MEMORANDUM

TO: Barry Burnell, Water Quality Program Administrator, DEQ State Office, Boise
Daniel Redline, Regional Administrator, DEQ Coeur d'Alene
Matt Plaisted, P.E., Engineering Manager, DEQ Coeur d'Alene
John Tindall, P.E., Engineer, Coeur d'Alene Regional Office

FROM: Andrew John, Environmental Scientist, Technical Services Division

DATE: May 31, 2016

SUBJECT: Staff Analysis for the Draft Permit M-018-05, Outlet Bay Sewer District, Municipal Wastewater Reuse Permit Renewal Application

---

Executive Summary

The Outlet Bay reuse site is operated by Outlet Bay Sewer District. It is a Class II system for collection and treatment. The facility applies treated wastewater to a 46 acre forested site. For permit years 2010 through 2015 the facility applied ~14 MG to the reuse site each year. Wastewater is land applied through a solid set sprinkler system only during the growing season (May 1 through September 30).

Major changes proposed by both DEQ and the permittee in the draft permit compared to the current permit include the following: increasing the permit period from five (5) years to ten (10) years; recalculating the hydraulic and nitrogen (N) loading limits for the native conifer forest irrigation site; decreasing the sampling frequency for nitrogen (nitrate, nitrite, and total Kjeldahl nitrogen) and total coliform in the irrigated recycled water; decreasing soil sampling frequency from every five (5) years to once during the ten (10) year permit period; adding plant available phosphorus to the soil monitoring requirements; and changing the facility's flow meter calibration requirement from once every two (2) years to in accordance with the manufacturer's recommendations.

The soil monitoring data have not shown an upward trend in soil profile N accumulation since 2004. The facility has been well below the Class C total coliform wastewater limits in the current permit and during the last permit cycle (2010-2016). Nitrogen loading during each growing season has also been substantially below the 143 lb. acre^{-1} requirement in the current permit. Hydraulic loading has also been consistently below the monthly and annual hydraulic loading limits in the current permit. Facility inspections generally report substantial compliance with the permit. It appeared in the most recent inspection (8/13/2015) that the facility was having difficulty transporting total coliform samples to Accurate Testing Laboratory at the recommended preservation/holding temperature (4°C).

It is recommended that the Outlet Bay Sewer District be re-permitted incorporating conditions discussed in this Staff Analysis and specified in the attached draft permit.

1 Introduction

The purpose of this memorandum is to satisfy the requirements of IDAPA 58.01.17.400 for issuing recycled water reuse permits. The memorandum states the principal facts and significant questions considered in preparing the draft permit and provides a summary of the basis for the draft permit conditions.

Outlet Bay Sewer District (OBSD) was issued their first Wastewater Land Application (WLAP) permit on May 2, 1989. Initially the facility and land application site were much smaller than the current system. The total loading allowance during the growing season was 3 to 5 MG and the land application site was 4.7 acres (IDHW 1989; IDHW 1994). Shortly after the second permit (LA-000018-02) expired the facility was upgraded to the current system. The facility is currently operating under Reuse Permit LA-000018-04 (4th permit) issued May 1, 2010 (DEQ 2010a) and has initiated the application process for the fifth permit.

A reuse permit workshop was held on June 19, 2015 and the most recent facility inspection was conducted on August 13, 2015 (DEQ 2015a). The permit application was submitted on December 1, 2015 (JASA 2015). The application was determined to be substantially complete by the Idaho Department of Environmental Quality (DEQ) on January 12, 2016. DEQ also issued a letter on February 9, 2016 indicating that a preliminary decision had been reached to prepare a draft permit for the OBSD facility.

2 Site Location and Ownership

The Outlet Bay Sewer District reuse site is located at the southwestern end of Priest Lake near the outlet entering Priest River (see maps in Figures 1 and 2). Outlet Bay Sewer District owns and operates the reuse facility. The facility is operated by Mr. Fritz Broschet, who is also the district manager (JASA 2015, Section 1, p. 5). The District is currently permitted (LA-000018-04; DEQ 2010a) to irrigate disinfected effluent on a 46-acre forested site.

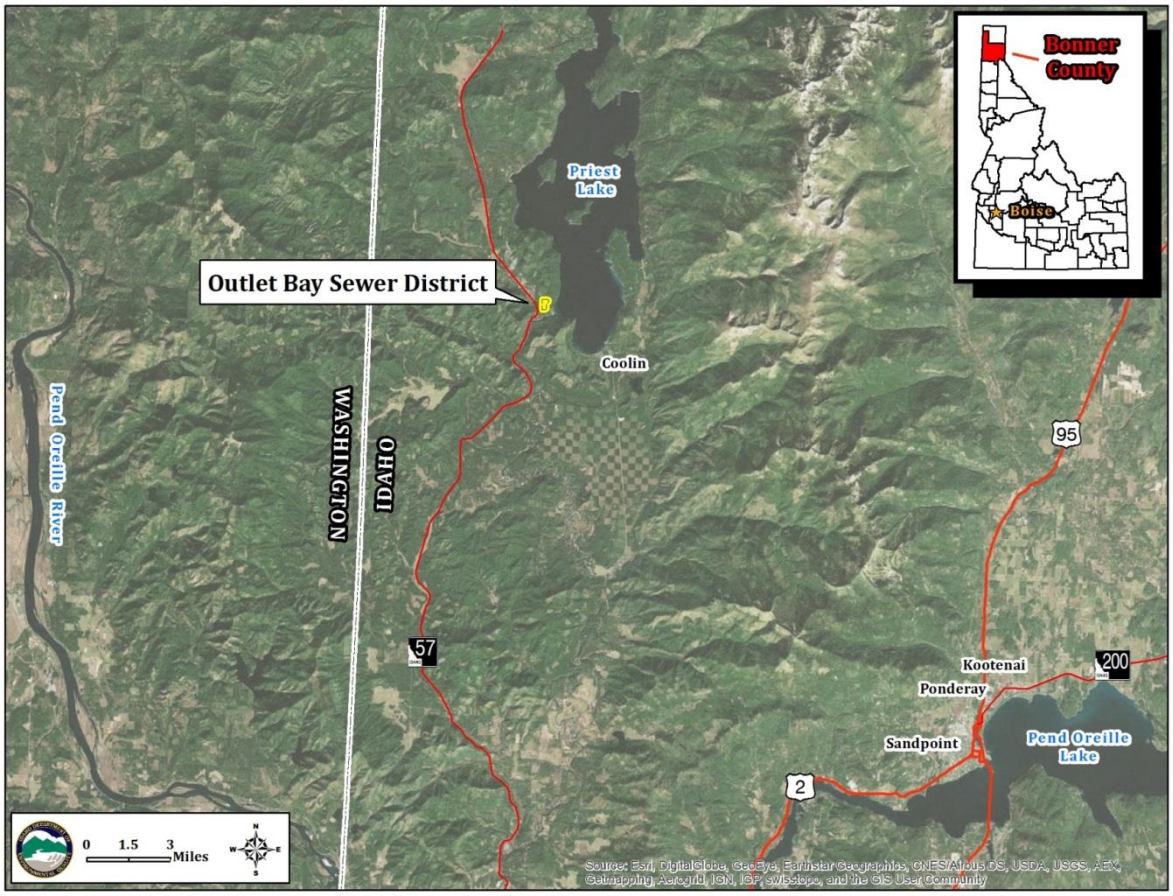


Figure 1. Location map.

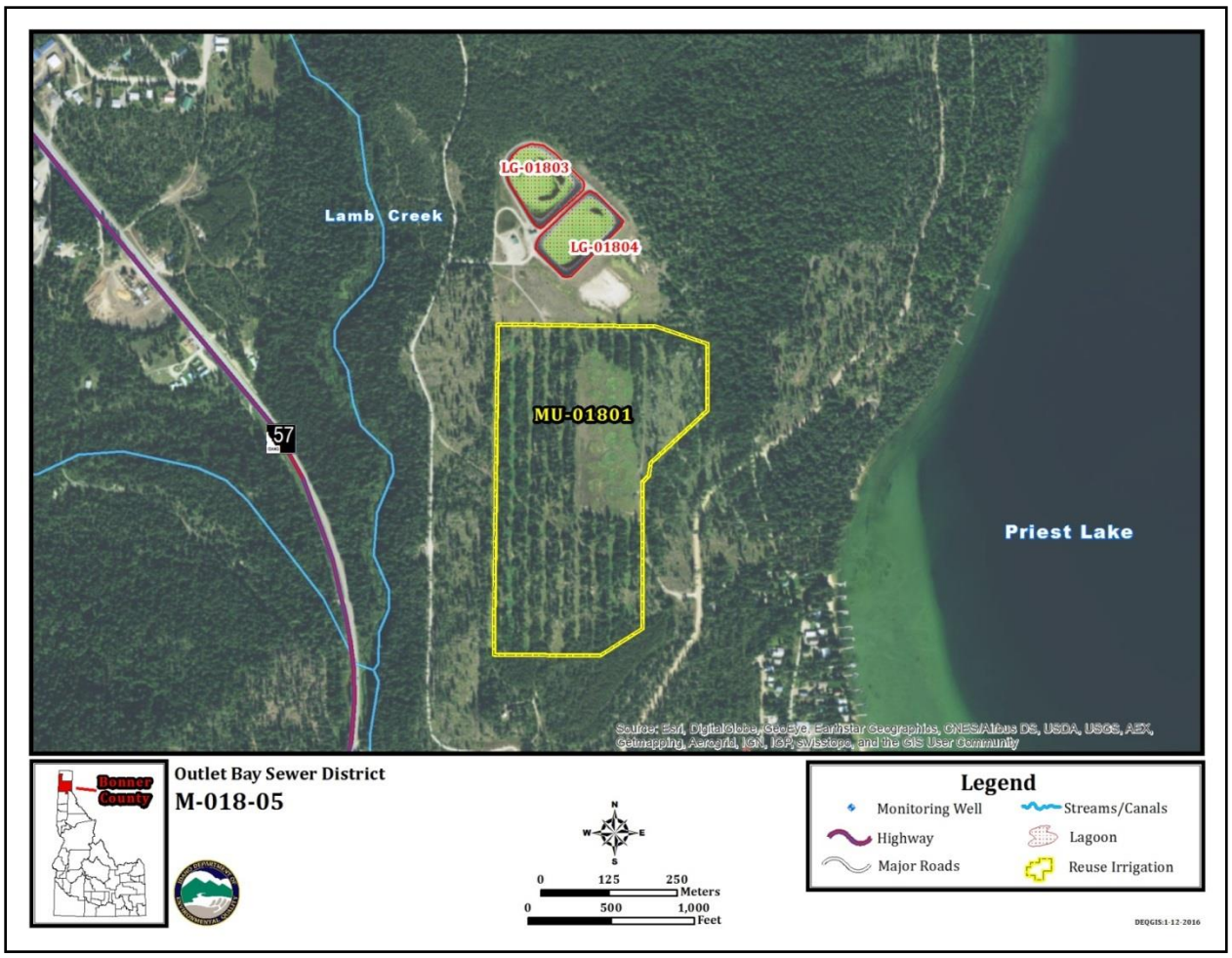


Figure 2. Site map.

3 Process Description

The wastewater treatment plant (WWTP) serves a community of 515 equivalent residential units (ERUs). The estimated flow from an ERU for this facility is estimated to contribute ~88 gal day^{-1} on average and ~131 gal day^{-1} for the maximum month flow (JASA 2010). There is a mix of full-time residential, seasonal residential and some commercial users. The large percentage of seasonal users reduces the average daily flow from an ERU when compared to communities with a majority of full-time residents. The current wastewater treatment and disposal system went into operation in 2003 and is designed to serve 915 ERUs at build-out. The system is designed to irrigate 29.5 million gallons (MG) annually (JASA 2015, Section 4.1, p. 9). The design maximum month flow to the WWTP is 120,000 gallons per day. The facility reported in the 2010 to 2014 Annual Reports that an average of ~15 MG was annually irrigated to the land application site. During the growing season the facility applied ~95,665 gal day^{-1} of recycled water to the land application site.

