

January 15, 2014

## **MEMORANDUM**

TO: R. Todd Crutcher, P.E.  
Engineering Manager, Boise Regional Office

FROM: Valerie A. Greear, P.E.  
Boise Regional Office

SUBJECT: Staff Analysis for Draft Reuse Permit M-080-04 (formerly LA-000080-03)  
Bogus Basin Recreation Association, Inc.

### **1. PURPOSE**

The purpose of this memorandum is to satisfy the requirements of the *Recycled Water Rules (Rules)*, IDAPA 58.01.17.400.05, for issuing reuse permits. This memorandum addresses draft Reuse Permit M-080-04, for the municipal wastewater treatment and reuse system owned and operated by Bogus Basin Recreation Association, Inc. (BBRA). BBRA's treatment and reuse system is currently permitted under the terms of Reuse Permit No. LA-000080-03.

### **2. SUMMARY OF EVENTS**

The Department of Environmental Quality (DEQ) issued permit no. LA-000080-03 to BBRA on January 9, 2009 for continued operation of the wastewater treatment and reuse system serving BBRA. These facilities are located north of Boise in Boise County. The purpose of draft permit M-080-04 is to renew Reuse Permit No. LA-000080-03, which will expire on January 9, 2014.

An application for a modification of BBRA's wastewater reuse permit was first received on January 26, 2012. DEQ responded with comments on April 2, 2012, and BBRA submitted a revised application, *Bogus Basin Reuse Permit Application Technical Report* (CH2M Hill, 2012) on September 10, 2012. The permit renewal application requests the addition of 2 acres to the current 0.82 acre reuse site that serves Pioneer Lagoon 2, and the addition of drip irrigation to rehabilitate 1.9 acres of cut banks. This application largely serves as the basis for the terms and conditions contained in the draft permit.

Because the current permit will expire in less than a year, the draft permit is written as a renewal permit rather than a modification of the current permit. As required by the *Recycled Water Rules*, the draft permit will be presented for a public comment period. After the comment period has closed, DEQ will provide written responses to all relevant comments and prepare a final permit for BBRA's wastewater reuse facilities.

### **3. PROCESS AND SITE DESCRIPTIONS**

The site and treatment processes have not changed since BBRA's current permit was issued. Additional discussion regarding these items can be found in the staff analysis for the draft version of Reuse Permit No. LA-000080-03, dated October 8, 2008 (DEQ, 2008).

BBRA operates a ski resort during the winter, and the area is used for other recreational opportunities such as

hiking and disc golf during the summer. The area is located north of Boise, at the end of Bogus Basin Road. Wastewater is generated from the lodges, restaurants, and condominiums associated with the resort. The permittee operates under a special use permit from the USDA Forest Service. There are two wastewater treatment systems and three forested reuse sites currently totaling five (5) acres. A site map is included as Attachment A to this document, and hydraulic profiles of each treatment system are included as Attachments B and C. Irrigation occurs in the growing season only, from July through October.

The upper Pioneer treatment system serves the Pioneer Lodge and the Pioneer Condominiums. The Pioneer system consists of a manually cleaned bar screen and the 0.44 million gallon (MG) Pioneer Lagoon 1 with a ¾ hp surface aerator. Water then flows to either the 1.8 MG Pioneer Lagoon 2 storage lagoon or the 0.943 MG Pioneer Lagoon 3 surface aerated lagoon. Influent flow is measured by a Parshall flume located in each headworks building. Flow from the Frontier Point Nordic Center flows directly to Pioneer Lagoon 3. Irrigation from Pioneer Lagoon 2 is via nine (9) solid set sprinklers on a 0.82 acre reuse site. Irrigation from Pioneer Lagoon 3 is via 13 solid set sprinklers on a 2.06 acre reuse site.

The lower Bogus Creek treatment system serves the JR Simplot Lodge (formerly the Bogus Creek Lodge). Influent is measured via a Parshall flume, and wastewater flows through a manually cleaned bar screen to the Bogus Creek Lagoon 1, Bogus Creek Lagoon 2 and Lagoon 3, all of which are aerated and are operated in series. The total volume of this system is 1.26 MG. Irrigation is via 24 solid set sprinklers on a 2.12 acre reuse site.

### 3.1 Site Management

BBRA produces Class E recycled water that has been minimally treated in either the Pioneer lagoon system or the Bogus Creek lagoon system. Application of Class E recycled water is via solid set sprinklers during the growing season, designated for this site as July through October, and is stored through the winter. The current permitted acreage is on management units MU-008002, MU-008003 and MU-008004, which are Bogus Creek, Pioneer 1&2, and Pioneer 3 with 2.12, 0.82, and 2.06 acres respectively. The permit application requests an increase in the acreage of the Pioneer 1&2 site, MU-008003, to 2.82 acres, which was added to the draft permit. The following table shows a summary of the forested site management units.

Table 1: Forested Site Management Units

Management Unit	Lagoon System (Common Name)	Current Acreage	Proposed Acreage
MU-08002	Bogus Creek	2.12	2.12
MU-08003	Pioneer 1&2	0.82	2.82
MU-08004	Pioneer 3	2.06	2.06

According to the permit application, the vegetation onsite was viewed by representatives of the National Resource Conservation Service (NRCS), the Bureau of Land Management (BLM), and the Forest Service. The plant species and density were determined to be uniform across the site, consisting of trees, shrubs and grasses as shown in Table 2. Since the plants are a layered canopy, the percent of canopy coverage is greater than 100%.

