

**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)**

Applicant: **Major Brands Distributing, Inc.**

Permit Number: **MTX000148**

Facility Name: **Town Pump – Three Forks**

Facility Location: NE ¼ NE ¼ Section 21, Township 02 North, Range 01 East, in
Broadwater County;
Latitude: 46.391528°; Longitude: -111.615278°

Facility Address: 5 West Farm Road
Three Forks, Montana 59752

Facility Contact: Ryan Casne, Consultant
Casne & Associates, Inc.
PO Box 1123
Helena, Montana 59624

Receiving Water: Class III Ground Water

Number of Outfalls: 1 (one)

Outfall/Type: 001 – Type: Domestic in nature effluent to a subsurface drainfield.

I. PERMIT STATUS

The following fact sheet outlines the basis for renewing MGWPCS wastewater discharge permit to Major Brands Distributing, Inc. for the Town Pump – Three Forks wastewater treatment facility located near Three Forks, Montana. 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 operation and maintenance of the wastewater treatment and disposal system.

In addition to the current MGWPCS permit, the applicant maintains DEQ Public Water Supply (PWS) approval and DEQ Subdivision Plan and Plat approval. The DEQ PWS ID. # is MT0002034. DEQ PWS files identify the PWS as Town Pump #35.

A. Application Info

On June 2, 2009 Town Pump, Inc. provided a letter indicating that the consulting firm Casne & Associates, Inc. will continue to manage the O&M, conduct effluent sampling and reporting, and permit management for the Major Brands Inc. / Town Pump – Three Forks MGWPCS permit.

The MGWPCS permit issued by DEQ on April 28, 2010 had special conditions for the Permittee to:

- Submit a plan and specification to DEQ that addressed the installation of an effluent flow meter. The flow meter was to be installed, followed by flow monitoring, and reporting of flow rates and load parameters.
- Submit to DEQ for approval a plan for the installation of the ground water monitoring well(s). The well or wells were then to be installed and a minimum of 3 samples collected from the well(s) during separate quarters. A report documenting the well installation and analysis results would then be submitted to DEQ.

Plans for the effluent flow meter were submitted to DEQ and the meter was installed as reported on June 3, 2011. Flow monitoring in the system began then and continued. Plans were submitted to DEQ and the final well construction, map, specifications, and log were submitted on February 3, 2014. A reporting of the water samples (for 3 quarters) and the analytic results were submitted on May 31, 2015.

A MGWPCS permit renewal application was made to DEQ on November 5, 2014 and a DEQ Completeness letter was issued for that application on December 17, 2014.

B. Permit Changes

Since the issuance of the last permit (2010) the following work has been completed at the facility:

- 1) A monitoring well (MW-1) was installed up-gradient of the drainfield and sampled (Figure 2). MW-1 was installed to establish the nature of the receiving waters beneath the discharge structures. This well was installed in 2014 and sampled over 3 consecutive quarters in 2014 and 2015. And
- 2) An effluent flow meter was installed (FM-001) on the treatment plant and has been providing flow measurements (Figures 2, 3, and 4).

The only changes from the 2010 permit are:

- 1) The reclassification of the receiving water from Class II ground water in the previous permit cycle to Class III ground water for this permit. That change affects the Effluent Limits presented on Table 2.
- 2) To provide ongoing data that will help characterize the receiving water through time and to help provide information to support future permitting of the waste water treatment system (WWTS), DEQ is requiring quarterly ground water sampling from MW-1 as part of this permit.

II. FACILITY INFORMATION

A. Facility Location

The Town Pump – Three Forks facility and its waste water treatment system (WWTS) are located on the SW corner of the intersection with West Farm Road and Highway 287, in Broadwater County, Montana. This intersection is directly south of the intersection of Highway I-90 and Highway 287. Refer to Figure 1. The WWTS is located on the south side of the convenience store and travel plaza. The business consists of a truck stop, convenience store, public restrooms, pay shower facilities, laundry machines, trucker lounge, a restaurant, and a casino. The plaza does not have a vehicle dump station.

B. Facility and Operations

The Town Pump – Three Forks WWTS has a design capacity of 9,000 gallons/day. The WWTS is designed to provide Level II sewage treatment prior to disposal with a pressure dosed drainfield. It treats wastes from 2 sources at Town Pump travel plaza. The main line receives wastes from toilets, sinks, showers, etc. and a second line distributes wastes from the kitchen facilities. The kitchen facility line is directed through a 7,000 gallon grease interceptor before combining with the main line. The combined influent flow is sent through a 3,000 gallon trash tank and then into a 20,000 gallon septic tank and lift station containing 4 effluent filters. The wastewater is then sent into a 14,000 gallon recirculation tank, with 1 recirculating sand filter. The effluent is then sent to a 1,500 gallon dose tank, which is then distributed by a valve vault to 6 different zones within the pressure dosed drainfield. Refer to Figures 2, 3, and 4 for the layout and line drawings of the WWTS processes.

During the previous permit cycle an effluent flow meter was installed. It is a Orenco FM200 Totalizing Flow Meter with a vault enclosure. In addition, a monitoring well was installed up-gradient (west) of the drainfield and sampling was conducted over 3 quarters.

This permit renewal authorizes the permittee to discharge treated domestic-quality wastewater to ground water from Outfall 001. Table 1 below is a brief summary of the WWTS.

Table 1

Collection, Treatment, and Disposal System Summary. Major Brands Distr. / Town Pump, Three Forks	
Outfall 001 - Domestic Wastewater/Sewerage	
Method of Disposal: Infiltration to ground water, via pressure dosed drainfield	
Disposal Structure: Subsurface Drainfield (Outfall 001)	
NE1/4 NE1/4 Section 21, Township 02 N, Range 01 E, Broadwater County, Montana	
Latitude: 46.391528°; Longitude: -111.615278°	
Contributing Sources: Convenience store & casino with showers, sinks, toilets, etc. & the kitchen for both.	
Average Daily Design Flow (g/d): 7,200	Daily Maximum Design Flow (g/d): 9,000
(ft ³ /day): 962.5	(ft ³ /day): 1,203
Influent Sampling Location INF-001: Within the 20,000 gallon septic tank (after the trash tank and grease interceptor tank).	
Effluent Sampling Location EFF-001: Effluent sampling port at the 1,500 gallon dose tank located just prior to the vault that pumps to the drainfield.	
Flow Monitoring Equipment: Orenco FM-200 totalizing wastewater flow meter.	
Flow Monitoring Location FM-001: Flow meter was installed after the 20,000 gallon septic tank & lift station and before the 14,000 gallon recirculation tank.	
Treatment: Level 2 via a Recirculating Sand Filter.	

C. Influent Monitoring Location

Influent monitoring is required in this permit. The influent monitoring location INF-001 is within the 20,000 gallon septic tank (located after the trash tank and grease interceptor tank). Sampling requirements are further discussed in Section V.

D. Influent Characteristics

The applicant provided influent quality data for Outfall 001 as summarized within Appendix I.

E. Effluent Monitoring Location

Effluent monitoring is required in this permit. The effluent monitoring location EFF-001 is a sampling port at the 1,500 gallon dose tank that pumps to the drainfield. Sampling requirements are further discussed in Section V.

F. Effluent Characteristics

DEQ requires the applicant to disclose the quality of the effluent to be discharged such that the potential pollutants can be identified and the proposed discharge can be examined to determine if it will cause pollution of state water, 75-5-605, Montana Code Annotated (MCA). The applicant provided effluent quality data for Outfall 001 as summarized within Appendix I.

