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)

Date:	July 12, 2016
Applicant:	Stoney Brook Village Condominium Association 20 Stoney Brook Drive Clancy, MT 59634
Permit Number:	MTX000197
Facility Name:	Stoney Brook Village Condominium
Facility Location:	NW1/4NE1/4 Section 23, Township 9 North, Range 3 West; Latitude 46.52768/ Longitude -111.94298; Jefferson County
Facility Address:	Stoney Brook Drive, Clancy, MT 59634
Facility Contact:	Rick Barnwell, Wastewater Operator, B& R Water Solutions 2804 6th Ave. South Great Falls, MT 59405-3127
Receiving Water:	Class 1 Ground Water
Number of Outfalls:	Two (2)
Outfall(s)/Type:	001 – Subsurface Drainfield (Phases I & II) 002 – Subsurface Drainfield (Phase III)

I. PERMIT STATUS

The following fact sheet outlines the basis for renewing and modifying the Montana Ground Water Pollution Control System (MGWPCS) wastewater discharge permit for Stoney Brook Village Condominium (SBVC). 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 systems.

This is a renewal and a modification of the existing MGWPCS Permit MTX000197 for SBVC. It should be noted that on June 16, 2016, a Permit Transfer Notification Form was received by the Department from the Stoney Brook Village Condominium Association to transfer the name of the permittee from Julie Rasmussen to Stoney Brook Village Condominium Association. The 2016 permit also modifies ground water sampling from composite sampling to grab sampling based on the information provided by the applicant.

During the development of the SBVC Permit Renewal/Modification Fact Sheet; the drainfield serving SBVC Phase III was identified as Outfall 002 (Figure 2).

A. Application Info

David Rasmussen (now deceased) was the previously identified as the permittee/ facility contact for the SBVC. On April 9, 2007, the Montana Department of Environmental Quality (DEQ) received a MGWPCS permit application from Mr. Rasmussen for a new wastewater discharge permit for the Stoney Brook Condominium Village (SBVC) pursuant to ARM 17.30.1023(3) and (4). At that time, Mr. Rasmussen was operating Level II [ARM 17.30.702(11)] wastewater treatment systems [recirculating sand filters (RSFs)] for Phases I and II. On June 10, 2008, the permittee submitted a revised GW-1 application with $200 for a minor modification. This application included the proposed wastewater treatment and disposal system for Phase III. Revised and updated hydrogeological data were provided for the entire site, including all of Phases I, II, and III. The Phase III wastewater treatment system also provides Level II wastewater treatment via a RSF.

After David Rasmussen's passing; Julie Rasmussen, his wife became the permittee. Ms. Rasmussen submitted the permit renewal application (Forms 1 and GW-1) for Phases I, II, and III of the development. The application was received by the Department on April 7, 2014. A portion of the fees were received on November 7, 2013, with the remaining portion received on April 28, 2014. The MGWPCS application was determined to be complete on June 6, 2014.

B. Permit Changes

Since the previous ground water discharge permit application, infrastructure for SBVC Phase III has been constructed. This includes the associated wastewater treatment system that will provide Level II wastewater treatment for 20 additional condominiums.

At the request of the applicant, and based on effluent sampling at nearby subdivisions, ground water sampling has been modified from composite sampling to grab sampling.

II. FACILITY INFORMATION

A. Facility Location

The SBVC wastewater treatment system is located 7.2 miles south of Helena. The property is situated between Highway 282 and Interstate 15, south of Montana City (Figure 1). The legal location for the wastewater treatment system is listed in Table 1.

