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:	Anaconda-Deer Lodge County
Permit Number:	MTX000338
Permit Type:	Domestic wastewater
Application Type:	Renewal
Facility Name:	Anaconda-Deer Lodge County Wastewater Holding Ponds and IP Beds Facility
Facility Location:	Section 29, T5N, R10W, Anaconda-Deer Lodge County Latitude: 46.12924°, Longitude: -112.90081°
Facility Address:	Approximately ¼ mile east of the intersection of the Galen Highway and Lost Creek Road in Anaconda, MT 59711
Facility Contact:	Carl Hamming, Planning Director
Treatment Type:	Aerated Lagoons
Receiving Water:	Class I Ground Water
Number of Outfalls:	1
Outfall / Type:	001 / Infiltration - Percolation (IP) Beds
Effluent Type:	Domestic and commercial strength wastewater
Mixing Zone:	Standard
Effluent Limit Type:	WQBEL
	Total nitrogen: 219 lbs./day
Flow Rate:	Design maximum: 3.0 million gpd Design average: 2.5 million gpd
Effluent sampling:	Monthly: INF-01 (Influent sampling manhole) Monthly: EFF-01 (Effluent sampling manhole)
Ground water sampling:	Monthly: MW-5, MW-6; Quarterly: MW-1B
Fact Sheet Date:	September 2025
Prepared By:	M. Peziol

1.0 PERMIT INFORMATION

The following fact sheet outlines the basis for issuing a renewal Montana Ground Water Pollution Control System (MGWPCS) wastewater discharge permit to Anaconda-Deer Lodge County (Permittee) for the Anaconda-Deer Lodge County Wastewater Holding Ponds and IP Beds Facility. The MGWPCS permit application and supplemental materials provide the information that serves as the basis for the development of the effluent limits and the monitoring requirements outlined within this fact sheet. The scope of this permitting action is for the construction, operation, and maintenance of the wastewater treatment and disposal system.

DEQ issues MGWPCS permits for a period of five years. The permit may be renewed at the end of the period, subject to timely application, reevaluation of compliance, water quality, and operations and maintenance.

1.1 PERMIT HISTORY

The original permit, MTX000231, was issued on April 1, 2014. The permit renewed in 2019 with conditions requiring lagoon liner and aerator replacement and construction of a septic pumper truck dump station. Substantial completion of these improvements was documented by DEQ in November 2021.

Permit MTX000231 expired on May 31, 2024. Anaconda-Deer Lodge County submitted a new application for MGWPCS coverage on May 15, 2025, which DEQ determined complete on September 16, 2025. The new MGWPCS permit number for Anaconda-Deer Lodge County Wastewater Holding Ponds and IP Beds Facility is MTX000338.

2.0 FACILITY INFORMATION

2.1 LOCATION

The Anaconda-Deer Lodge Wastewater Holding Ponds and Infiltration/Percolation (IP) Beds Facility is located northeast of Anaconda in Section 29, Township 5 North, Range 10 West (**Figure 1**). The headworks and aerated lagoons are situated approximately 1.5 miles east of Anaconda along MT Highway 1, about 0.5 miles west of the intersection of Galen Road and MT Highway 48 at Latitude 46.12924°, Longitude -112.90081° (**Figure 2**).

The facility's discharge point, Outfall 001, consists of the holding ponds and infiltration/percolation (IP) beds, which are located approximately 3 miles northeast of Anaconda at the intersection of Galen Road and Lost Creek Road, at Latitude 46.15806°, Longitude -112.88083° (**Figure 3**). In addition, the irrigation facility is located approximately 5 miles northeast of Anaconda at the junction of Galen Road and South Racetrack Road at Latitude 46.184666°, Longitude -112.86889° (**Figure 4)**.

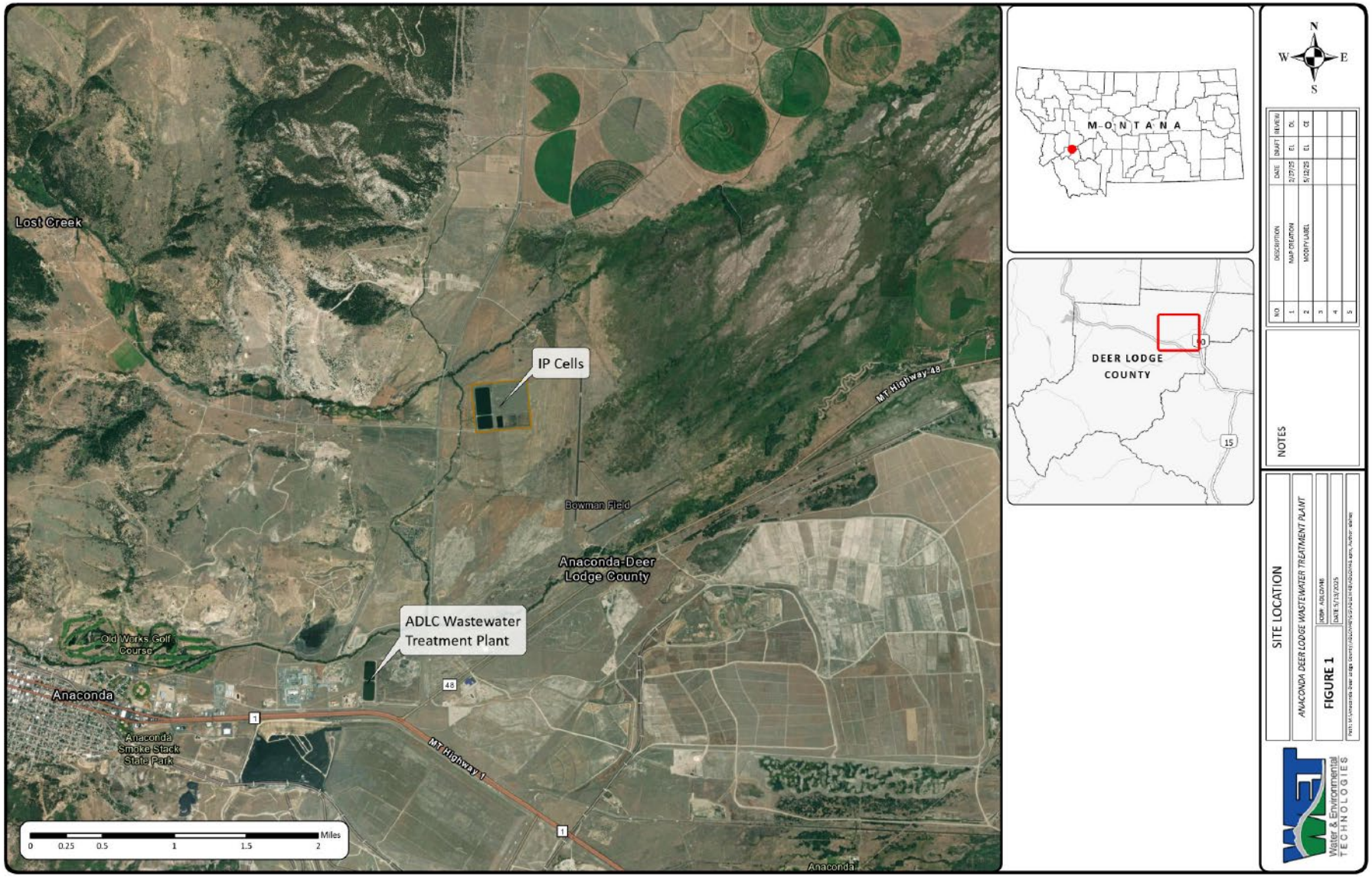

Figure 1: Location of the Anaconda-Deer Lodge County Wastewater Holding Ponds and IP Beds Facility