G. Geology

The area beneath and surrounding the Town Pump travel plaza has been mapped as Middle Tertiary sedimentary materials that form dissected terraces along the northwest flank of the Jefferson River valley. These materials appear to be comprised of complexly

inter-fingering lenses and strata of coarse to very fine lithic and carbonate rich sediment. These sediments likely represent sediments that formed in closed basin valley floors as well as distal portions of alluvial fans derived from the adjacent highlands. Soils in the area have been described as a thick and well-drained loam (silty clay loam to sandy loam) that may be derived from the above tertiary sediments as well as younger fluvial (stream) deposition.

H. Hydrogeologic Characteristics

Receiving water for Outfall 001 is the first/shallowest ground water beneath this site. Several local well logs suggest that the first water bearing zone is encountered between 70-75 feet deep. This zone may not be laterally continuous, but likely represents a shallow unconfined water bearing unit that is scattered within the local sediments. The static water level in the new monitoring well (MW-1, 2014) located immediately up-gradient of the drainfield was 100 feet deep. That water likely came from a semi-confined water bearing sand layer seen somewhere between 125-140 feet deep. This water appears to be somewhat isolated from the shallower water bearing unit in this area. The 2 public water supply wells for the travel plaza are located north of the WWTS. These wells were drilled to 221 and 223 feet deep. Static water levels in these wells were 206 and 155 feet deep, which suggests that these public supply wells are drawing from other water bearing units that are somewhat isolated from the above zone (for MW-1). A summary table of water quality in MW-1 is provided within Appendix III.

I. Ground Water Monitoring Well

As a special condition of the last permit cycle, a monitoring well was installed in 2014 in an up-gradient location and sampled for 3 consecutive quarters. Information regarding this monitoring well has been summarized and listed in Appendix II and a map of its location is found on Figure 2.

J. Ground Water Quality Characteristics

The class of use was established in a previous statement of basis (DEQ 2004) as Class II ground water based on earlier ground water samples taken from offsite wells. However, recent sampling of the new monitoring well (MW-1) resulted in specific conductance averaging ~3033 $\mu\text{S}/\text{cm}$. Therefor DEQ is classifying the water as within the definition of Class III ground water (17.30.1006(3)). Ground water quality results are summarized in Appendix III.

III. MIXING ZONE

A mixing zone was requested by the applicant and is authorized in this permit. The Montana Water Quality Act (75-5-103, Montana Code Annotated (MCA)) states that a mixing zone is an area of the receiving water, established in a permit, where the water quality standards may be exceeded. DEQ will be reauthorizing a mixing zone within this permit. The mixing zone rationale is further discussed in Appendix IV.

IV. RATIONALE FOR PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. The

following is the basis for discharge limitations in accordance with the requirements of ARM 17.30.1006, ARM 17.30.1031 and ARM 17.30.715. The bases for deriving and establishing effluent limitations are further discussed in Appendix V. Based on the information and analyses presented in Sections III and IV, pursuant to ARM 17.30.1031, DEQ proposes the numerical effluent limitations in the table below. The nondegradation provisions of 75-5-303 MCA do not apply to Class III ground water [ARM 17.30.1006(3)(c)]. Based on multiple ground water samples from MW-1, the receiving water beneath the Major Brands Distributing - Town Pump, Three Forks is Class III ground water. Discharges established in this permit are in compliance with the human health criteria and preservation of beneficial uses.

Table 2

Final Effluent Limits – Outfall 001. Major Brands Distr. / Town Pump, Three Forks		
Parameter	Units	Effluent Limitations
		Daily Maximum⁽¹⁾
Nitrogen, Total - Load (as N) ⁽¹⁾	% removal ₍₂₎	60
	lbs/day ₍₃₎	3.74

Beneficial Uses: ARM 17.30.1006(1)(b)(ii)

1) See definition in Part V of permit.

2) DBEL. At least 60% removal of total nitrogen from the raw influent. The % removal = [(I-E)/100], where I is the influent concentration, E is the effluent concentration.

3) WQBEL. Lbs/dy Load Calculation: $lb/dy = [(mg/L) \times flow(g/d) \times (8.34 \times 10^{-6})]$
 Report the highest measured daily value for quarterly reporting period on the DMR form.

The nondegradation provisions of 75-5-303 MCA do not apply to Class III ground water [ARM 17.30.1006(3)(c)]. The receiving water beneath the Major Brands Distributing - Town Pump, Three Forks is Class III ground water.

The above WQBEL was developed based upon drainfield dilution, ambient ground water quality, and the fact that the receiving water is Class III ground water. Refer to the Mixing Zone tables in this document.

V. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. ARM 17.30.1031 requires that all issued MGWPCS permits contain monitoring requirements that assure compliance with the developed numeric effluent limitations and therefore water quality standards. Influent, effluent, and ground water monitoring will be required as a condition of this permit. Monitoring requirements and respective rationale is summarized in Appendix VII.

VI. SPECIAL CONDITIONS

Special conditions have not been established within this permit.

VII. COMPLIANCE SCHEDULE

A compliance schedule has not been established within this permit.

VIII. NONSIGNIFICANT DETERMINATION

DEQ has determined that the receiving ground water is Class III and is therefore not a high quality water of the state (Section II.J.). Pursuant to ARM 17.30.1006(3), nonsignificant criteria do not apply. Discharges in compliance with the limitations of this permit are considered nonsignificant. This permit includes monitoring and reporting requirements to establish, confirm, and maintain compliance with the permit limits.

IX. 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 24 May 2016. Comments may be directed to:

DEQWPBPublicComments@mt.gov

or,

Montana DEQ
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 issue a final decision within thirty days of the close of the public comment period.

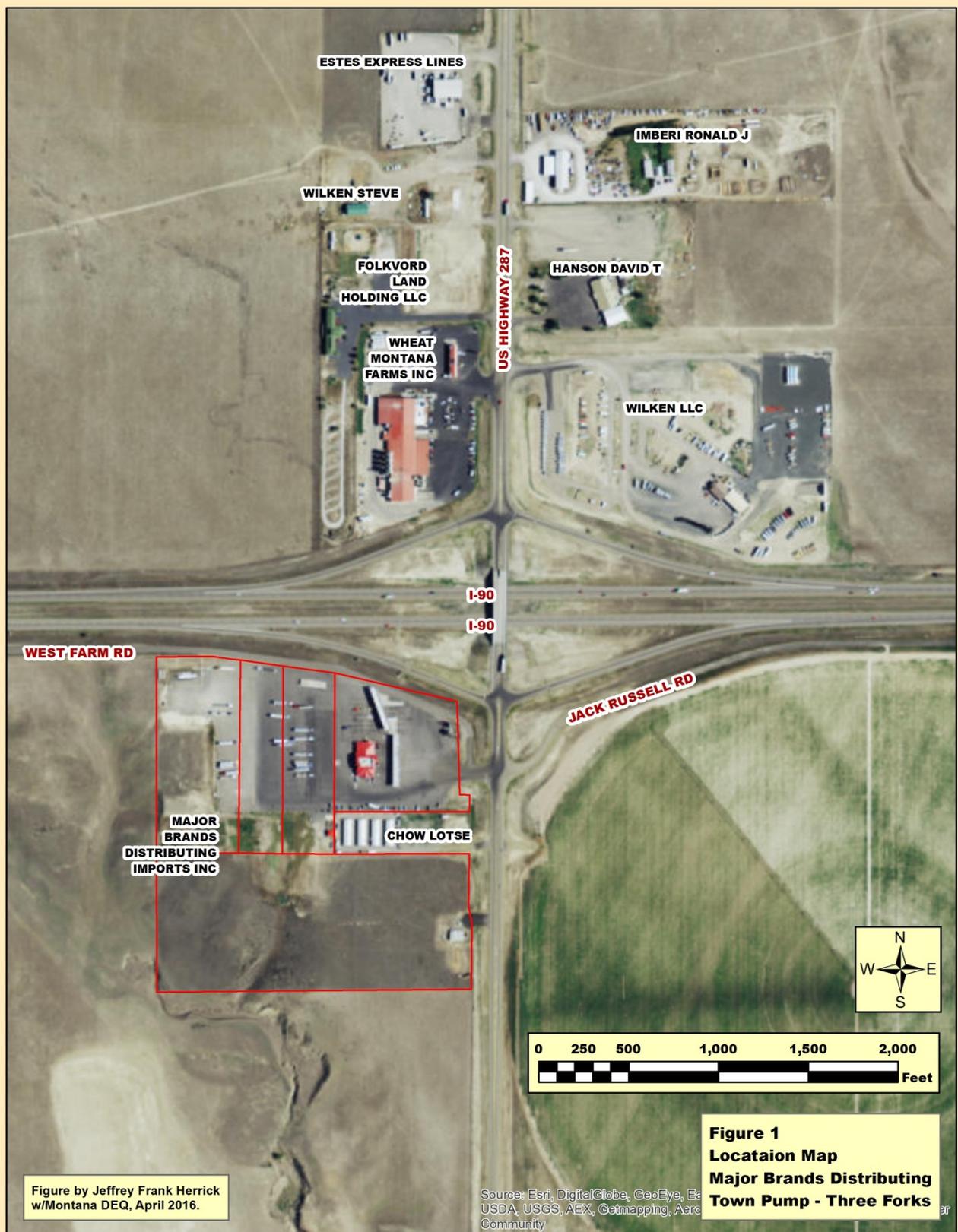
All persons, including the applicant, who believe any condition of the draft permit is inappropriate, or that DEQ's tentative decision to deny an application, terminate a permit, or prepare a draft permit is inappropriate, shall raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period (including any public hearing) under ARM 17.30.1372. 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.

