2021: Fourth quarter (November through December)
- 2022: Second quarter (March through April)
- 2023: First quarter (January through February)

This schedule spreads monitoring over the permit effective period, as well as captures a range of seasons.

In addition, the permittee must continue permit renewal effluent monitoring at a frequency of once every fifth quarter after the last sample event listed in the schedule above until a new permit is issued.

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5 Special Conditions

5.1 Compliance Schedule

IDAPA 58.01.25.305 and 40 CFR 122.47 allow for compliance schedules in IPDES permits to provide additional time for permittees to achieve compliance.

The permit includes a compliance schedule for TP, ammonia, and total residual chlorine. Total phosphorus has new water quality based limits derived from the Little Wood River TMDL. Ammonia and TRC have new limits based on RPA. The facility does not have sufficient data for TP, ammonia, and TRC to verify if limits can be met. During the first three years of this permit, the facility will gather data and evaluate if permit compliance is already achievable. If permit compliance is not immediately achievable, the TP and ammonia compliance schedule outlines actions to take to meet permit limits by 2030. The TRC compliance schedule outlines actions to take to meet permit limits by 2025.

5.2 Nondomestic Waste Management

The permittee has nonsignificant, nondomestic (industrial/commercial) users which are neither subject to the pretreatment standards in 40 CFR 405 through 471 nor meet any of the criteria of a significant industrial user (SIU) as specified in 40 CFR 403.3(v), and, therefore, DEQ does not require an authorized pretreatment program. The permittee must ensure, through a sewer use ordinance, that pollutants from nondomestic wastes discharged to their system do not negatively impact system operation or pass through the wastewater treatment facility. The permittee must not authorize indirect discharges of pollutants that would inhibit, interfere with, or otherwise be incompatible with operation of the wastewater treatment works, including interference with the use or disposal of municipal sludge.

6 Standard Conditions

Section 4 of the permit contains standard regulatory language that must be included in all IPDES permits. DEQ bases the Standard Conditions on state and federal law and regulations. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

6.1.1 Quality Assurance Project Plan

In accordance with IDAPA 58.01.25.300.05, permittees are required to develop procedures to ensure that the monitoring data submitted is accurate and explain data anomalies if they occur. The permittee is required to develop, maintain, and implement a plan for quality assurance. The quality assurance project plan (QAPP) shall consist of standard operating procedures for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan shall be retained on site and made available to DEQ upon request.

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6.1.2 Operation and Maintenance Manual

The permit requires City of Richfield to properly operate and maintain all facilities and systems of conveyance, treatment, and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to maintain and implement an operation and maintenance plan for their facility. The plan must be retained on site and made available to DEQ upon request.

6.1.3 Emergency Response Plan

The permittee must maintain and implement an emergency response plan that identifies measures to protect public health and the environment. At a minimum, the plan must include mechanisms for the following:

1. Ensure that the permittee is aware (to the greatest extent possible) of all overflows from portions of the collection system over which the permittee has ownership or operational control as well as any unanticipated treatment unit bypass or upset that may exceed any effluent limit in the permit.
2. Ensure that reports of an overflow or of an unanticipated bypass or upset that may exceed any effluent limit in this permit are immediately dispatched to appropriate personnel for investigation and response.
3. Ensure immediate notification to DEQ of any noncompliance that may endanger public health or the environment and identify the public health district and other officials who will receive immediate notification for items that require 24-hour.
4. Ensure that appropriate personnel understand, are appropriately trained on, and follow the Emergency Response Plan; and
5. Provide emergency facility operation.

7 Compliance with Other DEQ Rules

7.1 Operator's License

The permittee must meet the requirements and operator license levels listed in the wastewater rules at IDAPA 58.01.16.203 for the type(s) of operations at the facility.

7.2 Lagoon Seepage Testing

The permittee must comply with the Wastewater Rules in IDAPA 58.01.16, including the seepage testing requirements in IDAPA 58.01.16.493 for municipal lagoons. Prior to lagoon seepage testing, the permittee must consult DEQ. The seepage test report submittals to DEQ must be up-to-date per the IDAPA 58.01.16 timelines.

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7.3 Sludge/Biosolids

DEQ separates wastewater and sludge permitting for the purposes of regulating biosolids. DEQ may issue a sludge-only permit to each facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at each facility continue to be subject to the national sewage sludge standards at 40 CFR 503 and the requirements of Idaho's Wastewater Rules (IDAPA 58.01.16.480 and 650). The 503 regulations are self-implementing, and facilities must comply with them whether or not a permit has been issued. Idaho's Wastewater Rules require a POTW to have the capability to process sludge accumulated on site in preparation for final disposal or reuse (IDAPA 58.01.16.480 and 58.01.16.650). Operations of these sludge processing, storage, and disposal activities must comply with the facility's sludge management plan.

8 Permit Expiration or Modification

The permit will expire five years after the effective date.

DEQ may modify a permit before its expiration date only for causes specified in IDAPA58.01.25.201. A modification other than a minor modification requires preparing a permit that incorporates the proposed changes, preparing a fact sheet, and conducting a public review period. Only the permit conditions subject to the modification will be reopened when a permit is modified. All other conditions of the existing permit remain in effect. Modifying a permit does not change the expiration date of the original permit.

9 References for Text and Appendices

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EPA. 1996**.** *Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies.* Washington, DC: EPA Office of Water, Office of Enforcement and Compliance Assurance. Memorandum. *https://www3.epa.gov/npdes/pubs/perf-red.pdf*

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Appendix A. Facility Maps/Process Schematics