B. Facility and Operations

SBVC is a private senior citizen residential development. The development is divided into three phases. The wastewater treatment systems are designed to serve a population of 128 residents in a total of 64 residences. Wastewater treatment for Phases I & II consists of primary and secondary treatment. Septic tanks (1,500-gallon) are shared between every two units. The community center has its own 1,500 gallon septic tank. A collection system (gravity and pressure) conveys the wastewater from the septic tanks to the common Wastewater Treatment System (WWTS). Secondary treatment for Phases I and II occurs in two recirculation tanks (14,475- gallon and 9,935 gallon capacities) and two recirculating sand filters where it receives Level II treatment. From the sand filters, the treated effluent is pumped to the dose tank (EFF-001) and then pressure-dosed to a 4-zone, gravel-trench subsurface drainfield (Outfall 001). Secondary treatment for Phase III occurs in a similar manner. Phase III secondary treatment consists of a 12,000-gallon recirculation tank, recirculating sand filter, and a dose tank (EFF-002) for pressure dosing to a 4-zone, gravel-trench subsurface drainfield (Outfall 002). Tables 1 and 2 provide a summary of the wastewater treatment and disposal systems.

Table 1: Collection, Treatment, and Disposal System Summary for Outfall 001 (Phases I and II	
Outfall 001 - Domestic Wastewater/Sewerage	
Method of Disposal: Infiltration to ground water	
Disposal Structure: Subsurface Drainfield NW1/4NE1/4 of Section 23, Township 09 North, Range 03 West Outfall 001: Latitude 46.5268; Longitude: -111.9429	
Contributing Sources: Residential	
Average Daily Design Flow (gpd): 12,112 (ft^3/day): 1,619	Daily Maximum Design Flow (gpd): Not Reported (NR) (ft^3/day): NR
Effluent Sampling Location: EFF-001 (Dose tank 001) for Phases 1 & II	
Flow Monitoring Equipment: AMCO Class II turbine T3000 totalizing flow meter	
Flow Monitoring Location: After pump tank, prior to the dose tank, and prior to discharging to the subsurface drainfield	
Treatment: Level 2 (2 recirculating sand filters)	

Table 2: Collection, Treatment, and Disposal System Summary for Outfall 002 (Phase III)	
Outfall 002: Domestic Wastewater/Sewerage	
Method of Disposal: Infiltration to ground water	
Disposal Structure: Subsurface Drainfield NW1/4NE1/4 of Section 23, Township 09 North, Range 03 West Latitude: 46.52636; Longitude: -111.9427	
Contributing Source: Residential	
Average Daily Design Flow (gpd): 6,000 (ft^3/day): 802	Daily Maximum Design Flow (gpd): NR (ft^3/day): NR
Effluent Sampling Location: EFF-002 (Dose tank 002)	
Flow Monitoring Equipment: One (1) AMCO Class II turbine T3000 totalizing flow meter	
Flow Monitoring Location: After the pump tank , prior to dose tank 002, and prior to discharging to the subsurface drainfield	
Treatment: Level 2 (recirculating sand filter)	

As part of the general facility operations and maintenance plan, settled solids/sludge from the septic tanks and the RSFs will be removed periodically as needed. All solids/ sludge will be disposed of at the City of Helena Wastewater Treatment Plant.

C. Effluent Monitoring Location

Effluent monitoring for SBVC Phases I and II occurs at Dose Tank 001. Dose Tank 001 is located off of the northeast corner of Phase III's drainfield. Effluent monitoring for Phase III occurs at Dose Tank 002. Dose Tank 002 is located approximately midway along the east property boundary. Effluent monitoring locations are located after each pump tank, prior to each dose tank, and prior to discharging to the drainfields. Sampling requirements are further discussed in Section V.

D. 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 effluent quality data for Outfall 001 and Outfall 002 as submitted by the applicant is summarized in Appendix I.

The applicant proposes to dose treated effluent from three RSF treatment systems to two gravel-trench subsurface drainfields [Outfall 001 (Phases I and II) and Outfall 2 (Phase III)].

E. Geology

Sediments in the vicinity of Prickly Pear Creek and the floodplain are composed of fine alluvium. On the steeper slopes, colluvial material associated with the weathered bedrock sediments (limestone chips and cobbles with a clay matrix) are present. Shallow bedrock in this area consists of fractured limestone. Prickly Pear Creek is located approximately 65 feet from the closest condominiums.