Figure 2: Location of the Headworks and Aerated Lagoons

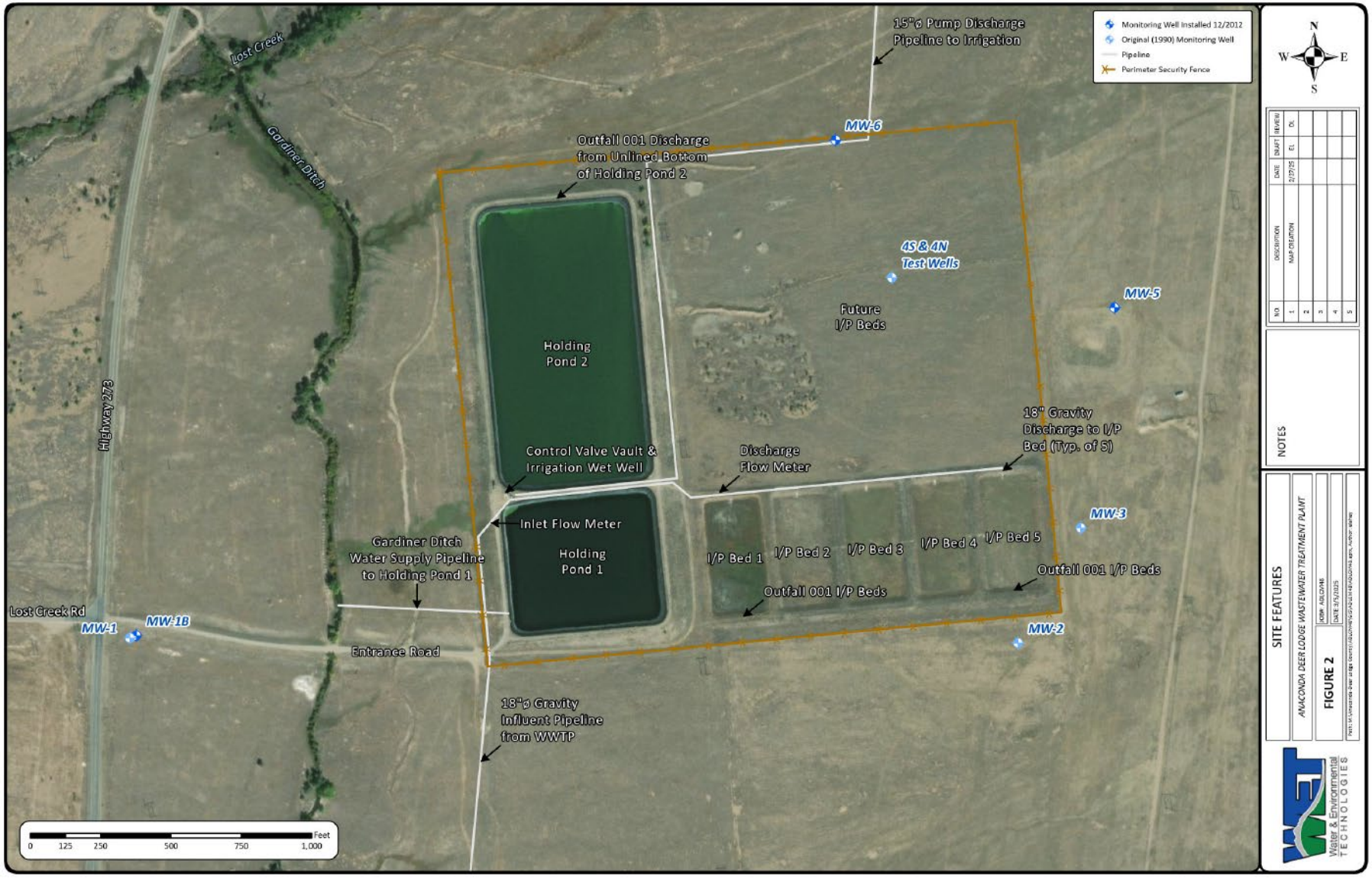

Figure 3: Location of the Holding Ponds and Infiltration/Percolation Beds

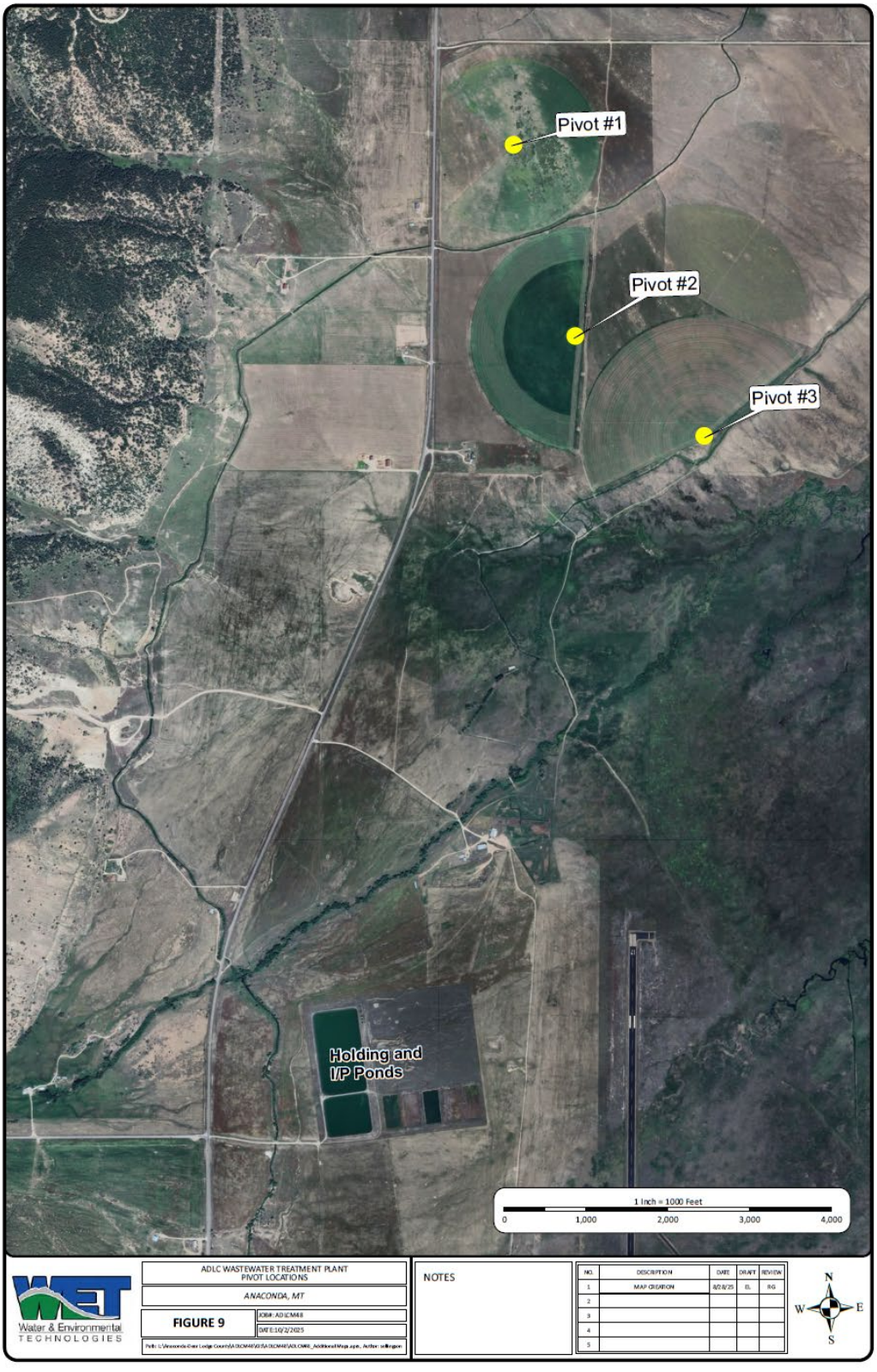

Figure 4: Location of Irrigation Facility

2.2 OPERATIONS

The Anaconda-Deer Lodge Wastewater Holding Ponds and Infiltration/Percolation (IP) Beds Facility is operating through a series of treatment and disposal steps, which are summarized in **Table 1. Figure 5** provides a line drawing of the collection, treatment and disposal process.