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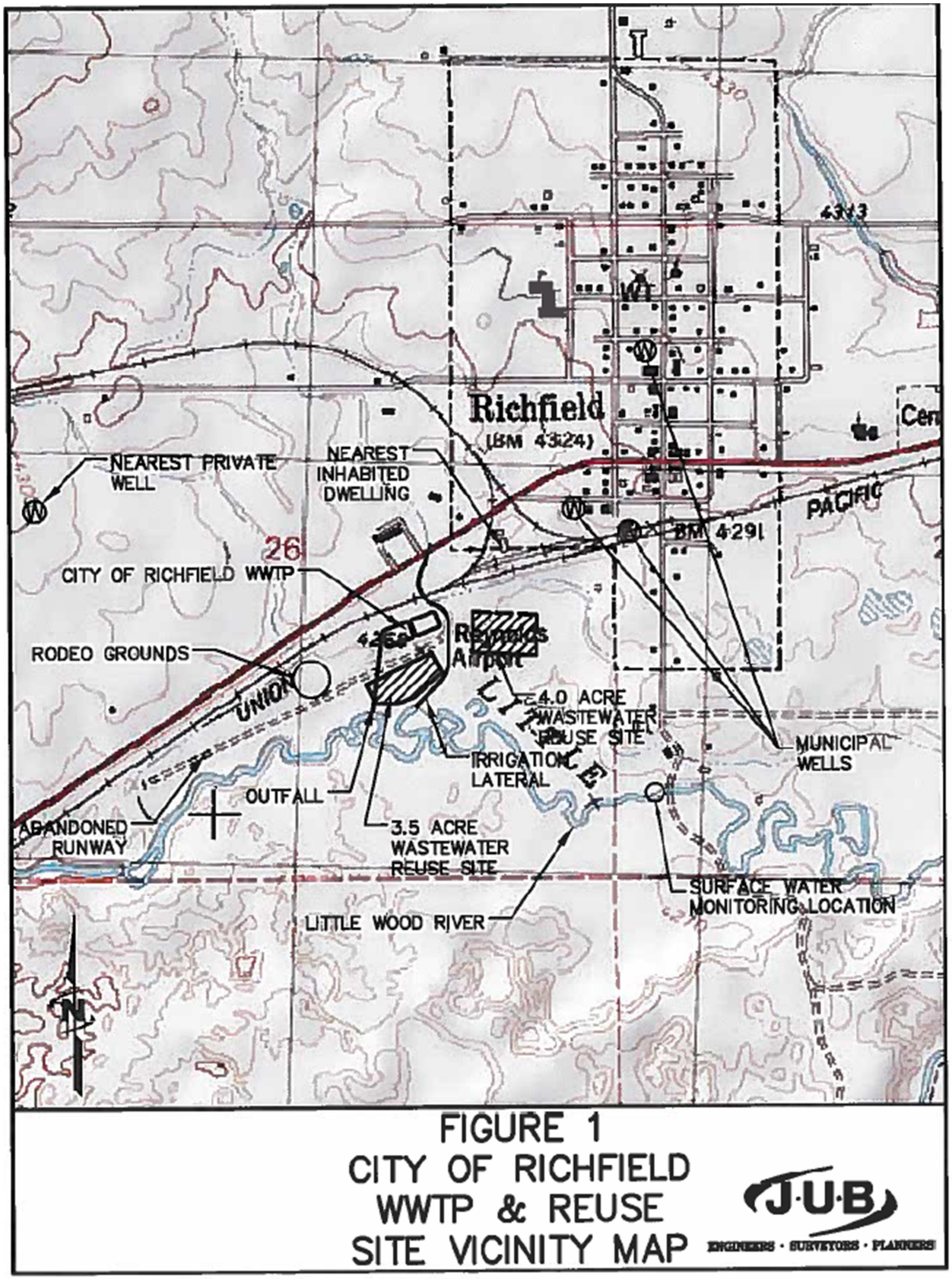
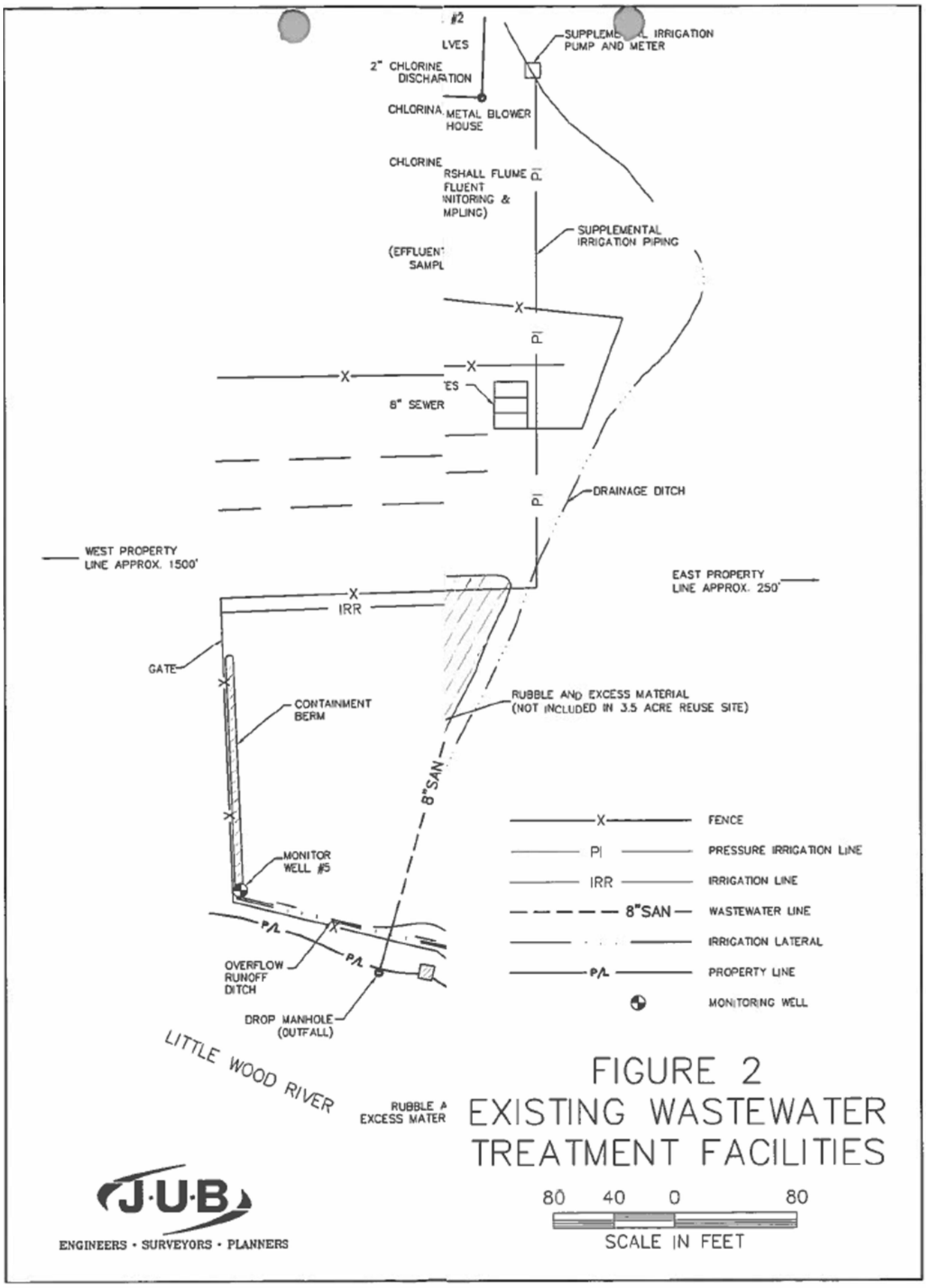
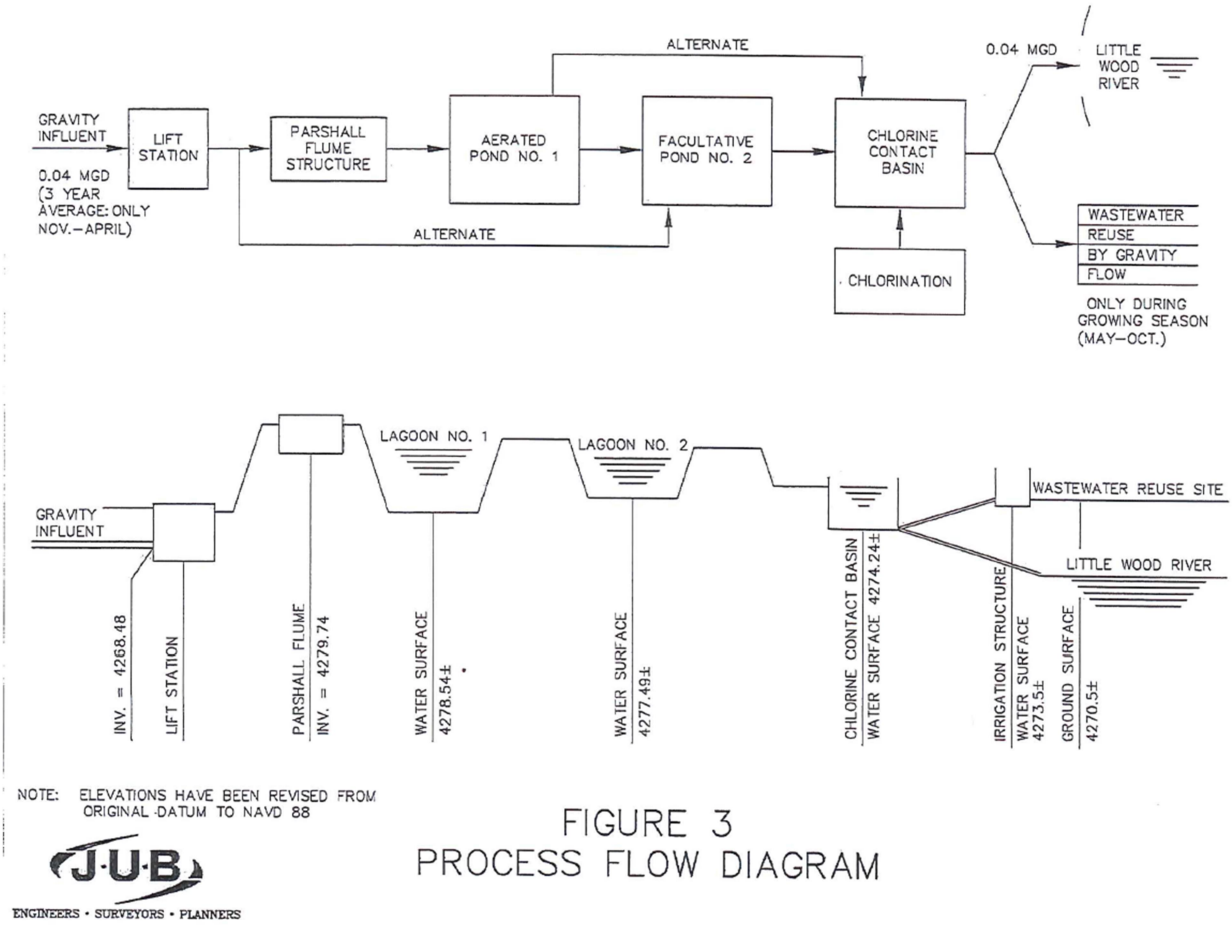