The Outlet Bay Sewer District's collection system handles a combination of raw wastewater and septic tank effluent from homes, resorts, small businesses and two (2) United States Forest

Service (USFS) campgrounds (Osprey and Outlet Bay Campgrounds). A majority of the District's customers are located on primary (year-round residence) and secondary (vacation) lots along the Priest Lake shoreline. The District maintains the collection system, septic tanks and lift stations. The District owns a tanker truck used to pump septage from the District's septic tanks and the septage is hauled to the WWTP for disposal into the lagoons.

The WWTP has four (4) processes used to treat wastewater that enters the facility:

1. Wastewater is pumped from the collection system to Lift Station #5 and then pumped to the headworks building. Here, inorganic wastes (rags and plastics) are removed in a screening process. The headworks building consists of a fine screen (1/8" openings), a bypass channel and an odor control biofilter. The headworks building was designed to handle wastewater and septage from the District and septage hauled from other areas. The District has used the headworks to accept sludge hauled to the facility from the Priest River WWTP and some other municipal WWTPs in the area.

2. After the screening process, the wastewater gravity flows into one (1) of two (2) aerated lagoons. The volume of each lagoon is 12 MG, with a working volume of 9 MG. Each lagoon is equipped with four (4) mechanical surface aspirating aerators. These lagoons can be operated independently, parallel or in series. The aerated lagoons are used to biologically breakdown organics in the wastewater and provide storage volume for the non-growing season when irrigation is not permitted (JASA 2015, Section 4.1, p. 9).

3. During the growing season (May 1 to September 30), the lagoon effluent is pumped to a contact chamber (dual, buried 36-inch diameter pipes, each 450 feet long) where a hypochlorite solution is mixed with the effluent to achieve the required disinfection. The effluent is in contact with the hypochlorite solution for 45 to 60 minutes.

4. The disinfected effluent is then land applied to a 46 acre forested site (during the growing season) via a solid set sprinkler irrigation system. During the non-growing season, wastewater is stored in the lagoons.

There are two other features included in the WWTP that should be noted:

1. A control building to house the irrigation pumps, hypo-chlorination system, utility water system and self-priming sludge pump.

2. A 100 KW backup diesel generator used to power half the aerators, Lift Station #5, and the control system during a power outage.

4 Site Characteristics

4.1 Site Management History

Historically, the Outlet Bay Sewer District operated a smaller wastewater treatment and application system that was constructed in 1979 (JASA 2015, Section 10.1, p. 25). During this time, wastewater was applied to field crops on less acreage than the current site. The first reuse

permit for the WWTP was issued on May 2, 1989. The second reuse permit was issued on October 31, 1994 and expired on October 30, 1999. The permit renewal application for the third reuse permit was submitted by James A. Sewell and Associates, LLC (JASA) and was received by DEQ on March 15, 2001.

The third permit (LA-000018-03) was issued on September 1, 2002 and expired on September 1, 2007. In 2003, the District upgraded the WWTP to the current facility described in Section 3. Around 2004 and 2005, after the old system was decommissioned, the District planted coniferous vegetation (~1400 trees; larch & pine) similar to that of the surrounding forests (JASA 2015). The facility performed lagoon seepage tests on both newly constructed lagoons in 2004 as well. Results showed that both lagoons met the seepage permit requirement of 0.25 inches day^{-1} (DEQ 2002, Section G, p. 9). Lagoon 1 had a seepage rate of 0.039 inches day^{-1} and Lagoon 2 had a seepage rate of 0.023 inches day^{-1} (JASA 2015, Section 6, p. 17). DEQ staff conducted three (3) site inspections from 2006 to 2008 (May 11, 2006, August 9, 2007 and August 12, 2008. DEQ staff did not find major system deficiencies during these inspections. However, DEQ staff did observe ponding where the former WWTP's lagoon was and this has since been regraded.

The current permit (LA-000018-04; DEQ 2010a) was issued on May 1, 2010 and originally expired May 1, 2015. A modification to the permit was made October 28, 2014 that extended the permit expiration date by one year to May 1, 2016. In 2011, the computer and SCADA system at the lagoons were replaced and three lagoon aerators were rebuilt (JASA 2015). The facility conducted a seepage test in 2014 and found that Lagoon 1 leaked 0.041 inches day^{-1} and Lagoon 2 leaked 0.133 inches day^{-1} (JASA 2015, Section 6, p. 17). Both of these values are below the permit requirement of 0.25 inches day^{-1} (DEQ 2010a, Section E, p. 7). DEQ staff conducted facility inspections on August 14, 2013 and August 13, 2015 (DEQ 2013 and DEQ 2015a).

The facility submitted their Reuse Permit Application and Technical Report on December 1, 2015. In a letter addressed to the DEQ, the facility requested the reduction of certain monitoring frequency requirements in the next permit. The facility would like to reduce wastewater nitrogen (nitrate, nitrite, and TKN) and total coliform sampling frequency, use manufacturer's flow meter calibration recommendations, and reduce soil sampling frequency to every 10 years.

4.2 Climatic Characteristics

The nearest weather station is the Priest River Experimental Station (107386), located approximately 11 miles southeast of the facility. The average annual precipitation is ~31 inches, with ~8 inches falling in the growing season (May 1 to September 30; WRCC 2015). The average annual maximum temperature is 56° F for the region and the average annual minimum is 32° F. The approximate elevation of the reuse site is 2510 feet above sea level.

4.3 Soils

Originally, the Bonner County soil survey (ID604) did not include the reuse site. The facility excavated soil pits near the lagoons to characterize. Based on the previous Staff Analysis (DEQ 2010b) and the current facility technical report (JASA 2015), soils on site were characterized as Bonner silt loams and Priest Lake gravelly sandy loams. More recently, the Idaho Panhandle

National Forest, Idaho-Washington-Montana soil survey (ID670) was conducted and now incorporates the reuse site. Listed below are the two soils considered present in the most recent survey (NRCS 2015).

1. Soil Type #155, Typic Udivitrands-Typic Vitrixerands complex, outwash plains of mixed geology.

   Landform: Terraces, hillslopes
   Parent Material: Volcanic ash over sand alluvium and/or sandy outwash
   Slope: 0 to 30 percent
   Natural Drainage Class: Well drained

2. Soil Type #350, Andic Humudepts-Typic Udivitrands-Anid Eutrudepts complex, glaciated mountain slopes, granitic geology, north aspects.

   Landform: Mountain slopes
   Parent Material: Volcanic ash over till
   Slope: 10 to 35 percent
   Natural Drainage Class: Moderately to well drained

See Appendix B for the complete NRCS soil survey descriptions of the two (2) soil types.

4.4 Surface Water

The nearest surface water bodies to the reuse site are Priest Lake and Lamb Creek. Priest Lake is approximately 2438 feet above sea level and ~1150 feet east and ~1000 feet south of reuse site. Lamb Creek is located ~600 feet west of the reuse site. The “Surface Water Use Designations” for Priest Lake listed in the Idaho Water Quality Standards (IDAPA 58.01.02.110.06) are the following: primary contact recreation; domestic water supply; cold water aquatic life; and salmonid spawning. Lamb Creek is a “nondesignated surface water” in the Idaho Water Quality Standards and protected for cold water aquatic life and primary or secondary contact recreation beneficial uses. The U.S. Fish and Wildlife Service’s National Wetland Inventory depicts the presence of a freshwater forested shrub wetland to the west of the reuse site and two freshwater ponds within the reuse site (USFWS 2016). The two freshwater ponds are the facility’s old lagoons that were decommissioned in 2003 (JASA 2016). The forested shrub wetland along Lamb Creek is located ~500 feet from the reuse site, which is beyond the permit buffer distance limit of 100 feet.

4.5 Ground Water/Hydrogeology

Ground water potentiometric surface at the site fluctuates between 10 to 40 feet below the surface seasonally. There are at least eight (8) public and private ground water wells around the WWTP. There are three (3) wells west of the facility with ground water depths between 10 and 50 feet. There are two (2) wells southwest of the site with ground water depths between 108 and 150 feet. East of the site, there are three (3) wells with ground water depths between 6 and 65 feet. The surface geology at the reuse site is characterized as Quaternary glacial and alluvial deposits and Cretaceous granodiorite (Appendix A-4; Miller et al. 1999). Based on the well logs

reported in the technical report, wells that had deeper bore holes were in the granite and shallower were in the gravels (JASA 2015, Appendix 7.2). This indicates the possibility of two (2) separate aquifer systems around the reuse site.

Based on the correspondence between DEQ and the facility on May 6, 2002, bi-annual soil monitoring was approved as an indirect gage of potential impacts to ground water. A ground water modeling memorandum was generated in 2007 that showed that with nitrogen loading rates comparable to the average rates from 2010 to 2015 (see Table 2), the predicted increase to the ambient ground water nitrate concentration was negligible (~ 0.1 mg L^{-1} nitrate). (DEQ 2007b).

4.6 Recycled Water Characterization and Loading Rates

This section discusses characterization of wastewater flows and chemistry, and associated hydraulic-and constituent-loading rates.

4.6.1 Historical Recycled Water Characterization and Loading Rates

The reuse facility receives both raw wastewater and septic tank effluent. The combined wastewater stream originates from homes, resorts, small businesses and two (2) USFS campgrounds (Osprey and Outlet). Average annual recycled water quality data are shown in Tables 1 and 2 for years 2010 to 2015.

Table 1. Total coliform data for Outlet Bay Sewer District from 2010 to 2015.

Year	Total Coliform (MPN* 100 mL^{-1})		Sample (#)
	Median	Range	
2010	ND**	ND – 80	17
2011	ND	ND – 8	21
2012	ND	ND – 8	17
2013	ND	ND – 170	16
2014	ND	ND – 13	14
2015	ND	ND – 2	14

* MPN = Most Probably Number
** ND = Non-detect

Table 2. Annual average recycled water nitrogen concentrations and loadings.

Year	Nitrate (mg L^{-1})	Nitrite (mg L^{-1})	Total Kjeldahl N (mg L^{-1})	Total N (mg L^{-1})	Total N Loading (lb. $acre^{-1}$ $year^{-1}$)
2010	2.6	0.2	11.1	13.9	33.0
2011	0.0	0.0	8.8	8.8	25.5
2012	5.5	0.0	10.8	16.3	48.0
2013	0.6	1.3	10.0	11.8	34.1
2014	3.3	0.0	4.2	7.5	17.4
2015	1.5	0.0	3.9	5.4	9.4
Mean	2.2	0.2	8.1	10.6	27.9
Std Dev	2.0	0.5	3.3	4.1	13.6

Under the current permit (LA-000018-04), the facility is considered a Municipal Class C. The Recycled Water Rules (IDAPA 58.01.17.602.03a) states that a Class C facility's effluent cannot exceed a median of 23 CFU 100 mL^{-1} in the last five (5) days and no sample can exceed 230 CFU 100 mL^{-1}. Within in the last five (5) years the facility has not exceeded the median total coliform limit and there have been no one time exceedances.

4.6.2 Hydraulic Loading Rates

Annual average wastewater influent and recycled water flow data to the 46 acre forested site are shown in Table 3. The table summarizes data for each year between 2010 and 2015.

Table 3. Annual average wastewater influent and recycled water flows.

Year	WW* Influent (MG**)	Recycled Water (MG**)
2010	15.9	13.1
2011	15.9	15.9
2012	17.1	16.3
2013	13.5	15.9
2014	14.7	12.8
2015	14.3	10.2
Mean	15.2	14.0
Std Dev	1.3	2.4

* WW = Wastewater

** MG = Millions of Gallons

There does not appear to be a notable trend in the hydraulic loading rate data over the past five (5) years. The District has not requested a change to the permitted hydraulic loading rates from permit LA-000018-04.