F. Hydrogeologic Characteristics

The hydrogeologic characteristics of this site were determined using data obtained from a 24-hour constant rate (85 gpm) shallow aquifer pump test conducted in 2008. Monitoring Well MW-1 was used as the pumping well. MW-2 was used as an observation well. Based on the drawdown and recovery data from MW-1 and MW-2; the average transmissivity was determined to be 8,370 $ft.^2$ /day. The aquifer thickness at MW-1 was estimated at 25 feet. Therefore, an average hydraulic conductivity (K) was calculated at 335 ft/day. Based on a three-point calculation using MW-1, MW-2, and MW-3, the hydraulic gradient is 0.005 ft/ft to the N55°W from Outfall 001. The Department has verified this gradient (using May 29, 2008 elevations) via generating a contoured flow map that includes the surface water elevations as provided by the applicant. The depth to shallow ground water at this site ranges from an average depth of 6.57 feet from the top of the well casing (TOC) at MW-3, to 17 feet below the TOC at MW-1, to 30 feet below the TOC at MW-2.

During drilling MW-1, moist subsoil was encountered from 10 to 25 feet below ground surface (bgs) in limestone cobbles and clay. Ground water was encountered from 25 to 40 feet bgs in limestone and clay. MW-1 was drilled to 40 feet bgs; and was reported to produce at greater than 60 gallons per minute (gpm) through an open bottom completion (Faber, 1996).

According to the DEQ Public Water Supply, Source Water Delineation and Assessment Report (2005), "Stoney Brook Village Condominium Association Public Water System," the shallow alluvial-colluvial aquifer is unconfined and in some reaches may be hydraulically connected to Prickly Pear Creek.

The nearest downgradient surface water is an unlined pond used for potential fire-suppression. The pond is located approximately 413 feet from the hydraulically downgradient side of the existing (Phase I and II) drainfield area. It is northeast of the 380-foot Department modified ground water mixing zone (see Part VI of this statement of basis). The relative positions of these features are identified on Figure 2.

Prickly Pear Creek, located 600 feet hydraulically downgradient (N55°W) from Outfall 001, is generally considered to be a hydraulic boundary in this area (DEQ, PWS 2005). According to the PWS report, ground water flows towards Prickly Pear Creek then parallels the creek-flow to the north, until a gaining reach and/or sufficiently low seasonality occurs.

G. Ground Water Monitoring Wells

Three ground water monitoring wells are located at SBVC (MW-1, MW-2, and MW-3). Monitoring well MW-1 was installed in 1996 and is located approximately 135 feet north of the north side (upgradient/ side-gradient) of the existing subsurface drainfield areas. MW-2 is located immediately downgradient (on the west side of the existing Phase I and II drainfields). MW-3 is located approximately 150 feet east of Prickly Pear Creek and downgradient of the mixing zone. Detailed information regarding these monitoring wells has been summarized and listed in Appendix II, in Table 2. For the Site Map see Figure 2.

H. Ground Water Quality Characteristics

The receiving water is Class 1 ground water and high quality waters of the state (75-5-301, MCA). The quality of Class 1 ground water must be maintained so that these waters are suitable for the following beneficial uses with little or no treatment (ARM 17.30.1006):

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

Class 1 ground water. Ground water quality results are summarized in Appendix III.

III. MIXING ZONE

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 renew the 380-foot Department modified 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. 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. 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 following numerical effluent limitations:

Table 3: Final Effluent Limits Outfall 001 (Phase I & II)

Parameter	Units	Effluent Limitations		Rationale
		Daily Maximum(1)	Annual Maximum(1)	
Nitrogen, Total (as N)	lbs/day	2.42	---	Nondegradation Nonsignificance Criteria
Phosphorus, Total (as P)	lbs/year	---	285	Surface Water breakthrough time greater than 50 years

Footnotes:
Beneficial Uses: ARM 17.30.1006
(1) See definition in Part V of permit.