Table 2. Plant Species and Coverage

	Plant Species	Percentage of Canopy Cover
Trees	Pine, Fir	20%
Shrubs	Willow, rose, ceanothus, alder and maple	60%
Grasses	Mountain brome, lupine	40%

The permit application also proposes addition of 1.9 acres of rehabilitation areas to the acreage available for wastewater reuse. Although this is proposed as a drip system, the cut slopes are sheer slopes that are located next to parking lots and the risk of public access is considered high. Therefore Class E wastewater is not acceptable, and the water must be disinfected prior to use. Drip irrigation systems also frequently require some level of filtration prior to use. The cut slopes were not included in the draft permit, and if BBRA wishes to include them in the future, a more thorough plan must be submitted that addresses additional treatment as well as more analysis of how vegetation will grow on these exposed faces. If an acceptable plan is developed and approved by DEQ, BBRA can submit a permit modification request to have these areas added to the application acreage.

### 3.1.1 Hydraulic Loading

The current permit requires the hydraulic loading to be substantially equal to the irrigation water requirement (IWR) throughout the growing season, with the total application being no more than 2.7 MG total and no more than 19.8 in/ac/yr. In the 2009 staff analysis, DEQ calculated the IWR for this site by weighting consumptive use values for the onsite vegetation in *Water Use by Naturally Occurring Vegetation Including an Annotated Bibliography* (Johns, 1989), precipitation data from the National Weather and Climate Center, and an irrigation efficiency of 70%.

The hydraulic loading to the 5 acre site during the current permit term is listed in Table 3.

Table 3. Wastewater Hydraulic Loading Rate, as reported in Annual Reports

Reporting Year	Million Gallons (MG)				Acre-In/Acre		
	MU-000802	MU-000803	MU-000804	Total MG	MU-000802	MU-000803	MU-000804
2009	1.12	0.83	0.95	2.90	19.5	37.07	17.04
2010	1.21	1.36	0.94	3.51	21.0	61.03	16.83
2011	1.20	1.37	0.93	3.50	20.9	61.54	16.65
2012	1.14	0.82	0.91	2.87	19.8	36.65	16.33
Average	1.17	1.10	0.93	3.20	20.3	49.07	16.71
<b>Current Limit</b>	IWR <sup>a</sup>			2.7 MG combined application	IWR <sup>a</sup> 19.8 acre-in/acre/yr each management unit		

a. Irrigation Water Requirement (IWR) is defined in Section C of the current permit as the sum of wastewater and supplemental water applied at rates commensurate to the moisture requirements of the crop.

As the values in Table 3 show, the volume of effluent produced exceeds the site-wide permit limit of 2.7 MG. This is primarily due to the volumes applied to the 0.82 acre Pioneer 1&2 site, MU-08003. The requested modification would increase MU-08003 by 2 acres, which if the wastewater generation were to continue at a similar level would decrease the application on that management unit to 14 acre-in/acre based on a 4 year average flow rate.

For this permit renewal, the draft *Guidance for Forested/Poplar Site Nutrient and Hydraulic Loading* (DEQ, 2012) was referenced to determine an appropriate hydraulic loading based on the plant species listed in Table 2. According to the guidance, the *Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho* (ETIdaho) (Allen and Robison, 2007) values can be used to estimate water use for forested sites. The crop to use for the trees is irrigated Orchards – no cover, and for the understory is pasture grass – high maintenance. In both cases, the numbers for 80% exceedance (rather than the mean) are to be used to minimize the likelihood of over-application. The water requirements (precipitation deficit, or Pdef) are then area weighted and monthly limits are

assigned based on that number divided by an irrigation efficiency of 75%. Table 4 shows the resulting hydraulic loading limits for this site, using the 2012 numbers for the National Weather Service station Boise 7N.

Table 4: Breakdown of the Recommended Hydraulic Loading Limit.

	Trees <sup>a</sup> 20% Area Coverage	Understory <sup>b</sup> 100% Area Coverage	Whole Site		MU- 000802 2.12 acres	MU- 000803 2.82 acres	MU- 000804 2.06 acres
	Pdef (in/mo)	Pdef (in/mo)	Weighted Pdef (in/mo)	IWR (Pdef/E <sub>i</sub> ) <sup>c</sup> (in/mo)	MG/mo	MG/mo	MG/mo
July	7.14	7.24	8.67	11.55	0.67	0.88	0.65
August	5.13	5.89	6.92	9.23	0.53	0.71	0.52
September	3.20	3.01	3.65	4.87	0.28	0.37	0.27
October	0.78	0.60	0.75	1.01	0.06	0.08	0.06
<b>Proposed Hydraulic Loading Limits<sup>d</sup>:</b>				26.66 in/yr	1.53 MG	2.04 MG	1.49 MG

- a. The application stated that there was a 20% canopy of trees consisting of fir and pine. The precipitation deficit (Pdef) is 80% exceedance for Orchards – Apples and Cherries no ground cover from ETIdaho 2012.
- b. The application stated that there was a 60% canopy of shrubs consisting of willow, rose, ceanothus, alder and maple, and a 40% canopy of grasses consisting of mountain brome and lupine. As suggested in DEQ, 2012, the precipitation deficit (Pdef) are 80% exceedance for pasture grass – high maintenance from ETIdaho 2012.
- c. The irrigation efficiency (E<sub>i</sub>) used to calculate the Irrigation Water Requirement (IWR) is 75% as recommended in DEQ, 2012.
- d. The proposed hydraulic loading limits in the draft permit are monthly limits. The totals are for information purposes only.