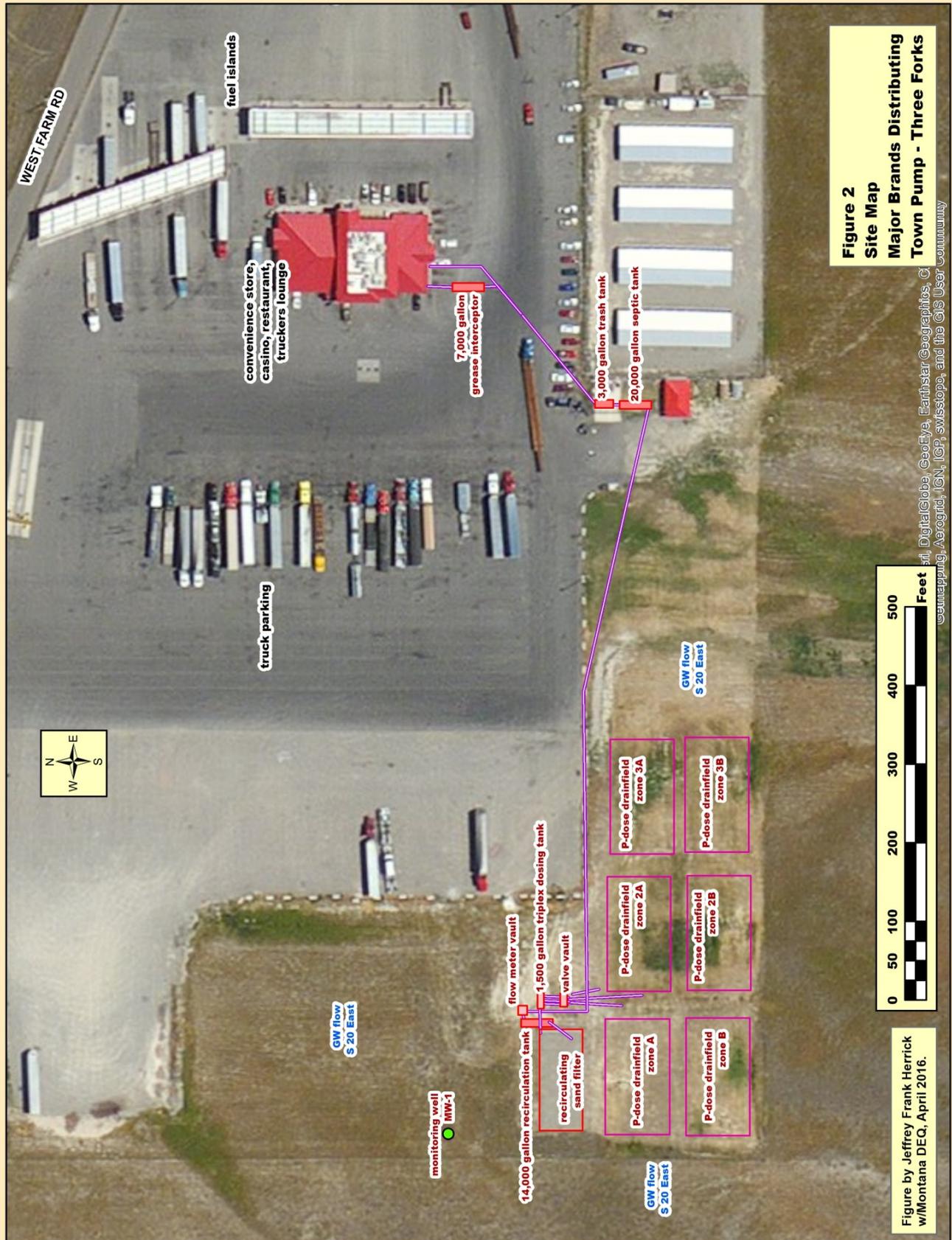
Copies of the public notice were mailed to the applicant, state and federal agencies and interested persons who have expressed interest in being notified of permit actions. A copy of the distribution list is available in the administrative record for this draft permit. Electronic copies of the public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

