Montana Department of Environmental Quality

Water Protection Bureau
P.O. Box 200901
Helena, MT 59620-0901

PERMIT FACT SHEET

MONTANA GROUND WATER POLLUTION CONTROL SYSTEM (MGWPCS)

Permittee:	Bonner Holdings LLC
Permit Number:	MTX000127
Permit Type:	Domestic wastewater
Application Type:	Renewal
Facility Name:	Bonner Town Pump Travel Plaza
Facility Location:	NW ¼, Section 21 T13N, R18W, Missoula County Latitude: 46.87485° Longitude: -113.887917°
Facility Address:	7985 Hwy 200 East, Milltown, MT 59851
Facility Contact:	Traci Ruschetti
Treatment Type:	RSF
Receiving Water:	Class I Ground Water
Number of Outfalls:	1
Outfall / Type:	001 / Subsurface Drainfield
Effluent Type:	Domestic strength wastewater
Mixing Zone:	Standard
Effluent Limit Type:	WQBEL
Effluent Limits:	Total nitrogen: 24.0 lbs/day, 60% removal
	Total phosphorus: 484 lbs/year
Flow Rate:	Design maximum: 15,000 gpd Design average: 15,000 gpd
Effluent/Influent sampling:	Quarterly EFF-001, INF-001
Ground water sampling:	Quarterly MW1, MW2
Fact Sheet Date:	10/25/19
Prepared By:	R. Morse

1.0 PERMIT INFORMATION

DEQ issues MGWPCS permits for a period of five years. The permit may be reissued at the end of the period, subject to reevaluation of the receiving water quality and permit limitations. This fact sheet provides the basis for DEQ's decision to renew a MGWPCS wastewater discharge permit to Bonner Holdings LLC for the Town Pump Travel Plaza, Bonner wastewater treatment system. The Travel Plaza includes a 24-hour convenience store and truck stop with the following features: public restrooms, pay-shower facilities, laundry machines, casino, and three fast food restaurants.

1.1 APPLICATION

DEQ received an application for renewal of the permit on November 2, 2018. Renewal fees accompanied the application. DEQ reviewed the submittal and issued a completeness letter on November 9, 2018.

1.2 PERMIT HISTORY

This facility was first permitted in October of 1995 (EQ# 96-1473). In 2001 the capacity was increased from 7,500 gallons per day to 15,000 gallons per day. The modification in discharge volume required a new permit which was issued in 2001. The 2001 permit was renewed in 2007 and 2013. The 2013 renewal incorporated the approval of the monitoring well #916B as the ambient monitoring location (located in the parking area east and upgradient of the treatment area). The 2013 renewal also addressed flow monitoring issues and required flow monitoring reports for the system. A June 2018 compliance inspection required the installation of a new flow metering system to accurately and correctly report discharge. The required meter was reported by Casne & Associates to have been installed in 2019. See **Figure 6** for the location of that metering vault. The Town Pump Travel Plaza is owned by Bonner Holdings LLC.

1.3 CHANGES TO THIS PERMIT

This permit renewal will include changes to monitoring parameters and reporting requirements and the addition of a downgradient monitoring well. Water quality based effluent limits are recalculated with each permit cycle using current ambient monitoring data.

2.0 FACILITY INFORMATION

2.1 LOCATION

The Town Pump Travel Plaza, Bonner wastewater treatment system is east of Missoula on Route 200 and north of Interstate 90 at the Bonner interchange (**Figure 1**). The outfall for this facility is on the western portion of the site with adjacent pumping and treatment (**Figure 2**).

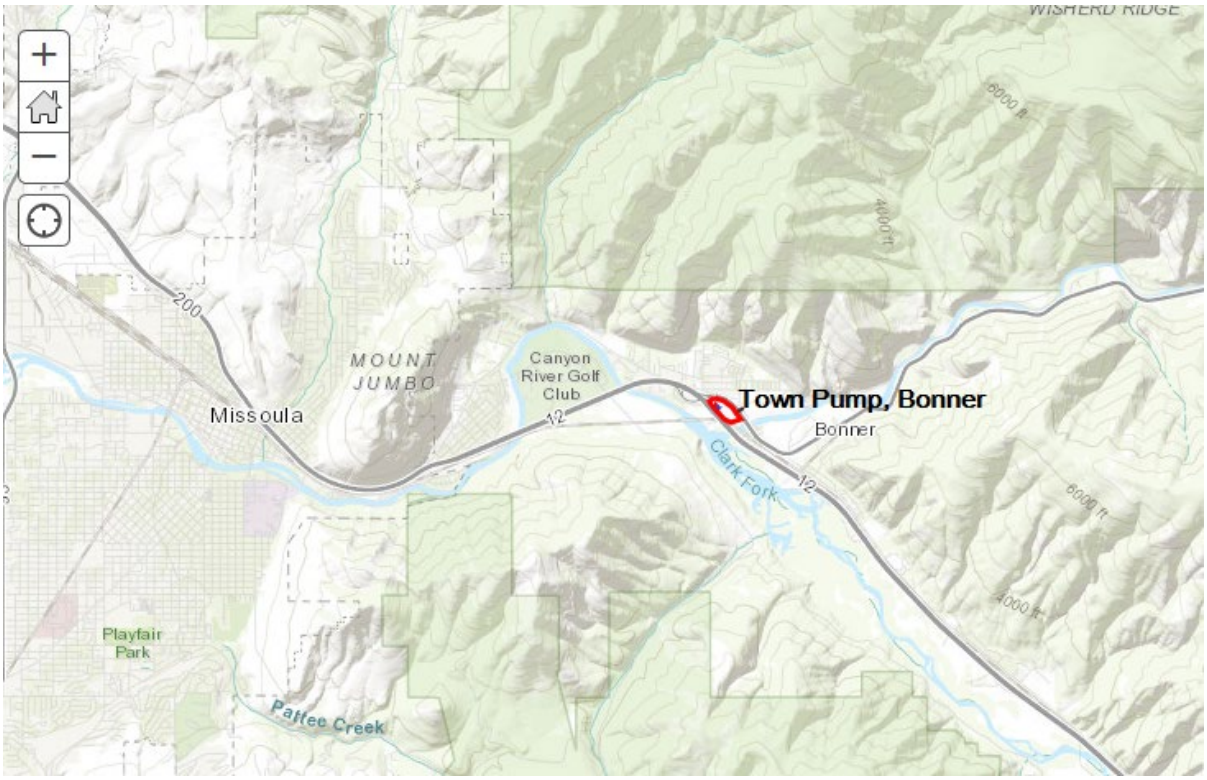


Figure 1. Bonner Town Pump site location.

Figure 2. Bonner Town Pump Site.

Figure 3. Town Pump Travel Plaza, Bonner Site Map

2.2 OPERATIONS

System operations are summarized below in **Table 1**.