### 3.1.2 Historic Water Quality and Constituent Loading

Grab samples of the effluent to each management unit are required to be collected once per month during the land application season. Samples are analyzed for Total Coliform, Chemical Oxygen Demand (COD), Total Kjeldahl Nitrogen (TKN), Ammonia Nitrogen, Nitrate Nitrogen, and Total Phosphorus. The loading rates of total nitrogen and total phosphorus in lbs/acre/yr are required to be calculated and reported annually, and the lbs/acre/day seasonal average is required for COD.

The annual average wastewater characteristics during this permit cycle are shown in Table 5.

Table 5. Average Wastewater Quality from 2009-2012, in mg/L

Management Unit	Total Phosphorus	Total Nitrogen	Chemical Oxygen Demand
	mg/L		
MU-08002	4.6	16.2	119
MU-08003	3.3	11.1	111
MU-08004	3.7	11.8	83

The average nutrient loading rates reported in the 2009-2012 annual reports are shown in Table 6. The only nutrient loading rate limit in the current permit is total nitrogen, which is limited to 70 lbs/acre/yr for each management unit.

Table 6. Annual Average Nutrient Loading Rates

Management Unit	Total Phosphorus	Total Nitrogen	Chemical Oxygen Demand
	lb/ac/yr		lb/ac/day seasonal average
MU-08002	20.8	75.8	3.8
MU-08003	36.0	111.4	10.1
MU-08004	14.4	45.0	1.8
<b>Current Limits</b>	NA	70 lb/ac/yr	NA

The total nitrogen loading rate limit was exceeded in 2009 on MU-008002, Bogus Creek, and was exceeded in 2009, 2010 and 2011 on MU-008003, Pioneer 1&2, which is the management unit that is proposed to be expanded by 2 acres in the draft permit.

In the previous staff analysis, the nitrogen loading limit of 70 lb/ac/yr was calculated as 150% of the upper end of the nitrogen uptake for an older growth stand of Ponderosa Pine and Douglas Fir from *Managing Nitrogen from Biosolids* (Henry et al, 1999). For this permit renewal, it is recommended that the limit be calculated from the updated guidance (DEQ, 2012). The calculation procedure is documented in Table 7 for the plant canopy identified in the application and shown in Table 2 above.

Table 7. Breakdown of the Recommended Nitrogen Loading Limit

Plant Type	Age	Percentage of Canopy Cover	Total N Uptake	Efficiency Factor of 80% <sup>d</sup>
Douglas Fir <sup>a</sup>	Over 25 years	10%	4.5 <sup>b</sup>	5.6
Pine (Semiarid Environment) <sup>a</sup>	Over 25 years	10%	3.0 <sup>b</sup>	3.8
Woody Vegetation	NA	60%	28 <sup>c</sup>	35
Herbaceous Vegetation	NA	40%	24 <sup>c</sup>	30
<b>Proposed Total Nitrogen Loading Limit:</b>				74.4 lb/ac/yr

- a. The application stated that there was a 20% canopy of trees consisting of fir and pine. For the purposes of this calculation, it was assumed that there is half of each.
- b. The nitrogen uptake was taken from Table 13 of the guidance, and then multiplied by 10% as the percent of canopy cover.
- c. The nitrogen uptake values in Table 14 of the guidance were extrapolated for 60% and 40% of canopy cover for woody and herbaceous vegetation respectively.
- d. The guidance recommends that an uptake efficiency factor of between 75% and 85% be used to account for denitrification and volatilization losses.

Staff recommends that the nitrogen loading limit be increased from 70 lb/ac/yr to 74.4 lb/ac/yr as calculated in Table 7 above.

### 3.2 Environmental Discussion

#### 3.2.1 Soils

According to information described by the National Resource Conservation Service Soil Survey, soils appear to vary between four complexes across the sites, but are mostly shallow soils considered to be somewhat excessively

drained to excessively drained with low soil water holding capacity (1.7-3.6 inches). Depth to bedrock generally ranges from 20 to 40 inches. All reuse sites are located on mountain slopes.

Soil data (nitrate, electrical conductivity, TKN, and chloride) were collected twice annually during the first permit term from 1992 to 1995. The second permit did not require soil sampling. The most recent permit which was issued in 2008 required that soil samples be collected in the fall of 2009 and 2013. The 2013 samples have not yet been collected. The facility sampled the soil in the first and last year of this permit cycle in October for Electrical Conductivity (EC), Sodium Absorption Ration (SAR), Nitrate-Nitrogen, Ammonia-Nitrogen, Plant Available Phosphorus, and pH.

None of the 2009 samples were at a level of note except for phosphorus. Due to the acidic soils, the Bray extraction method for plant available phosphorus was used, and as is shown in Table 8, it is apparent that phosphorus is building up in the soil.

Table 8: Plant Available Phosphorus in Soil (Bray Extraction Method)

Management Unit	0"-12"	12"-24"	24"-36"	Phosphorus Loading Rate <sup>a</sup>
	mg/kg			lb/ac
MU-08002	78.4	35.4	21.5	20.8
MU-08003	210	62.9	143	36.0
MU-08004	146	67.9	27.1	14.4

a. As an average of 2009-2012 annual loading rates.

In two of the three sample sets, the phosphorus concentration is highest in the top foot and decreases with depth. Therefore it is possible that the phosphorus application rate may be exceeding the rate at which the vegetation is taking up phosphorus. Phosphorus can be an environmental concern when there is a connection between ground water and surface water. Surface water is discussed in the next section.