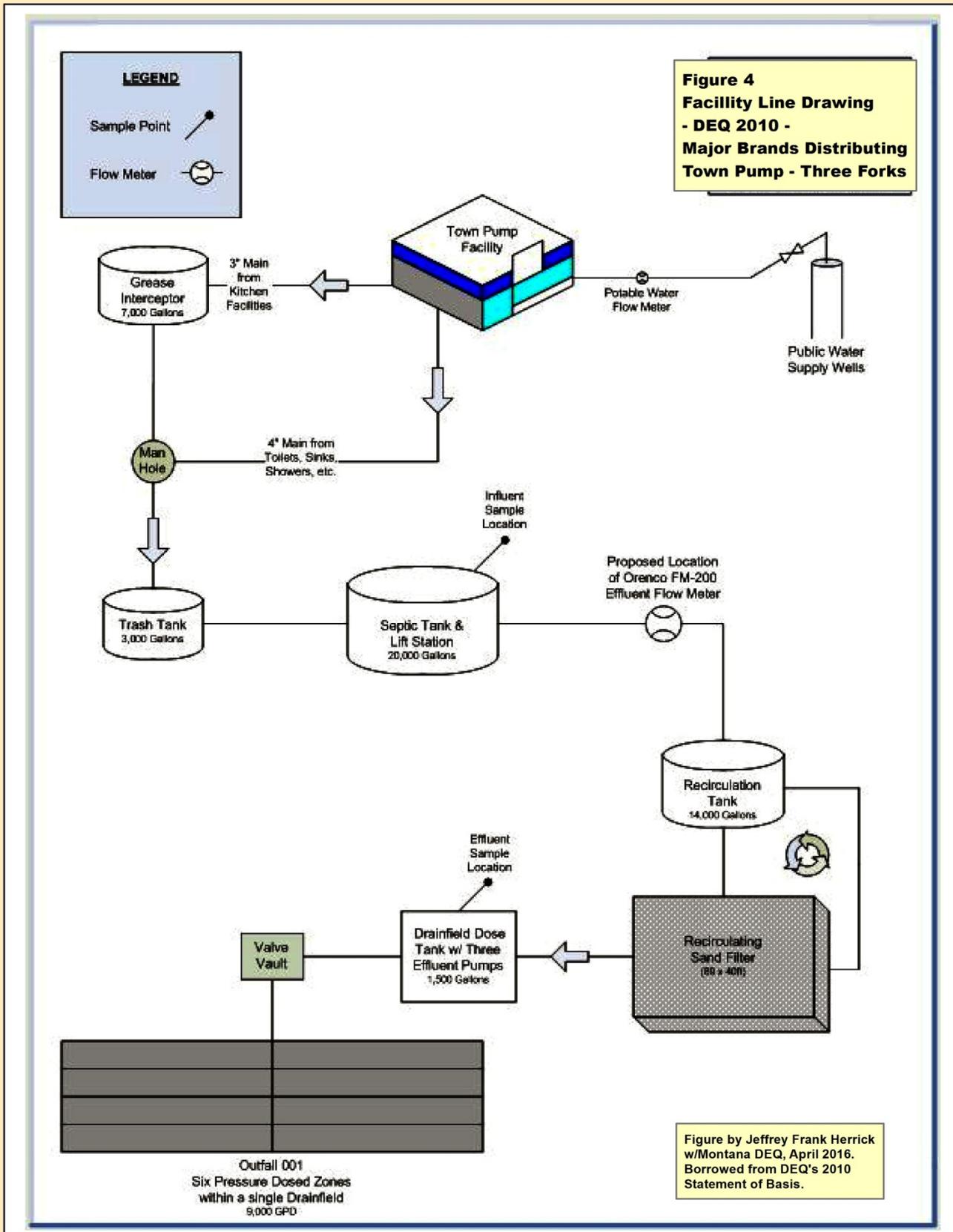
Any person interested in being placed on the mailing list for information regarding this permit may contact the DEQ Water Protection Bureau at (406) 444-3080 or email Jenna Stamper at JStamper@mt.gov. All inquiries will need to reference the permit number (MTX000148), and include the following information: name, address, and phone number.

During the public comment period provided by the notice, the Department 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 (ARM 17.30.1373).

FIGURES







APPENDIX I – INFLUENT AND EFFLUENT QUALITY

Table 3

Influent Quality – Outfall 001. Major Brands Distr. / Town Pump, Three Forks							
Parameter⁽¹⁾	Location	Units	Reported Minimum Value⁽³⁾	Reported Average Value⁽⁴⁾	Reported Maximum Value⁽²⁾	# of Samples	Source of Data
Biochemical Oxygen Demand (BOD)	INF-001	mg/L	260	453	550	22	DMR
Nitrogen, Total (as N)	INF-001	mg/L	100.9	110.7	161.0	22	DMR
		lbs/day	1.31	4.34	6.75	22	DMR
Oil & Grease	INF-001	mg/L	8.0	12.9	35.0	22	DMR
Total Suspended Solids (TSS)	INF-001	mg/L	33.7	58.4	90.0	19	DMR

Footnotes:
Period of Record: 09/2010 through 12/2015.
 DMR = Self Reported Discharge Monitoring Reports
 INF-001 = Influent Sampling Location is within the 20,000 gallon septic tank (after the trash tank and grease interceptor tank).
 (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) Values are derived from the minimum of quarterly averages.
 (4) Values are derived from the average of the quarterly averages.

Table 4

Effluent Quality – Outfall 001. Major Brands Distr. / Town Pump, Three Forks								
Parameter⁽¹⁾	Location	Units	Reported Minimum Value⁽³⁾	Reported Average Value⁽⁴⁾	Reported Maximum Value⁽⁵⁾	# of Samples	Source of Data	2010 Permit Limit
Biochemical Oxygen Demand (BOD ₅)	EFF-001	mg/L	6.7	23.3	260.0	22	DMR	NA
Chloride (as Cl) ⁽²⁾	EFF-001	mg/L	NR	NR	NR	NR	NR	NA
Flow rate, Discharge ⁽⁶⁾	FM-001	gpd	2117.2	5233.9	7595.0	22	DMR	NA
Nitrogen, Nitrate + Nitrite (as N)	EFF-001	mg/L	0.30	3.46	18.70	22	DMR	NA
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	19.0	35.8	91.0	22	DMR	NA
Nitrogen, Total Kjeldahl (as N)	EFF-001	mg/L	21.0	49.6	91.6	22	DMR	NA
Nitrogen, Total (as N)	EFF-001	mg/L	23.2	43.5	117.0	22 ⁽⁷⁾	DMR	NA
		lbs/day	0.55	1.64	4.89	25 ⁽⁸⁾	DMR	2
		% removal	14.20	54.30	78.00	28 ⁽⁹⁾	DMR	60%
Phosphorus, Total (as P)	EFF-001	mg/L	0.69	10.03	27.30	22	DMR	NA
		lbs/day	0.09	0.42	0.95	22	DMR	365 lbs/yr
Total Suspended Solids (TSS)	EFF-001	mg/L	4.0	26.5	44.0	22	DMR	NA

Footnotes:

Period of Record: 09/2010 through 12/2015.

NA = Not applicable

NR = Not Reported. This is an analyte listed on the Authorization To Discharge 2010, but wasn't coded on the DMRs supplied to the Applicant.

DMR = Self Reported Discharge Monitoring Reports

EFF-001: Effluent Sampling Location EFF-001: Effluent sampling port at the 1,500 gallon dose tank that pumps to the drainfield.

FM-001 = The flow meter was installed after the 20,000 gallon septic tank & lift station and before the 14,000 gallon recirculation tank.

- 1) Conventional and nonconventional pollutants only, table does not include all possible toxics.
- 2) Chloride (as Cl) was required to be sampled as part of the 2010 Authorization To Discharge. It appears that Chloride was not coded into the DMR sheets by DEQ and was therefore not sampled by the Permittee.
- 3) Values are derived from the minimum of reported quarterly averages.
- 4) Values are derived from the average of the reported averages.
- 5) Maximum value recorded of all quarterly reported Daily Maximum Values.
- 6) These are all daily maximum values.
- 7) Sample numbers represent the 90 day average on DMRs.
- 8) Sample numbers represent the daily maximum on DMRs.
- 9) Sample numbers represent the quarterly minimum on DMRs

APPENDIX II – MONITORING WELL SUMMARY

Table 5

Monitoring Well Summary. Major Brands Distr. / Town Pump, Three Forks
Monitoring Well: MW-1
MBMG GWIC #: 226620
Status: Constructed on 23 January 2014
Location: At the Town Pump truck stop and casino. Southwest of the store building and northwest of the drainfield.
Latitude: 46.874712° North Longitude: -113.860793° West
Representation: Ambient quality of the deeper receiving ground water, upgradient of Outfall 001 and the drainfields.

Well 1 for the Town Pump PWS. Not currently used.

MONTANA WELL LOG REPORT

NOTICE >> This well has been marked as **ABANDONED** in the GWIC database. << **NOTICE**

Site Name: TOWN PUMP INC. * 01
GWIC Id: 12483
DNRC Water Right: C062129-00

Section 7: Well Test Data

Total Depth: 207
 Static Water Level: 106
 Water Temperature:

Section 1: Well Owner(s)

1) TOWN PUMP INC. (MAIL)
 190 & 287 RT 1 BOX 235
 THREE FORKS MT 59752 [11/25/1985]

Pump Test *

Depth pump set for test _ feet.
 30 gpm pump rate with _ feet of drawdown after 24 hours of pumping.
 Time of recovery _ hours.
 Recovery water level _ feet.
 Pumping water level 116 feet.