Wastewater from the City of Anaconda enters the headworks, where fine screening removes grit and debris. Flow is directed into two partially mixed aerated lagoons that can be operated in series or parallel with a detention time of 30-45 days.

Treated effluent is then conveyed by gravity to two holding ponds. The first pond is lined, while the second has lined sides and an unlined bottom. Once the first pond is filled, excess flow is routed to the second pond.

Disposal occurs by three methods: (1) direct infiltration from the second holding pond, (2) discharge to five infiltration/percolation beds or (3) seasonal spray irrigation at the designated land application site. Land application must be conducted at agronomic rates and in a manner that avoids ponding, over-application or overland flow.

The system serves approximately 3,330 residential connections and 210 commercial connections within the city of Anaconda. Both the second holding pond and the IP beds discharge to Class I ground water.

Monitoring and sampling requirements are further discussed in **Section 6** and irrigation volumes and associated nitrogen loadings for 2019-2024 reporting period are summarized in **Table 2**.

Table 1: Collection, Treatment, and Disposal System Summary
Inflows
Contributing Sources: Domestic and Commercial (SIC 14952) Residences: 3,330 Businesses: 210 Influent Sampling: INF-001 (manhole prior to headworks) Flow Monitoring: FM-001 (Electromagnetic Badger M-series M2000, in headworks prior to discharge to lagoons)
Treatment
Process: Two partially mixed aerated lagoons followed by two holding ponds Treatment Level: Aerated Lagoons Location: Lat 46.12924°, Long -112.90081°
Disposal System
Disposal Structure: Outfall 001 Method: Two holding ponds followed by five infiltration / percolation (I/P) beds Location: Section 29, T5N, R10W Coordinates: Lat 46.15806°, Long -112.88083° Average Daily Design Flow: 2.5 MGD Daily Maximum Design Flow: 3.0 MGD Effluent Sampling: EFF-001-A (manhole post lagoons prior to discharge to holding ponds)

Flow Monitoring: FM-002 (Electromagnetic Badger M-series M2000 Flow Meter, post lagoons prior to holding ponds)
Disposal Structure: Land Application
Method: Spray irrigation of treated effluent (May-September)
Reporting period 6/1/2019-5/31/2024
Coordinates: Lat 46.18466°, Long -112.86889°
Volume of Wastewater diverted to Irrigation: 809 MGD
Total Nitrogen diverted to Irrigation: 130,212 lbs.

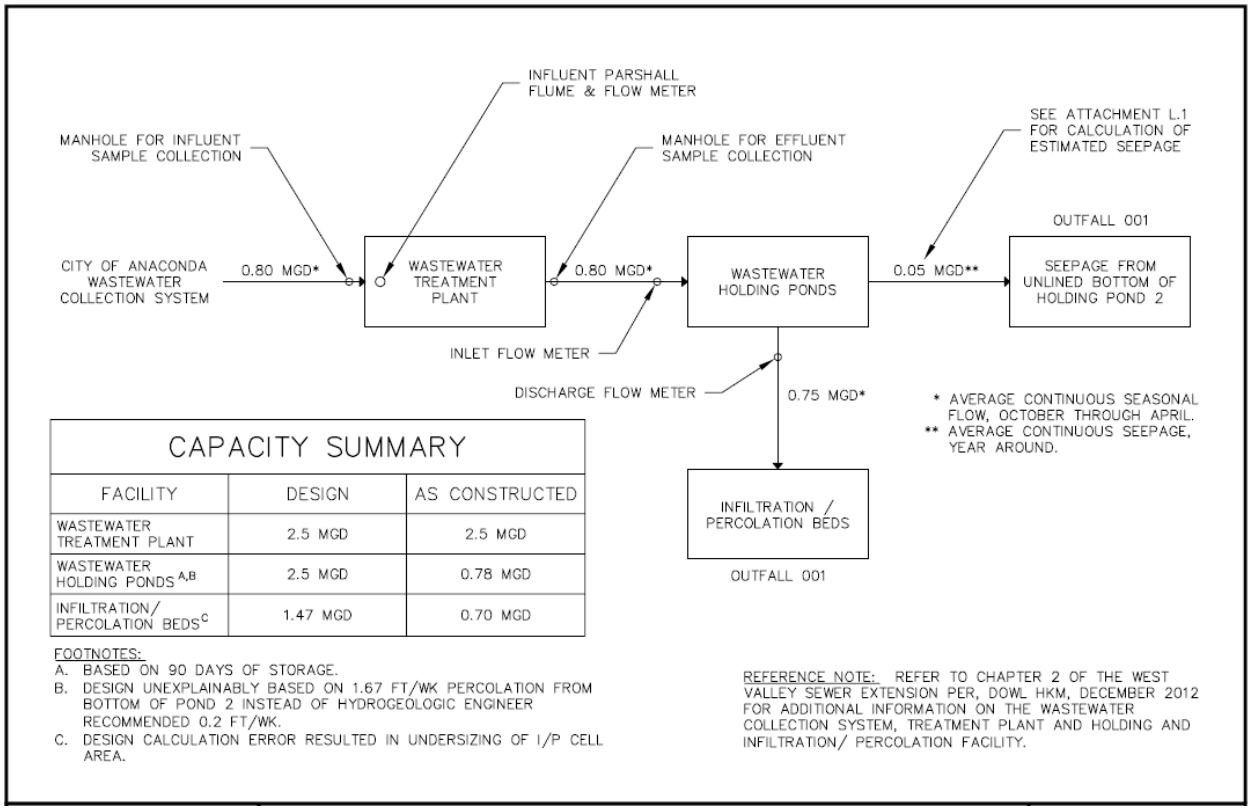

Figure 5: Collection, Treatment, and Disposal System Line Diagram

Table 2: Land Application Summary

Year	Volume to Irrigation (MGD)	TN to Irrigation (lbs.)
2019	115.8	18,639
2020	341.1	54,909
2021	134	21,571
2022	145.7	23,455
2023	69.2	11,136
2024	31	502
Total	**809 MGD**	**130212 lbs.**

MGD = million gallons per day
lbs. = pounds
Period of record: September 2019 through March 2024

2.3 GEOLOGY/HYDROGEOLOGY/HYDROLOGY

The Anaconda-Deer Lodge County Wastewater Holding Ponds and IP Beds Facility sits within the Deer Lodge Valley, a north-south trending Tertiary basin drained by the Clark-Fork River. The site is underlain by Quaternary alluvium and glacial outwash deposits overlying Tertiary valley fill.

Soils mapped by the USDA NRCS in proximity to the IP beds and holding ponds include Sixbeacon gravelly loam and Sixbeacon cobbly loam, and downgradient soils include Saypo loam and Gregson fine sandy loam. These soils are consistent with onsite monitoring well logs (**Appendix A**).

Groundwater occurs in a shallow, unconfined aquifer of unconsolidated valley fill. Depth to groundwater measured in onsite wells ranges from 20 - 80 ft. Average groundwater depths from 2019-2024 are: 76 ft for MW-1B, 33 ft for MW-5 and 44 ft at MW-6, with an overall site average of 38 ft. Hydraulic conductivity of the aquifer has been reported at 165 ft/d. The hydraulic gradient is estimated between 0.0045 - 0.007 ft/ft, with flow directed northeast. For permit evaluation, DEQ applies the conservative N30°E flow direction to assess potential impacts to groundwater and Lost Creek, located approximately 2000 ft downgradient.

2.5 GROUND WATER MONITORING NETWORK

Three monitoring wells are associated with Anaconda-Deer Lodge County Wastewater Holding Ponds and IP Beds Facility: MW-1B, MW-5 and MW-6. MW-1B is upgradient of the outfall and represents ambient ground water quality. MW-5 and MW-6 are located downgradient of the outfall, beyond the mixing zone and are used to measure groundwater quality after discharge has infiltrated through the IP beds. Monitoring well locations are provided in **Figure 3** and well information is summarized in **Table 3**

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.