### 3.2.2 Surface Water

Bogus Creek flows along the west and south sides of the reuse area. The creek flows within 50 feet of Bogus Creek Lagoon 3. The nearest reuse site is the Bogus Creek site (MU-000802), which is greater than 100 feet from the creek. The creek is sampled upstream and downstream monthly during the growing season for Total Coliform, Nitrate-Nitrogen, Total Phosphorus, and Total Kjeldahl Nitrogen (TKN). The upstream sample location is above Bogus Creek Lagoon #1 just below the main road. The downstream sample location is below Pioneer Lagoon #3 at the junction of the lower loop.

The creek is sampled every month when water is land applied, with data for nitrate available from 1997 to the present, fecal coliform was sampled from 1997 to 2009, and total coliform, TKN and total phosphorus samples were taken from 2009 to the present. There have only been three samples for which total phosphorus was detected: two were upstream (0.05 mg/l on 9/18/12 and 0.06 mg/L on 10/2/12) and one downstream (0.08 mg/L on 9/27/11). Plots of the other three constituents follow.

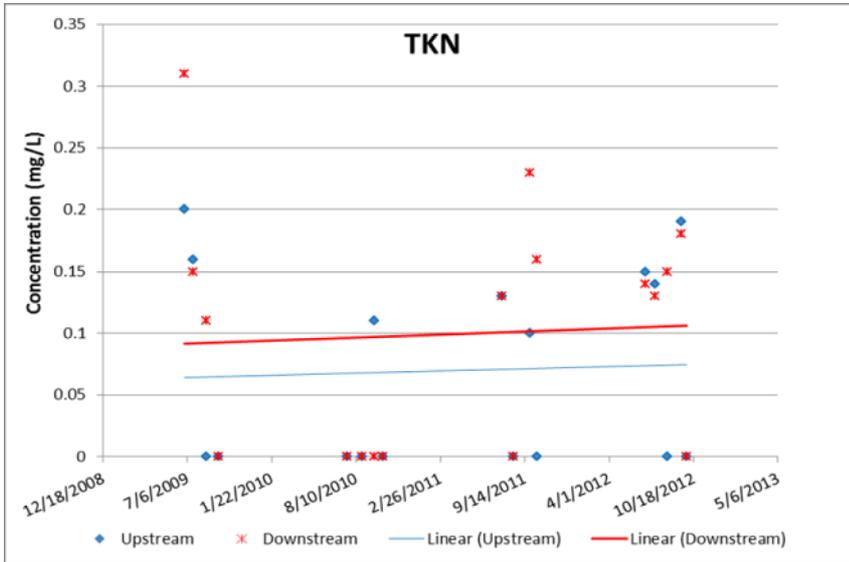


Figure 1: Total Kjeldhal Nitrogen (TKN) concentration in Bogus Creek upstream and downstream of the site.

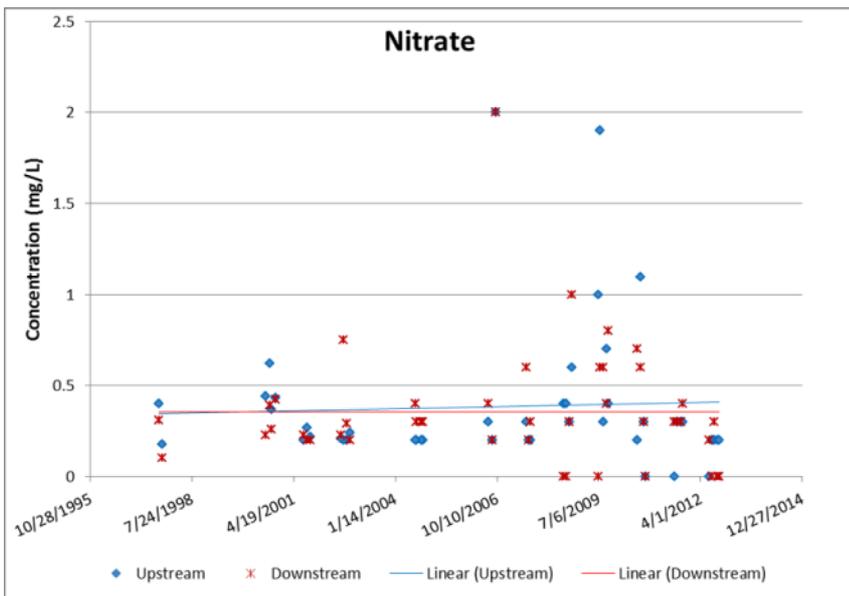


Figure 2: Nitrate concentration in Bogus Creek upstream and downstream of the site.