Section 2: Location

Township	Range	Section	Quarter Sections	
02N	01E	21	SE¼ NE¼ NE¼ NE¼	
County		Geocode		
BROADWATER				
Latitude	Longitude	Geomethod	Datum	
45.9171	111.5974	MAP	NAD27	
Ground Surface Altitude		Method	Datum	Date
Addition		Block	Lot	

* 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 3: Proposed Use of Water
 PUBLIC WATER SUPPLY (1)

Section 8: Remarks

RIGGED UP CASING JACS AND TRIED TO PULL 6IN STEEL BACK. WELD BROKE 40FT BELOW SURFACE. FILLED IN WELL CASING WITH 49 SACKS OF BENTONITE HOLE PLUG, AND .5 YD OF CEMENT. FILLED TOP 3FT WITH TOP SOIL.

Section 4: Type of Work

Drilling Method: CABLE
 Status: ABANDONED

Section 9: Well Log

Geologic Source

Unassigned

From	To	Description
0	2	TOPSOIL
2	63	SANDY CLAY
63	79	SHELL ROCK 1 GPM
79	91	CLAY
91	140	BENT
140	145	BROKEN ROCK (WATER)
145	176	CLAY
176	178	COARSE GRAVEL (WATER)
178	200	BENT
200	205	CLAY GRAVEL MIX
205	210	SAND GRAVEL WATER
210	221	CLAY

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	207	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1	207	6	0.25			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
0	0	6			15 FT STAINLESS STEEL SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	CEMENT	

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: DONALD MORELOCK
Company: MORELOCK DRILLING AND PUMP
License No: WWC-414
Date 11/25/1985
Completed:

Well 2 for the Town Pump PWS. This is their active drinking water well.

MONTANA WELL LOG REPORT

Site Name: TOWN PUMP INC. * 02
GWIC Id: 140076
DNRC Water Right: C088699-00

Section 7: Well Test Data

Total Depth: 223
 Static Water Level: 113
 Closed-in Pressure: 5 psi
 Water Temperature:

Section 1: Well Owner(s)

1) RICE, DEB (MAIL)
 P.O. BOX 6000
 BUTTE MT 59701 [06/25/1999]
 2) TOWN PUMP INC. (MAIL)
 10800 HWY 287
 THREE FORKS MT 59752 [12/21/1993]

Air Test *

55 gpm with drill stem set at feet for 12 hours.
 Time of recovery 1 hours.
 Recovery water level 114 feet.
 Pumping water level 164 feet.

Section 2: Location

Township	Range	Section	Quarter Sections	
02N	01E	21	SE¼ NE¼ NE¼ NE¼	
County			Geocode	
BROADWATER				
Latitude	Longitude	Geomethod	Datum	
45.9169	111.5974	MAP	NAD27	
Ground Surface Altitude		Method	Datum	Date
Addition	Block		Lot	

* 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 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: ROTARY
 Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Tuesday, December 21, 1993

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	223	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	223	6	0.25		WELDED	A53B STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
155	165	6			.06 SLOT SCREEN
170	175	6			.06 SLOT SCREEN
212	217	6			.06 JOHNSON SCR

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	CEMENT	

Section 9: Well Log

Geologic Source

Unassigned

From	To	Description
0	2	TOPSOIL
2	18	CLAY FINE SAND SANDY CLAY
18	22	FINE SAND MEDIUM GRAVEL-GRAVEL
22	60	CLAY STREAKS FINE SAND-SANDY CLAY-STREAKS SANDSTONE
60	62	CLAY
62	72	FINE SAND-MEDIUM GRAVEL-GRAVEL
72	74	FRACTURED ROCK
74	85	CLAY
85	89	FINE SAND SOME COURSE
89	96	CLAY-ROCK GREEN
96	121	CLAY-STREAKS OF BENTONITE BLUE
121	129	FINE SAND COARSE TO FINE
129	151	CLAY-STREAKS OF BENTONITE
151	163	FINE SAND COARSE TO FINE
163	170	SHALE BLACK

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: DUANE L. HAUSER
Company: RED TIGER DRILLING
License No: WWC-386
Date 12/21/1993
Completed:

Site Name: TOWN PUMP INC.
GWIC Id: 140076

Additional Lithology Records		
From	To	Description
170	175	FINE SAND-TRACES MEDIUM GRAVEL
175	182	CLAY BLUE
182	184	FINE SAND-TRACES GRAVEL
184	187	CLAY-SANDY CLAY LIGHT GREEN
187	190	SHALE BLACK
190	210	CLAY-STREAKS OF BENTONITE
210	217	FINE SAND-TRACES M. GRAVEL
217	223	CLAY BLUE

APPENDIX III - GROUND WATER QUALITY MONITORING RESULTS

Table 6

Ground Water Monitoring Results, MW-1. Major Brands Distr. / Town Pump, Three Forks									
Monitor Source (1)	Represents	Parameter	Units	Reported Minimum Value	Reported Average Value	Reported Maximum⁽²⁾ Value	RL	# of Samples	Source of Data
MW-1	Ambient Ground Water Quality up-gradient from Outfall 001	Total Organic Carbon	mg/L	3.9	5.2	5.8	0.5	3	lab
		Chloride (as Cl)	mg/L	140	147	160	1	3	lab
		<i>Escherichia coli</i> Bacteria	CFU /100ml	<1	<1	<1	1	3	lab
		Nitrogen, Nitrate + Nitrite (as N)	mg/L	2.02	2.19	2.29	0.02	3	lab
		Nitrogen, Total Kjeldahl (as N)	mg/L	0.5	0.6	0.7	0.5	3	lab
		Sulfate	mg/L	1300	1317	1350	1	3	lab
		pH	s.u.	7.4	7.47	7.5	0.1	3	lab
		Specific Conductivity (@ 25°C)	µS/cm	2970	3033	3070	1	3	lab
		Total Dissolved Solids (TDS)	mg/L	2520	2553	2590	20	3	lab

Footnotes:

Period of Record: 3rd Qtr 2014 through 1st Qtr 2015.

Lab = The results were found in Laboratory Reports, but not in the DMRs.

CFU = Colony Forming Units

s.u. = standard units

(1) Refer to Section II 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.

APPENDIX IV – MIXING ZONE RATIONALE

In the 2014 renewal application for MGWPCS permit MTX000148, the applicant requested to maintain the existing standard mixing zone. No changes to the size or shape of the mixing zone were proposed or considered in this statement of basis for the permit.

The Montana Water Quality Act (75-5-103(21), MCA) states that a mixing zone is an area established in a permit, or final decision on nondegradation issued by DEQ, where water quality standards may be exceeded, subject to conditions that are imposed by DEQ and that are consistent with the rules adopted by the Board of Environmental Review.

DEQ determines whether a mixing zone is appropriate pursuant to the requirements and procedures of ARM 17.30.501 et seq. DEQ must conduct a water quality assessment in accordance with ARM 17.30.506(2)(a-i), to determine if a mixing zone is applicable and the type of mixing zone authorized. The permittee requesting a mixing zone has indicated the type of mixing zone requested and supplied information of sufficient detail in order for DEQ to make a determination regarding the authorization of the mixing zone (ARM 17.30.515(2)). The applicant requested a standard mixing zone in the 2014 renewal application for MGWPCS permit MTX000148. No changes to the size or shape of the mixing zone were proposed or considered.