Table 1. Bonner Town Pump Collection, Treatment, and Disposal Summary

Collection	
Contributing sources:	24-hour convenience store and truck stop with the following features: Public restrooms, pay-shower facilities, laundry machines, casino, and three fast food restaurants. Non-industrial wastewater.
Standard industrial code(s) of sources:	Eating places, 5812, Grocery Store, 5411, Gasoline Service stations, 5541
Collection method:	Gravity-driven sewer lines to force main.
Flow volume:	Average daily design flow: 15,000 gallons per day Maximum daily design flow: 15,000 gallons per day
Treatment,	
Treatment level:	Level 2
Treatment technology:	Recirculating sand filter, and four pressure-dosed drainfields.
Treatment location:	Latitude: 46.875711°, Longitude: -113.889978°
Disposal	
Method of disposal:	Infiltration to ground water
Disposal structure:	Subsurface drainfield (Outfall 001)
Outfall location:	Latitude: 46.875326° Longitude: -113.890185°

Wastewater generated by the Town Pump Travel Plaza, Bonner facility is directed through a collective treatment system. **Figure 4** provides a flow line diagram showing an overview of the treatment process. Gravity fed sewer lines collect the wastewater and route it through sanitary sewer lines. The wastewater from the restaurant facilities runs through a 6,000 gallon (gal) grease receptor. The wastewater lines combine and flow into a 30,000 gal septic tank and lift station for primary treatment. After primary treatment, the effluent is pumped through a force main to the 20,000 gal recirculating tank. The recirculating tank delivers the wastewater to the recirculating sand filter (RSF) for advanced treatment. The waste filters via gravity through the RSF. The recirculating tank routes a minimum of four-fifths of the wastewater back to the recirculation tank while the remaining portion is diverted to the 6,000 gal drainfield dose tank. The portion of effluent leaving the RSF is pressure-dose into a subsurface drainfield (Outfall 001). The drainfield divides into sixteen (16) zones with four 4-way valves to evenly distribute the effluent. The subsurface drainfield discharges the treated effluent to Class I ground water. A licensed septic tank maintenance person pumps the septic tank semi-annually and grease trap as needed. All grease and sludge are transported and disposed of at the City of Missoula Wastewater Treatment Plant. One (1) Orenco® FM200 flow meter measures total effluent flow rate. The flow meter is located between the septic tank and recirculation tank. Table 1 summarizes the Town Pump and Travel Plaza, Bonner wastewater treatment and disposal system.

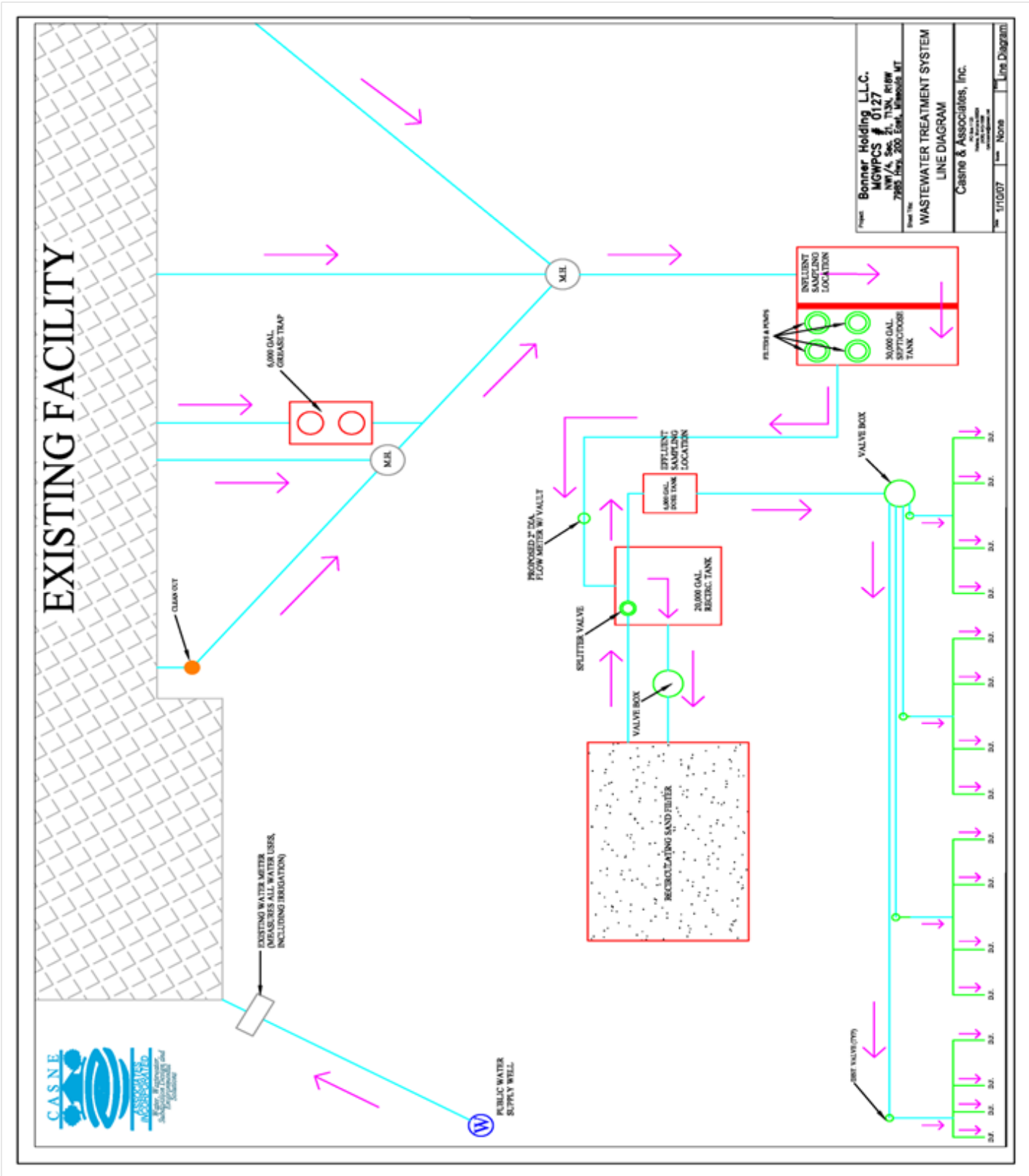


Figure 4. Wastewater Treatment System Line Diagram.