Table 3. Monitoring Well Summary
Monitoring Well: MW-1B
MBMG GWIC well 269838 Constructed December 10, 2012 Location: Junction of Galen Road and Lost Creek Road Coordinates: Lat 46.15689°, Long -112.89131° Representation: Ambient ground water quality
Monitoring Well: MW-5
MBMG GWIC well 269839 Constructed December 10, 2012 Location: 300 ft northeast of IP beds Coordinates: Lat 46.16015°, Long -112.87786° Representation: Downgradient groundwater, post- mixing zone
Monitoring Well: MW-6
MBMG GWIC well 269840 Constructed December 11, 2012

Location: 500 ft north of IP beds
Coordinates: Lat 46.16197° Long -112.88163°
Representation: Downgradient groundwater, post- mixing zone

2.6 QUALITY INFORMATION

2.6.1 Ground Water Characteristics

Ground water quality was monitored at MW-1B, MW-5 and MW-6 during the 2019-2024 reporting period. Specific conductance averaged 290 µS/cm, consistent with Class I ground water.

Groundwater monitoring results from all the wells for the 2019-2024 reporting period are summarized in **Table 4**.

Table 4: Ground Water Monitoring Results

Monitor Source (1)	Parameter	Units	Reported Minimum Value	Reported Average Value	Reported Maximum (2) Value	# of Samples
MW-1B	Chloride (as Cl)	mg/L	0.5	0.9	2.0	19
	Nitrogen, Nitrate + Nitrite (as N)	mg/L	0.04	0.18	1.00	19
	Nitrogen, Total Kjeldahl (as N)	mg/L	0.1	0.06	0.14	19
	Nitrogen, Ammonia [as N]	mg/L	0.05	0.06	0.14	19
	Nitrogen, Total [as N]	mg/L	0.3	0.5	1.0	4
	Specific Conductivity (@ 25°C)	µS/cm	233	290	402	19
	Phosphorus, Total [as P]	mg/L	0.008	0.037	0.269	19
	Static Water Level (SWL)	ft-bgs	63.50	75.90	85.00	19
MW-5	Chloride (as Cl)	mg/L	0.50	0.94	2.00	19
	Nitrogen, Nitrate + Nitrite (as N)	mg/L	0.05	0.26	1.19	19
	Nitrogen, Total Kjeldahl (as N)	mg/L	0.05	0.07	0.19	19
	Nitrogen, Ammonia [as N]	mg/L	0.05	0.07	0.14	19
	Nitrogen, Total [as N]	s.u.	0.32	0.59	1.19	4
	Specific Conductivity (@ 25°C)	µS/cm	219	283	388	19
	Phosphorus, Total [as P]	mg/L	0.008	0.030	0.086	19
	Static Water Level (SWL)	ft-bgs	25.00	32.70	40.50	19
MW-6	Chloride (as Cl)	mg/L	0.05	0.96	2.00	19
	Nitrogen, Nitrate + Nitrite (as N)	mg/L	0.05	0.23	1.14	19
	Nitrogen, Total Kjeldahl (as N)	mg/L	0.05	0.07	0.16	19
	Nitrogen, Ammonia [as N]	mg/L	0.05	0.06	0.14	19
	Nitrogen, Total [as N]	s.u.	0.29	0.54	1.14	4
	Specific Conductivity (@ 25°C)	µS/cm	226	292	396	19

	Phosphorus, Total [as P]	mg/L	0.009	0.029	0.084	19
	Static Water Level (SWL)	ft-bgs	42.30	43.70	44.70	19

Footnotes:

Source of data from Discharge Monitoring Reports (DMRs) submitted to Montana DEQ.

DMRs reporting period from September 2019 through March 2024.

Non-detect (ND) results were substituted at one-half the laboratory reporting limit (0.5xRL) for statistical summaries. Detection limits were assumed as 1.0 mg/L for chloride, 0.1 mg/L for nitrogen species and 0.01mg/L for phosphorus.

bgs = below ground surface

CFU = Colony Forming Units

s.u. = standard units

The median value is displayed for the parameters that have a skewed, variable, or limited data set; otherwise, average is listed.

(1) Refer to Section 2.5 of the Fact Sheet for the existing or proposed location of the monitoring wells.

(2) Maximum value recorded of all monthly or quarterly reported values.

2.6.2 Effluent and Influent Characteristics

During the 2019-2024 permit cycle, the facility submitted influent and effluent monitoring data through Discharge Monitoring Reports (DMR). Results are summarized in **Table 5**.

Influent monitoring provides information on raw wastewater strength, while effluent monitoring demonstrates lagoon treatment performance prior to discharge to the holding ponds and IP beds. Reported effluent quality was generally consistent with domestic wastewater treatment levels.

Table 5: Estimated Effluent and Influent Quality – Outfall 001.

Parameter (1)	Location	Units	Reported Minimum Value	Reported Average Value	Reported Maximum (2) Value	# of Samples	2019 Permit Limit
Biochemical Oxygen Demand (BOD_5) (3)	EFF-001	mg/L	15	45	120	59	
Influent Flow rate, Discharge	FM-001	gpd	628,840	854,374	1,783,810	120	
Nitrogen, Nitrate + Nitrite (as N)	EFF-001	mg/L	0.01	3.50	18.90	116	
	INF-001		0.01	0.12	0.54	60	
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	0.1	11.0	21.5	120	
Nitrogen, Total Kjeldahl (as N)	EFF-001	mg/L	2.10	16.60	27.80	120	
	INF-001		20.00	34.00	48.60	60	
	EFF-001	mg/L	8.67	19.96	28.34	232	

Nitrogen, Total (as N)		lbs./d	3.63	87.76	209.60	60	219
	INF-001	mg/L	20.52	34.11	48.70	60	
Oil & Grease	EFF-001	mg/L	1.00	3.17	34.90	44	
pH (Maximum)	EFF-001	s.u.	NA				
pH (Minimum)	EFF-001	s.u.	NA				
Phosphorus, Total (as P)	EFF-001	mg/L	1.4	3.2	5.6	44	
Specific Conductivity	EFF-001	µS/cm	NA				
Total Dissolved Solids (TDS)	EFF-001	mg/L	NA				

Footnotes:
Source of data from Discharge Monitoring Reports (DMRs) submitted to Montana DEQ.
DMRs reporting period from September 2019 through March 2024.
CFU = Colony Forming Unit
EFF-001: See Table 1
FM-001 = See Table 1
INF-001 = See Table 1
NA = Not Analyzed
s.u. = standard units
The median value is displayed for the parameters that have a skewed, variable, or limited data set; otherwise, average is listed.
(1) Conventional and nonconventional pollutants only; table does not include all possible toxics.
(2) Maximum value recorded of all quarterly reported Daily Maximum Values.
(3) Elevated BOD concentrations typically occur during the land application season (May - September), when lagoon drawdown and reduced retention time can increase effluent variability.

3.0 WATER QUALITY STANDARDS

Part of DEQ's mission is to protect and sustain the quality of state waters. Water quality standards provide the basis for limitations that protect state waters. These include beneficial use maintenance, specific water quality standards, and the nondegradation policy. DEQ protects all designated uses of state water by basing effluent limitations on the most restrictive water quality standards intended to protect the most sensitive uses.

3.1 BENEFICIAL USES

Discharges from the Anaconda-Deer Lodge County Wastewater Treatment Facility are to Class I ground water, as defined by ARM 17.30.1006. Class I ground water is defined by a specific conductance of less than 1,000 µS/cm at 25°C, and monitoring data collected for this facility confirm that the receiving ground water continues to meet classification.

Class I ground water is protected for a range of beneficial uses, including public and private water supplies, culinary and food processing purposes, irrigation, livestock and wildlife drinking water and commercial and industrial applications. Because this facility is not considered a new or increased source

of pollution, the applicable standards for this discharge are the human health standards contained in Department Circular DEQ-7. To protect human health, nitrate plus nitrite (as nitrogen) in ground water must not exceed 10 mg/L.