A mixing zone may be denied if it will threaten or impair existing uses (see Section IV.A.) in accordance with ARM 17.30.505(2). In making this determination, DEQ will consider whether the currently available data accurately predicts ground water or pollutant movement or whether there is sufficient unpredictability that might result in adverse impacts due to a particular concentration of a parameter within the mixing zone (ARM 17.30.506; ARM 17.30.518).

A mixing zone may be granted for individual parameters in a discharge (ARM 17.30.505(1)(a)). As part of the water quality assessment described above, the concentration of pollutants at the downgradient boundary of the mixing zone must be estimated in accordance with ARM 17.30.517 in order to determine if the discharge qualifies for a standard ground water mixing zone. If the estimated concentration meets the applicable standard and/or the nonsignificance criteria at the boundary of the mixing zone, the discharge may qualify for a standard mixing zone(s) (ARM 17.30.517(1)(c)). In the case of the Major Brands – Town Pump, Three Forks WWTS the nonsignificance criteria do not apply due to the ground water characterized as Class III. Pursuant to ARM 17.30.502(6) a “Mixing Zone” is defined as a limited area or portion of an aquifer where initial dilution of a discharge takes place, where water quality changes may occur, and where certain water quality standards may be exceeded. ARM 17.30.517(1)(d)(iii) states that a specific width and depth are necessary to determine the aquifer cross-sectional area for a mixing zone.

The downgradient boundary mixing zone width is the width of the source (the maximum outfall width perpendicular to the direction of ground water) plus the distance determined by the tangent of 5° (equal to 0.0875) times twice the length of the mixing zone (ARM 17.30.517(1)(d)(iii)(B)). The permittee has requested a standard mixing zone length of 500 feet for Outfall 001 (ARM 17.30.517). The width of the drainfield structure perpendicular to ground water flow direction is 404 feet. Using the adjustment discussed above, the mixing

zone width at the downgradient boundary of Outfall 001 is equal to 491.5 feet (Refer to Table 7 below). ARM 17.30.517(1)(d)(iii)(A) states that the depth of a standard ground water mixing zone extends from the top of the water table beneath the source down to 15 feet below the water table. Although the soils are fine-grained, no specific limiting layers were documented within these depths at the location of the facility's mixing zone. Therefore, DEQ has used 15 feet as the depth of the mixing zone for Outfall 001.

The cross-sectional area (A) of the mixing zone is the area of the ground water flux boundary at the terminus of the mixing zone. This area is calculated by multiplying the depth of the mixing zone (15 feet) by the width of the mixing zone at the downgradient boundary (491.5 feet). This results in a cross-sectional area at the downgradient boundary of mixing zone of 7372.5 ft². The permittee submitted information indicating that the ground water gradient (I) is 0.0122 ft/ft, the ground water flow direction is S20°E, and the hydraulic conductivity (K) is 68.2 ft/day. Most of the above values are drawn from the original DEQ basis of facts (2010), the most recent permit (2010), and the most recent permit application (2014). As summarized in Table 6, the permittee has indicated an average ambient Nitrate + Nitrite (as N) concentration was 2.19 mg/L. The ambient Nitrate + Nitrite + Total Kjeldahl (as N) concentration is 2.79 mg/L. These values are for the receiving water. The applicable mixing zone variables for Outfall 001 are summarized below in Table 7.

Therefore, pursuant to DEQ procedures (ARM 17.30.515), DEQ will reauthorize a mixing zone for this permit cycle.

Table 7

Mixing Zone Information - Outfall 001. Major Brands Distr. / Town Pump, Three Forks																						
Parameter	Units	Value																				
Mixing Zone Type	-	Standard																				
Authorized Parameters	-	Total Nitrogen																				
Ambient Ground Water Concentrations: Nitrate, Nitrite, & Total Kjeldahl (as N)	mg/L	2.79																				
Ground Water Flow Direction	azimuth/bearing	S20°E																				
Length of Mixing Zone	feet	500																				
Thickness of Mixing Zone	feet	15																				
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	404																				
Width of Mixing Zone at Down Gradient Boundary	feet	491.5																				
Cross Sectional Area of Mixing Zone (A)	ft ²	7372.5																				
Hydraulic Conductivity (K)	feet/day	68.2																				
Hydraulic Gradient (I)	ft/ft	0.0122																				
Volume of Ground Water Available for Mixing (Q _{gw})	ft ³ /day	6,134																				
<p>N+N total N comes from recent MW-1 sampling (2014+2015). Finally submitted on May 30, 2015. The values entered above come from the 2014 GW Discharge Permit Renewal Appl. Rept. (Supplemental to Form GW-1 Application)</p> <table border="1"> <thead> <tr> <th>MW-1 sample dates</th> <th>1/29/2015</th> <th>10/21/2014</th> <th>7/29/2014</th> <th></th> </tr> </thead> <tbody> <tr> <td>N, Kjeldahl</td> <td>0.7</td> <td>0.6</td> <td>0.5</td> <td></td> </tr> <tr> <td>N, Nitrate&Nitrite</td> <td>2.25</td> <td>2.02</td> <td>2.29</td> <td>2.18667 N&N avg</td> </tr> <tr> <td>Total N</td> <td>2.95</td> <td>2.62</td> <td>2.79</td> <td>2.78667 avg total</td> </tr> </tbody> </table>			MW-1 sample dates	1/29/2015	10/21/2014	7/29/2014		N, Kjeldahl	0.7	0.6	0.5		N, Nitrate&Nitrite	2.25	2.02	2.29	2.18667 N&N avg	Total N	2.95	2.62	2.79	2.78667 avg total
MW-1 sample dates	1/29/2015	10/21/2014	7/29/2014																			
N, Kjeldahl	0.7	0.6	0.5																			
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Total N	2.95	2.62	2.79	2.78667 avg total																		

APPENDIX V - RATIONALE FOR PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, 401, and 402 MCA and rules adopted under that Act. Section IV presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1006, ARM 17.30.1031, and ARM 17.30.715.

A. Water Use Classification & Applicable Water Quality Standards

The receiving water is Class III ground water and not considered to be high quality waters of the state (75-5-301 MCA and 17.30.1006 ARM). The quality of Class III ground water must be maintained so that these waters are at least marginally suitable for the following beneficial uses with little or no treatment (ARM 17.30.1006(3)):

- Drinking, culinary, and food processing purposes;
- Irrigation of some salt tolerant crops;
- Drinking water for some livestock and wildlife; and,
- Some commercial and industrial purposes.

Persons may not cause a violation of the following specific water quality standards in Class III ground water, pursuant to ARM 17.30.1006, except within a DEQ approved mixing zone as provided in ARM 17.30.1005:

- The human health standards for ground water listed in Circular DEQ-7;
- For concentrations of parameters for which human health standards are not listed in DEQ-7, no increase of a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses listed for Class III water. DEQ may use any pertinent credible information to determine these levels; and,

In accordance with ARM 17.30.705 and 706, DEQ is required to determine whether a new or increased source may cause degradation or whether it is nonsignificant according to ARM 17.30.715. DEQ performed a significance determination for the proposed activity as part of permit development (DEQ, 2010). The determination established that it is an activity resulting in a change of existing water quality occurring on or after April 29, 1993. Discharges established in the current permit are in compliance with the human health criteria and preservation of beneficial uses, as the nondegradation criteria do not apply [ARM 17.30.1006(3)(c)]. The applicable ground water standards pursuant to ARM 17.30.1006(3)(b)(ii) and 17.30.715 are summarized in the table below and will be used as the basis for developing effluent limitations in the permit.