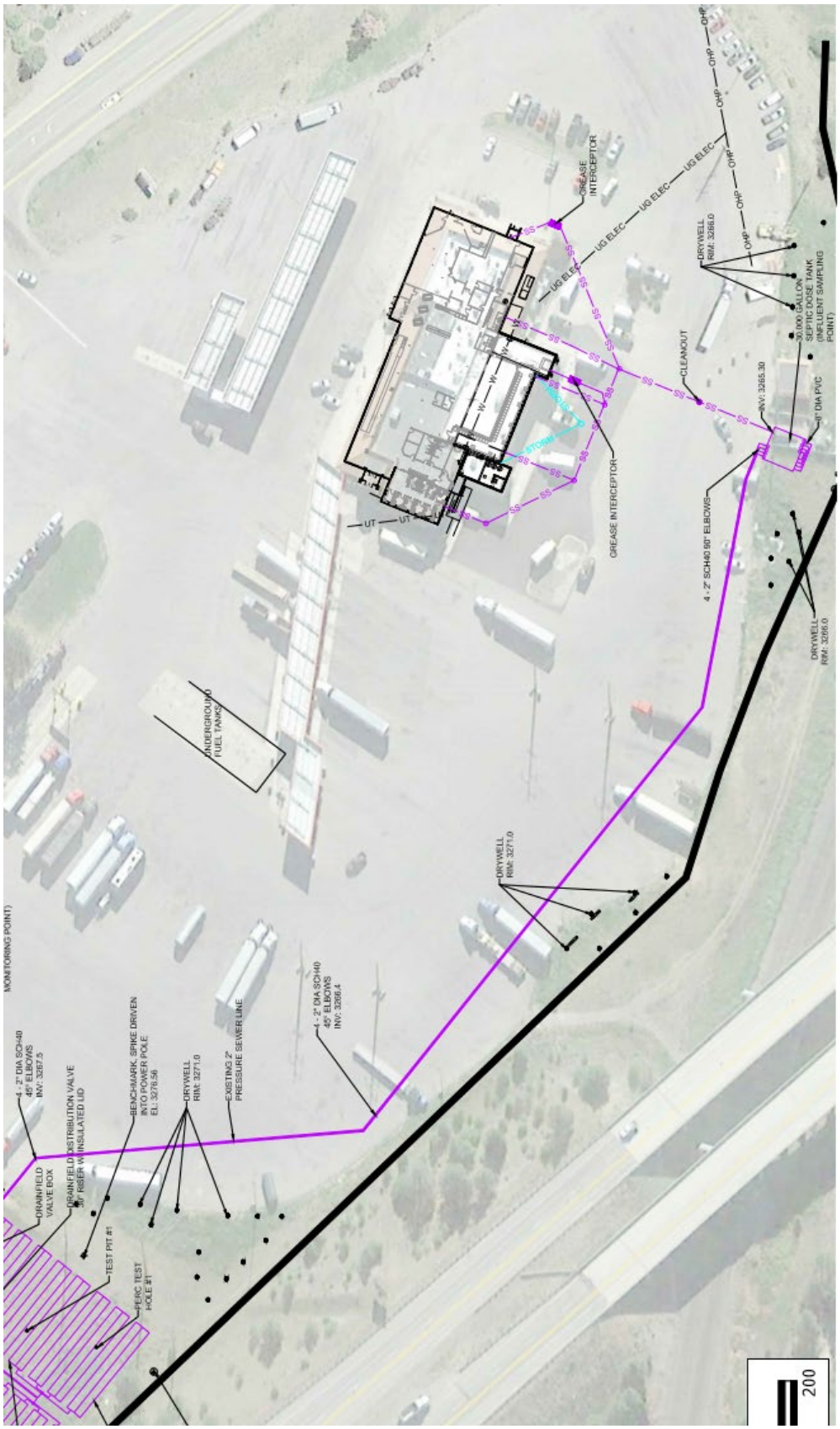


Figure 5. Bonner Town Pump Collection System.

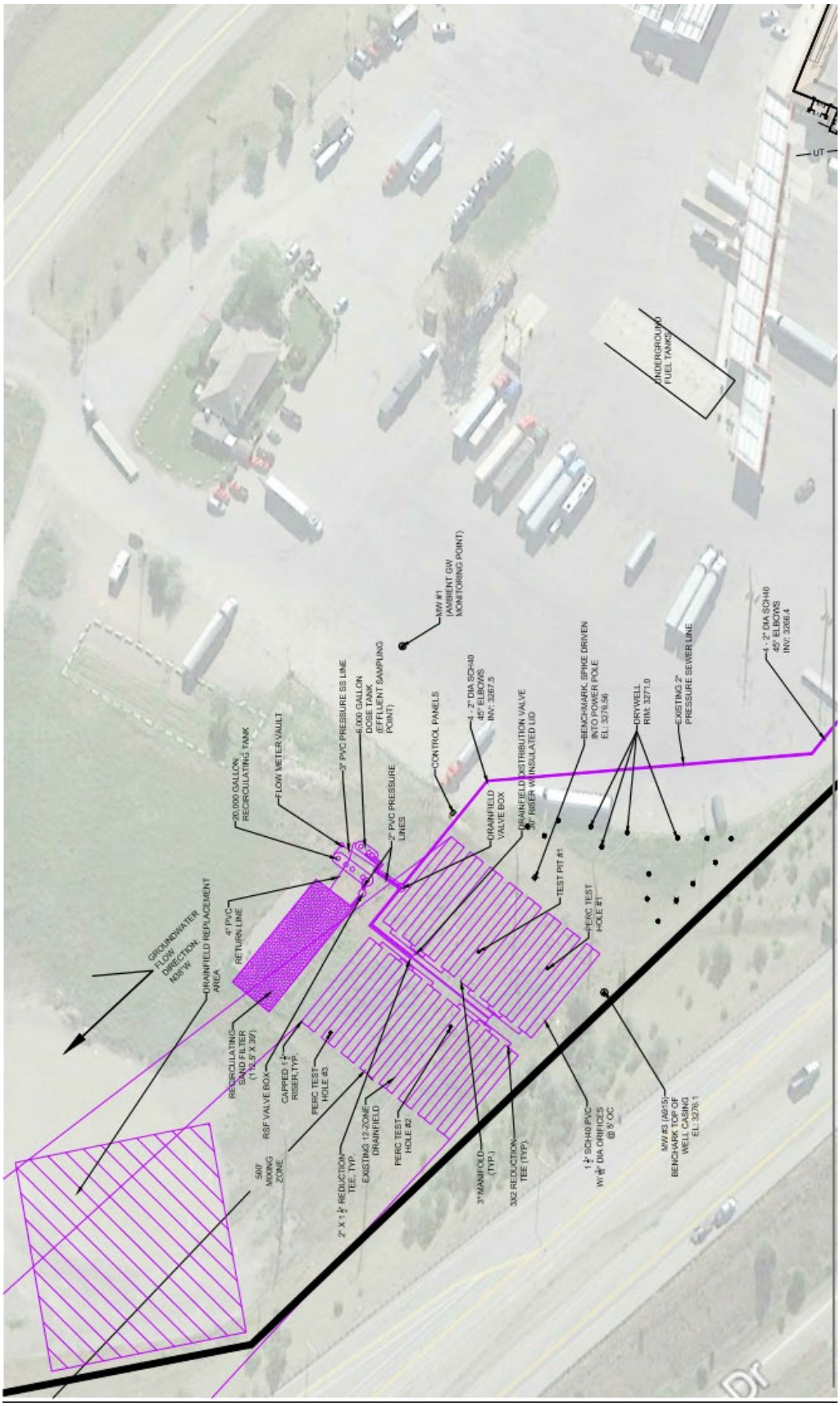


Figure 6. Bonner Town Pump Outfall 001

2.3 EFFLUENT CHARACTERISTICS

DEQ requires a permit applicant to disclose the quality of the effluent so that DEQ may evaluate the potential for pollution of state water. During the previous permit cycle, the facility sampled and reported effluent quality criteria to DEQ in the form of discharge monitoring reports (DMRs). These data are summarized below in **Table 2**. The majority of the concentrations are reported in units of milligrams per liter (mg/L), which is equivalent to one part per million.