FIGURE 1
CITY OF RICHFIELD
WWTP & REUSE
SITE VICINITY MAP

J·U·B ENGINEERS · SURVEYORS · PLANNERS


#2
LVES
2" CHLORINE DISCHARGE
CHLORINA
METAL BLOWER HOUSE
SUPPLEME IRRIGATION PUMP AND METER
CHLORINE
RSHALL FLUME
FLUENT NITORING & MPLING)
(EFFLUEN SAMPL
SUPPLEMENTAL IRRIGATION PIPING
ES
8" SEWER
DRAINAGE DITCH
WEST PROPERTY LINE APPROX. 1500'
EAST PROPERTY LINE APPROX. 250'
IRR
GATE
CONTAINMENT BERM
RUBBLE AND EXCESS MATERIAL (NOT INCLUDED IN 3.5 ACRE REUSE SITE)
8"SAN
MONITOR WELL #5
OVERFLOW RUNOFF DITCH
DROP MANHOLE (OUTFALL)
LITTLE WOOD RIVER
RUBBLE A EXCESS MATER
FENCE
PRESSURE IRRIGATION LINE
IRRIGATION LINE
WASTEWATER LINE
IRRIGATION LATERAL
PROPERTY LINE
MONITORING WELL
FIGURE 2
EXISTING WASTEWATER TREATMENT FACILITIES
80 40 0 80
SCALE IN FEET
J·U·B
ENGINEERS · SURVEYORS · PLANNERS



NOTE: ELEVATIONS HAVE BEEN REVISED FROM ORIGINAL DATUM TO NAVD 88

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FIGURE 3
PROCESS FLOW DIAGRAM

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Appendix B. Technical Calculations

The results of the technical calculations are discussed above in sections 3.2 and 3.3 of the fact sheet.