Table 8

Applicable Ground Water Quality Standards. Major Brands Distr. / Town Pump, Three Forks			
Parameter⁽¹⁾	Units	17.30.1006(1)(b)(i) Human Health Standards - Ground Water	17.30.1006(1)(b)(ii) Beneficial Uses - Ground Water
<i>Escherichia coli</i> Bacteria	CFU / 100mL	< 1	
Nitrogen, Nitrate (as N)	mg/L	10.0	-
Nitrogen, Total (TN)	mg/L	-	10.0

Footnotes:
 CFU = Colony Forming Unit
 These standards establish the maximum allowable changes in ground water quality and are the basis for limiting discharges to ground water, ARM 17.30.1005(1); Circular DEQ-7 (2012), Footnote 16; and **ARM 17.30.715(1)(d)**.
 (1) Includes known pollutants and parameters of concern only.
 The nondegradation provisions of 75-5-303 MCA do not apply to Class III ground water [ARM 17.30.1006(3)(c)]. The receiving water beneath the Major Brands Distributing - Town Pump, Three Forks is Class III ground water.

B. Pollutants and Parameters of Interest (POI)

This is a permit renewal. In the 2010 development of the basis for the permit and in the current Fact Sheet (2016), DEQ identified pollutants and parameters of interest (POI's) for the proposed discharge based on the following:

- Reported effluent characteristics (Section II,D and Appendix II of this Fact Sheet);
- Water quality standards (Table 8 above);
- Water use classification of the receiving ground water (Appendix III, IV, and VI); and
- US EPA reference documents (Appendix IX).

Each individual POI is further discussed below.

C. Development of Effluent Limits

ARM 17.30.1006 sets forth the basis for developing effluent limitations that will protect water quality. The ground water quality standards establish the maximum allowable changes to ground water quality; are the basis for limiting discharges to ground water; and may only be exceeded within a mixing zone authorized by DEQ. The nondegradation provisions of 75-5-303 MCA do not apply to Class III ground water [ARM 17.30.1006(3)(c)]. Based on multiple ground water samples from MW-1, the receiving water beneath the Major Brands Distributing - Town Pump, Three Forks is Class III ground water.

1) Water Quality Based Effluent Limitations

a) Nitrogen

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. DEQ has established the effluent limitations for nitrogen based on the projection that the entire nitrogen load in the wastewater stream will ultimately be converted to nitrate (US EPA 2002a).

To protect beneficial uses (ARM 17.30.1006(1)(b) and Appendix VI), the most restrictive of the ground water human health standards was used as the effluent limitation. The effluent limitation for nitrogen is displayed within Section IV and Appendix V Table 8 (above). An explanation of the development of the effluent limits is presented in Appendix IV and Table 7 (above).

Application materials indicate that nitrogen will be present in the proposed wastewater stream (Section II.D & F, and Appendix I). 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 has established 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 were derived from a mass-balance equation (ARM 17.30.517) which is a simple steady-state model, used to determine the POI concentration after accounting for other sources of pollution in the receiving water and any dilution as provided by a mixing zone. The equation factors in cumulative impacts of existing upgradient discharges and will limit the discharger to the assimilative capacity currently available in the receiving aquifer. 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 III).

Equation 2:

$$C_{\text{limt}} = C_{\text{std}} + D(C_{\text{std}} - C_{\text{gw}})$$

Where:

- C_{limt} = effluent limitation concentration
- C_{std} = water quality standard concentration
- C_{gw} = ambient receiving ground water concentration
- D = dilution ratio ($Q_{\text{gw}}/Q_{\text{eff}}$)

i. Outfall 001

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 effluent load limitation is as follows:

$$[(8.34 \times 10^{-6}) * 49.83 \text{ mg/L} * 9,000 \text{ gal/day}] = 3.7402 \text{ lb/day}$$

as based on the following equation:

Equation 3:

$$L_{\text{limt}} = \text{CON} * C_{\text{eff}} * \text{DC}_{\text{eff}}$$

Where:

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

Also, please refer to Table 7 for Mixing Zone Information and Section V.C.(1) above for an explanation of the development of the Mass Balance Calculation. Refer to Table 2 at the beginning of this document for the Load Limit established for Outfall 001.

b) Phosphorus

Phosphorus in wastewater is removed mainly through soil sorption processes, which vary based on soil composition. The 50-year breakthrough nondegradation criterion is based on the amount of soil available to adsorb the load of phosphorus from the wastewater source between the discharge points and the closest downgradient surface water.

A phosphorus breakthrough analysis was conducted by DEQ in preparation for the previous permit (2010) and listed in the DEQ permit / Authorization to Discharge (2010). The monitoring well MW-1 was installed and sampled during 3 consecutive quarters in 2014 and 2015. The analytic data for MW-1 is listed in Appendix III Table 6. The specific conductivity in the samples representing the receiving water averages 3,033 $\mu\text{S}/\text{cm}$. The specific conductivity in all three samples collected from MW-1, and the average of these sample values, fall within the defined limits for Class III ground waters (ARM 17.30.1006(3)). Class III ground waters are those with a natural specific conductance that is greater than 2,500 and less than or equal to 15,000 $\mu\text{S}/\text{cm}$. Since the receiving water is Class III ground water, the previous breakthrough analysis was not used in this basis of fact to establish a limit for phosphorous. As such, there is no limit set for phosphorus in Table 2.

E. Final Effluent Limitations

Based on the information and analyses presented in Sections III and IV and pursuant to 75-5-402, MCA and ARM 17.30.1031, DEQ proposes the following numerical effluent limitations.

Numeric effluent limitations are expressed as loads whenever possible since this type of limitation inherently regulates both the volume and the strength of the effluent as prescribed in 75-5-402(3), MCA. Load limits also ensure compliance with the ground water standards at the end of the mixing zone. The proposed final effluent limits are listed in Section IV Table 2.

APPENDIX VI – PHOSPHORUS BREAKTHROUGH ANALYSIS

A phosphorus breakthrough analysis was conducted by DEQ in preparation for the previous permit (2010) and listed in the DEQ permit / Authorization to Discharge (2010). Since that time ground water monitoring (from the monitoring well MW-1) has demonstrated that the receiving water beneath the discharge averages a specific conductance of 3,033 $\mu\text{S}/\text{cm}$. The average specific conductance falls within the defined limits for Class III ground waters (ARM 17.30.1006(3)). Since the receiving water is Class III ground water, the previous breakthrough analysis was not used in this basis of fact to establish a limit for phosphorous. Discharges established in this permit are in compliance with the human health criteria and preservation of beneficial uses, as the nondegradation criteria do not apply [ARM 17.30.1006(3)(c)].

APPENDIX VII – RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

ARM 17.30.1031 requires that all issued MGWPCS permits contain monitoring requirements that assure compliance with the developed numeric effluent limitations and the water quality standards. Influent and effluent monitoring will be required as conditions of this permit.

A. Effluent Monitoring - Compliance

Final numeric effluent limitations are developed for this permit with specific magnitudes and durations based on site-specific conditions that ensure the discharge will not cause or contribute to an exceedance of an applicable water quality standard (see Sections III and IV). Accordingly, the permittee will be required to monitor and report monitoring results at a specified frequency in order to demonstrate compliance with the applicable effluent limitations. Effluent monitoring and reporting requirements are summarized in the table below. All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter.

B. Influent Monitoring – Sampling Location

Samples collected (at INF-001) shall be representative of the nature of the monitored influent (Permit Part II.A.). As discussed in Section II.C of this document, the influent sample location has been established at the 20,000 gallon septic tank and lift station. This location is depicted on Figures 2, 3, and 4. Note that Figures 3 and 4 are simplistic line diagrams and are not to scale. Influent monitoring and reporting requirements are discussed in Table 9.