Table 2. Effluent Quality Data from Outfall 001

Parameter	Units	Reported DMR values			2013 Limit	# of Samples
		Minimum	Maximum	Average		
Flow rate	Gallons/day	7,305	10,080	8,692	15,000	22
	Gallons/day (Quarterly average)	5,166	16,146	8,265	15,000	22
Nitrogen, nitrate+nitrite	mg/L Qtr. Avg.	.53	26.7	10.77	–	24
Nitrogen, total ammonia	mg/L daily	6.5	63	19.25	–	22
Nitrogen, total Kjeldahl	mg/L daily	9.8	104	29	–	22
Nitrogen, total*	mg/L	21	98	35.7	26	22
	pounds/day	1.41	5.97	2.335	23.8	22
Reported % removal in DMR	% TN	2.8	76.9	62.18	minimum of 60%	22
Phosphorus, total	mg/L	0.46	12.8	4.61	–	63
	pounds/day	0.062	1387	0.617	2.7	63
Total suspended solids	mg/L	0.0	930.0	30.39	–	49

*Total Nitrogen = Nitrate + Nitrite + Total Kjeldahl Nitrogen (as N)
Period of record: 9/30/13 – 6/30/19

2.4 GEOLOGY

The geology of the Hellgate valley consists of sand and gravel deposits with no known areas of shallow bedrock. "The subsurface drainfield is constructed in predominantly coarse alluvial gravels. The alluvium in this area consists primarily of cobbles, gravel and sand" (Land and Water, 1994 and DEQ, Regensberger, 2001).

2.5 HYDROGEOLOGY

The shallow aquifer consists of sand and gravel deposits. "Very little fine material exists in the alluvium, which is evidenced by the high hydraulic conductivities reported" (Land and Water, 1994).

The current depth to shallow ground water at this site ranges from 38.8 feet to 55.6 feet below ground surface (bgs) (GW-1, 2007). "The depth to ground water fluctuates seasonally and is highest during the spring and early summer" (approximately 7 feet of fluctuation over an 11 month period, see statement of basis 2001, Section IV.A.).

The hydraulic conductivity used in the original 1995 non-significance determination, as well as subsequent permit renewals was 1,900 feet per day (ft/day). According to published information contained in the Hellgate Aquifer Study, this value lies within the range of 1,050 to 3,150 ft/day, predicted as part of a local ground water flow model (Land and Water,1994). The hydraulic conductivity of 1,900 ft/day will be used in the permit renewal.

The nearest surface water is the Clark Fork River. The river is approximately 1,000 feet southwest of the drainfield area and is a losing stream in this reach of the river. Ground water flows approximately parallel to the river in the vicinity of this site and will not pass under the river for a distance of approximately 3,500 feet (Land

and Water, 1994). This information was used in the previous two permit renewals. Important hydrogeologic characteristics are summarized below in **Table 3**.

Table 3. Hydrogeologic Summary

Average depth to ground water	38 feet
General ground water flow direction	N45°W
Hydraulic conductivity	1,900 feet per day
Hydraulic gradient	0.0056 feet/feet
Nearest downgradient surface water	Clark Fork River 3500 feet NW

2.6 GROUND WATER MONITORING WELLS

There are two monitoring wells associated with this permit: MW#916B and MW#919C. These wells are plotted on **Figure 5**. Monitoring well construction details are provided below in **Table 4**. MW#916B is an upgradient ambient monitoring well that is approved by DEQ and is located in the parking area northeast of Outfall 001. This is a nested well and represents upgradient water quality. A driller's logs for this well is attached as **Appendix A**.

Monitoring well MW#919C is being added to the monitoring requirements of this renewal as a downgradient well. This well was installed as part of the Milltown Dam project. It is also a nested well with three levels screened separately. The monitoring well is located approximately 340 feet northwest of Outfall 001.

Table 4. Monitoring Well Summary

Monitoring Well MW-1 (MW#916B), upgradient well.	
MBMG GWIC ID:	No #GWIC. This well is also referenced as well 916B.
Location- latitude/longitude:	46.875443° Longitude: -113.889091°
Location- narrative:	Parking area 150 feet north and east of Outfall 001, nested wells A and B .
Rationale:	Upgradient, ambient receiving water quality
Depth; screened interval:	Nested well, MW1B total depth is 80 feet, screened from is 68 to 78 feet, MW1A total depth is 106 feet and is screened from 87 to 97 feet.
Notes:	This well was approved by DEQ.
Monitoring Well MW-2 (MW#919C), downgradient well.	
MBMG GWIC ID:	No #GWIC. This well is also referenced as well 919C
Location-latitude/longitude:	Latitude: 46.87618° Longitude: -113.891226°
Location narrative:	Approximately 340 feet northwest of outfall in mixing zone
Rationale:	Downgradient monitoring of shallow aquifer.
Depth: screened interval:	MW2#919C is a nested well screened from 85-95 feet. Total Depth is 200 feet.
Notes:	This downgradient monitoring well is being added.

If a DEQ-approved monitoring well is abandoned, destroyed or decommissioned, or is no longer able to be sampled due to fluctuations in the ground water table, the permittee must install or designate a new well to replace the abandoned, destroyed, decommissioned, or non-viable well.

2.7 GROUND WATER QUALITY CHARACTERISTICS

Water sampling results from MW1 are provided below in **Table 5**. Based on the 281 average microsiemens per centimeter (µS/cm) specific conductance, the receiving water is Class I ground water. Data reported in the table is taken from data from DMRs and application material.

Table 5. Ambient Water Quality Reported From Monitoring Well MW1#916B

MW1 represents shallow ground water 320 feet north east and upgradient of Outfall 001						
Parameter[(1)]	**Units**	**Reported in Application and DMR Values**			**Reporting Limit**	**# of Samples**
		Minimum	**Maximum**	**Average**		
Chloride (as Cl)	mg/L	4	6	5	1	3
Total dissolved solids	mg/L	158	166	162	10	2
Escherichia coli bacteria	CFU/100mL	<1	<2	<1	1	3
Nitrogen, nitrate+nitrite (as N)	mg/L	.33	.37	.35	0.01	3
Nitrogen, total Kjeldahl (as N)	mg/L	ND	ND	ND	0.5	3
Total Nitrogen	Mg/L	0.33	0.6	0.41	7.5	4
Organic carbon	mg/L	1.2	1.2	1.2	0.5	3
pH	Standard units	7.3	8.2	7.7	0.1	3
Specific conductivity (@25°C)	µS/cm	272	296	281	1	3
Static water level	Feet below ground surface	50	54	52	0.1	3

*Total Nitrogen = Nitrate + Nitrite + Total Kjeldahl Nitrogen (as N)
(1) Nitrogen Period of Record 9/30/2018 – 9/26/2019, all other parameters 9/30/2013 – 9/26/2019

The calculated total nitrogen concentration in the receiving water is 0.35 mg/L.

3.0 WATER QUALITY STANDARDS AND NONDEGRADATION

Part of DEQ's mission is to protect, sustain, and improve the quality of state waters. Water quality standards provide the basis for effluent limits that DEQ applies to discharge permits (**Section 5**). These standards include three components: designated uses, water quality criteria, and nondegradation policy. DEQ protects all designated uses of state water by basing effluent limits on the most restrictive water quality limitations, intended to protect the most sensitive uses.