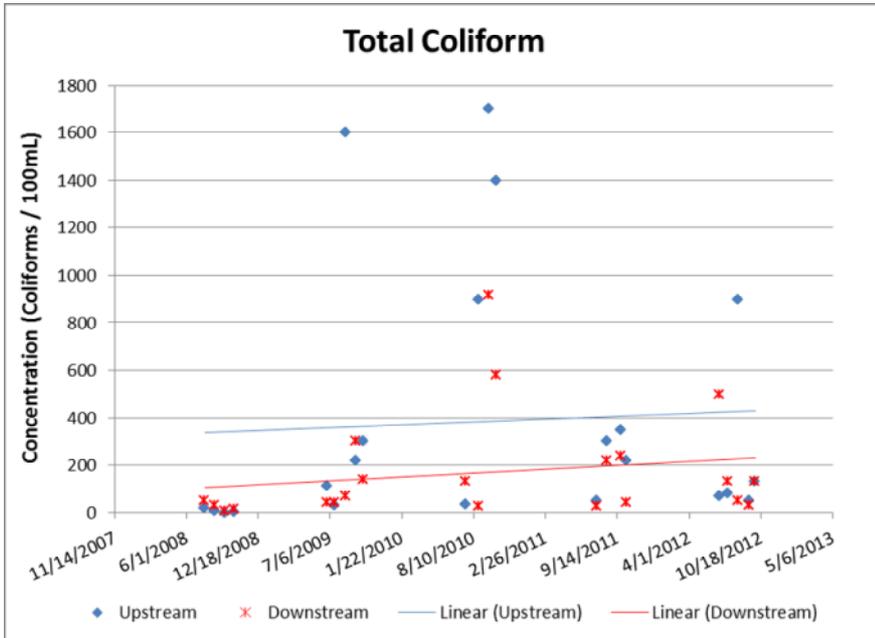


Figure 3: Total Coliform concentration in Bogus Creek upstream and downstream of the site.

The concentrations in the creek are not at a level of concern, and there does not appear to be any trending that does not appear both upstream and downstream of the site. It is recommended that the facility continue to monitor the stream, but that monitoring be conducted for constituents of concern in surface water. Therefore, instead of TKN and total coliform, the facility would monitor ammonia and *E.coli*, as well as pH and temperature which are needed to assess the impact of ammonia on the water body. Nitrate and total phosphorus would continue to be monitored.

### 3.2.3 Ground Water and Geology

Ground water in the vicinity of the site is estimated to be first encountered between 30 and 60 feet below ground surface (bgs), and in some areas to about 15 feet bgs. According to the Staff Analysis for the current permit, dated October 8, 2008, it appears that there is a deeper, possibly regional aquifer reached between 350 and 500 feet bgs. It is assumed that ground water flows downhill towards Bogus Creek. No wells are located within ¼ mile of the current or proposed reuse sites. A monitoring well network has not been established at this site, because during the 1996 and 2009 re-permitting processes, it was determined that at the hydraulic and constituent loadings at that time, there was little potential for adverse impacts to ground water. Loading has greatly increased since the permit was issued in 2008, but the topography is very steep, varying over 500 feet of elevation across the site, the sites are incongruous and the lagoons are spread out, and in general it would be impractical to install an adequate number of monitoring wells to gain usable information. Therefore ground water monitoring is still not recommended as a requirement for this site. In lieu of ground water monitoring, surface water monitoring is recommended to continue.

## 4. PERMITTING DISCUSSION

The following sections outline changes made to the terms of the draft renewal permit, based on changes requested by the permittee, evaluations of past performance with previous permit requirements, and/or updates required by changes to the *Recycled Water Rules* or any other applicable regulatory standards. Terms and conditions that are

unchanged from the previous permit and remain applicable to the facility are not addressed in this document.

#### 4.1 Compliance Schedule for Required Activities – Section 3

The following table shows the status of all compliance activities that were required in Section E. Compliance Schedule for Required Activities in the current permit.

Table 9. Status of Compliance Activities Required by LA-000080-03

Activity Number	Description	Due Date	Status
CA-080-01	Update Plan of Operation	January 2010	Received on April 22, 2010
CA-080-02	Quality Assurance Project Plan	January 2010	Received on April 22, 2010
CA-080-03	Seepage Test all Lagoons	June 2013	Approved: Bogus Creek 1, July 15, 2011 Bogus Creek 2, September 26, 2012 Bogus Creek 3, May 21, 2009 Pioneer 1, May 21, 2009 Pioneer 2, July 8, 2010 Pioneer 3, July 8, 2010
CA-080-04	Treatment System Evaluation Plan	If nitrogen loading rate exceeded	Information received October 20, 2011 (2010 Annual Report Review Response) and Technical Memorandum received on January 26, 2012.
CA-080-05	Public Access Restriction Plan	January 2011	Information received on April 22, 2010 (Updated Plan of Operation) and October 20, 2011 (2010 Annual Report Review Response)
CA-080-06	Renew Permit	June 2013	Complete Application for Major Modification received September 9, 2012

##### CA-080-01 Plan of Operations

BBRA's current permit required submittal of an updated Plan of Operation (PO), and DEQ received this updated submittal on April 22, 2010 but did not complete a review. The PO will need to be updated to address current operations and the requirements of the draft renewal permit after final issuance. Therefore, a compliance activity requiring that an updated PO be submitted within one year of permit issuance has been included in the draft permit.

##### CA-080-02 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP) is a standard requirement of permits where a current QAPP is not already in place. The QAPP covers sampling and analysis, personnel qualifications, and data analysis among other things, and must be in place although it will not be subject to DEQ approval. A responsible official or duly authorized representative will certify each year that the information presented in the annual report was collected, evaluated and prepared in accordance with the QAPP, per Section 6.1.3 of the draft permit.

CA-080-03 Lagoon Seepage Testing

Municipal wastewater lagoons are required to be seepage tested once every ten years in accordance with the *Wastewater Rules*, IDAPA 58.01.16.493.02. BBRA has two treatment systems with three lagoons each. The following table outlines the function and construction of each lagoon, and provides the most recent seepage test approval date.