A. Technology-Based Effluent Limits

The CWA requires POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as secondary treatment, which all POTWs were required to meet by July 1, 1977. The EPA has developed and promulgated secondary treatment effluent limits, which are found in 40 CFR 133. These TBELs apply to all municipal wastewater treatment facilities and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH.

The concentration and removal rate limits for BOD_5 and TSS are the technology-based effluent limits of 40 CFR 133.102. As explained below, DEQ has determined that more stringent WQBELs are necessary for pH in order to ensure compliance with WQS.

All other parameter limits for *E. coli*, total residual chlorine, ammonia, and phosphorus are based on WQBELs in order to ensure compliance with water quality standards. RPA was conducted for TRC and no reasonable potential existed to prompt limit development. Equations used in this determination are given below

B. Reasonable Potential and Water Quality-Based Effluent Limit Calculations

DEQ uses the process in the *Effluent Limit Development Guidance* (DEQ 2017) to determine reasonable potential. After characterizing the effluent and receiving water, DEQ compares the projected receiving water concentration after the effluent is discharged to the water quality criteria for the pollutant of concern. If the projected concentration exceeds the criterion, there is reasonable potential and an effluent limit is developed.

If DEQ chooses to authorize a mixing zone, the water quality criteria must still be met at the edge of the mixing zone. If after the analysis of the mixing zone, water quality criteria are not being met, the facility will receive an effluent limit that identifies both the size of the mixing zone and the final effluent limit.

Mass-Balance
For discharges to flowing water bodies, the maximum projected receiving water concentration is determined using the following mass-balance equation:

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$$C_d = \frac{(C_e Q_e) + \lfloor C_u(Q_u \times \%MZ) \rfloor}{Q_e + (Q_u \times \%MZ)}$$

Equation 1. Simple mass-balance equation.

Where:

C_d = downstream receiving water concentration	Calculated value
Q_e = critical effluent flow	From discharge flow data (design flow for POTW)
Q_u = critical upstream flow (1Q10 acute criterion, 7Q10 chronic, or harmonic mean)	From water quality standards
%MZ = percent of critical low flow provided by mixing zone	From mixing zone analysis
C_u = critical upstream pollutant concentration (90th to 95th percentile)	From receiving water data
C_e = critical effluent pollutant concentration	Calculated value using

A dilution factor (D) can be introduced to describe the allowable mixing. A dilution factor represents the ratio of the receiving water body low flow percentage (i.e., the low-flow design discharge conditions) to the effluent discharge volume and is expressed as:

$$Dilution\ Factor = D_f = \frac{(Q_S \times P + Q_e)}{Q_e} = \frac{(Q_s \times P)}{Q_e} + 1$$

Equation 2. Dilution factor calculation.

Where: D_f= Dilution factor

Qs = Receiving water low-flow condition (cfs)

P = Mixing zone percentage

Qe = Effluent discharge flow (cfs)

The above equations for C_d are the forms of the mass-balance equation, which were used to determine reasonable potential and calculate WLAs.

Critical Effluent Pollutant Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, DEQ's *Effluent Limit Development Guidance* (DEQ 2017) recommends using the critical effluent pollutant concentration (C_e) in the mass balance calculation (see Equation 1). To determine the C_e DEQ has adopted EPA's statistical approach that accounts for day-to-day variability in effluent quality by identifying the number of samples, calculating the coefficient of variation (CV) (Equation 7, below), and selecting a reasonable potential multiplying factor (RPMF) from the tables in the *Effluent Limit Development Guidance* (DEQ 2017).

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$$CV = \frac{Standard\ Deviation}{Mean}$$

Equation 3. CV calculation.

$$C_e = MOEC\ x\ RPMF$$

Equation 4. C_e calculation.

If the C_e exceeds water quality criteria then a reasonable potential analysis is conducted.

Reasonable Potential Analysis

The discharge has reasonable potential to cause or contribute to an exceedance of WQC, referred to as a reasonable potential to exceed (RPTE), if the critical concentration of the pollutant at the end of pipe exceeds the most stringent WQC for that pollutant. This RPTE may result in end-of-pipe limits or may be accommodated if the receiving water has sufficient low flows to provide a mixing zone and the POC does not have acute toxicity attributes. Other conditions may also be applicable that may restrict the use of a mixing zone for the POC.

RPA Calculations for Total Residual Chlorine (to oxbow lake)

The calculations below are also shown in Table 28.

$$C_d = \frac{(C_e Q_e) + \lfloor C_u (Q_u \times \%MZ) \rfloor}{Q_e + (Q_u \times \%MZ)}$$

Where:

C_d = downstream receiving water concentration = calculated
Q_e = critical effluent flow = 0.093 cfs (0.06 mgd design flow)
$Q_{u\text{-}acute}$ = critical upstream flow (1Q10) = 0 cfs
$Q_{u\text{-}chronic}$ = critical upstream flow (7Q10) = 0 cfs
%MZ = percent of critical low flow 25%
C_u = critical upstream concentration = 0 µg/L
C_e = critical effluent pollutant concentration = $MOEC \times RPMF$ = 139
MOEC = maximum observed effluent concentration = 67.5 µg/L
RPMF = reasonable potential multiplying factor =2.1 (see Table 28)

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$$C_{d-acute} = \frac{\left(139\frac{\mu g}{L} \times 0.093cfs\right) + \lfloor 0\mu g/L(0\ cfs \times 25\%)\rfloor}{0.093\ cfs + (0cfs \times 25\%)}$$

$$C_{d-acute} = \frac{(12.9) + \lfloor 0\rfloor}{0.093}$$

$$C_{d-acute} = 139$$

Acute WQS for TRC is 19 µg/L. $C_{d\text{-}acute}$ > WQS therefore there is reasonable potential to cause or contribute to water quality impairments.

$$C_{d-chronic} = \frac{\left(139\frac{\mu g}{L} \times 0.093cfs\right) + \lfloor 0\mu g/L(0\ cfs \times 25\%)\rfloor}{0.093\ cfs + (0cfs \times 25\%)}$$

$$C_{d-chronic} = \frac{(12.9) + \lfloor 0\rfloor}{0.093}$$

$$C_{d-chronic} = 139$$

Chronic WQS for TRC is 11 µg/L. $C_{d\text{-}chronic}$ > WQS therefore there is reasonable potential to cause or contribute to water quality impairments.