3.1 DESIGNATED USES

With a specific conductivity of 281 µS/cm (**Table 5** above), the receiving water is Class I ground water and therefore a high-quality water of the State. Class I ground waters must be maintained suitable for the following uses with little or no treatment:

- Public and private drinking water supplies
- Culinary and food processing purposes
- Irrigation
- Drinking water for livestock and wildlife
- Commercial and industrial purposes

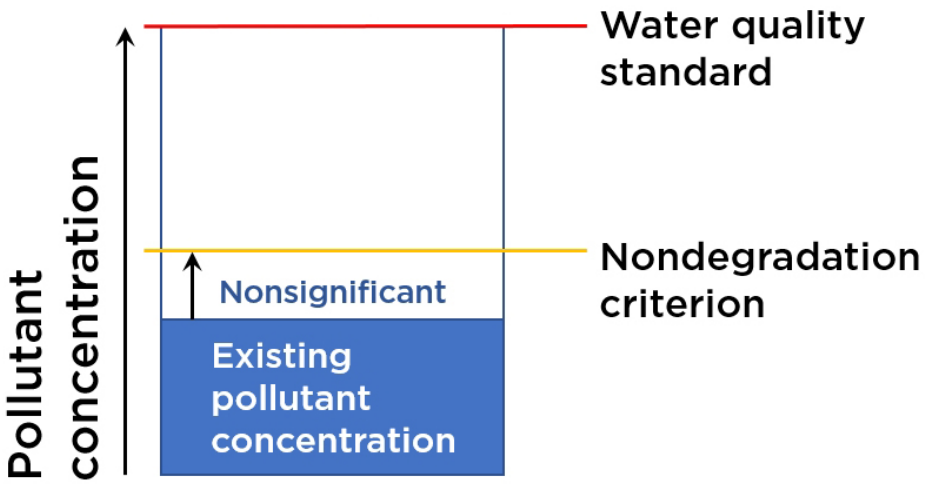
DEQ protects all the assigned beneficial uses by protecting the most sensitive. Drinking water is the most sensitive use of this receiving water.

3.2 Water Quality Criteria

Montana has water quality standards for both surface water and ground water. The numeric criteria for each are different because they must support different uses. DEQ writes permits to protect the most sensitive, thereby protecting all uses. DEQ's ground water standard for nitrate is 10.0 mg/L, as is the standard for nitrate + nitrite (as nitrogen). Class I ground water must be maintained suitable for use as a drinking water supply with little or no treatment, and therefore must meet the corresponding human health standard of 10.0 mg/L total nitrogen. These water quality standards may not be exceeded outside a designated mixing zone (**Section 4**).

3.3 Nondegradation

Montana's nondegradation policy is intended to preserve the existing condition of high-quality state waters. Any water whose existing condition is better than the water quality standards must be maintained in that high quality. Nondegradation policy allows discharges to cause only nonsignificant changes in water quality. Changes in water quality that are deemed significant require an authorization to degrade. An authorization to degrade is not an authorization to pollute; the water quality standard must not be exceeded.



DEQ must determine whether the proposed discharge will result in significant changes in water quality.

3.4 Nonsignificance

This section establishes whether or not a significance determination is required for this action.
When developing the initial permit and modified permit (1994 and 2001), DEQ determined that discharges in compliance with this permit result in nonsignificant changes in water quality. This discharge has not increased or changed in character since this determination, therefore DEQ did not perform a new significance determination for this permit renewal. DEQ determined that the discharge continues to meet ground water nonsignificance/nondegradation criteria (described below) at the end of the mixing zone (**Section 4**). DEQ used these criteria and updated ground water quality data to establish effluent limits (discussed below in **Section 5**).

3.4.1 Ground Water Nonsignificance Criteria

For this discharge to ground water, the following nonsignificance criteria are relevant:

Nitrogen

Under Montana statute, ground water total nitrogen at or below 7.5 mg/L at the downgradient end of the mixing zone (see **Section 4**) is a nonsignificant change in water quality, so long as the discharge does not cause degradation of surface water. Evaluation of the effects to surface water are discussed below in **Section 3.4.2**. Using the nonsignificance criterion of 7.5 mg/L, DEQ established effluent limits that cause the discharge to comply with ground water nonsignificance/nondegradation criteria at the end of the mixing zone. This is discussed in detail in **Section 5.1**.

Phosphorus

A total phosphorus surface water breakthrough time of greater than 50 years is a nonsignificant change in water quality. The phosphorus criterion requires an analysis to determine a breakthrough time. Breakthrough occurs when the subsurface soils lose their capability to adsorb any more phosphorus, and it reaches surface water.

A phosphorus breakthrough analysis conducted by DEQ in 2007 (DEQ, 2007) estimated the phosphorus breakthrough to occur in 89.5 (>50) years. Phosphorus breakthrough time of greater than 50 years is considered nonsignificant. The 2007 permit established an effluent limit in order to maintain the 50-year breakthrough. This 2007 effluent limitation is maintained within this proposed permit renewal.
Ground water discharges meeting these criteria are nonsignificant, so long as they do not cause degradation of surface waters (see **Section 3.4.2**).

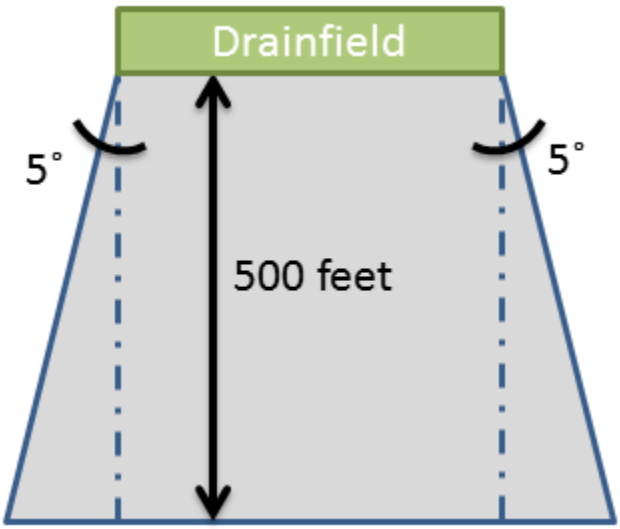
3.4.2 Surface Water Nondegradation

The phosphorus breakthrough analysis is based upon distance and time to nearest downgradient surface water, inherently addressing the potential for degradation of surface water. Therefore, the analysis of reasonable potential for surface water degradation in this section is limited to nitrogen.

4.0 MIXING ZONE

DEQ authorizes a standard mixing zone for total nitrogen discharged from Outfall 001. A mixing zone is a specifically defined area of the receiving water where water quality standards may be exceeded. DEQ evaluates the suitability according to criteria established in the Administrative Rules of Montana. The mixing zone is then defined in the permit. The applicant requested a standard mixing zone for this discharge, consistent with previous permit cycles.

A standard mixing zone extends 500 feet downgradient from the source. The upgradient boundary is equal to the width of the source (measured perpendicular to the of ground water flow direction). The mixing zone widens in the downgradient direction by 5° on either side. The width of the downgradient boundary is calculated by adding the increased width for each side (the tangent of 5° (0.0875) times the mixing zone length) to the width of the upgradient boundary. Standard mixing zones extend 15 feet below the ground water table.



The volume of ground water (Q_{GW}) available to mix with the effluent is calculated using Darcy's Equation: $Q_{GW} = KIA$

Where:
Q_{GW} = ground water flow volume (feet^3/day)
K = hydraulic conductivity (feet/day)
I = hydraulic gradient (feet/feet)
A = cross-sectional area (feet^2) at the downgradient boundary of the mixing zone.