Table 10. Lagoon Seepage Test Dates and Seepage Rates

Lagoon	Dates			Seepage Rate
	Procedure Approval	Testing	Approval Letter	Daily Average in/day
Bogus Creek 1	March 9, 2011	June 21-30, 2011	July 15, 2011	0.0315
Bogus Creek 2 (for retest)	June 11, 2012	June 25-July 1, 2012	September 26, 2012	0.068
Bogus Creek 3	July 23, 2008	August 6-10, 2008	May 21, 2009	0.0268
Pioneer 1	July 23, 2008	July 30-August 4, 2008	May 21, 2009	0.1218
Pioneer 2	April 15, 2010	June 15-24, 2010	July 8, 2010	0.0063
Pioneer 3	April 15, 2010	June 15-24, 2010	July 8, 2010	0.0092

Compliance Activity No. CA-080-03 lays out the dates by which the lagoons are to be seepage tested again according to the test dates in Table 10, and that a protocol must be submitted 42 days prior to the planned test, and the results must be submitted to DEQ for review within 90 days of completion of the test.

CA-080-04 Phosphorus Soil Study and Management Plan

Compliance Activity No. CA-080-04 would require that the permittee investigate whether phosphorus is building up in the soil, or if the apparently high levels of phosphorus discussed in Section 3.2.1 are natural. If the soil profile becomes saturated with phosphorus, the potential for surface water impacts from runoff or ground water to surface water connections could become a problem. The Guidance recommends that phosphorus be investigated if the concentration in the 24-36 inch depth is above 50 ppm (by the Bray method) (DEQ, 2007). Therefore staff recommends that the permittee be required to conduct a Phosphorus Soil Study to determine if these levels are natural by determining background concentrations, and to also find the average or typical influent concentration levels to determine if those are high, and make a determination of whether phosphorus is or will be building up in the soil. If the results of the study show that phosphorus loading must decrease in order to be sustainable, the permittee would be required to identify if there are any influent sources of phosphorus in the waste streams that can be reduced or eliminated so that the phosphorus buildup in the soils can be minimized, and determine if reduction of phosphorus in the lagoons could be achieved prior to application each year. This reduction would likely be achieved through chemical precipitation using alum or ferric chloride, and should be explored especially if influent phosphorus cannot be reduced. The condition would require that the permittee propose a phosphorus concentration to be achieved through the means identified in a Phosphorus Management Plan, and although this concentration will not be a permit limit, the permittee should attempt to achieve this reduction through the activities identified in the plan.

#### CA-080-05 and CA-080-06 Application for Permit Renewal

Compliance Activity No. CA-080-05 requires that the permittee have a pre-application meeting with DEQ one year prior to permit expiration, and Compliance Activity CA-080-06 requires that an application for permit renewal be submitted 180 days prior to permit expiration. Staff recommends that an updated plant species, density and canopy cover determination be included in the renewal application.

#### **4.2 Permit Limits and Conditions – Section 4**

The following sections discuss the limits and conditions that are recommended for BBRA to operate their wastewater reuse system in a manner that will protect public health and the environment.

##### Hydraulic Loading Limits – Section 4.2

The current permit requires that hydraulic loading rate be “substantially equal to the irrigation water requirement throughout the growing season with loading to each [management unit] totaling no more than 19.8 ac-in/acre/yr and combined loadings to all three [management units] totaling no more than 2.7 MG for the year.” The IWR was calculated using a consumptive use from *Water Use By Naturally Occurring Vegetation Including an Annotated Bibliography* (Johns, 1989).

For this permit renewal, the *Guidance for Forested/Poplar Site Nutrient and Hydraulic Loading* (DEQ, 2012) was used as discussed in Section 3.1.1, along with the basis for the recommended hydraulic loading limits. The limits in the draft permit are monthly, but sum to 26.66 in/year, or a total of 5.07 MG.

An irrigation efficiency of 75% is listed in Section 4.1. This is the efficiency recommended in DEQ, 2012, and is already factored in to the hydraulic loading limits in Section 4.2.

##### Constituent Loading Limits – Section 4.3

The current permit limits the total nitrogen application to 70 pounds/acre/yr to each management unit. Staff recommends that the limit of 74.4 lb/ac/yr be included in the draft permit as discussed in Section 3.1.2 of this document.

The COD limits are unchanged. A non-volatile dissolved solids (NVDS) limit was not included in the draft permit because the leachate does not seem likely to reach ground water, the SAR in the soil is low, and NVDS levels are not a concern in the nearby surface water.

##### Buffer Zones – Section 4.4

BBRA’s treatment and reuse facilities constitute a Class E municipal treatment system, which means that there is minimal treatment, and no disinfection. Buffer zones are those recommended Guidance (DEQ, 2007) for Class E municipal systems using spray irrigation, which includes a 1,000 foot buffer to inhabited dwellings and 1,000 foot buffer to areas of public access.

The previous permit addressed public access requirements, which were met by fencing the lagoons, placing signs every 250 feet along the border, and moving the disc golf course out of the vicinity of the application area. They also only irrigate during the low traffic times of Monday through Thursday. The

buffer zone of 1,000 feet to public access is met.

#### Other Limits and Conditions – Section 4.5

Fencing is not required for this site because with the topography of the site, the snow destroys it every year. Additionally, there are snow show trails that go through the land application sites during the winter months when no application is taking place. Instead, warning signs are required to be located every 250 feet and at each entrance point. The access roads that lead to the land application sites are gated during the summer, and are also required to include warning signs.

#### **4.3 Monitoring and Reporting – Sections 5 and 6**

BBRA is required to monitor the volumes of wastewater applied on the land application site on a daily basis, and wastewater sampling is required on a monthly basis when effluent is being applied. Influent flow is also required to be monitored daily. Wastewater monitoring parameters from the previous permit have been carried over unchanged into the draft renewal permit, with the following changes: total dissolved solids and volatile dissolved solids are now standard monitoring constituents that were added to the list of effluent monitoring constituents, and rather than the current permit requirement of nitrate-nitrogen monitoring, the draft permit updates this to nitrate + nitrite nitrogen.