In the current permit (LA-000018-04; DEQ 2010a, Section F, p. 8) the facility has a hydraulic loading rate limit of substantially equal to the irrigation water requirement (IWR) during the growing season with monthly rates and a total growing season volume of 29.6 MG specified. Growing season hydraulic application rates are typically based on crop precipitation deficit values and irrigation efficiency of the irrigation system from the ET_{idaho}2012 website (Allen and Robison 2012). Since native forest vegetation is not considered a crop, a different approach must be used to calculate the IWR for the Outlet Bay Sewer District land application site. Native forests have adapted to precipitation patterns that are location specific and have the capacity to vary the evapotranspiration (ET) rate depending on precipitation amounts. Therefore, estimation of IWR on this native forest site requires a few assumptions. The assumptions are as follows: the precipitation deficit for a forested site is the same as an orchard – no ground cover and grass pasture – high management; the site is estimated to have 65 % tree and 35 % understory coverage (JASA 2015, Section 8.2, p. 20); a solid set irrigation system is assumed to have an irrigation efficiency (E_i) of 75 % (DEQ 2007a, Section 4.4.8).

The IWR will be calculated for the Outlet Bay reuse site using the approach listed below:

1. On the ET_{Idaho}2012 website (Allen and Robison 2012), select the most representative station to the reuse site. In the case of Outlet Bay Sewer District, the Coeur d'Alene station should be used. Both the Sandpoint and Bayview stations are flagged as non-irrigated stations, so the P_{def} data from them are much lower than from an irrigated station. Both the Bonners Ferry and Coeur d'Alene stations are flagged as irrigated stations which will yield P_{def} data conforming better to a wastewater land treatment site. The Coeur d'Alene station has both a higher elevation (2160 ft.) and higher precipitation (655 mm yr^{-1}) than Bonners Ferry (1850 ft. and 546 mm yr^{-1} respectively), which are closer to conditions at Outlet Bay.

2. Obtain monthly precipitation deficit (P_{def}) values for both "Orchards – Apples and Cherries no ground cover" and "Grass Pasture – High Management". A canopy density correction factor was not used for this location because that correction is necessary when understory is not present and it is assumed that 35% of the vegetation covering the irrigation site is understory (DEQ 2012 Draft, Section 4.1.3.2.2, p. 5).

3. Calculate IWR in inches per month for each vegetation type using Equation 1.

$$\boldsymbol{Eq.\,1}: IWR(inches\ month^{-1}) = \frac{P_{def}}{E_i}$$

4. Multiply the orchard IWR value by 0.65 and the grass pasture value by 0.35 to weight each requirement based on the vegetation coverage.

5. Add these two numbers together to calculate monthly growing season IWR for the entire site.

The P_{def} values for each vegetation type and composited IWR values for the Outlet Bay reuse site are shown in Table 4. The growing season IWR values and the monthly hydraulic loading limits are shown in Table 5.

Table 4. Precipitation deficit (Pdef) values during the growing season for "Orchard – Apples and Cherries no ground cover" and "Grass Pasture – High Management" at 80% exceedance. Also, included are the combined Irrigation Water Requirement (IWR) values.

Month	Orchard – No Ground Cover (mm day^{-1*})	Grass Pasture – High Management (mm day^{-1})	Composite IWR (inches $month^{-1}$)
May	1.38	2.13	2.67
June	3.32	2.99	5.05
July	5.09	5.05	8.26
August	3.78	3.52	6.00
September	2.06	2.00	3.21
		Total	25.19

* Convert mm day^{-1} to inches $month^{-1}$ by multiplying by the number of days in the month and dividing by 25.4.

Table 5. Composite IWR at 80% exceedance rates compared to current permit limits.

Month	80 % Exceedance Composite IWR (inches month^{-1})	80 % Exceedance Composite IWR (MG)	Current Permit IWR (inches month^{-1})	Current Permit IWR (MG)
May	2.67	3.34	3.33	4.2
June	5.05	6.30	5.36	6.7
July	8.26	10.32	6.85	8.6
August	6.00	7.50	5.46	6.8
September	3.21	4.01	2.62	3.3
Total	25.19	31.47	23.93	29.6

The calculated growing season IWRs for the entire 46 acre reuse site are 31.47 MG using the 80% exceedance P_{def} values and 39.61 MG using the 50% exceedance P_{def} values. Between 2010 and 2015, the facility on average applied substantially less wastewater than the calculated IWRs listed above and shown in Figure 3.

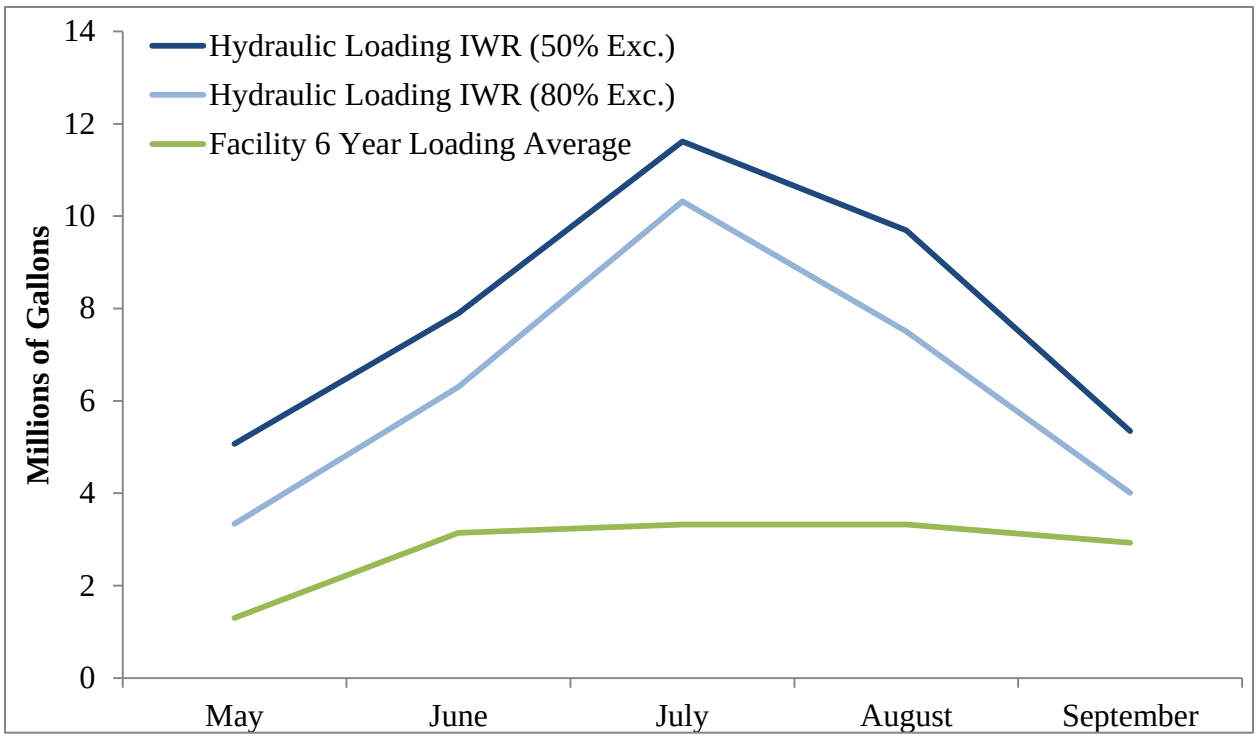


Figure 3. Average (2010-2015) monthly growing season hydraulic loading rates documented by the facility compared to the new hydraulic loading limit calculation (50 % and 80 % P_{def} exceedances). The October 2012 hydraulic loading is not included in this figure since it was an atypical event.

DEQ recommends that for annual planning purposes, Outlet Bay Sewer District calculate the IWR using the 80% exceedance values for P_{def}. The 80% exceedance estimates represent the amount of water that can be added to the ground surface that has an 80% chance of completely

evaporating or transpiring, with no net flux below the root zone. This conservative approach means that statistically only 20% of the time will the P_{def} be less than these values. Since a native conifer forest does not require irrigation but does benefit from irrigation, this conservative approach to estimating the IWR reduces the risk of hydraulically overloading the forested sites except during unusually wet growing seasons. If the 50% P_{def} is used for the IWR, the annual report will need to include meteorological data to support the use of these higher hydraulic loading rates.

DEQ further recommends that the draft permit include hydraulic loading limits that are substantially at or below the IWR instead of monthly limits as the current permit includes. The Plan of Operation (PO) will include the monthly IWRs the operator will use to schedule irrigation. The PO will be reviewed and approved by DEQ and the District must operate the recycled water system in accordance with the PO as stated in the draft permit.

Based on historic hydraulic loading rates and projected growth for Outlet Bay (JASA 2015, Section 8.6, p. 23), the proposed hydraulic loading limit as recommended in Table 5 should be feasible over the next permit cycle.

4.6.3 Constituent Loading Rates

<u>Nitrogen</u>

In permit LA-000018-04 the nitrogen (N) loading rate limit for the facility was 143 lb. acre^{-1} year^{-1}. This value was calculated based on a NRCS publication that recommended an N-uptake of 100 lb. acre^{-1} and a 70 % nitrogen recovery factor for privately owned woodlands (NRCS 1998). These recommendations along with the DEQ guidance recommended loading limit of 150 % of crop uptake (DEQ 2007a, Section 4.2.2.3.2) were used to calculate 143 lb. acre^{-1}. However, DEQ currently has more contemporary and site specific N-loading limit recommendations from the *Guidance for Forested/Poplar Site Nutrient and Hydraulic Loading* (DEQ 2012 Draft). The guidance allows factors such as, the age of the stand and vegetative distribution percentages to be accounted for when determining loading limits.

Based on the original Silviculture Management Plan, the reuse site currently includes trees that range in age between 25 and 40 years old (JASA 2015, Appendix 9, p. 7). A nitrogen uptake value of 45 lb. acre^{-1} year^{-1} would be appropriate for this age forest based on the DEQ guidance (DEQ 2012 Draft, Table 13, p. 18). The facility noted in the technical report that approximately 65 % of the reuse site is covered by trees and the remaining 35 % is understory. According to the DEQ guidance, a vegetative understory composition of 35 % would have an annual nitrogen uptake of 25 lb. acre^{-1} (DEQ 2012 Draft, Table 14, p. 19). A nitrogen loss from denitrification of 25 % was also assumed for this reuse site (DEQ 2012 Draft, Section 4.2.2.4.3, p. 17). Based on these parameters, the following equation was used to calculate an N-loading limit of 72 lb. acre^{-1} year^{-1} (Equation 2).

$$\boldsymbol{Eq.2}: N\ Loading\ Limit\ (lb.acre^{-1}) = \frac{N\ Uptake\ of\ Crop}{Nitrogen\ Efficiency\ Factor}$$

$$72\ (lb.acre^{-1}) = \frac{(45\ \times 0.65) + 25}{0.75}$$

The proposed N loading limit is substantially higher than the facility's 2010-2015 annual N loading average of ~28 lb. acre^{-1} year^{-1} (Table 2). Growth within the District during the proposed 10 year permit period is not expected to be substantial enough to increase this loading rate significantly. Over the past six (6) years (2010 to 2015) there has not been an increasing trend in influent flows (see Table 3).Therefore, DEQ recommends that this N loading limit be used in the new permit (M-018-05).

Phosphorous

During the renewal process for permit LA-000018-04, the phosphorus loading limit (20 lb. acre^{-1} year^{-1}) was removed. Sufficient phosphorous data from the recycled water and soil had been collected during the LA-000018-03 permit cycle to characterize the potential impacts from the irrigation of recycled water on the District's forested site. Based on the data collected from 2004 to 2008, the average total phosphorus concentration in the recycled water was 5.6 mg/L and total average annual total phosphorus loading was 19 lb. acre^{-1} year^{-1} (DEQ 2010b, Section 4.2.2, p. 5). The estimated annual phosphorus uptake by a forested site is 20 lb. acre^{-1} year^{-1} (DEQ, 2012). Using the highest volume irrigated from 2010 to 2015 (2012 and 16.3 MG – see Table 3) and the 5.6 total phosphorus concentration, the estimated total phosphorus loading rate is 16.5 lb. acre^{-1} year^{-1}. Also, plant available phosphorus concentrations in the soil samples collected from 2004 to 2008 showed that phosphorus concentrations were generally at or below the DEQ guidance medium range for phosphorus concentrations in typical Idaho soils (15-30 mg kg^{-1}; DEQ 2007, Section 2.5.1, p. 57).