Table 6 summarizes the variables used in Darcy's equation and the resulting volume of ground water available to mix at Outfall 001. These values are drawn from the previous fact sheet, recent investigation, permit application.

Table 6. Standard Mixing Zone for Total Nitrogen Discharged from Outfall 001

Parameter	Units	Value
Receiving water nitrogen concentration	0.41	mg/L
Ground water flow direction	N45W	Bearing
Length of mixing zone	500	Feet
Thickness/depth of mixing zone	15	Feet
Upgradient width of mixing zone	240	Feet
Downgradient width of mixing zone	327.5	Feet
Cross-sectional area of mixing zone (A)	4,912	Square feet
Hydraulic conductivity (K)	1,900	Feet per day
Hydraulic gradient (I)	.0056	Feet per feet
Volume of ground water available for mixing (Q_{GW})	52,269	Cubic feet per day

In order to determine whether a mixing zone is allowable, DEQ calculates a predicted concentration at the downgradient end of the mixing zone. This mixing calculation follows the following procedure:

- Volume of ground water times the concentration of the parameter = existing load;
- Volume of discharge times the concentration of the parameter = waste load; and
- (Existing load + waste load) / total volume = predicted concentration.

Because the predicted concentration must satisfy the most stringent nonsignificance criterion (**Section 3**), DEQ can calculate water quality based effluent limits (WQBELs) by rearranging the equation and solving for the effluent concentration (**Section 5**).

5.0 Permit Conditions

Discharge permits include conditions that ensure compliance with the Montana Water Quality Act and the regulations used to implement it. These conditions include effluent limits as well as any special conditions that DEQ deems necessary to protect the quality of the receiving water.

Montana's numeric water quality standards are published in Circular DEQ-7. Water quality criteria applicable to this permit are summarized below in **Table 7**. The permit establishes effluent limits that will meet water quality standards and nondegradation criteria, thereby protecting beneficial uses and existing high quality waters. The most restrictive criteria in **Table 7** provide the basis for the effluent limits.

Table 7. Applicable Ground Water Quality Criteria

Parameter	Human Health Standard	Beneficial Use Support	Nondegradation Criteria
Nitrate plus nitrite (as Nitrogen[N])	10 mg/L	-	-
Total Nitrogen	-	10 mg/L	**7.5 mg/L**
Total Phosphorus	-	-	**>50 year breakthrough**

This discharge permit includes numeric WQBELs that restrict the strength and volume of the discharge. The ground water nonsignificance criteria (**Section 3.4.1**) provide the basis for the limits. DEQ calculates WQBELs by rearranging the mixing zone equation (**Section 4**) and solving for the effluent concentration that satisfies the water quality criteria. DEQ evaluates and recalculates the limits using updated water quality data as part of every permit renewal cycle. In this way, DEQ protects the receiving water quality by continually assessing cumulative impacts to the receiving water.

DEQ calculated the effluent limits using the same method as for the previous permit. DEQ uses updated ambient ground water quality data to re-evaluate the receiving water quality and the assimilative capacity for dilution.

5.1 TOTAL NITROGEN EFFLUENT LIMIT

The nonsignificance criterion of 7.5 mg/L is the most restrictive of the water quality criteria applicable to this permit; therefore it is the water quality target for this effluent limit. DEQ established the final WQBEL for this discharge by back-calculating the effluent concentration that results in 7.5 mg/L at the end of the mixing zone, given the available dilution. Available dilution is determined by recent ground water quality sampling of the receiving water. Ambient total nitrogen averaged 0.41 mg/L (**Section 2**). DEQ calculates an effluent limit that protects receiving water quality and beneficial uses according to the following equation:

$$\underline{\text{Equation 1:}}\ C_{lmt} = C_{std} + D(C_{std} - C_{gw})$$

Where:

C_{lmt} = effluent limitation concentration
C_{std} = limiting water quality criterion
C_{gw} = ambient receiving ground water concentration
D = dilution ratio (Q_{gw} / Q_{eff})
Q_{gw} =ground water flux at the end of the mixing zone
Q_{eff} = average maximum daily discharge

Using the values provided above in **Table 6**, the result for C_{lmt} is 192.31 mg/L. This is the final WQBEL expressed as a concentration. Load limits are more appropriate for discharges to ground water since the long-term loading is the greater concern in absence of aquatic life considerations. Additionally, load limits inherently control both the strength and volume of the discharge. A discharge of 15,000 gallons per day containing 192.31mg/L total nitrogen is equivalent to 24.00 pounds per day. The limit calculations are provided in detail in **Appendix B**.

5.2 TOTAL PHOSPHORUS EFFLUENT LIMIT

DEQ previously determined (2007) that phosphorous discharged to ground water would reach the surface water Clark Fork River in 89.5 years. A phosphorous breakthrough time of less than 50 years is considered significant. As discussed above, the total phosphorous effluent limit will stay the same as the last permit cycle. The phosphorous effluent limit is 484 pounds per year.

Based on the information and analyses presented above, DEQ proposes the following numerical effluent limitations in **Table 8** below.

Table 8.

Proposed Final Effluent Limits – Outfall 001, Bonner Town Pump, MTX000127				
Parameter	**Units**			
		Daily Maximum(1)(2)	**Minimum Percent Removal**(1)	**Annual Maximum**(1)(3)
Nitrogen, Total (as N)	lbs/day	24	NA	NA
	%	NA	60	NA
Phosphorus, Total (as P)	lbs/year	NA	NA	484

Footnotes:

Beneficial Uses: ARM 17.30.1006

(1) See definition in Part V of permit.

(2) Highest measured daily value for the reporting period as indicated on the Dishcharge Monitoring Report (DMR) form.

(3) Calculated as {[Influent TN - Efflent TN/Influent TN] x 100} using the corresponding quarterly average values as reported on the DMR form for the reporting period.

6.0 MONITORING AND REPORTING REQUIREMENTS

DEQ requires effluent, influent and ground water monitoring to assure compliance with the effluent limitations and therefore water quality standards. Effluent, influent monitoring and ground water monitoring is required as a condition of this permit. All monitoring and sampling required by this permit must be representative; therefore the permit identifies specific monitoring locations. Monitoring requirements and rationale are summarized below.

6.1 EFFLUENT/INFLUENT MONITORING

This permit includes numeric effluent limitations with specific magnitudes and durations to ensure the discharge will not cause or contribute to an exceedance of an applicable water quality standard (see **Section 3**). Accordingly, the permittee is required to monitor and report at a specified frequency in order to demonstrate compliance with these limitations.

Effluent and influent samples and discharge flow measurements must be representative of the nature and volume of the effluent. The influent sample location (INF-001) is located at the initial 30,000 gallon STEP tank prior to treatment. Effluent sampling is done at the dose tank prior to discharge. Flow metering is done prior to the recirculating tank. All locations are shown in **Figure 3**. The permittee is required to maintain and report flow measurements using a flow-measuring device capable of measurements that are within 10 percent of the actual flow. The flow measuring device (FM-001) is located as shown in **Figure 3**. The flow measuring device must be installed and in operating condition prior to discharge.