DEQ reviewed the facility's operations and monitoring data and determined that the discharge remains consistent with historical use prior to April 29, 1993. This permit applies the DEQ-7 human health standards at the boundary to ensure protection of all Class I beneficial uses. Effluent limitations for this permit are therefore established to maintain compliance with these standards. Permit limits and monitoring requirements are discussed in **Section 5.0**.

The corresponding numeric and narrative standards are listed in **Table 6**.

Table 6: Water Quality Standards

Parameter (1)	**Ground Water Human Health Standards**
Bacteria [*Escherichia coli*]	< 1 CFU/100mL
Nitrogen, Nitrate + Nitrite [as N]	10 mg/L
Nitrogen, Total (TN) (2)	10 mg/L

Footnotes:
CFU = Colony Forming Unit
These standards establish the allowable changes in ground water quality and are the basis for limiting discharges to ground water.
(1) The list includes identified parameters of interest.
(2) DEQ conservatively assumes all forms of nitrogen will convert to nitrates within the aquifer. DEQ recognizes that other nitrogen forms may be harmful to the beneficial uses therefore will use Total Nitrogen for projecting impacts and in formulation of compliance efforts (limitations).

3.2 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.

Activities that cause a significant change in water quality require an authorization to degrade. An authorization to degrade is not an authorization to pollute; the water quality standard may not be exceeded outside of a department-authorized mixing zone. This activity is not authorized to degrade. **Figure 6** illustrates the relationship between water quality standards, nondegradation, and nonsignificant changes in water quality.

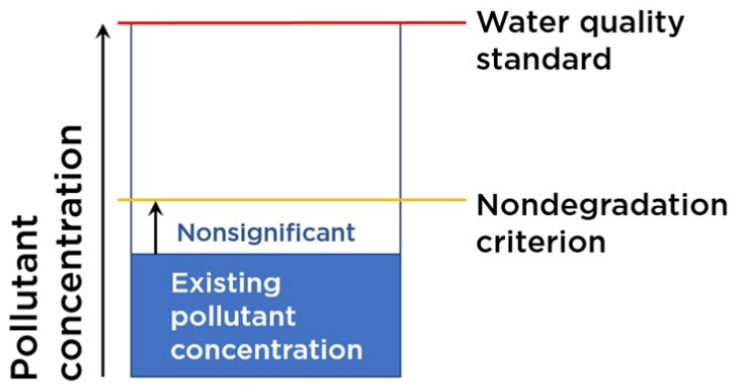

Figure 6. Pollutant Loading Effects on Nondegradation and Nonsignificance

4.0 MIXING ZONE

A mixing zone is an area of the receiving shallow ground water where the aquifer can assimilate wastewater pollutants. It is a specifically defined area of the receiving aquifer where water quality standards may be exceeded. The availability of dilution is based on the site-specific aquifer characteristics and the drainfield dimensions. The allowable level of dilution is limited by the permit to ensure that water quality standards are met at the end of the mixing zone.

The applicant requested a standard mixing zone for this combined discharge. 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 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 **Figure 7**. Standard mixing zones extend 15 feet below the top contact of the ground water table. A map of the mixing zone is provided in **Figure 8**.

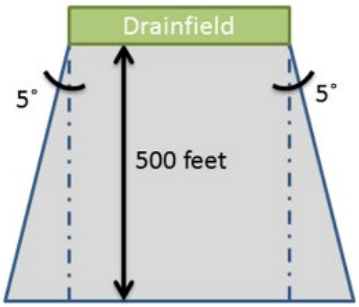

Figure 7: Mixing zone schematic

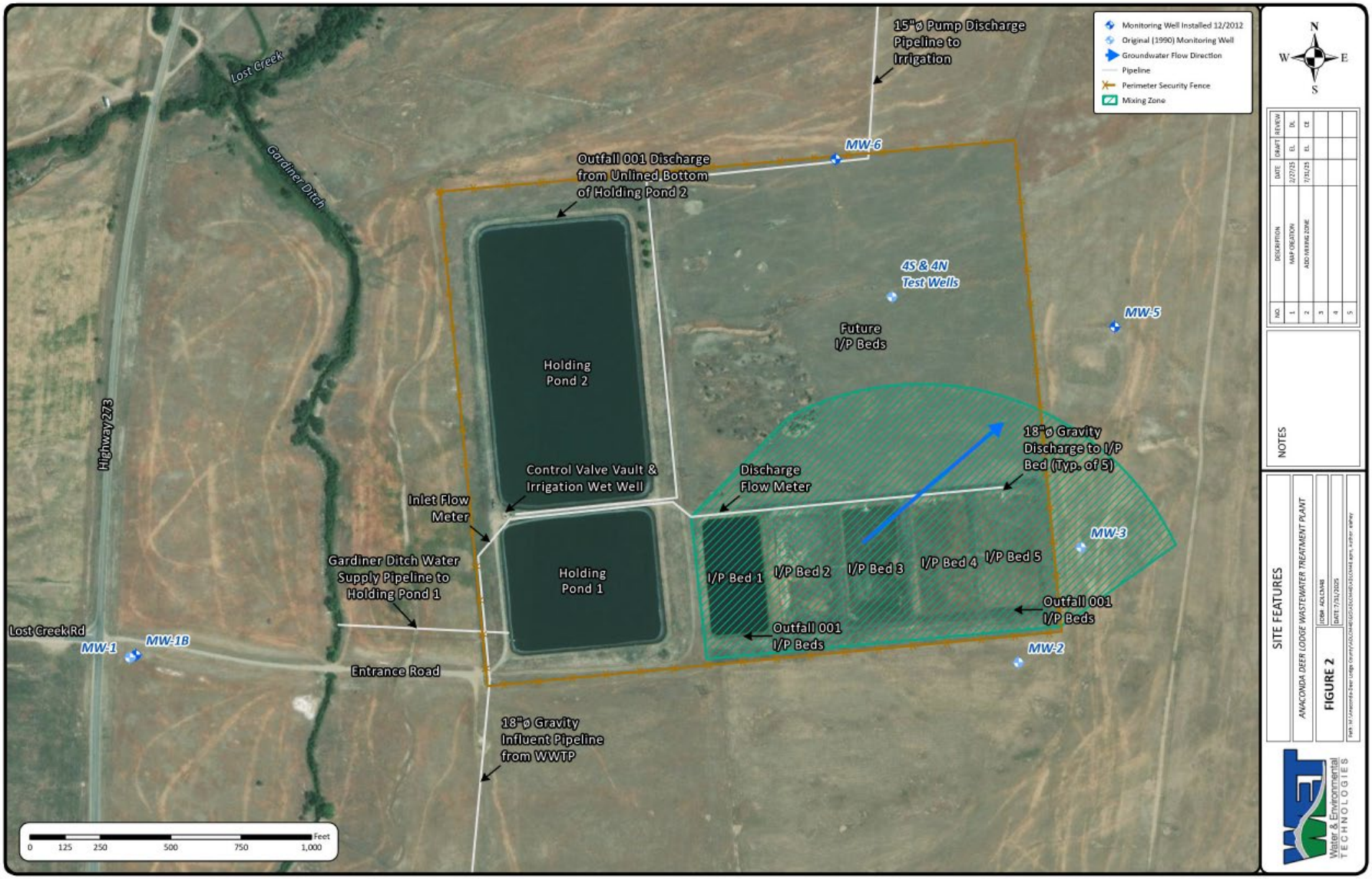

Figure 8. Mixing Zone

Information below provides details on how DEQ calculates the available dilution of the receiving aquifer and summary of the hydrogeologic and mixing zone information is provided in **Table 7.**

Based on the dimensions of the mixing zone, and the hydrogeologic characteristics (**Section 2**), the volume of ground water (Q_{gw}) available to mix with the wastewater is calculated using Darcy's Equation: $Q_{gw} = KIA$

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

Modern drainfield systems are designed to minimize the likelihood of the subsurface transport of pathogenic bacteria. Pathogens are a direct existential threat to public and environmental health. In general, DEQ recognizes that replacement of older drainfields with a newly designed one may have environmental benefits.