Phosphorus applied in excess of the plant uptake rate and the soil adsorption capacity could result in phosphorus entering the surface water. Excess phosphorus in surface water can produce detrimental water quality impacts. Lamb Creek is about 600 feet west and Priest Lake is about 1,000 feet south of the irrigation site (see Section 4.4 and Appendix A-2). There is minimal risk of the phosphorus in the District's irrigated recycled water impacting the nearby surface water.

DEQ recommends that no phosphorus loading limit be included in the draft permit 5 but recommend that soil sampling for plant available phosphorus. Section 6.2 of this Staff Analysis will address this monitoring requirement in greater detail.

Chemical Oxygen Demand (COD)

The current permit does not have a COD loading limit or require COD monitoring. DEQ guidance recommends COD loading rate limit of 50 lb. acre^{-1} day^{-1} during the growing season (DEQ, 2007a). From 2004 to 2008, the average COD concentration in the irrigated recycled water was 93 mg/L (DEQ, 2010b). Assuming the highest hydraulic loading rate that occurred between 2010 and 2015 of 16.3 MG (see Table 3), the loading rate over the 46 acres was approximately 2 lb. acre^{-1} day^{-1}. In addition, high COD loading to an irrigation site can sometimes lead to nuisance odor problems. There have not been any documented odor complaints registered with DEQ related to the irrigation of recycled water on this site. DEQ will not recommend any COD loading limit or COD monitoring in this draft permit

Non-volatile Dissolved Solids (NVDS)

NVDS monitoring of the irrigated recycled water during the growing season is sometimes required in reuse permits. Typical concentration of NVDS in raw municipal wastewater is 300 mg/L and a strong concentration is 525 mg/L (Metcalf, 1979). Assuming a NVDS concentration of 300 mg/L in the irrigated recycled water (following treatment and storage) and a total of 16.3 MG irrigated for the season over the 46 acres, the estimated loading is 887 lb. NVDS $acre^{-1}$.

For a native conifer forest, no information on the estimated annual ash (NVDS) uptake was found. Excess NVDS loading can lead to salt leaching into the ground water and/or build-up of salts in the soils that could be detrimental to the health of the forest.

The highest annual hydraulic loading rate during the last permit period (2012) was about 13 inches $acre^{-1}$ (see Table 5) and the average annual precipitation is 31 inches $acre^{-1}$ (see Section 4.2). Leaching of salts from the recycled water irrigation will occur during the non-irrigation periods and likely prevent any harmful salt buildups in the soil. The risk appears to be low of the salt leaching causing an impact to the ground water due to the dilution provided by the precipitation. The secondary constituent standard for total dissolved solids in the Idaho Ground Water Quality Rule (IDAPA 58.01.11) is 500 mg/L.

DEQ recommends that no NVDS loading limit or monitoring in the irrigated recycled water for this constituent be included in the draft permit. In addition, no monitoring of electrical conductivity in the soil is recommended.

5 Site Management

This section discusses buffer zones, runoff, seepage testing, waste solids management and disposal, and silviculture planning.

5.1 Buffer Zones

Table 6. Buffer zone past and future requirements.

Wastewater Class	Class C		
	Existing Permit Buffer Requirements	**Guidance Buffer Zone Values***	**Distances Present on Site**
Nearest Inhabited Residence (ft.)	300	300	>500
Nearest Public Water System (ft.)	1000	1000	>1000
Nearest Private Water Supply (ft.)	500	500	>500
Areas Accessible to the Public (ft.)	0	0	West Lake Shore Road and USFSR #1048 are ~300 feet. Trail #235 is ~200 feet.
Nearest Natural Surface Water Bodies	100	100	Lamb Creek is ~600 feet from reuse site
Nearest Irrigation Ditches/Canals (ft.)	Not Required	50	There are no known irrigation canals
Fencing	Not Required	Three Wire Pasture Fence	Not Required
Posting: "Caution: Recycled Water – Do Not Enter"	Posted every 100 feet around the reuse site perimeter and 500 feet along roads/trails accessible by the public**	Posted every 500 feet around the reuse area or any access points	Posted every 100 feet around the reuse site perimeter and 500 feet along roads/trails accessible by the public **

* The DEQ "Municipal Reuse System Buffer Zone Guidance" (DEQ, 2015b) provides recommended buffer distances for various reuse scenarios. For this permit, the following scenario was used for determining buffer distances: municipal, Class C, rural location, sprinkler application.

** Along Forest Service Road (UFSR) #1048, West Lake Shore Road and Forest Service Trail #235 where these roads/trails parallel the reuse site boundaries.

The nearest public water supply well to the site is a community well ~1,200 feet to the west of the site. The nearest private water supply well and home are located ~600 feet to the east of the site. Both Lamb Creek and Priest Lake are further from the irrigation site than the recommended surface water buffer distance. There are no known ditches and/or canals located in the vicinity of the reuse site. USFS Road #1048, West Lake Shore Road and Trail #235 are publicly accessible roads/trails. USFS Road #1048 and West Lake Shore Road are ~300 feet and Trail #235 is ~200 feet at the closest point from the reuse site boundary (see Figure 4). There is not a trail or road accessible to the public that crosses the reuse site as shown in Figure 4.

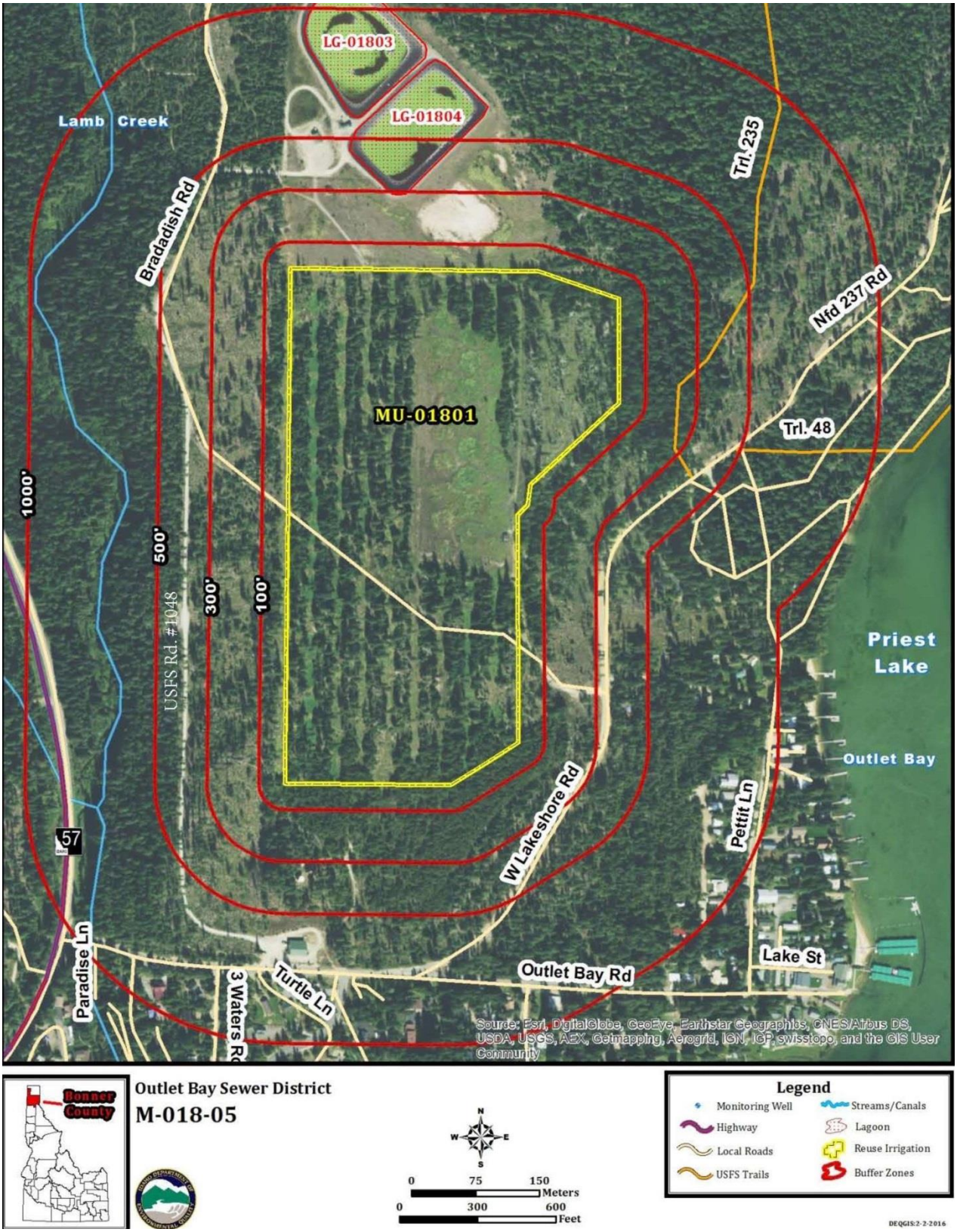


Figure 4. Reuse site with distances to roads and trails accessible to the public.

Three-wire pasture fence or equivalent fencing is recommended for reuse facilities that irrigate Class C wastewater (DEQ 2007a, Section 6.5.2.1). Instead of a fence, the 2010 permit requires the following (DEQ 2010a, Section F):

1. Signs that read “Reclaimed Wastewater Irrigation Area, Do Not Drink, Do Not Enter” or equivalent at 100 feet intervals around the reuse site perimeter.
2. Signs that read “Reclaimed Wastewater Irrigation Area, Do Not Drink, Do Not Enter” or equivalent at 500 feet intervals along USFS Trail #235, USFS Road #1048, and West Lake Shore Road where these roads/trail parallel the reuse site.
3. A minimum 300-foot buffer zone will be maintained between the reuse site and USFS Road #1048 and West Lake Shore Road. A minimum 200-foot buffer zone will be maintained between the reuse site and USFS Trail #235.

The use of signage and buffer zones as described above satisfies the requirement for protection and limiting public access at this reuse site. In addition, a fence would be difficult to maintain due to deer, elk, and moose traffic through the area.

5.2 Runoff

The facility does not have a runoff management plant in the Operation and Maintenance (O&M) manual (JASA 2010). This will be required in the updated O&M manual for the draft permit.

5.3 Seepage Rate Testing

Table 7 contains a summary of seepage rate testing for the lagoons associated with this reuse permit. Lagoons Cell 1 and Cell 2 require seepage testing in 2024.

Table 7. Summary of seepage rate testing for the Outlet Bay Sewer District.

Lagoon	Test Date Completion	Date of DEQ Approval of Test Report	Seepage Rate (inches day^{-1})	Allowable Rate (inches day^{-1})	Date Next Seepage Rate Test is Due
Cell 1	August 2004	NA*	0.039	0.125	August 2014
Cell 1	July 10, 2014	May 29, 2015	0.041	0.25	July 10, 2024
Cell 2	August 2004	NA	0.023	0.125	August 2014
Cell 2	August 5, 2014	May 29, 2015	0.133	0.25	August 5, 2024

* NA = Not Available

The working surface area of each lagoon is approximately 3.35 acres (this assumes a depth of 15 feet with 3 feet of freeboard). The calculated seepage rates for each lagoon are 3,729 gallons per day for Cell 1 and 12,098 gallons per day for Cell 2.

Test procedures for completing seepage tests should be submitted at least 42 days prior to the due date shown in the table above.