C. Effluent Monitoring - Sampling Location

Samples collected (at EFF-001) shall be representative of the nature of the monitored discharge (Permit Part II.A.). As discussed in Section II.E of this document, the effluent sample location has been established at the 1,500 gallon Triplex dose tank, which is directly before the effluent is sent to the pressure dosed drainfield. This location is depicted on Figures 2, 3, and 4. Note that Figures 3 and 4 are simplistic line diagrams and are not to scale. Effluent monitoring and reporting requirements are discussed in Table 10.

D. Discharge Monitoring

Measurements shall be representative of the volume of the monitored discharge (Permit Part II.A.). The applicant 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 (Permit Part II.B.). During the previous permit cycle an effluent flow meter was installed. It is a Orenco FM200 Totalizing Flow Meter with a vault enclosure. The flow meter was installed after the 20,000 gallon septic tank & lift station and before the 14,000 gallon recirculation tank. Flow monitoring (at FM-001) and reporting requirements for the monitoring are summarized in Table 12.

Table 9

Influent Monitoring and Reporting Requirements – Outfall 001. Major Brands Distr. / Town Pump, Three Forks						
Parameter/Method	Monitor Location	Units	Sample Type⁽¹⁾	Minimum Sample Frequency	Reporting Requirements⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾	Reporting Frequency
Oil & Grease	INF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Total Suspended Solids (TSS)	INF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Biochemical Oxygen Demand (BOD ₅)	INF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total (as N) ⁽⁴⁾	INF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
		lbs/day ⁽⁵⁾	Calculate	Monthly	Daily Maximum ⁽⁶⁾ Quarterly Average ⁽⁷⁾	Quarterly

Footnotes:
 INF-001 = Influent Sampling Location is within the 20,000 gallon septic tank (after the trash tank and grease interceptor tank).
 If no discharge occurs during the reporting period, “no discharge” shall be recorded on the effluent 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 specified above.

- 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) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
- 5) Load calculation: lbs/day = (mg/L) x flow (gpd) x [8.34 x 10⁻⁶].
- 6) Daily Maximum Load calculation: lbs/day = the maximum of all calculated individual daily average loads (lbs/day) recorded during the reporting period.
- 7) Quarterly Average Load calculation: lbs/day = the average of all calculated individual daily average loads (lbs/day) recorded during the reporting period.

Table 10

Effluent Monitoring and Reporting Requirements – Outfall 001. Major Brands Distr. / Town Pump, Three Forks						
Parameter/Method	Monitor Location	Units	Sample Type⁽¹⁾	Minimum Sample Frequency	Reporting Requirements⁽¹⁾⁽²⁾	Reporting Frequency
Flow Rate, Effluent ⁽³⁾	FM-001	gal/day	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Total Suspended Solids (TSS)	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Biochemical Oxygen Demand (BOD ₅)	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Chloride (as CL)	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Nitrite + Nitrate (as N)	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Ammonia (as N)	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
Nitrogen, Total (as N) ⁽⁴⁾⁽⁵⁾	EFF-001	mg/L	Grab	Monthly	Daily Maximum Quarterly Average	Quarterly
		% removal ⁽⁴⁾	Calculate	Monthly	Quarterly Average	Quarterly
		lbs/day ⁽⁵⁾	Calculate	Monthly	Daily Maximum Quarterly Average ⁽⁶⁾	Quarterly
Phosphorus, Total (as P)	EFF-001	mg/L	Grab	Monthly	Quarterly Average	Quarterly
		lbs/day	Calculate	Monthly	Quarterly Average ⁽⁶⁾	Quarterly
		lbs/year	Calculate	1/Year	Annual Maximum ⁽⁷⁾	Annually ⁽⁸⁾

Footnotes:

- EFF-001 = Effluent Sampling Location. Effluent sampling port at the 1,500 gallon dose tank located just prior to the vault that pumps to the drainfield.
 FM-001 = The flow meter that was installed after the 20,000 gallon septic tank & lift station and before the 14,000 gallon recirculation tank.
 If no discharge occurs during the reporting period, “no discharge” shall be recorded on the effluent 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 specified above.
- 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. Daily Maximum Load calculation: lbs/day = the maximum of all calculated individual daily average loads (lbs/day) recorded during the reporting period.
 - 3) Requires recording device or totalizing meter, must record daily effluent volume.
 - 4) At least 60% removal of total nitrogen from the raw influent. Calculated as $\{[(\text{Influent TN} - \text{Effluent TN})/\text{Influent TN}] * 100\}$ using the corresponding quarterly average values as reported on the Discharge Monitoring Report (DMR) form for the reporting period.
 - 5) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen. Calculated as $\{[(\text{Influent TN} - \text{Effluent TN})/\text{Influent TN}] * 100\}$ using the corresponding quarterly average values as reported on the DMR form for the reporting period. Load calculation: lbs/day = (mg/L) x flow (gpd) x $[8.34 \times 10^{-6}]$.
 - 6) Quarterly Average Load calculation: lbs/day = the average of all calculated individual daily average loads (lbs/day) recorded during the reporting period.
 - 7) 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). The calculation is: lbs/year = (mg/L) x flow (gpd) x $[8.34 \times 10^{-6}]$ x 365 (days/year).
 - 8) Annual maximum load shall be reported (DMR) on an annual basis (due January 28 each year of the permit cycle).

As a side note to the Effluent Monitoring And Reporting Requirements described above; it should be noted that over the last permit period, the DEQ issued DMR reporting pages to the permittee that did not list chloride as an analyte. As such, chloride was, for the most part, not analyzed and results were not reported to DEQ. Care should be taken to ensure that all of the analytic parameters listed in Tables 9 and 10 are sampled, analyzed, and reported to DEQ as required.

E. Ground Water Quality Monitoring

The installation of an up-gradient monitoring well was required in DEQ's Authorization to Discharge (2010) as one of the Special Conditions of the permit. This monitoring well was installed to better establish the nature of the receiving waters beneath the discharge structures. This well was installed in 2014 and sampled over 3 consecutive quarters in 2014 and 2015. To provide ongoing data that will help characterize the receiving water through time, DEQ is requiring quarterly ground water sampling from MW-1 as part of this permit. The sampling requirements for MW-1 are on the following table.

Table 11

Ground Water Monitoring and Reporting Requirements for MW-1. Major Brands Distr. / Town Pump, Three Forks						
Parameter/Method	Monitor Location ⁽¹⁾	Units	Sample Type ⁽²⁾	Minimum Sampling Frequency	Reporting Requirements	Reporting Frequency
Chloride (as Cl)	MW-1	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Nitrate + Nitrite (as N)		mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Total Ammonia (as N)		mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
Nitrogen, Total Kjeldahl (TKN)(as N)		mg/L	Grab	1/Quarter	Quarterly Average	Quarterly
pH		s.u.	Grab or Instantaneous	1/Quarter	Quarterly Average	Quarterly
Specific Conductivity @ 25°C		µS/cm	Grab or Instantaneous	1/Quarter	Quarterly Average	Quarterly
Total Dissolved Solids (TDS)		mg/L	Grab or Instantaneous	1/Quarter	Quarterly Average	Quarterly
Static Water Level (SWL)		ft-bmp	Instantaneous	1/Quarter	Quarterly Average	Quarterly

Footnotes:

ft-bmp = feet below measuring point. Measuring point (point of reference) for SWL measurements shall be from top of casing and measured to within 1/100th of one foot.

s.u. = standard units

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

Each monitoring well to be individually sampled and analyzed for each respective parameter listed above.

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 Figure 2 of the Fact Sheet for the location of the monitoring well.

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

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This Fact Sheet was Prepared By: Jeffrey Frank Herrick
Permit Writer
Water Protection Bureau
Montana Department of Environmental Quality.
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