Effluent and Influent monitoring and reporting requirements are summarized in **Table 9** below. All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter.

Table 9.

Influent and Effluent Monitoring and Reporting Requirements – Outfall 001 Bonner Town Pump, MTX000127

Parameter	Monitor Location	Units	Sample Type[1]	Minimum Sample Frequency	Reporting Requirements[1][2]	Report Freq
Count of Daily Samples Collected During Reporting Period	EFF-001	-	-	-	Count	Quarterly
Flow Rate, Effluent[6]	FM-001	gpd	Contin-uous	Contin-uous	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Nitrite+Nitrate (as N)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total (as N)[7]	EFF-001	mg/L	Calculate	1/Quarter	Daily Maximum Quarterly Average	Quarterly
		lbs/day[8]	Calculate	1/Quarter	Daily Maximum[9] Quarterly Average[10]	Quarterly
Nitrogen, Nitrite+Nitrate (as N)	INF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)(as N)	INF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nirogen, Total (as N)	INF-001	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen Total Percent removal (4)	0	% (mg/L)	Calculate(5)	1/Quarter	Daily Minimum(3) Quarterly Average	Quarterly
Phosphorus, Total (as P)	EFF-001	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
		lbs/day[8]	Calculate	1/Quarter	Quarterly Average[10]	Quarterly
		lbs/year[11]	Calculate	1/Year	Annual Maximum[12]	Annually[13]

Footnotes:

EFF-001: Description provided in **Figure 3.**

INF-001: Description provided in **Figure 3.**

FM-001: Description provided in **Figure 3**.

If no discharge occurs through out the reporting period, "no discharge" shall be recorded on the effluent Discharge Monitoring Report (DMR) report forms.

Grab sample will represent concentration for a 24 hour period.

Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless

(1) See definitions in Part V of the permit.

(2) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR) form.

(3) Daily Minimum: Report lowest measured daily value for the reporting period on Discharge Monitoring Report (DMR).

(4) Percent Removal will be based on daily minimum.

(5) Calculated as {[(Influent TN - Effluent TN)/Influent TN]*100} using the corresponding quarterly average values as reported on the Discharge Monitoring Report (DMR) form for the reporting period.

(6) Requires recording device or totalizing meter, must be capable of recording daily effluent volume.

(7) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.

(8) Load calculation: lbs/day = (mg/L) x flow (gpd) x [8.34 x 10^{-6}].

(9) Daily Maximum Load calculation: lbs/day = the maximum of all calculated individual daily average loads (lbs/day) recorded during the reporting period.

(10) Quarterly Average Load calculation: lbs/day = the average of all calculated individual daily average loads (lbs/day)

(11) Annual Load calculation: lbs/year = (mg/L) x flow (gpd) x [8.34 x 10-6] x 365 (days/year).

(12) Annual Load calculation: lbs/year = the total average of all calculated individual daily average loads (lbs/day) recorded during the calendar year, multiplied by 365 (days/year).

(13) Annual maximum load shall be reported (DMR) on an annual basis (due January 28 each year of the permit cycle).

6.2 GROUND WATER MONITORING

As a condition, this permit requires ground water monitoring to provide long term of the aquifer. Ground water monitoring will be required at monitoring wells MW-1. Data collected via ground water monitoring will be used for mixing zone evaluation and aquifer characterization in future permit. Ground water monitoring and reporting requirements are summarized in the table below. Sampling and reporting requirements shall commence upon the effective date of the permit. Quarterly ambient ground water monitoring was established in the 2013 permit renewal. That requirement is continued as a requirement of this renewal.

Ground water monitoring and reporting requirements are summarized in **Table 10** below. All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter.

Table 10.

Ambient Ground Water Monitoring and Reporting Requirements MW1#916B and MW2#919C.

Parameter	Monitor Location, MW1 is well #916B, MW2 is #919C [1]	Units	Sample Type[2]	Minimum Sampling Frequency	Reporting[2][3][4] Requirements	Reporting Frequency
Chloride (as Cl)	MW1 and MW2	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Count of Daily Samples Collected During Reporting Period	MW1 and MW2	-	-	-	Count	Quarterly
Escherichia coli Bacteria	MW1 and MW2	CFU/100ml	Grab	1/Quarter	Daily Maximum Quarterly Average[5]	Quarterly
Nitrogen, Nitrate + Nitrite (as N)	MW1 and MW2	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)(as N)	MW1 and MW2	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly
Specific Conductivity @ 25°C	MW1 and MW2	µS/cm	Grab or Instant-aneous	1/Quarter	Minimum Quarterly Average Maximum	Quarterly
Temperature	MW1 and MW2	°C	Instant-aneous	1/Quarter	Minimum Quarterly Average Maximum	Quarterly
Static Water Level (SWL)[6]	MW1 and MW2	ft-bmp	Instant-aneous	1/Quarter	Minimum Quarterly Average Maximum	Quarterly

Footnotes:

CFU = Colony Forming Units

ft-bmp = feet below measuring point

s.u. = standard units

At no time shall the permittee mark or state "no discharge" on any monitoring well DMR form.

If any monitoring well(s) are abandoned, destroyed or decommissioned, or are no longer able to be sampled due to fluctuations in the ground water table; the permittee shall install a new well to replace the abandoned, destroyed, decommissioned, or non-viable well(s).

Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above.

Submittal of discharge monitoring report forms (DMRs) will be required, regardless of the operational status of the facility or of each individual monitoring well.

(1) Refer to Section 2.6 and Table 4 of the Fact Sheet for the existing location of the monitoring well.

(2) See definitions in Part V of the permit.

(3) Submittal of DMRs will be required, regardless of the installation status of each individual monitoring well. If the monitoring well(s) is not installed for an individual monitoring period, the following shall be stated upon each applicable DMR: "monitoring well has not been installed".

(4) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR).

(5) The geometric mean must be reported if more than one sample is taken during a reporting period.

(6) Measuring point (point of reference) for SWL measurements shall be from top of casing and measured to within 1/100th of one foot.

PUBLIC NOTICE

Legal notice information for water quality discharge permits are listed at the following website: http://deq.mt.gov/Public/notices/wqnotices. Public comments on this proposal are invited any time prior to close of business **on January 31, 2020**. Comments may be directed to:

DEQWPBPublicComments@mt.gov

or to:
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Montana Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, MT 59620

All comments received or postmarked prior to the close of the public comment period will be considered in the formulation of the final permit. DEQ will respond to all substantive comments pertinent to this permitting action and may issue a final decision within thirty days of the close of the public comment period.