5.4 Waste Solids, Biosolids, Sludge, and Solid Waste

The facility manages solids according to the Operation and Maintenance (O&M) Manual (JASA 2010, Section V.A). Solids generated during the screening process are disposed of in a landfill. The biosolids that accumulate in each of the treatment lagoons may be dredged from the lagoons in the future. The O&M Manual also states the land application of the biosolids could be done in an area to the southwest of the plant (JASA 2010, Section V, p. 62). The facility currently is not approved by DEQ to remove or dispose of any lagoon biosolids. The O&M Manual recommends that the facility drains each lagoon every other year to document biosolids accumulation. If the facility determines that the biosolids need to be removed, a biosolids management plan will need to be submitted to DEQ for review and approval prior to starting any removal. It is not efficient to detail of how the biosolids removal will occur and the fate of the removed biosolids years in advance of performing the activity because testing of the biosolids and site approval are time sensitive. Therefore, a biosolids management plan should be submitted to DEQ six (6) months in advance of when the facility plans on doing the biosolids removal so there is adequate time for the review and the information in the plan will be relevant. The updated O&M Manual will need to clarify the process the facility needs to follow when the lagoons are to be dredged.

5.5 Nuisance Odors, Salt Influences, and Grazing

The facility manages odors in accordance with the Operation and Maintenance manual (JASA, Section IV.B.3). The facility no longer uses the biofilter that was designed to remove odor at the

headworks building. Despite the discontinued use of this filter, the facility has not noted odor complaints and/or nuisance issues (DEQ 2015a, Section 7.3, p. 9).

As discussed in Section 4.6.3 (see NVDS), excess salt loading of the soil or impacts to ground water are not anticipated to be a problem.

At this time, grazing is not allowed on site. If the facility desires to allow grazing, a grazing management plan will be required to be submitted.

5.6 Silviculture Plan

A draft silviculture plan is included in Appendix A of the Operation & Maintenance Manual (JASA 2010). The year the plan was prepared is not clear. A timber harvest of the land application site has not been planned for the foreseeable future (JASA 2015, Section 9).

DEQ recommends that an updated silviculture plan be prepared and submitted to DEQ one (1) year after permit issuance as part of the compliance activity for the Plan of Operation (PO) update. The updated plan should provide a description of the vegetation found on the site and recommendations on how the facility should manage the irrigation site to optimize the nutrient and hydraulic uptake by the vegetation. The facility will be required to follow the recommendations listed in the silviculture plan and provide annual updates in the annual reports.

6 Monitoring

The proposed monitoring requirements for the draft permit are described in detail in the following subsections. All monitoring will be conducted in accordance with an approved Quality Assurance Project Plan (QAPP).

6.1 Recycled Water Monitoring

The applicable current disinfection requirements for Class C effluent are “at the point of compliance, the median number of total coliform organisms does not exceed twenty-three (23) per one hundred (100) milliliters, and does not exceed two hundred thirty (230) per one hundred (100) milliliters in any confirmed sample as determined from the bacteriological results of the last five (5) days for which analyses have been completed”. For Class C effluent, analysis shall be based on weekly sampling during period of application. The point of compliance for Class C effluent for total coliform shall be at any point in the system following final treatment and disinfection contact time” (IDAPA 58.01.17.600.07c).

Based on the Outlet Bay Sewer District’s annual reports, total coliform monitoring results from 2010 to 2015 showed that the facility was consistently below the 23 CFU 100 mL^{-1} median limit and had no events that exceeded 230 CFU 100 mL^{-1} (Table 1). The facility’s point of compliance and monitoring location for total coliform, chlorine residual and other constituent sampling is a sample tap at the outlet of the chlorine contact chamber. All disinfection and water quality monitoring of the recycled water is done after disinfection and just prior to irrigation (JASA 2015, QAPP, Section 5.1.1, p. 15).

The facility has asked for a reduction in sampling frequency for both total coliform and nitrogen (nitrate, nitrite, and total Kjeldahl nitrogen). For nitrogen, the facility has requested a sample frequency reduction from monthly to three (3) times an irrigation season. A data compilation of total-N recycled water concentrations over the past six (6) years (2010 to 2015) revealed that concentrations are lowest in mid-summer and highest in the fall (Figure 5). The proposed sampling is to sample once in the first week of irrigation, once in July and once in September. The average of these three (3) samples would be used to determine N-loading for that reporting year (JASA 2016).The sampling plan proposed by the facility should capture the seasonality trends observed.

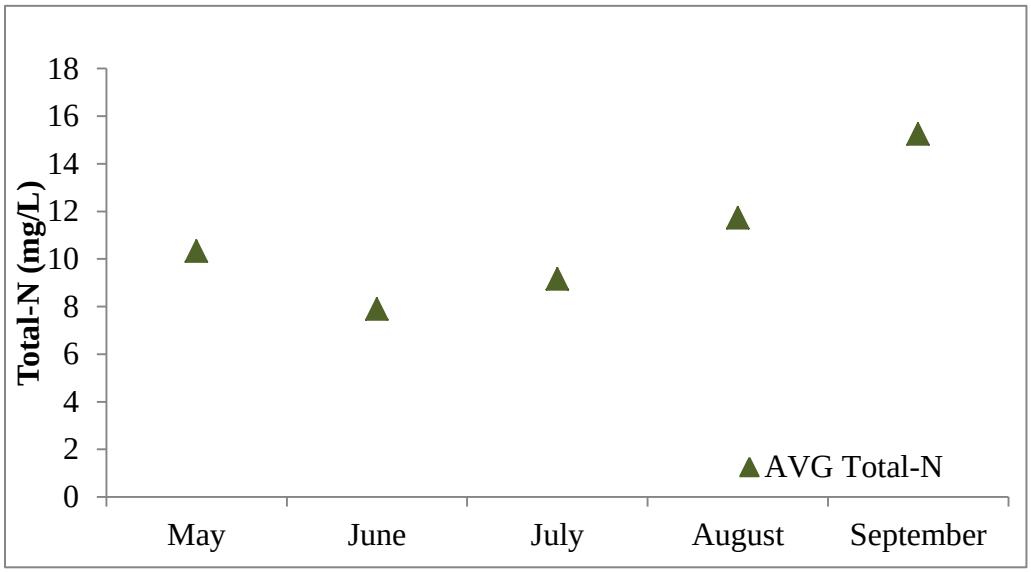


Figure 5. Average monthly total-N concentrations in recycled water over the past six (6) years (2010 to 2015).

For coliform, the facility has proposed to take samples once a month during irrigation. The facility stated that, "If any samples show concentrations of coliform above 23 units 100 mL^{-1}, then samples will be taken each following week until the most recent sample is less than 23 units 100 mL^{-1} and the average concentration of the three most recent consecutive samples is under 23 units 100 mL^{-1}" (JASA 2016). With monthly sampling, an exceedance response plan that requires the average concentration of the three (3) most recent consecutive samples to be below 23 units 100 mL^{-1} creates uncertainty in the process when there are not sufficient data to calculate the average. Potentially, this issue would occur if an exceedance is reported at the start of the irrigation season.

Switching from a weekly sampling plan to monthly is more economically feasible for such a small system (JASA 2015). A compilation of weekly recycled water coliform data over the past six (6) years (2010 to 2015) showed that the facility has always met the Class C median and maximum limits (see Figure 6; IDAPA 58.01.17.602.03). Therefore, DEQ recommends that the weekly coliform sampling be waived for the facility in this case and that these three (3) total coliform conditions be included in the permit:

1. The median number of total coliform organisms does not exceed 23 total coliform organisms 100 mL^{-1}, as determined from the bacteriological results of the last three (3) days for which analyses have been completed.

2. No sample shall exceed 230 total coliform organisms 100 mL^{-1} in any confirmed sample.

3. If total coliform concentrations are above 23 total coliform organisms 100 mL^{-1} in any one (1) sample, then additional samples shall be collected at a minimum on a weekly basis until the most recent sample does not exceed 23 total coliform organisms 100 mL^{-1}.

The Idaho Recycled Water Rule total coliform monitoring frequency requirements for meeting the Class C disinfection limits are "once weekly or as determined" (IDAPA 58.01.17.602.01). By requiring weekly sampling until the total coliform concentration does not exceed 23 total coliform organisms 100 mL^{-1} if any of the monthly samples exceed 23 total coliform organisms 100 mL^{-1}, the facility would be providing public health protection consistent with the rule requirements for other Class C systems. In addition, the median concentration permit limit is proposed to be based on the last three (3) sample results instead of the rule requirement of five (5) sample results for Class C systems. This change is also more protective of public health considering the proposed monthly sampling frequency.

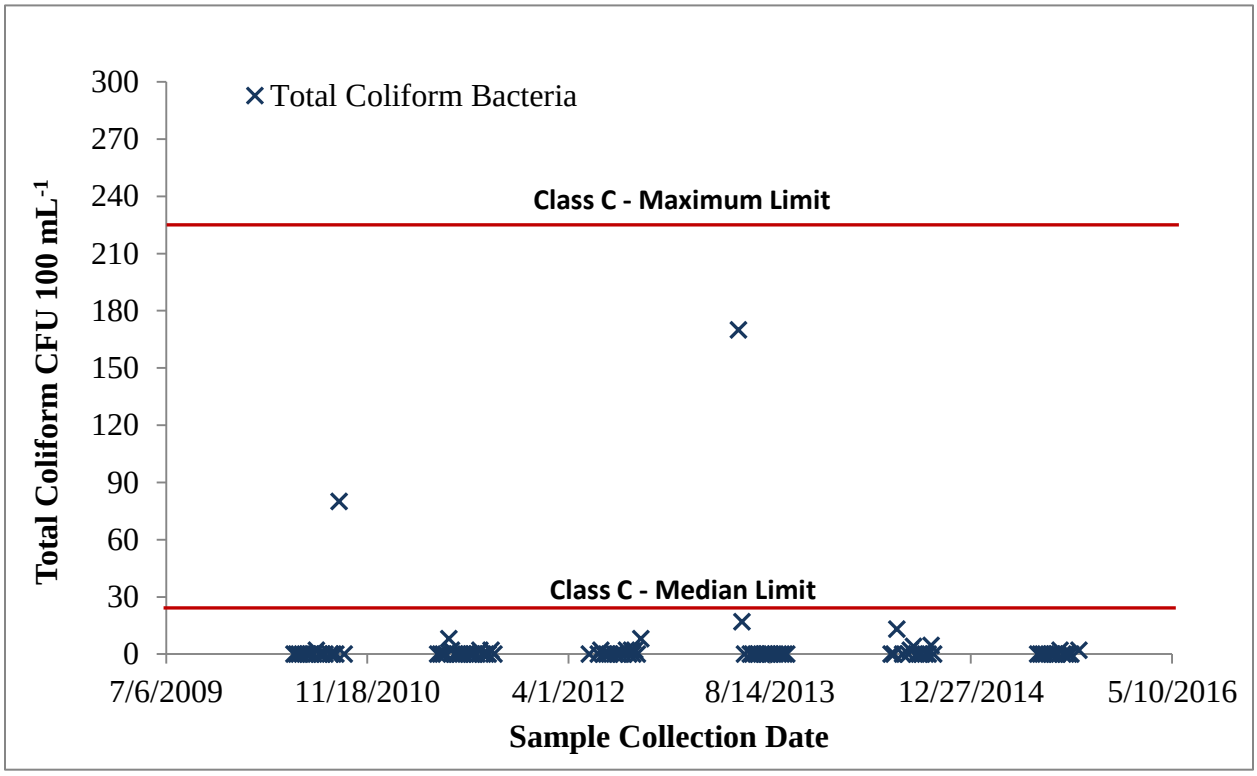


Figure 6. Weekly recycled water coliform data over the past six (6) years (2010 to 2015) compared to the Recycled Water Rule Class C facility limits.

6.2 Soil Monitoring

Soils at the site are currently required to be sampled during the fifth (5th) year of the permit in April (or May) and October. Soil data from the most recent sampling event revealed that nitrate (NO_3-N) concentrations were below detection levels for all three (3) depths (0-12", 12-24", and 24-36") and (ammonia) NH_3-N concentrations were below 1 mg kg^{-1}. This is similar to historic soil data for the reuse site (2004-2008) where NO_3-N concentrations were non-detect and NH_3-N concentrations were ~1 mg kg^{-1}. Soil pH analyzed from the last sampling event showed a pH of 6.33 for soils on site. Soil sampling for phosphorus was not required in the current permit based on the conclusion that sufficient data had been collected to show that there was minimal risk of the phosphorus in the irrigated recycled water impacting ground water or surface water.