C. WQBEL Calculations

The following calculations demonstrate how the WQBELs in the permit were calculated. The permit includes WQBELs for pH, *E. coli*, TRC, TP, and ammonia. The following discussion presents the general equations used to calculate the WQBELs.

Calculate the Wasteload Allocations (WLAs)

WLAs are calculated using the same mass-balance equations used to calculate the concentration of the pollutant at the mixing zone boundary in the RPA. WLAs must be calculated for both acute and chronic criteria. To calculate the WLAs, C_d is set equal to the appropriate criterion and the equation is solved for C_e. The calculated C_e is the WLA. Equation 9 is rearranged to solve for the WLA:

$$C_e = WLA_{(a\ or\ c)} = \frac{WQC_{(a\ or\ c)}[Q_e + (Q_u \times \%MZ)] - [C_u \times (Q_u \times \%MZ)]}{Q_e}$$

Equation 5. Simple mass-balance equation for calculating WLA for flowing water.

Where:

$WQC_{(a\ or\ c)}$ = Pollutant water quality criterion (acute or chronic)	Calculated value
Q_e = Critical effluent flow	From discharge flow data (design flow for POTW)
Q_u = Critical upstream flow (1Q10 acute criterion or 7Q10 chronic)	From water quality standards
%MZ = Percent of critical low flow provided by mixing zone	From mixing zone analysis

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C_u = Critical upstream pollutant concentration (90th to 95th percentile)	From receiving water data
C_e = $WLA_{(a \text{ or } c)}$ = wasteload allocation (acute or chronic)	Calculated from Equation 4

Idaho's WQC for some metals are expressed as the dissolved fraction. The rules regulating the IPDES program (IDAPA 58.01.25.303.03) require that effluent limits be expressed as total recoverable metal unless standards have been promulgated allowing limits specified in dissolved, valent, or total forms. A case-by-case basis has been established for limits specified in dissolved, valent, or total form, or all approved analytical methods for the metal inherently measure only its dissolved form. Therefore, the permit writer should calculate a WLA in total recoverable metal that will be protective of the dissolved criterion. This is accomplished by dividing the WLA expressed as dissolved by the criteria translator. As discussed in *Guidance Document on Dynamic Modeling and Translators* (EPA 1993), the criteria translator (CT) is equal to the conversion factor when site-specific translators are not available. Conversion factors for metals criteria are listed in DEQ's Water Quality Standards (WQS) at IDAPA 58.01.02.210.02. The WQS also lists several guidance documents at IDAPA 58.01.02.210.04 that are recommended for the development of site specific translators.

The next step is to compute the acute and chronic long-term average ($LTA_{(a \text{ or } c)}$) concentrations, which will be derived from the acute and chronic WLAs. This is done using the following equations from the *Effluent Limit Development Guidance* (DEQ 2017):

$$LTA_a = WLA_a \times e^{(0.5\sigma^2 - z_{99}\sigma)}$$

Equation 6. Acute LTA for toxics.

Where:

LTA_a = Acute long-term average	Calculated value
WLA_a = Acute wasteload allocation	Calculated value. See Equation 5.
e = Base of natural log	Approximately 2.718
σ = Square root of σ^2	
σ^2 = $Ln(CV^2+1)$	Ln is the natural log
CV = Coefficient of variation	Calculated using field data. If 10 or less samples available, use default value of 0.6. See Equation 3
Z_{99} = z score of the 99th percentile of the normal distribution	2.326

$$LTA_c = WLA_c \times e^{(0.5\sigma_n^2 - z_{99}\sigma_n)}$$

Equation 7. Chronic LTA average for toxics.

Where:

LTA_c = Chronic long-term average	Calculated value
WLA_c = Chronic wasteload allocation	Calculated value. See Equation 5.
e = Base of natural log	Approximately 2.718
σ_n = Square root of σ_n^2	
$\sigma_n^2 = Ln[(CV^2)/n + 1)]$	Ln is the natural log
CV = Coefficient of variation	Calculated using field data. If 10 or less, samples available use default value of 0.6. See Equation 3.
Z_{99} = z score of the 99th percentile of the normal distribution	2.326
n = Averaging period for the chronic water quality criterion (typically 4 days)	Varies

The acute and chronic LTAs are compared, and the more stringent of the two is used to calculate the maximum daily and average monthly limits.

Derive the Maximum Daily and Average Monthly Effluent Limits
Using the *Effluent Limit Development Guidance* (DEQ 2017) equations, the maximum daily limit (MDL) and average monthly limit (AML) are calculated as follows:

$$Maximum\ Daily\ Limit = LTA_m \times e^{(z_{99}\sigma - 0.5\sigma^2)}$$ **Equation 8. Maximum daily limit for toxics.**

Where:

LTA_m = Minimum long-term average value	Lesser value calculated from Equation 6 and Equation 7
e = Base of natural log	Approximately 2.718
σ = Square root of σ^2	
$\sigma^2 = Ln(CV^2+1)$	Ln is the natural log of base e
Z_{99} = z score of the 99th percentile of the normal distribution	2.326
CV = Coefficient of variation	See Equation 3.

$$AML = LTA_m \times e^{(z_{95}\sigma_n - 0.5\sigma_n^2)}$$ **Equation 9. Average monthly limit for toxics.**

Where:

LTA_m = Minimum long-term average	Lesser value calculated from Equation 6 and Equation 7
AML = Average monthly limit	Calculated value
e = Base of natural log	Approximately 2.718
σ_n = Square root of σ_n^2	
$\sigma_n^2 = Ln[(CV^2)/n + 1]$	Ln is the natural log of base e
Z_{95} = z score of the 95th percentile of the normal distribution	1.645
n = Number of sample specified in the permit to be analyzed each month	Typically n = 1, 2, 4, 10, or 30.
CV = Coefficient of variation	See Equation 3

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Table 28, below, details the calculations for WQBELs.