Table 7. Hydrogeologic and Mixing Zone Information - Outfall 001

Parameter	Units	Value
Mixing Zone Type	-	Standard
Authorized Parameters	-	Total Nitrogen
Ambient Ground Water Concentrations, Nitrate + Nitrite	mg/L	0.5
Ground Water Flow Direction	azimuth/bearing	N30°E
Length of Mixing Zone	feet	500
Thickness of Mixing Zone	feet	15
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	1500
Width of Mixing Zone at Down Gradient Boundary	feet	1587.5
Cross Sectional Area of Mixing Zone (A)	ft^2	23,820
Hydraulic Conductivity (K)	feet/day	165
Hydraulic Gradient (I)	ft/ft	0.0045
Volume of Ground Water Available for Mixing (Q_{gw})	ft^3/day	17,686

5.0 PERMIT LIMITATIONS

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.

5.1 TOTAL NITROGEN EFFLUENT LIMIT

To protect beneficial uses, there shall be no increase of a pollutant to a level that renders the waters harmful, detrimental, or injurious. Therefore, no wastewaters may be discharged such that the wastewater either alone or in combination with other wastes will violate or can reasonably be expected

to violate any standard. DEQ will establish an effluent limitation for nitrogen within this permit. The limit will conservatively be based on the projection that the entire nitrogen load in the wastewater stream may ultimately be converted to nitrate.

The allowable discharge will be derived from a mass-balance equation which is a simple steady-state model that determines the assimilative capacity of the receiving aquifer. The equation factors in cumulative impacts of existing upgradient discharges in the receiving aquifer and any available dilution within the mixing zone. The mass-balance equation derived for ground water is as follows:
$Q_{gw}C_{gw} + Q_{eff}C_{eff} = Q_{comb}C_{proj}$

Where Q_{gw} = ground water available for mixing; C_{gw} = ambient receiving ground water concentration; Q_{eff} = design capacity of wastewater system; C_{eff} = effluent pollutant concentration; Q_{comb} = combined ground water and effluent volume; and, C_{proj} = projected pollutant concentration (after available dilution).

The mass-balance equation has been arranged to calculate the maximum amount of nitrogen that can be added to the aquifer without causing or contributing to an exceedance of the water quality standard:
$C_{limit} = C_{std} + \frac{Q_{gw}}{Q_{eff}}(C_{std} - C_{gw})$

Where C_{limit} = concentration-based effluent limit; C_{std} = water quality standard concentration; Q_{gw} = ground water available for mixing; Q_{eff} = design capacity of wastewater system; and C_{gw} = ambient receiving ground water concentration.
Numeric effluent limits are often expressed as loads which inherently regulates both volume and strength of the discharge. The load limit ensures compliance with the ground water standard at the end of the mixing zone.
$L_{limit} = C_{limit}Q_{eff}f_{con}$

Where L_{limit} = load-based effluent limit (lb/d); C_{limit} = concentration-based effluent limit (mg/L); Q_{eff} = design capacity of wastewater system (gpd); and f_{con} = conversion factor of 8.34×10^{-6}.

With the facility's design capacity 2.5 MGD, the resulting concentration and load limits are:

C_{limit} = 10.5 mg/L
L_{limit} = **219 lbs./d**

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 impacts to the receiving water.

The effluent limitations for this permit are summarized in **Table 8.**

Table 8: Effluent Limit - Outfall 001

Parameter	Units	Monthly Average (1)
Total Nitrogen (as N)	lbs./d	219

Footnotes:

(1) See definition in Part V of permit.

6.0 MONITORING AND REPORTING REQUIREMENTS

Long-term monitoring and reporting of wastewater and ground water will be established as a condition of the permit. Monitoring of the wastewater characteristics before and after treatment will help ensure operation, maintenance, and compliance with the permit limitations. Wastewater monitoring and reporting requirements are provided in **Table 9**. The permittee must develop and implement a Wastewater Sampling, Analysis, and Reporting Operation Manual. This manual is further discussed in **Section 7**.

Ground water monitoring will provide DEQ with ongoing information on the current and future health of the aquifer. Ground water monitoring and reporting requirements are divided into two tables. **Table 10a** includes monthly monitoring for MW-5 and MW-6, and **Table 10b** includes quarterly monitoring for MW-1B. The permittee must develop/update and implement a Ground Water Monitoring, Analysis, and Reporting Operational Manual. This manual is further discussed in **Section 7**.

Reporting must be completed in use of Discharge Monitoring Reports (DMRs). The permittee or operator will file DMRs electronically in use of the online NetDMR program. Information and contacts for this program can be found here: https://deq.mt.gov/water/assistance.

Table 9: Influent and Effluent Monitoring and Reporting Requirements

Analyte/Measurement	Monitor Location	Units	Sample Type(1)	Minimum Sample Frequency	Reporting Requirements(1)(2)	Report Frequency
Biochemical Oxygen Demand (BOD_5)	INF-001 EFF-001	mg/L	Grab	1/Month	Monthly Average	Monthly
Flow Rate, Effluent(3)	FM-001	gal/d	Contin-uous	Contin-uous	Monthly Average(4)	Monthly
Nitrogen, Nitrite+Nitrate [as N]	INF-001 EFF-001	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total Ammonia [as N]	INF-001 EFF-001	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)[as N]	INF-001 EFF-001	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total [as N](5)	INF-001 EFF-001	mg/L	Calculate	1/Month	Monthly Average	Monthly
		lbs./d (6)	Calculate	1/Month	Monthly Average	Monthly
Phosphorus, Total [as P]	INF-001 EFF-001	mg/L	Grab	1/Month	Monthly Average	Monthly

Total Suspended Solids (TSS)	INF-001 EFF-001	mg/L	Grab	1/Month	Monthly Average	Monthly

Footnotes:

EFF-001: Description provided in Table 1 of the Fact Sheet document.

INF-001: Description provided in Table 1 of the Fact Sheet document.

FM-001: Description provided in Table 1 of the Fact Sheet document.

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

Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above or within a deviation authorized by DEQ.

(1) See definitions in Part V of the permit unless defined within this table or by a permit condition.

(2) Monthly Average: The average of all individual daily concentrations (mg/L) analyzed during the reporting period.

(3) Requires recording device and/or totalizing meter. Equipment must be capable of recording daily, quarterly, and annual effluent volumes.

(4) Monthly Average Flows: Determine total flows that occurred during the reporting period. Divide total flow by the number of calendar days in the reporting period to get a unit of daily flow (gal/d).

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

(6) Load Calculation. Determine concentration (mg/L): Use the average of all individual daily concentrations (mg/L) analyzed during the reporting period. Determine totalized flows (gal/quarter): Total flow that occurred during the quarterly reporting period. Convert to a daily flow average (gal/d): Divide the total monthly flow by the total calendar days of the reporting period. Calculate load (lbs./d): Concentration (mg/L) x Flows (gal/d) x [8.34×10^{-6}].