BBRA has been monitoring influent flow to both systems during this permit term. Influent flow to the Pioneer system was added as a requirement in the draft permit, in addition to required monitoring of the Bogus Creek system. Influent flow is useful at this site to compare to effluent flow, because much of the water collected in the lagoons is a result of precipitation.

The draft permit includes a requirement to conduct soil monitoring twice during this permit term at four year intervals; the constituents required were not changed. Bogus Creek is sampled every month that water is applied to the site. The constituents were upgraded to those required by surface water programs: *E.coli* is required instead of total coliform; ammonia is required instead of TKN; pH and temperature were added; and nitrate and total phosphorus were carried over from the current permit.

The permittee is also required to submit an annual report that includes, among other things, 1) all monitoring conducted under the terms of the permit, 2) the status of compliance activities required by the permit, and 3) an interpretive discussion of the monitoring data with particular respect to any potential environmental impacts. The annual report is due by January 31<sup>st</sup> of each year, and should address operations conducted from November 1 through October 31 of the preceding year. An additional requirement in new permits is included in Section 6.1.3, that all annual reports and other information requested by DEQ must be signed by the responsible official or the duly authorized representative certifying that the information submitted is true, accurate and complete, and the data was collected in accordance with the facility's QAPP.

#### **5. RECOMMENDATIONS**

Based on review of applicable state rules, staff recommends that DEQ issue draft Reuse Permit M-080-04 for a public review and comment period. The draft permit contains effluent quality requirements for the wastewater treatment system, as well as terms and conditions required for operation of the reuse system. Monitoring and reporting requirements to evaluate system performance and to determine permit compliance have been specified, and compliance activities have been incorporated into Section 3 of the permit.

## **6. REFERENCES CITED**

Allen, R.G. and C. Robison. 2007. Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho. Moscow, ID: University of Idaho.

CH2M Hill. 2012. Bogus Basin Reuse Permit Application Technical Report.

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

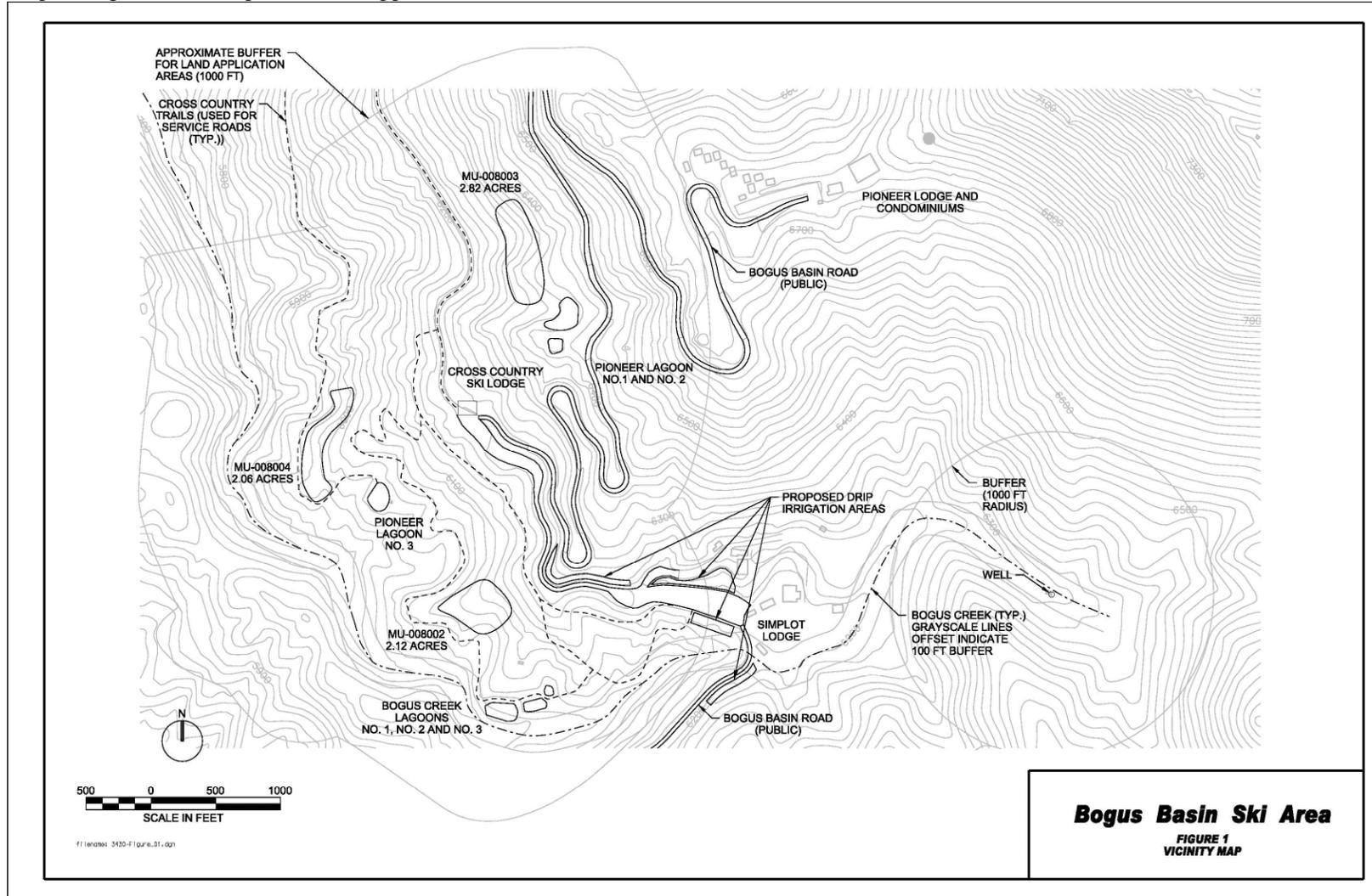
DEQ (Department of Environmental Quality). 2008. Staff Analysis, Bogus Basin Recreational Association Wastewater Reuse Permit Application Review – LA-000080-03 (Municipal Wastewater Facility)