Table 28. City of Richfield RPA (Discharge to Oxbow Lake)

Reasonable Potential Analysis (RPA) and Water Quality Effluent Limit (WQBEL) Calculations

Facility Name	Richfield
Facility Flow (mgd)	0.06
Facility Flow (cfs)	0.093

Critical River Flows	(IDAPA 58.01.02 03. b)	Annual Crit. Flows	Units
Aquatic Life - Acute Criteria - Criterion Max. Concentration (CMC)	1Q10	0.0	cfs
Aquatic Life - Chronic Criteria - Criterion Continuous Concentration (CCC)	7Q10 or 4B3	0.0	cfs
Ammonia	30B3/30Q10 (seasonal)	0.0	cfs
Human Health - Non-Carcinogen	30Q5	0.0	cfs
Human Health - carcinogen	Harmonic Mean Flow	0.0	cfs

DISCHARGE TO OXBOW

Receiving Water Data		Notes:	Annual	
Hardness, as mg/L $CaCO_3$	Hardness, as mg/L $CaCO_3$	5th prctile at critical flow		
Temperature, °C	Temperature, °C	90th - 95th percentile	10.2	(90th percentile)
pH, S.U.	pH, S.U.	90th - 95th percentile	8.32	(90th percentile)

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages	CHLORINE (Total Residual)
Effluent Data	Number of Samples in Data Set (n)		6	75
	Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)		0.6	1.2
	Effluent Concentration, µg/L (Max. or 95th Percentile) - (C_e)		34,800	67.5
	Calculated 50th prctile Effluent Conc. (when n>10), Human Health Only			
Receiving Water Statistics	90th Percentile Conc., µg/L - (C_u)		213	0
	Geometric Mean, µg/L, Human Health Criteria Only			
Applicable Water Quality Criteria	Aquatic Life Criteria, µg/L	Acute	3,029	19.
	Aquatic Life Criteria, µg/L	Chronic	1,474	11.
	Human Health Water and Organism, µg/L		--	--
	Human Health, Organism Only, µg/L		--	--
	Metals Criteria Translator, decimal (or default use Conversion Factor)	Acute		--
		Chronic		--
	Carcinogen (Y/N), Human Health Criteria Only		--	N
Assign Percent Mixing	Use this row to set the mixing zone size instead of letting it auto-calculate		25%	25%
Percent River Flow	Aquatic Life - Acute	1Q10	25%	25%
	Aquatic Life - Chronic	7Q10 or 4B3		25%
		30B3 or 30Q10		25%
	Human Health - Non-Carcinogen and Chronic Ammonia	Harmonic Mean	25%	25%
	Human Health - Carcinogen	Harmonic Mean		25%
Calculated Dilution Factors (DF) (or enter Modeled DFs)	Aquatic Life - Acute	1Q10	1.0	1.0
	Aquatic Life - Chronic	7Q10 or 4B3		1.0
		30B3 or 30Q10		1.0
	Human Health - Non-Carcinogen and Chronic Ammonia	Harmonic Mean	1.0	1.0
	Human Health - Carcinogen	Harmonic Mean		1.0

Aquatic Life Reasonable Potential Analysis

σ	$\sigma^2=\ln(CV^2+1)$		0.555	0.944
P_n	=(1-confidence level)$^{1/n}$, where confidence level =	99%	0.464	0.940
Multiplier (TSD p. 57)	$=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)\sigma-0.5\sigma^2]$, where	99%	3.8	2.1
Statistically projected critical discharge concentration (C_e)			132886	139
Predicted max. conc.(ug/L) at Edge-of-Mixing Zone		Acute	132886	139
(note: for metals, concentration as dissolved using conversion factor as translator)		Chronic	132886	139
Reasonable Potential to exceed Aquatic Life Criteria			Yes	Yes

Table 28 continued.

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages	CHLORINE (Total Residual)
Aquatic Life Effluent Limit Calculations				
Number of Compliance Samples Expected per month (n)			4	4
n used to calculate AML (if chronic is limiting then use min=4 or for ammonia min=30)			30	4
LTA Coeff. Var. (CV), decimal	(Use CV of data set or default = 0.6)		0.6	1.2
Permit Limit Coeff. Var. (CV), decimal	(Use CV from data set or default = 0.6)		0.6	1.2
Acute WLA, ug/L	$C_d = (Acute\ Criteria \times MZ_a) - C_u \times (MZ_a - 1)$	Acute	3,029	19.0
Chronic WLA, ug/L	$C_d = (Chronic\ Criteria \times MZ_c) - C_u \times (MZ_c - 1)$	Chronic	1,474	11.0
Long Term Ave (LTA), ug/L	WLAc x $\exp(0.5\sigma^2 - z\sigma)$, Acute	99%	972	3.3
(99^{th} % occurrence prob.)	WLAa x $\exp(0.5\sigma^2 - z\sigma)$; ammonia n=30, Chronic	99%	1,150	3.5
Limiting LTA, ug/L	used as basis for limits calculation		972	3.3
Applicable Metals Criteria Translator (metals limits as total recoverable)			[illegible]	--
Average Monthly Limit (AML), ug/L , where % occurrence prob =		95%	**1,157**	**7.0**
Maximum Daily Limit (MDL), ug/L , where % occurrence prob =		99%	**3,029**	**19**
Average Monthly Limit (AML), mg/L			**1.2**	**0.007**
Maximum Daily Limit (MDL), mg/L			**3.0**	**0.019**
Average Monthly Limit (AML), lb/day			**0.6**	**0.004**
Maximum Daily Limit (MDL), lb/day			**1.5**	**0.010**
Human Health Reasonable Potential Analysis				
σ	$\sigma^2 = \ln(CV^2+1)$			0.944
P_n	$=(1-\text{confidence level})^{1/n}$ where confidence level =	95%		0.961
Multiplier	$=\exp(2.326\sigma - 0.5\sigma^2)/\exp[\text{invnorm}(P_N)\sigma - 0.5\sigma^2]$,	50%		0.190
Dilution Factor (for Human Health Criteria)		.		1.0
Max Conc. at edge of Chronic Zone, ug/L (C_d)				12.799
Reasonable Potential to exceed HH Water & Organism				**NO**
Reasonable Potential to exceed HH Organism Only				**NO**