Table 10a: Monthly Ground Water Monitoring and Reporting Requirements: MW-5 and MW-6

Analyte/Measurement	Monitor Location	Units	Sample Type (1)	Minimum Sample Frequency	Reporting Requirements (1)(2)	Report Frequency
Chloride [as Cl]	MW-5	mg/L	Grab	1/Month	Monthly Average	Monthly
	MW-6	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Nitrite+Nitrate [as N]	MW-5	mg/L	Grab	1/Month	Monthly Average	Monthly
	MW-6	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total Ammonia [as N]	MW-5	mg/L	Grab	1/Month	Monthly Average	Monthly
	MW-6	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)[as N]	MW-5	mg/L	Grab	1/Month	Monthly Average	Monthly

	MW-6	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total [as N][3]	MW-5	mg/L	Calculate	1/Month	Monthly Average	Monthly
	MW-6	mg/L	Calculate	1/Month	Monthly Average	Monthly
Specific Conductivity @ 25°C	MW-5	µS/cm	Grab or Instantaneous	1/Month	Monthly Average	Monthly
	MW-6	µS/cm	Grab or Instantaneous	1/Month	Monthly Average	Monthly
Temperature	MW-5	°C	Instantaneous	1/Month	Monthly Average	Monthly
	MW-6	°C	Instantaneous	1/Month	Monthly Average	Monthly
Static Water Level (SWL)[4]	MW-5	ft-bmp	Instantaneous	1/Month	Monthly Average	Monthly
	MW-6	ft-bmp	Instantaneous	1/Month	Monthly Average	Monthly
Well Depth[4]	MW-5	ft-bmp	Instantaneous	1/Month	Monthly Average	Monthly
	MW-6	ft-bmp	Instantaneous	1/Month	Monthly Average	Monthly

Footnotes:
CFU = Colony Forming Units
ft-bmp = feet below measuring point
A description of each monitoring well can be found in Table 3 of the Fact Sheet document.
At no time shall the permittee mark or state “no discharge” on any monitoring well DMR form.
Each well to be individually monitored and sampled for the analyte and measurements respectively listed.
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.
Samples must not be collected until after the well casing is properly purged as determined by the DEQ approved Ground Water Monitoring Operational Manual.
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) See definitions in Part V of the permit unless defined within this table or by a permit condition.
(2) Average: The average of all individual daily concentrations (mg/L) analyzed during the monthly reporting period.
(3) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(4) Measuring point (point of reference) for SWL measurements shall be from top of inner casing or as established by the Operational Manual and measured to within 1/100th of one foot.

Table 10b: Quarterly Ground Water Monitoring and Reporting Requirements: MW-1B

Analyte/Measurement	Monitor Location	Units	Sample Type (1)	Minimum Sample Frequency	Reporting Requirements (1)(2)	Report Frequency
Chloride [as Cl]	MW-1B	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Nitrite+Nitrate [as N]	MW-1B	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Total Ammonia [as N]	MW-1B	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)[as N]	MW-1B	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Total [as N] (3)	MW-1B	mg/L	Calculate	1/Quarter	Quarterly Average	Quarterly
Specific Conductivity @ 25°C	MW-1B	µS/cm	Grab or Instantaneous	1/Quarter	Quarterly Average	Quarterly
Temperature	MW-1B	°C	Instantaneous	1/Quarter	Quarterly Average	Quarterly
Static Water Level (SWL) (4)	MW-1B	ft-bmp	Instantaneous	1/Quarter	Quarterly Average	Quarterly
Well Depth (4)	MW-1B	ft-bmp	Instantaneous	1/Quarter	Quarterly Average	Quarterly

Footnotes:

CFU = Colony Forming Units

ft-bmp = feet below measuring point

A description of each monitoring well can be found in Table 3 of the Fact Sheet document.

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

Each well to be individually monitored and sampled for the analyte and measurements respectively listed.

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.

Samples must not be collected until after the well casing is properly purged as determined by the DEQ approved Ground Water Monitoring Operational Manual.

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) See definitions in Part V of the permit unless defined within this table or by a permit condition.

(2) Average: The average of all individual daily concentrations (mg/L) analyzed during the quarterly reporting period.

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

(4) Measuring point (point of reference) for SWL measurements shall be from top of inner casing or as established by the Operational Manual and measured to within 1/100th of one foot.

7.0 SPECIAL CONDITIONS

7.1 GROUND WATER MONITORING, ANALYSIS, AND REPORTING OPERATIONAL MANUAL

The permittee shall use Best Management Practices (BMPs) in developing/updating SOPs (Standard Operating Procedures) for sampling, analyzing, and reporting ground water characteristics. The SOP manual must be site-specific and result in monitoring and reporting that is representative of the nature of the shallow ground water bearing zone. The manual must provide for consistent identification, development, monitoring, sampling, calculating, recording, and reporting of the monitoring wells. The manual must provide for guidance on determining and documenting dry-well occurrences; and determining future well viability. DEQ recommends using the Montana Bureau of Mines and Geology Open-File Report 746 titled Standard Procedures and Guidelines for Field Activities (MBMG, 2021) as a reference in developing a site-specific operational manual.

The completion and submittal date of the manual is listed in **Section 8**. The permittee shall maintain a copy of the manual, monitoring well development records, dry well occurrence records, sampling records, and calibration records at the facility at all times. Ground water monitoring requirements are discussed in **Section 6**. All subsequent amended manuals must be reported to DEQ within 30 calendar days.

7.2 MONITORING WELL VIABILITY

The permittee shall monitor and collect representative ground water samples from the receiving ground water aquifer. If any of the wells are abandoned, destroyed, decommissioned, or non-viable; or are no longer able to be monitored due to obstructions or fluctuations in the ground water table; the permittee shall rehab the non-viable well or replace with the installation of a new well.

7.3 MONITORING WELL REPLACEMENT, REHABILITATION, AND ABANDONMENT

If for any reason a monitoring well needs to be replaced, rehabilitated, or abandoned, the permittee shall submit a plan to DEQ for approval prior to the action taking place. The plan must document existing site-specifics and the reasoning behind the proposed action. The plan must detail the specific steps to take place during deconstruction, drilling, workover, and/or construction of the respective wells.

Written permission from DEQ is needed prior to the abandonment of any monitoring well. At minimum, monitoring well abandonment activities must be done in accordance with ARM 36.21.810(2-5). If the monitoring well is located in or around any collection, storage, treatment, disposal, land application, and/or mixing zone workings (or similar) additional actions may be required to prevent preferential subsurface flows, cross contamination, and to mitigate against any unauthorized wastewater releases. All new well installations must have detailed drilling, lithology, geospatial, and well construction information. A follow-up report summarizing all actions and details must be submitted to DEQ within 30 calendar days.

7.4 SAMPLING, ANALYSIS, AND REPORTING OPERATION MANUAL

The permittee shall use BMPs in developing/updating SOPs for sampling, analyzing, and reporting wastewater characteristics from the wastewater system. The manual needs to be site-specific and result in monitoring and reporting that is representative of the nature of the wastewater streams. The manual must be used as a guide in:

- Equipment calibration.
- Preparing and collecting wastewater influent (INF-001) and effluent (EFF-001) wastewater samples.
- Analyte calculations (**Table 9**).
- Recording and reporting wastewater characteristics.
- Recording and reporting wastewater flows.

The completion and submittal date for the manual is listed in **Section 8.** The manual must be reviewed and approved by DEQ prior to implementation. The permittee shall maintain a copy of the operational manual, sampling, and calibration records at the facility at all times. Wastewater monitoring requirements are discussed in **Section 6**. All subsequent amended manuals must be reported to DEQ within 30 calendar days.

8.0 COMPLIANCE SCHEDULE

The actions listed in **Table 11** must be updated before the respective scheduled completion date. A report documenting each respective action must be received by DEQ on or before the scheduled reporting date. Unless otherwise stated, completion of all actions or deliverables must be reported to DEQ in accordance with Part II and Part IV.G of the permit.

Table 11: Compliance Schedule

Action	Frequency	Completion Date of Action	Reporting Due Date
Update **Ground Water Monitoring, Analysis, and Reporting Operational Manual.**	Single event	*Within 90 days of the effective date of the permit.*	Due on or before the 28th day of the month following the completion date.
Update **Wastewater Sampling, Analysis, and Reporting Operation Manual.**	Single event	*Within 90 days of the effective date of the permit.*	Due on or before the 28th day of the month following the completion date.

9.0 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 **December 18, 2025**. Comments may be directed to DEQWPBPublicComments@mt.gov or to

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 (MTX000338), 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.