Soil sampling indicates that low nitrogen loading rates have resulted in low soil nitrogen levels. Nitrogen has not been accumulating in the soil and therefore, nitrogen migration to ground water is unlikely to occur. It was noted in the previous Staff Analysis that though the all soil depths consistently had plant available phosphorus concentrations less than what is considered a "medium" concentration for Idaho soils, the soil depth between 24 inches to 36 inches was consistently higher than the upper depths (DEQ 2010b, Section 4.2.2, p. 6). No explanation could be found for the higher concentrations.

DEQ recommends that soil monitoring, including NO_3-N, NH_3-N, pH, and plant available phosphorus, be conducted once in the fifth year of the permit after the irrigation season (October) to determine if any changes are occurring. In regards to soil phosphorus concentrations, DEQ will compare the next sampling event data with past soil sampling data. Based on this comparison, DEQ will determine if any permit changes are required.

6.3 Ground Water Monitoring

The Outlet Bay Sewer District currently does not have a monitoring well network and has never been required to monitor ground water quality around the irrigation site. Ground water contamination from the reuse irrigation site is unlikely to occur as long as the facility operates in compliance with permitted conditions. A ground water modeling study revealed that if the facility were to apply ~192 lb. N $acre^{-1}$ yr^{-1} to the reuse site, down gradient well NO_3-N concentrations could increase by ~1 mg L^{-1} (DEQ 2007b, Section 5, p. 4). In the past six (6) years the facility's average nitrate loading to the reuse site has been ~28 lb. N $acre^{-1}$ yr^{-1}. Predicted ground water nitrate increases are negligible (~0.1 mg L^{-1} nitrate) at those loading rates (DEQ 2007b). Growth within the District during the proposed 10 year permit period is not expected to be substantial enough to increase this loading rate significantly. Over the past six (6) years (2010 to 2015) there has not been an increasing trend in influent flows (see Table 3). Staff recommends that no ground water monitoring around the irrigation site is required based on the conservative hydraulic and nutrient loading rates and the ground water modeling results from 2007.

Idaho Wastewater Rules (IDAPA 58.01.016.493.09.c.v) require that a ground water monitoring network or lysimeters be constructed around the perimeter of new lagoons to facilitate ground water monitoring. The rule requirement went into effect in 2009 and the Outlet Bay Sewer District lagoons were constructed 2003 (JASA 2015). In 2014, it was demonstrated that all four

(4) of the SWSD lagoons had seepage rates that were less than the maximum allowable seepage rate (see Section 5.3). Staff recommends that no additional ground water monitoring is needed around any of the lagoons at this time to satisfy this rule requirement.

6.4 Supplemental Irrigation Water Monitoring

The Outlet Bay Sewer District does not use supplemental irrigation in their land application system.

6.5 Crop Yield and Tissue Monitoring

The facility will not be required to calculate nitrogen and phosphorus removal during timber harvest because this calculation would be highly complex, requiring numerous assumptions, and, consequently, the uncertainty within the estimated values would be substantially high. However, the facility will be required to report harvest date and yield in million board feet.

6.6 Meteorological Monitoring

Meteorological monitoring will not be required in the draft permit because there are a sufficient number of meteorological monitoring stations located within the region.

6.7 Calculation Methodologies

Please refer to Section 4.6.2 (Hydraulic Loading Rates) and 4.6.3 (Constituent Loading Rates) for in-depth discussions on calculation methodologies.

7 Quality Assurance Project Plan

Outlet Bay Sewer District has included a quality assurance project plan (QAPP) in their permit application. After the new permit has been issued, an updated QAPP will be one of the required compliance activities. There are a few changes to the current QAPP that will need to be addressed once the permit has been issued and these are listed below.

1. Monitoring descriptions in Table 3, Section 1.4.1, will need to be corrected to include the new frequencies and requirements outlined by the permit.

2. The flow meter calibration frequency description in Table 8, Section 2.6 will need to include the manufacturer’s recommendation for calibration frequency.

3. There is a reference error at the end of Section 4.2 and this will need to be corrected.

4. Section 4.3, Reconciliation with Data Quality Objectives, is missing from the current QAPP and will need to be included in the updated QAPP.

5. Sampling frequencies in Table 10, Section 5.1.1, will need to be changed to the frequencies outlined in the new permit.

6. In Section 5.4, Plant Tissue and Crop Monitoring, the description of post-harvest total-N and phosphorus monitoring will need to be omitted based on the requirement outlined in the new permit.

The requirement for Outlet Bay Sewer District to prepare a QAPP is in compliance condition CA-018-02 of the draft permit. Further discussion is provided in Section 9.2. The QAPP is a written document outlining the procedures used by the permittee to ensure the data collected and analyzed meet the requirements of the permit.

To support the agency's mission, DEQ is dedicated to using and providing objective, correct, reliable, and understandable information. Decisions made by DEQ are subject to public review and, at times, may be subject to rigorous scrutiny. Therefore, DEQ's goal is to ensure that all decisions are based on data of known and acceptable quality.

The QAPP is a permit requirement and must be submitted to DEQ as a stand-alone document for review and acceptance. The QAPP is used to assist the permittee in planning the collection, analysis, and reporting of all monitoring data in support of the reuse permit and explaining data anomalies when they occur.

DEQ does not approve QAPPs but reviews them to determine if the minimum EPA guideline requirements are met and that the reuse permit requirements are satisfied. DEQ does not approve QAPPs because it is Outlet Bay Sewer District's responsibility to validate the sampling data through the permittee's quality assurance officer and not through DEQ.

The QAPP format should adhere to the QAPP template that DEQ provided to Outlet Bay Sewer District. This template substantially adheres to recommendations and references in the Assurance and Data Processing sections of DEQ's guidance (DEQ 2007a) and EPA's QAPP guidance documents (available at *http://www.epa.gov/quality/qapps.html*).

8 Site Operation and Maintenance

Site operation and maintenance will be described in the plan of operation, which is a required compliance condition (CA-018-01) to be submitted 12 months after the permit issuance for review and approval by DEQ. The Outlet Bay Sewer District wastewater treatment classifications are Wastewater Collection–Class II, Wastewater Treatment–Class II, and Land Application. The reuse facility is operated by the following staff.

Mr. Christopher F. Broschet is the responsible charge operator of the system; he holds the following wastewater operator licenses:

- Wastewater Collection–Class II (WWC2-13663)
- Wastewater Treatment–Class II (WWT2-13664)
- Wastewater Treatment–Land Application (WWTLA-18026)

Mr. Kyle Holman is the back-up operator for the facility; he holds the following wastewater operator licenses:

- Wastewater Collection–Class I (WWC1-19481)

- Wastewater Treatment–Class II (WWT2-20532)
- Wastewater Treatment–Land Application (WWTLA-19843)

9 Compliance Activities

The following sections discuss the status of compliance activities in the current permit and provide an itemization of those compliance activities included in the draft permit.

9.1 Status of Compliance Activities in Current Permit

From the permit LA-000018-4 (DEQ 2010a, Section E), the following compliance activities are required and the status is presented here.

Compliance Activity	Description	Due Date	Status
CA-018-01	Plan of Operation	Six (6) months after permit issuance (11/1/2010)	Submitted unknown date in 2010
CA-018-02	Seepage Testing	10/31/2014	Submitted 11/24/2014 (Cell 1) and 12/5/2014 (Cell 2). Both Approved 5/29/2015
CA-018-03	Permit Renewal Application	One hundred eighty (180) days prior to permit expiration (11/2/2015)	Submitted 12/2/2015

9.2 Compliance Activities Required in New Permit

The following compliance activities are specified in the draft permit; plan of operation, QAPP, seepage testing, pre-application workshop and permit renewal application.

Specific conditions are presented here:

Compliance Activity (CA) Number and Completion Due Date	Compliance Activity Description
CA-018-01 Twelve (12) months after permit issuance	**Plan of Operation (PO)**: The permittee shall submit for review and approval a PO that reflects current operations and incorporates the requirements of this permit. The PO shall comply with the applicable requirements stated in IDAPA 58.01.17.300.05 and shall address applicable items in the Plan of Operation Checklist in the DEQ guidance. The PO shall include the following site management plans, or the permittee may submit the site management plans individually: 1. Buffer zone plan. 2. Emergency operating plan 3. Irrigation management and scheduling plan. 4. Nuisance and odor management plan. 5. Runoff management plan. 6. Waste solids management plan. 7. Silviculture plan for the Outlet Bay Sewer District reuse area. The plan shall include nutrient management recommendations. The PO shall be updated as needed to reflect current operations. The permittee shall notify DEQ of material changes to the PO and copies shall be kept on site and made available to DEQ upon request.
CA-018-02 Twelve (12) months after permit issuance	**Quality Assurance Project Plan (QAPP)**: The permittee shall prepare and implement a QAPP that incorporates all monitoring and reporting required by this permit. A copy of the QAPP along with written notice that the permittee has implemented the QAPP shall be provided to DEQ. The QAPP shall be designed to assist in planning for the collection, analysis, and reporting of all monitoring in support of this permit and in explaining data anomalies when they occur. At a minimum, the QAPP must include the following: 1. Details on the number of measurements, number of samples, type of sample containers, preservation of samples, holding times, analytical methods, analytical detection, and quantitation limits for each target compound and accuracy requirements, sample preparation requirements, sample shipping methods, and laboratory data delivery requirements. 2. Maps indicating the location of each monitoring and sampling point. 3. Qualification and training of personnel. 4. Names, addresses, and telephone numbers of the laboratories used by or proposed to be used by the permittee.

<table>
<tr><td></td><td>5. Example formats and tables that will be used by the permittee to summarize and present all data in the annual report.

The format and content of the QAPP should adhere to the recommendations and references in the Quality Assurance and Data Processing sections of the DEQ guidance.

The permittee shall amend the QAPP whenever there is a modification in sample collection, sample analysis, or other procedure addressed by the QAPP. The permittee shall notify DEQ of material changes to the QAPP, and copies shall be kept on site and made available to DEQ upon request.</td></tr>
<tr><td>CA-018-03 As Specified</td><td>Seepage Testing: The following table shows the date by which the permittee shall complete seepage testing on the specified lagoons:

<table>
<tr><th>Lagoon</th><th>Seepage Test Report Due Date</th></tr>
<tr><td>Cell 1</td><td>10/31/2024</td></tr>
<tr><td>Cell 2</td><td>10/31/2024</td></tr>
</table>
Submit to DEQ for review and approval a proposed schedule and procedure for performing the required seepage tests at least 42 days before the planned seepage test. Guidance for developing seepage test procedures are available at: http://www.deq.idaho.gov/water-quality/wastewater/lagoon-seepage-testing.aspx. The seepage test procedures shall be sealed by the Idaho licensed professional engineer or professional geologist in responsible charge of the test.

Seepage tests shall be completed in accordance with the procedures approved by DEQ. The seepage test report shall be sealed by the person in responsible charge and submitted within 90 days after completion of the seepage test.

For the OBSD municipal lagoons, the leakage rate for the existing lagoons (constructed prior to April 15, 2007) shall be no more than zero point twenty-five (0.25) inches (1/4 inch) per day. See IDAPA 58.01.16.493.03. Requirements for lagoons leaking above the allowable amount are outlined in IDAPA 58.01.16.493.04.</td></tr>
<tr><td>CA-018-04 Contingent on permit issuance</td><td>Pre-Application Workshop: If the permittee intends to continue operating the reuse facility beyond the expiration date of this permit, the permittee shall contact DEQ and schedule a pre-application workshop to discuss the compliance status of the facility and the content required for the reuse permit application package.</td></tr>
<tr><td>CA-018-05 Contingent on permit issuance</td><td>Renewal Permit Application: The permittee shall submit to DEQ a complete permit renewal application package, which fulfills the requirements specified at the pre-application workshop identified in CA-018-04.</td></tr>
</table>

10 Recommendations

Staff recommends the draft reuse permit attached be issued. The draft permit specifies hydraulic- and constituent-loading limits, compliance conditions to be performed, and establishes monitoring and reporting requirements to evaluate system performance, environmental impacts, and permit compliance. Other draft permit limits are included.