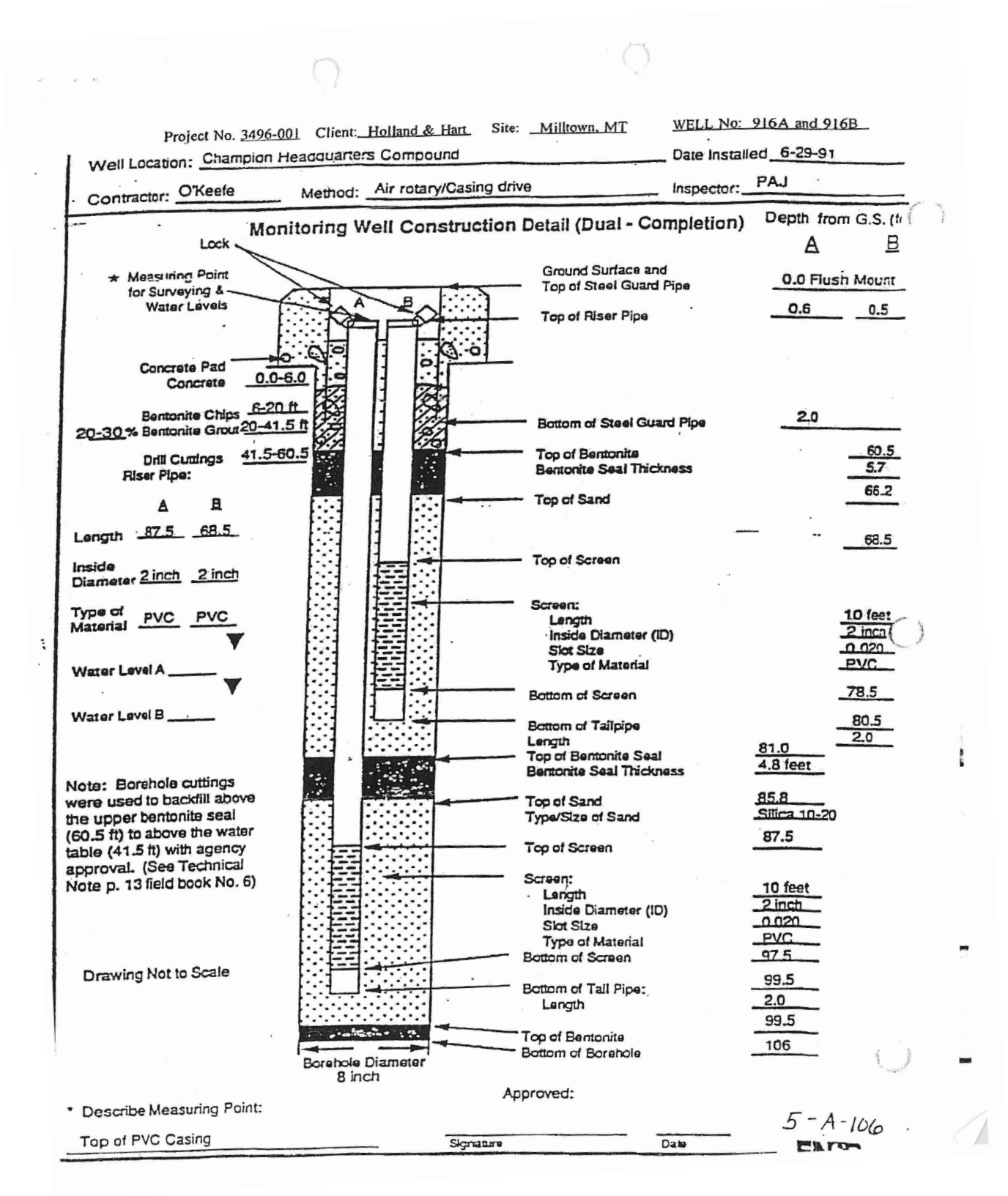
All persons, including the applicant, who believe any condition of the draft permit is inappropriate, or that DEQ's tentative decision to deny an application, terminate a permit, or prepare a draft permit is inappropriate, shall raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period (including any public hearing). All public comments received for this draft permit will be included in the administrative record and will be available for public viewing during normal business hours.

Copies of the public notice are mailed to the applicant, state and federal agencies, and interested persons who have expressed interest in being notified of permit actions. A copy of the distribution list is available in the administrative record for this draft permit. Electronic copies of the public notice, draft permit, fact sheet, and draft environmental assessment are available at the following website: http://deq.mt.gov/Public/notices/wqnotices.

Any person interested in being placed on the mailing list for information regarding this permit may contact the DEQ Water Protection Bureau at (406) 444-5546 or email DEQWPBPublicComments@mt.gov. All inquiries will need to reference the permit number (MTX000127), and include the following information: name, address, and phone number.

During the public comment period provided by the notice, DEQ will accept requests for a public hearing. A request for a public hearing must be in writing and must state the nature of the issue proposed to be raised in the hearing.

APPENDIX A – MONITORING WELL LOG MW1 (WELL 916A AND 916B)



APPENDIX B – EFFLUENT LIMIT CALCULATIONS

The system consists of a recirculating sand filter (RSF) system (Level 2 method for nitrogen treatment).

To protect beneficial uses [ARM 17.30.1006(1)(b)(ii)], there shall be no increase of a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses. Therefore, no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. DEQ establishes the effluent limitations for nitrogen based on the projection that the entire nitrogen load in the wastewater stream may ultimately be converted to nitrate (USEPA, 2002a).

The allowable discharge concentrations are derived from a mass-balance equation (ARM 17.30.517) which is a simple steady-state model, used to determine concentration after accounting for other sources of pollution in the receiving water and any dilution as provided by a mixing zone. The mass-balance equation (Equation 1) derived for ground water is as follows:

Equation 1:

$$Q_{gw}C_{gw} + Q_{eff}C_{eff} = Q_{comb}C_{proj}$$

Where:

Q_{gw}	=	ground water available for mixing
C_{gw}	=	ambient receiving ground water concentration
Q_{eff}	=	maximum design capacity of wastewater system
C_{eff}	=	effluent pollutant concentration
Q_{comb}	=	combined ground water and effluent ($Q_{comb} = Q_{gw} + Q_{eff}$)
C_{proj}	=	projected pollutant concentration (after available mixing)

The mass-balance equation has been arranged to calculate effluent limits so that the discharge does not cause or contribute to an exceedance of the most restrictive water quality standard. This equation can be applied to any effluent and receiving water where the applicable dilution ratio is known. This equation will only be used for nitrogen which has been authorized mixing (Section 4).

Equation 2:

$C_{lmt} = C_{std} + D(C_{std} - C_{gw})$

Where:
C_{lmt} = effluent limitation concentration
C_{std} = water quality standard concentration = 7.5 mg/L
C_{gw} = ambient receiving ground water concentration = 0.41 mg/L
D = dilution ratio (Q_{gw} / Q_{eff}) = 52,264 /2,005

$C_{lmt} = 7.5 + (52{,}264/2{,}005)(7.5 - 0.41)$ **= 192.31 mg/L**

A mass-balance approach is used to calculate the effluent quality of the discharge that meets the most restrictive water quality standard at the end of the mixing zone. Numeric effluent limitations are expressed as loads since this type of limitation inherently regulates both volume and strength of the effluent as prescribed by 75-5-402(3), MCA. Load limits ensure compliance with the ground water standards at the end of the mixing zone. Based on the proposed design capacity, the respective load effluent limitation is:

24.0 lbs/day
[(8.34*10-6)* 192.31 mg/L*15,000 gpd]
as based on the following equation:

Equation 3:

$L_{lmt} = CON * C_{eff} *$

DC_{eff} Where:
L_{lmt} = effluent limitation-load
C_{eff} = allowable effluent concentration
DC_{eff} = design capacity of wastewater treatment system
(gpd) CON = conversion factor [$8.34*10^{-6}$]

The Final Effluent Limits are summarized in Table 8 for Outfall 001.