10.0 REFERENCES

40 CFR § 136 – Guidelines Establishing Test Procedures for the Analysis of Pollutants. 2017.

Anaconda-Deer Lodge County. 2018. MGWPCS MTX000231 Permit Application. November 12, 2018.

Administrative Rules of Montana, Title 17, Chapter 30, Water Quality:
Subchapter 2 - Water Quality Permit Fees.
Subchapter 5 – Mixing Zones in Surface and Ground Water.
Subchapter 7 – Nondegradation of Water Quality.
Subchapter 10 – Montana Ground Water Pollution Control System.
Subchapter 13 – Montana Pollutant Discharge Elimination System.

Department of Environmental Quality. 2014. Administrative Record of Montana Ground Water Pollution Control System (MGWPCS) permit application and supplemental materials, Anaconda-Deer Lodge County, MTX000231.

Department of Environmental Quality. 2018. Administrative Record of Montana Ground Water Pollution Control System (MGWPCS) permit application and supplemental materials, Anaconda-Deer Lodge County, MTX000231.

Department of Environmental Quality, Water Quality Circulars:
Circular DEQ-2 – Design Standards for Wastewater Facilities.
Circular DEQ-4 – Montana Standards for On-Site Subsurface Sewage Treatment Systems.
Circular DEQ-7 – Montana Numeric Water Quality Standards, Required Reporting Values, and Trigger Values.

Montana Bureau of Mines and Geology, Ground-Water Information Center, GWIC state well database, Online at: http://mbmggwic.mtech.edu.

Montana Bureau of Mines and Geology, 2021. Standard Procedures and Guidelines for Field Activities, Open-File Report 746, p.96. Online at: http://www.mbmg.mtech.edu/mbmgcat/catmain.asp

Montana Code Annotated, Title 75, Chapter 5, *Montana Water Quality Act*, 2011.

APPENDIX A – MONITORING WELL SUMMARY

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (1/29/2013 1:23:01 PM)

Site Name: ANACONDA DEER LODGE COUNTY * MW-1B
GWIC Id: 269838

Section 1: Well Owner(s)
1) ANACONDA DEER LODGE COUNTY (MAIL)
800 S. MAIN
ANACONDA MT 59711 [01/23/2013]

Section 2: Location

Township	Range	Section	Quarter Sections
05N	10W	30	SE¼ NE¼ NE¼ SE¼

County	Geocode
DEER LODGE	

Latitude	Longitude	Geomethod	Datum
46.156791958333	-112.891041527778	SUR-GPS	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date

Section 3: Proposed Use of Water
MONITORING (1)

Section 4: Type of Work
Drilling Method: AIR ROTARY
Status: NEW WELL

Section 5: Well Completion Date
Date well completed: Monday, December 10, 2012

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	98	8

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.9	3	8				STEEL
-1.72	57	4				PVC-SCHED 40

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
57	97	4		0.06	SCREEN-CONTINUOUS-PVC

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	53	3/8 BENTONITE CHIPS	
53	98	6/9 COLORADO SILICA SAND	

Section 7: Well Test Data

Total Depth: 97
Static Water Level: 69.16
Water Temperature:

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log
Geologic Source
Unassigned

From	To	Description
0	3	(ML) SILT WITH VERY FINE SAND AND CLAY, LIGHT GRAY, DRY
3	38	(SM) SILTY SAND AND FINE GRAVEL, TRACE COURSE GRAVEL, SUBROUNDED, LIGHT GRAY, DRY
38	81	(SM) SILTY SAND AND FINE GRAVEL, INCREASE GRAVEL WITH INCREASING DEPTH, SUBROUNDED, LIGHT BROWN, MOIST
81	98	(GM) FINE TO MEDIUM GRAVEL WITH FINES, SUBROUNDED, LIGHT BROWN, WET

Driller Certification
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: OKEEFE DRILLING CO
License No: -
Date Completed: 12/10/2012

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (1/29/2013 1:24:48 PM)

Site Name: ANACONDA DEERLODGE COUNTY * MW-5
GWIC Id: 269839

Section 1: Well Owner(s)
1) ANACONDA DEERLODGE COUNTY (MAIL)
800 S. MAIN
ANACONDA MT 59711 [01/23/2013]

Section 2: Location

Township	Range	Section	Quarter Sections
05N	10W	29	SW¼ SE¼ NE¼ NW¼

County	Geocode
DEER LODGE	

Latitude	Longitude	Geomethod	Datum
46.160434397222	-112.877494608333	SUR-GPS	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
MONITORING (1)

Section 4: Type of Work
Drilling Method: AIR ROTARY
Status: NEW WELL

Section 5: Well Completion Date
Date well completed: Monday, December 10, 2012

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	57	8

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2.1	2.6	8				STEEL
-1.53	6.5	4				PVC-SCHED 40

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
6.5	56.5	4		0.06	SCREEN-CONTINUOUS-PVC

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	4	3/8 BENONTITE CHIPS	
4	57	6/9 COLORADO SILICA SAND	

Section 7: Well Test Data

Total Depth: 56.5
Static Water Level: 21.82
Water Temperature:

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log
Geologic Source
Unassigned

From	To	Description
0	2	(ML) SILT WITH VERY FINE SAND AND CLAY, LIGHT GRAY,DRY
2	32	(GM) FINE GRAVEL WITH SAND AND SILT, SUBROUNDED, LIGHT GRAY, DRY,MOISTURE AT 20 FEET AND COLOR CHANGE TO LIGHT BROWN
32	46	(GM) MEDIUM TO COURSE GRAVEL WITH FINES, SUBROUNDED, LIGHT BROWN, MOIST TO WET
46	49	(SM) SILTY SAND WITH TRACE GRAVEL, LIGHT BROWN TO WET
49	57	(GM) MEDIUM TO COURSE GRAVEL WITH FINES, SUB ROUNDED, LIGHT BROWN, WET

Driller Certification
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:OKEEFE DRILLING CO
License No:-
Date Completed:12/10/2012

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (1/29/2013 1:26:29 PM)

Site Name: ANACONDA DEERLODGE COUNTY * MW-6
GWIC Id: 269840

Section 1: Well Owner(s)
1) ANACONDA DEERLODGE COUNTY (MAIL)
800 S. MAIN
MT ANACONDA 59711 (01/23/2013)

Section 2: Location

Township	Range	Section	Quarter Sections
05N	10W	29	NE¼ NW¼ SW¼ NE¼

County	Geocode
DEER LODGE	

Latitude	Longitude	Geomethod	Datum
46.161948930556	-112.881518055556	SUR-GPS	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
MONITORING (1)

Section 4: Type of Work
Drilling Method: AIR ROTARY
Status: NEW WELL

Section 5: Well Completion Date
Date well completed: Tuesday, December 11, 2012

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	57	8

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.8	3	8				STEEL
-1.55	16.5	4				PVC-SCHED 40

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
16.5	56.5	4		0.06	SCREEN-CONTINUOUS-PVC

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	13	3/8 BENTONITE CHIPS	
13	57	6/9 COLORADO SILICA SAND	

Section 7: Well Test Data

Total Depth: 56.5
Static Water Level: 34.9
Water Temperature:

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2.5	(ML) SILT WITH VERY FINE SAND AND CLAY, LIGHT BROWN, DRY
2.5	41	(GM) FINE GRAVEL WITH SAND SILT, AND SCATTERED COBBLES, SUBROUNDED, LIGHT,GRAY, DRY, MOISTURE AT 32 FEET, COLOR CHANGE TO LIGHT BROWN, WET BELOW 37 FEET
41	47	(SM) MEDIUM TO COURSE SAND WITH SCATTERED WELL ROUNDED SMALL GRAVEL, LIGHT BROWN, WET
47	57	(GM) MEDIUM TO COURSE GRAVEL WITH FINES AND TRACE COBBLES, SUBROUNDED, LIGHT BROWN, WET

Driller Certification
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:OKEEFE DRILLING CO
License No:-
Date Completed:12/11/2012