11 References

Allen, R.G., Robison, C.W. 2012. *Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho: Supplemental updating the time series through December 2008.* Research Technical Completion Report, Kimberly Research and Extension Center, University of Idaho, Moscow, ID. (Allen and Robison 2012).

IDHW (The Idaho Department of Health and Welfare). 1989. *Wastewater Land Application Permit for Outlet Bay Water and Sewer District.* Permit LA-000018-01. (IDHW 1989).

IDHW (The Idaho Department of Health and Welfare). 1994. *Wastewater Land Application Permit for Outlet Bay Water and Sewer District.* Permit LA-000018-02. (IDHW 1994).

DEQ (The Idaho Department of Environmental Quality). 2002. *Municipal Wastewater Land Application Permit for Outlet Bay Water and Sewer District.* Permit LA-000018-03. (DEQ 2002).

DEQ (The Idaho Department of Environmental Quality). 2007. *Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater*. (DEQ 2007a).

DEQ (The Idaho Department of Environmental Quality). 2007. *Outlet Bay Wastewater Reuse Permit Application Review – Reuse Site Modeling (Outlet Bay, ID).* Permit LA-000018-02. (DEQ 2007b).

DEQ (The Idaho Department of Environmental Quality). 2010. *Municipal Wastewater Reuse Permit for the Outlet Bay Sewer District.* Permit LA-000018-04. (DEQ 2010a).

DEQ (The Idaho Department of Environmental Quality). 2010. *Outlet Bay Sewer District Staff Analysis for Permit LA-000018-04.* Permit LA-000018-03. (DEQ 2010b).

DEQ (The Idaho Department of Environmental Quality). 2012. *Guidance for Forested Poplar Site Nutrient and Hydraulic Loading: Draft*. (DEQ 2012).

DEQ (The Idaho Department of Environmental Quality). 2013. *Wastewater Reuse Program 2013 Inspection Report for Outlet Bay Sewer District.* Permit LA-000018-04. (DEQ 2013).

DEQ (The Idaho Department of Environmental Quality). 2015. *Wastewater Reuse Program 2015 Inspection Report for Outlet Bay Sewer District.* Permit LA-000018-04. (DEQ 2015a).

DEQ. 2015. Idaho Department of Environmental Quality (DEQ). *Municipal Reuse System Buffer Zone Guidance, October 28, 2015*. (TRIM #2015AGH1657). (DEQ 2015b).

JASA (James A. Sewell and Associates, LLC). 2010. *Outlet Bay Water & Sewer District Wastewater Treatment Plant; Operation & Maintenance Manual.* Permit LA-000018-04. (JASA 2010).

JASA (James A. Sewell and Associates, LLC). 2015. *Wastewater Reuse Application Technical Report.* Permit LA-000018-04. (JASA 2015).

JASA (James A. Sewell and Associates, LLC). February 18, 2016. Letter response from JASA to DEQ January 12, 2016 *Completeness Determination* letter. (JASA 2016).

Metcalf, 1979. Metcalf & Eddy, *"Wastewater Engineering: Treatment, Disposal, Reuse"*. McGraw Hill Book Company, 1979. (Metcalf, 1979).

Miller, F.K., Burmester, R.F., Miller, D.M., Powell, R.E., Derkey, P.D. 1999. *Digital Geologic Map of the Sandpoint 1- by 2-Degree Quadrangle, Washington, Idaho, and Montana.* U.S. Department of the Interior, U.S. Geological Survey. (Miller et al. 1999).

NRCS (Natural Resource Conservation Service). 1998. *Nutrients Available from Livestock Manure Relative to Crop Growth Requirements, Appendix I: Nutrient Uptake and Removal – Part C, Non-grazed Privately Owned Woodland.* Accessed 1 January, 2016. Available at *http://www.nrcs.usda.gov/wps/portal/nrcs/detail/de/home/?cid=nrcs143_014175*. (NRCS 1998).

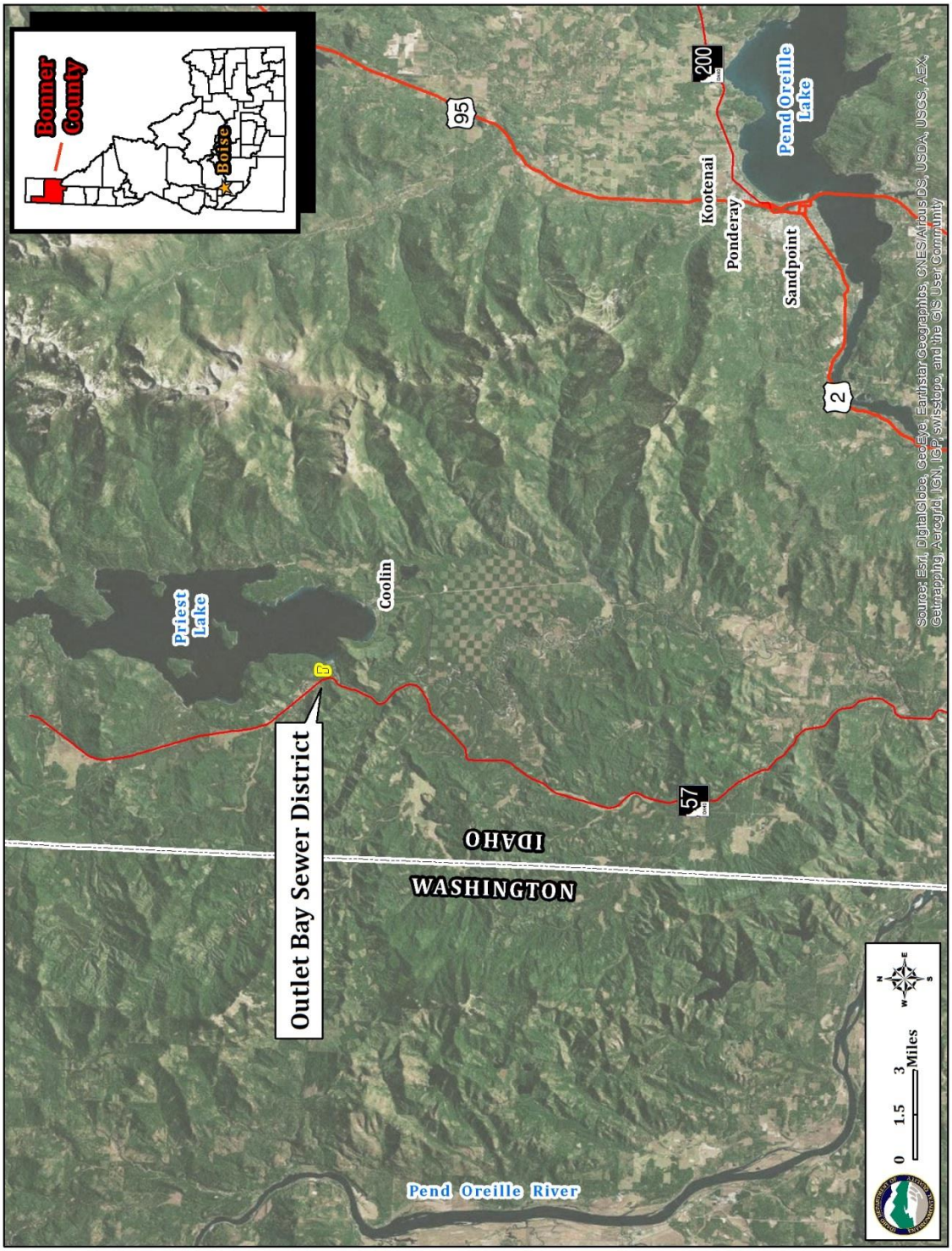
NRCS (Natural Resource Conservation Service). 2015. *Web Soil Survey.* Accessed 29 December, 2015. Available at *http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm*. (NRCS 2015).

USFWS (United States Fish and Wildlife Service). 2016. *National Wetland Inventory: Wetlands Mapper.* Accessed 2 February, 2016. Available at *http://www.fws.gov/wetlands/Data/Mapper.html*. (USFWS 2016).

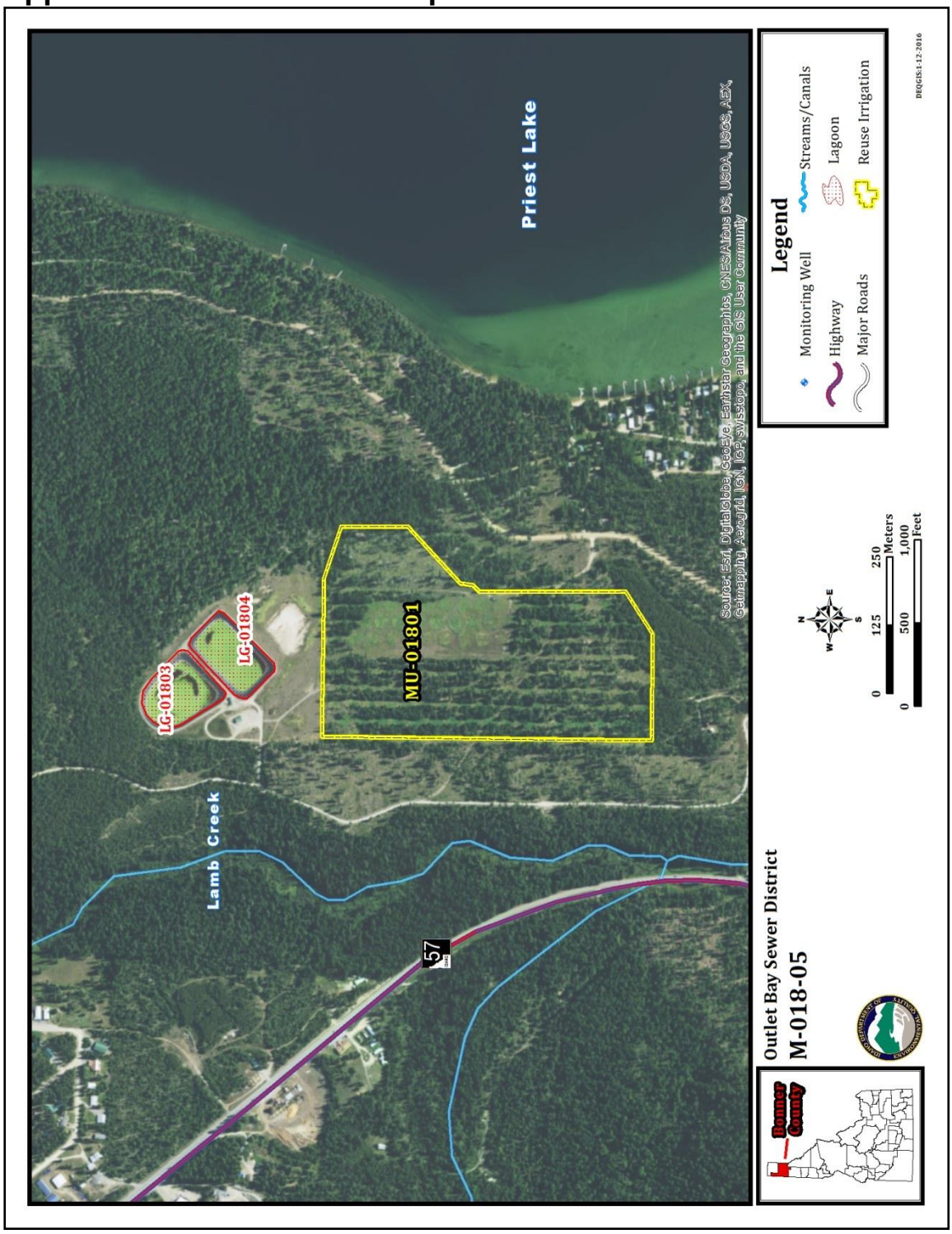
WRCC (Western Regional Climate Center). 2015. *Priest River Experimental Station, Idaho (107386).* Accessed 29 December, 2015. Available at *http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?id7386*. (WRCC 2015).