Table 4: Final Effluent Limits Outfall 002 (Phase III)

Parameter	Units	Effluent Limitations		Rationale
		Daily Maximum(1)	Annual Maximum(1)	
Nitrogen, Total (as N)	lbs/day	1.20	---	Nondegradation Nonsignificance Criteria
Phosphorus, Total (as P)	lbs/year	---	128	Surface Water breakthrough time greater than 50 years

Footnotes:
Beneficial Uses: ARM 17.30.1006
(1) See definition in Part V of permit.

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. Effluent monitoring and ground water monitoring requirements will be required as a condition of this permit. Monitoring requirements and respective rationale is summarized in Appendix VII.

VI. SPECIAL CONDITIONS

In accordance with ARM 17.30.1031 this section contains the basis for special permit conditions that are necessary to assure compliance with the ground water quality standards and the Montana Water Quality Act. The following special condition will be included in the permit.

A. Monitoring Well Installation

Within three (3) years after the effective date of the permit, a plan establishing a future ambient ground water monitoring source must be completed. The proposed monitoring well will be completed at a location and depth that will allow monitoring of the ambient water quality. Sampling of this well will be consistent with the existing wells. This is part of the renewal process and the applicant's duty to reapply.

VII. COMPLIANCE SCHEDULE

A compliance schedule is included to allow a reasonable opportunity for the permittee to attain compliance with permit requirements and to stay in compliance with the Water Quality Act and the Administrative Rules of Montana. The actions listed in the table below must be completed on or before the respective scheduled completion date. A report documenting each respective action must be received by DEQ on or before the scheduled reporting date. Completion of all actions or deliverables must be reported to DEQ in accordance with Part II.D and Part IV.G of the permit.

Table 5: Compliance Schedule

Authority	Permit Condition	Action	Freq.	Scheduled Completion Date of Action(1)	Scheduled Report Due Date.(2)
ARM 17.30.1031	Part I.E	Develop a plan to establish a future ambient ground water monitoring source. (3)(4) Begin sampling for parameters and at a frequency consistent with the other monitoring wells.	Single event	Three years after effective date of permit	Due on or before the 28th day of the month following the completion date

Footnotes:

(1) The actions must be completed on or before the scheduled completion dates.

(2) Reports must be received by DEQ on or before the scheduled report due dates.

(3) The written report documenting monitoring well installation, must include final location, drilling methods used, borehole lithologic log, well construction details, *elevation of measuring point, and the depth to the top contact of the first ground water bearing zone*. This information must be included for each respective monitoring well.

(4) The upgradient ambient monitoring well must be monitored for five (5) quarters (1 year and 3 months) prior to the next permit renewal cycle.

VIII. NONSIGNIFICANT DETERMINATION

DEQ has determined (DEQ, 2015a) that the discharge constitutes a new source and is subject to the Montana Non-degradation Policy (75-5-303, MCA; ARM 17.30.702). The applicable water quality standards for Class I or II ground water and non-degradation-non-significance criteria are summarized in Appendix V. Discharges in compliance with the limitations of this permit are considered nonsignificant. The 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/notices/WQnotices.mcpx.

Public comments on this proposal are invited any time prior to close of business on **August 30, 2016**. Comments may be directed to:

DEQWPBPublicComments@mt.gov

or,

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 (30) 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/notices/WQnotices.mcpx.