DEQ (Department of Environmental Quality). 2012. Draft Guidance for Forested/Poplar Site Nutrient and Hydraulic Loading.

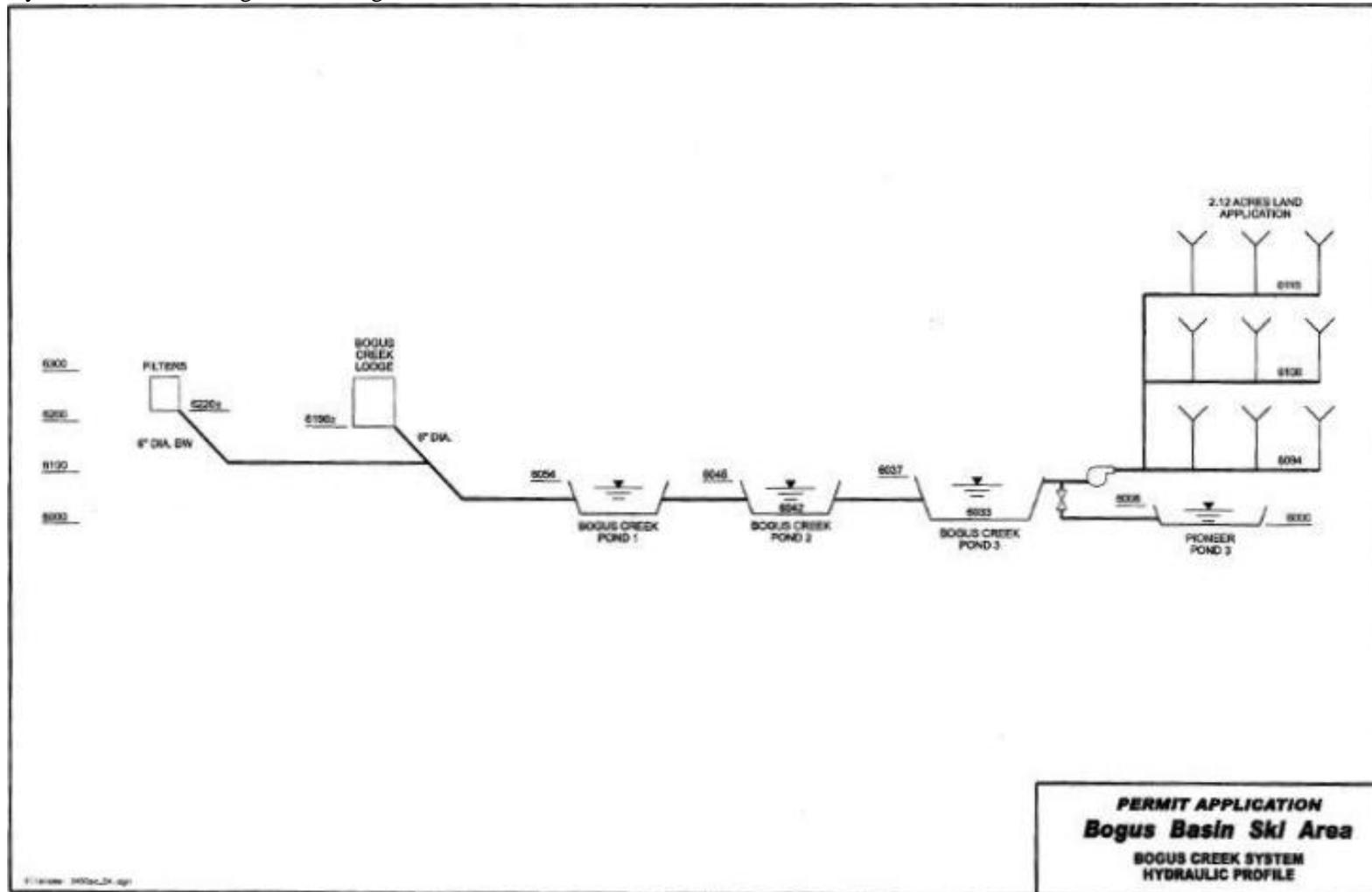
Henry, C.D, Sullivan, R. Rynk, K. Dorsey, and C. Cogger. 1999. Managing Nitrogen from Biosolids. Olympia, WA: Washington State Department of Ecology and Northwest Biosolids Management Association.

Johns, Eldon L. 1989. Water Use by Naturally Occurring Vegetation Including an Annotated Bibliography. Task Committee on Water Requirements of Natural Vegetation Committee on Irrigation Water Requirements, Irrigation and Drainage Division, American Society of Civil Engineers.

Attachment A.  
Map of Lagoons and Proposed Land Application Sites



Attachment B.  
Hydraulic Profile of Bogus Creek Lagoons and Reuse Sites



Attachment C.  
Hydraulic Profile of Pioneer Lagoons and Reuse Sites