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Table 29. City of Richfield RPA (Discharge to Mainstem Little Wood River)

Reasonable Potential Analysis (RPA) and Water Quality Effluent Limit (WQBEL) Calculations

Facility Name	Richfield
Facility Flow (mgd)	0.06
Facility Flow (cfs)	0.093

Critical River Flows	(IDAPA 58.01.02 03. b)	Seasonal Nov-Mar Crit. Flows	Seasonal April Crit. Flows	units
Aquatic Life - Acute Criteria - Criterion Max. Concentration (CMC)	1Q10	57	0	cfs
Aquatic Life - Chronic Criteria - Criterion Continuous Concentration (CCC)	7Q10 or 4B3	79	4.6	cfs
Ammonia	30B3/30Q10 (seasonal)	101	5	cfs
Human Health - Non-Carcinogen	30Q5	113	30	cfs
Human Health - carcinogen	Harmonic Mean Flow	114		cfs

Discharge to Mainstem Little Wood River

Receiving Water Data	Notes:	Seasonal	Seasonal	
Hardness, as mg/L $CaCO_3$	Hardness, as mg/L $CaCO_3$ — 5th percentile @ critical flows			min. hardness 25 mg/L except
Temperature, °C	Temperature, °C — 90th - 95th percentile	10.2	10.2	(90th percentile)
pH, S.U.	pH, S.U. — 90th - 95th percentile	8.32	8.32	(90th percentile)

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages present			CHLORINE (Total Residual)	CHLORINE (Total Residual)
Effluent Data	Number of Samples in Data Set (n)		6	6		119	119
	Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)		0.6	0.06		7.9	7.9
	Effluent Concentration, µg/L (Max. or 95th Percentile) - (C_e)		34,800	34,800		41	41
	Calculated 50th % Effluent Conc. (when n>10), Human Health Only						
Receiving Water Statistics	90th Percentile Conc., µg/L - (C_u)		213	213		0	0
	Geometric Mean, µg/L, Human Health Criteria Only						
Applicable Water Quality Criteria	Aquatic Life Criteria, µg/L	Acute	3,029	3,029	--	19.	19.
	Aquatic Life Criteria, µg/L	Chronic	1,474	1,474	--	11.	11.
	Human Health Water and Organism, µg/L		--	--	--	--	--
	Human Health, Organism Only, µg/L		--	--	--	--	--
	Metals Criteria Translator, decimal (or default use Conversion Factor)	Acute			--	--	--
		Chronic			--	--	--
	Carcinogen (Y/N), Human Health Criteria Only		--	--	--	N	N
Assign Percent Mixing	Use this row to set the mixing zone size instead of letting it auto-calculate		9%	25%		5%	0%
Percent River Flow	Aquatic Life - Acute	1Q10	9%	25%	--	5%	0%
	Aquatic Life - Chronic	7Q10			--	5%	0%
		30Q10			--	5%	0%
	Human Health - Non-Carcinogen and Chronic Ammonia	30Q5	9%	25%	--	5%	0%
	Human Health - Carcinogen	Harmonic Mean			--	5%	0%
Calculated Dilution Factors (DF) (or enter Modeled DFs)	Aquatic Life - Acute	1Q10	56.27	1.00	--	31.70	1.00
	Aquatic Life - Chronic	7Q10			--	43.56	1.00
		30Q10			--	1.00	1.00
	Human Health - Non-Carcinogen and Chronic Ammonia	30Q5	110.57	81.80	--	62.41	1.00
	Human Health - Carcinogen	Harmonic Mean			--	62.41	1.00

Aquatic Life Reasonable Potential Analysis

σ	$\sigma^2=\ln(CV^2+1)$		0.555	0.060	--	2.037	2.037
P_n	=(1-confidence level)^(1/n), where confidence level =	99%	0.464	0.464	--	0.962	0.962
Multiplier (TSD p. 57)	$=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)\sigma-0.5\sigma^2]$, where	99%	3.8	1.2	--	3.1	3.1
Statistically projected critical discharge concentration (C_e)			132886	40224	--	126	126
Predicted max. conc.(ug/L) at Edge-of-Mixing Zone		Acute	2571	40224	--	3.98	126
(note: for metals, concentration as dissolved using conversion factor as translator)		Chronic	1413	702	--	2.89	126.09
Reasonable Potential To Exceed (RPTE) Aquatic Life Criteria			**No**	**Yes**	--	**No**	**Yes**

Table 29 continued.

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages present		CHLORINE (Total Residual)	CHLORINE (Total Residual)
Aquatic Life Effluent Limit Calculations						
Number of Compliance Samples Expected per month (n)			4			4
n used to calculate AML (if chronic is limiting then use min=4 or for ammonia min=30)			--	30	--	--	4
LTA Coeff. Var. (CV), decimal	(Use CV of data set or default = 0.6)		--	0.060	--	--	7.900
Permit Limit Coeff. Var. (CV), decimal	(Use CV from data set or default = 0.6)		--	0.060	--	--	7.900
Acute WLA, ug/L	C_e= (Acute Criteria x MZ_a) - C_u x (MZ_a-1)	Acute	--	3,029	--	--	19.0
Chronic WLA, ug/L	C_e= (Chronic Criteria x MZ_c) - C_{eff} (MZ_c-1)	Chronic	--	103,394	--	--	11
Long Term Ave (LTA), ug/L	WLAc x exp(0.5σ^2-zσ), Acute	99%	--	2,639	--	--	1.3
(99th % occurrence prob.)	WLAa x exp(0.5σ^2-zσ); ammonia n=30, Chronic	99%	--	100,798	--	--	0.9
Limiting LTA, ug/L	used as basis for limits calculation		--	2,639	--	--	0.9
Applicable Metals Criteria Translator (metals limits as total recoverable)					--	--	--
Average Monthly Limit (AML), ug/L	, where % occurrence prob =	95%	--	**2687**	--	--	**4**
Maximum Daily Limit (MDL), ug/L	, where % occurrence prob =	99%	--	**3029**	--	--	**13**
Average Monthly Limit (AML), mg/L			--	**2.7**	--	--	**0.004**
Maximum Daily Limit (MDL), mg/L			--	**3.0**	--	--	**0.013**
Average Monthly Limit (AML), lb/day			--	**1.3**	--	--	**0.002**
Maximum Daily Limit (MDL), lb/day			--	**1.5**	--	--	**0.007**
Human Health Reasonable Potential Analysis						
σ	σ^2=ln(CV^2+1)				--	2.037	2.037
P_n	=(1-confidence level)$^{1/n}$ where confidence level =	95%			--	0.975	0.975
Multiplier	=exp(2.326σ-0.5σ^2)/exp[invnorm(P_n)σ-0.5σ^2], prob. =	50%			--	0.018	0.018
Dilution Factor (for Human Health Criteria)					--	62.4	1.0
Max Conc. at edge of Chronic Zone, ug/L (C_e)					--	0.012	0.753
Reasonable Potential to exceed HH Water & Organism					--	**NO**	**NO**
Reasonable Potential to exceed HH Organism Only					--	**NO**	**NO**