Appendix A. Maps:

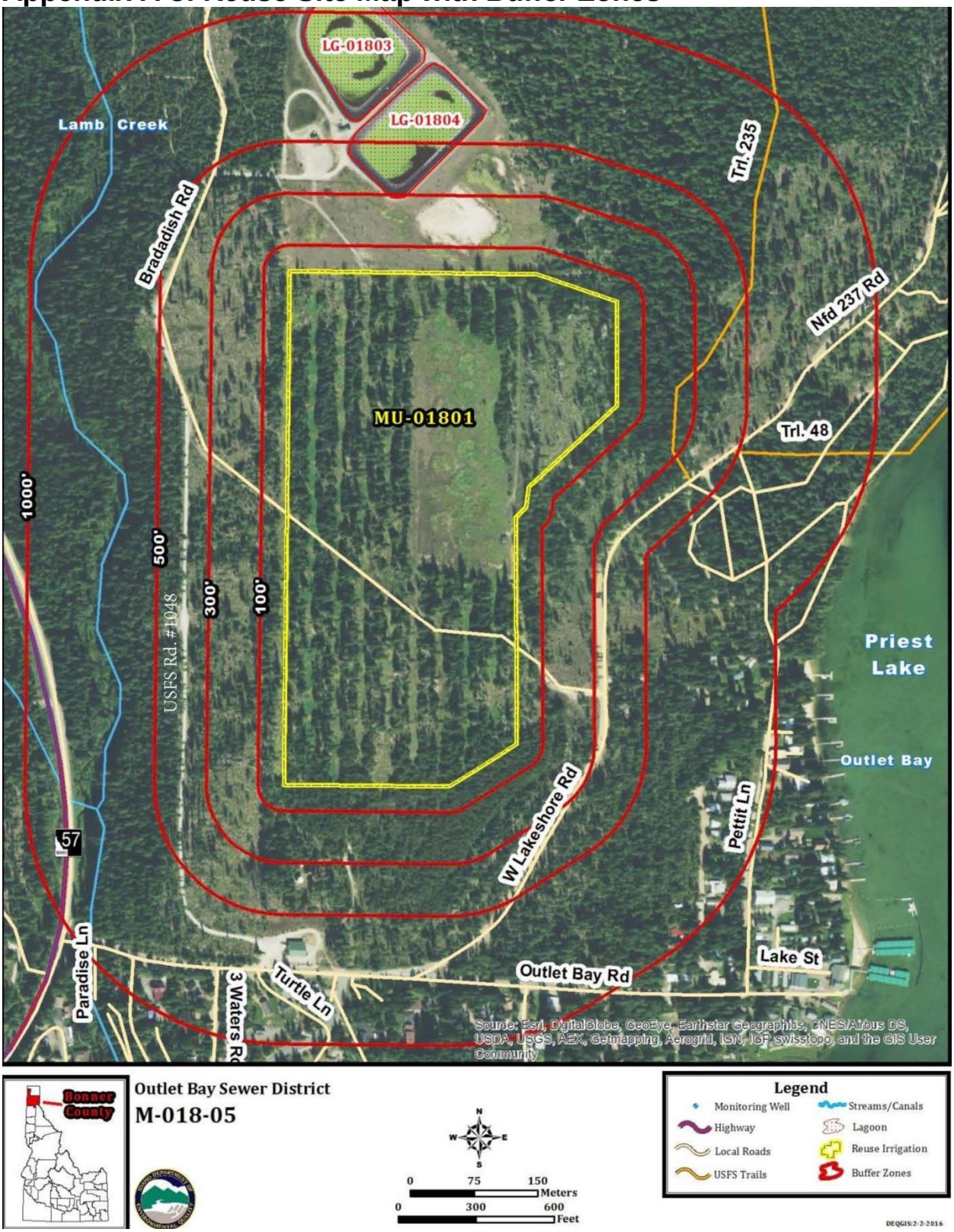
Appendix A-1: Regional Map



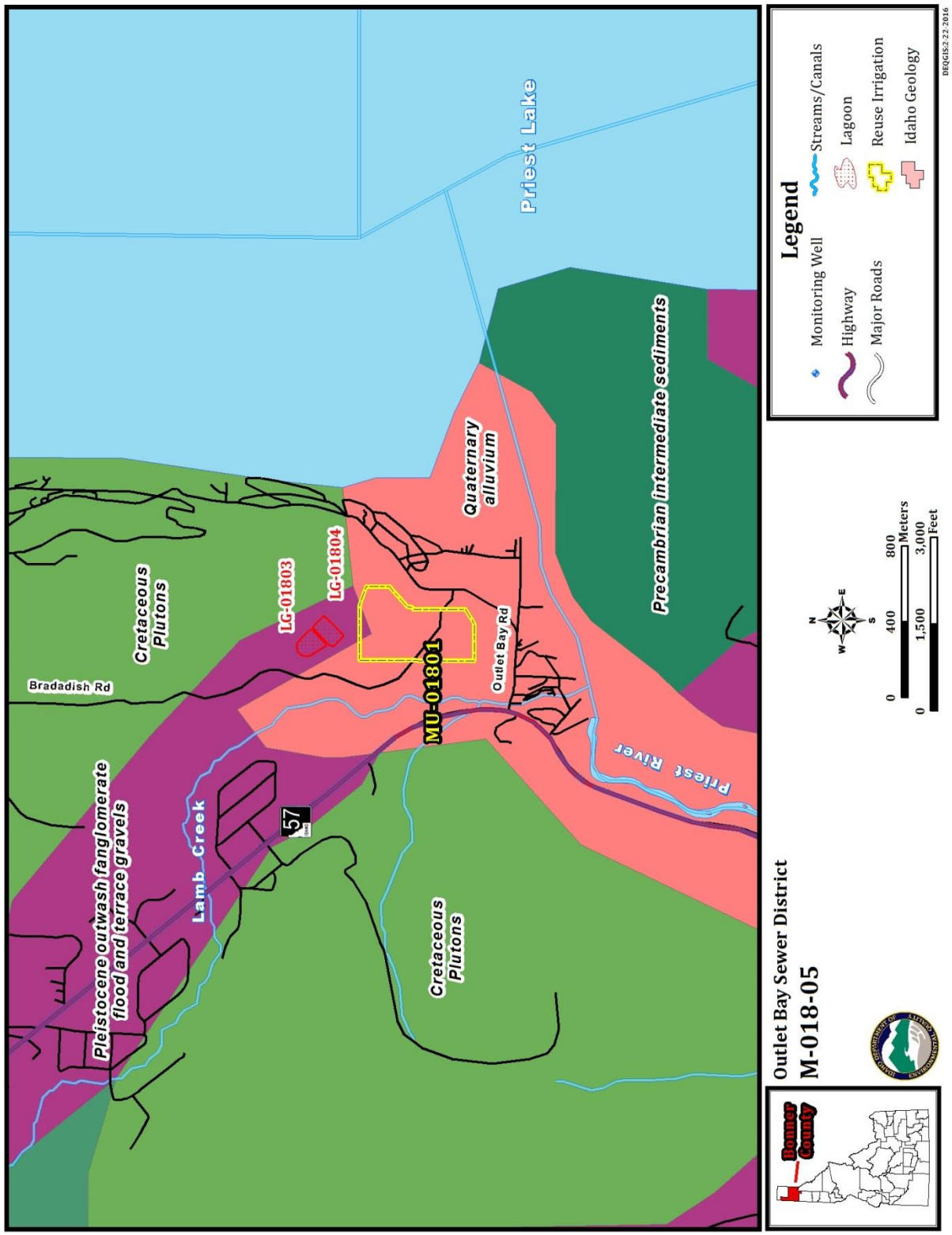
Appendix A-2: Reuse Site Map



Appendix A-3: Reuse Site Map with Buffer Zones



Appendix A-4: Reuse Site Geology



Appendix B: Soil Survey Descriptions

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Idaho Panhandle National Forest, Idaho-Washington-Montana

155—Typic Udivitrands-Typic Vitrixerands complex, outwash plains of mixed geology

Map Unit Setting

National map unit symbol: 2lfzx
Elevation: 1,940 to 5,280 feet
Mean annual precipitation: 34 to 42 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 60 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Typic udivitrands and similar soils: 70 percent
Typic vitrixerands and similar soils: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Typic Udivitrands

Setting

Landform: Terraces, hillslopes
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Volcanic ash over sandy alluvium and/or sandy outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: ashy silt loam
Bw1 - 3 to 16 inches: gravelly ashy silt loam
2Bw2 - 16 to 26 inches: very cobbly coarse sandy loam
2C1 - 26 to 46 inches: very gravelly coarse sand
2C2 - 46 to 61 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B

Description of Typic Vitrixerands

Setting

Landform: Terraces, hillslopes
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Volcanic ash over sandy alluvium and/or sandy outwash

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Bw1 - 2 to 9 inches: ashy silt loam
Bw2 - 9 to 20 inches: very cobbly ashy silt loam
2Bw3 - 20 to 34 inches: extremely gravelly fine sandy loam

2C - 34 to 62 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho-Washington-Montana
Survey Area Data: Version 3, Sep 25, 2015

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Idaho Panhandle National Forest, Idaho-Washington-Montana

350—Andic Humudepts-Typic Udivitrands-Andic Eutrudepts complex, glaciated mountain slopes, granitic geology, south aspects

Map Unit Setting

National map unit symbol: 2lg37
Elevation: 2,030 to 5,410 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 60 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Andic humudepts and similar soils: 25 percent
Typic udivitrands and similar soils: 25 percent
Andic eutrudepts and similar soils: 20 percent
Andic eutrudepts, thin densic, and similar soils: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Typic Udivitrands

Setting

Landform: Mountain slopes
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash over till

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 3 inches: gravelly ashy silt loam
A2 - 3 to 16 inches: extremely gravelly ashy silt loam
2Bw - 16 to 33 inches: extremely gravelly silt loam
3C - 33 to 60 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 10 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Other vegetative classification: western redcedar/queencup beadlily (CN530), western hemlock/queencup beadlily (CN570)

Description of Andic Humudepts

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash over till

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 13 inches: gravelly ashy silt loam
2Bw - 13 to 60 inches: extremely cobbly silt loam

Properties and qualities

Slope: 10 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Other vegetative classification: western redcedar/queencup beadlily (CN530), western hemlock/queencup beadlily (CN570)

Description of Andic Eutrudepts

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash over till

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: ashy silt loam
Bs - 7 to 14 inches: ashy silt loam
2Bw - 14 to 18 inches: very gravelly very fine sandy loam
2Bd - 18 to 60 inches: very gravelly very fine sandy loam

Properties and qualities

Slope: 10 to 35 percent
Depth to restrictive feature: 10 to 20 inches to densic material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 13 to 25 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D

Other vegetative classification: western redcedar/queencup beadlily (CN530), western hemlock/queencup beadlily (CN570)

Description of Andic Eutrudepts, Thin Densic

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Toeslope, footslope, backslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash over till

Typical profile

Oi - 0 to 3 inches: slightly decomposed plant material
A - 3 to 8 inches: gravelly ashy silt loam
AB - 8 to 11 inches: extremely cobbly ashy silt loam
2Bw - 11 to 16 inches: extremely gravelly silt loam
2Bd - 16 to 23 inches: extremely gravelly silt loam
2BC - 23 to 60 inches: extremely gravelly silt loam

Properties and qualities

Slope: 10 to 35 percent
Depth to restrictive feature: 10 to 20 inches to densic material
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Other vegetative classification: western redcedar/queencup beadlily (CN530), western hemlock/queencup beadlily (CN570)

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho-Washington-Montana
Survey Area Data: Version 3, Sep 25, 2015