Table 30. TSS TMDL WLA Limit Calculations

Annual/Seasonal Limit Calculations where the TMDL WLA is Assumed the LTA
Total Suspended Solids

ENTER TMDL WLA:	**21.8**	lb/day
Facility Flow:	**0.06**	mgd
Design Flow:	**0.09**	cfs

Multiplier to Calculate Permit Limits from LTA Reference: TSD Page 103

Number of Samples per Month (n)				**2**	
Number of Samples per Week Set (n/4)				**0.5**	
(i.e. 4 if sampling weekly for a month)					
Coefficient of Variation (CV) = Std. Dev./Mean				**0.56**	CV from DMR Data (2005-2019)
weekly σ	σ = std deviation			0.698	
	σ^2=ln(CV^2(n/4)+1)			0.146	
monthly σ	σ n= std deviation			0.382	
	σn^2=ln(CV^2/n+1)			0.146	
Average Monthly Limit (AML),	exp(zσ_n-0.5zσ_n^2); where % probability basis =	95%	Z= 1.64	1.74	
Maximum Daily Limit (MDL),	exp(zσ-0.5zσ^2); where % probability basis=	99%	Z= 2.33	2.94	
Average Weekly Limit (AWL),	exp(z$\sigma_{n/4}$-0.5z$\sigma_{n/4}^2$); where % probability basis =	99%	Z= 2.33	3.97	
Ratio AWL/AML				2.28	

Calculation:	LTA, Limiting	x	Multiplier	=	Limit	
AML = LTA, limiting x Multiplier	21.8	x	1.74	=	38	lb/day
MDL = LTA, limiting x Multiplier	21.8	x	2.94	=	64	lb/day
AWL = AML x Multiplier	37.97	x	2.28	=	87	lb/day
AAL/AAS=					21.8	lb/day

Table 31. TP TMDL WLA Limit Calculations

Annual/Seasonal Limit Calculations where the TMDL WLA is Assumed the LTA
Total Phosphorus

ENTER TMDL WLA:	**1.84**	lb/day
Facility Flow:	**0.06**	mgd
Design Flow:	**0.09**	cfs

Multiplier to Calculate Permit Limits from LTA Reference: TSD Page 103

Number of Samples per Month (n)				**1**	
Number of Samples per Week Set (n/4)				**0.25**	
(i.e. 4 if sampling weekly for a month)					
Coefficient of Variation (CV) = Std. Dev./Mean				**0.6**	(CV of 0.6 used because n< 10 samples)
weekly σ	σ = std deviation			0.944	
	σ^2=ln(CV^2(n/4)+1)			0.307	
monthly σ	σ n= std deviation			0.555	
	σn^2=ln(CV^2/n+1)			0.307	
Average Monthly Limit (AML),	exp(zσ_n-0.5zσ_n^2); where % probability basis =	95%	Z= 1.64	2.13	
Maximum Daily Limit (MDL),	exp(zσ-0.5zσ^2); where % probability basis=	99%	Z= 2.33	3.12	
Average Weekly Limit (AWL),	exp(z$\sigma_{n/4}$-0.5z$\sigma_{n/4}^2$); where % probability basis =	99%	Z= 2.33	5.76	
Ratio AWL/AML				2.70	

Calculation:	LTA, Limiting	x	Multiplier	=	Limit	
AML = LTA, limiting x Multiplier	1.84	x	2.13	=	3.9	lb/day
MDL = LTA, limiting x Multiplier	1.84	x	3.12	=	NA	lb/day
AWL = AML x Multiplier	3.928	x	2.70	=	NA	lb/day
AAL/AAS=					1.8	lb/day

Appendix C. Your Right to Appeal

Persons aggrieved, as specified in IDAPA 58.01.25.204.01.a., have a right to appeal the final permit decision. A Petition for Review must be filed with the Department's Hearing Coordinator within twenty eight (28) days after the Department serves notice of the final permit decision under IDAPA 58.01.25.107 (Decision Process).

All documents concerning actions governed by these rules must be filed with the Hearing Coordinator at the following address: Hearing Coordinator, Department of Environmental Quality, 1410 N. Hilton, Boise, ID 83706-1255. Documents may also be filed by FAX at FAX No. (208) 373-0481 or may be filed electronically. The originating party is responsible for retaining proof of filing by FAX. The documents are deemed to be filed on the date received by the Hearing Coordinator. Upon receipt of the filed document, the Hearing Coordinator will provide a conformed copy to the originating party. Additional requirements for appeals of IPDES final permit decisions can be found in IDAPA 58.01.25.204.

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Appendix D. Public Involvement and Public Comments

A. Public Involvement Information

DEQ proposes to reissue a permit to City of Richfield. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and DEQ's reasons for requiring permit conditions.

DEQ placed a Public Notice of Application on 12/15/2020 in Times-News to inform the public about the submitted application and to invite comment on the reissuance of this permit.

The notice:

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

[attach printed copy of the Public Notice and published article]

B. Public Comments and Response to Comments

[DEQ will complete this section after the public notice of draft period.]

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