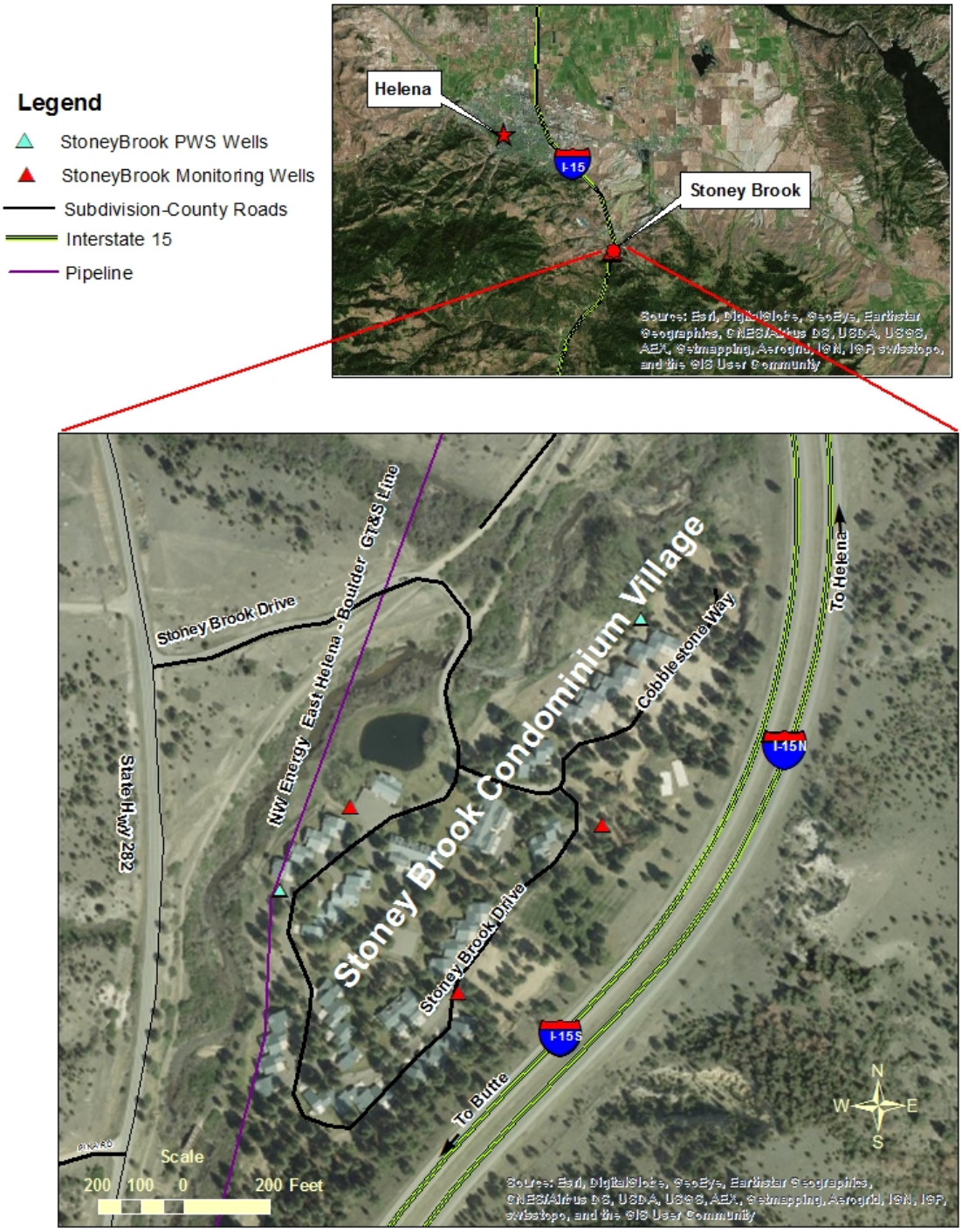
Any person interested in being placed on the mailing list for information regarding this permit may contact the DEQ Water Protection Bureau at (406) 444-3080 or email Jenna Stamper at

JStamper@mt.gov. All inquiries will need to reference the permit number (MTX000197), 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

Figure 1. Stoney Brook Condominium Village (Permit No. MTX 000197) Site Map



CD 3/ 2016

Figure 2. Stoney Brook Condominium Village (Permit MTX000197) Site Map

FIGURE 3. Phases 1 and 2 Line Diagram Showing Flow Meter Effluent Sample Locale and Flows

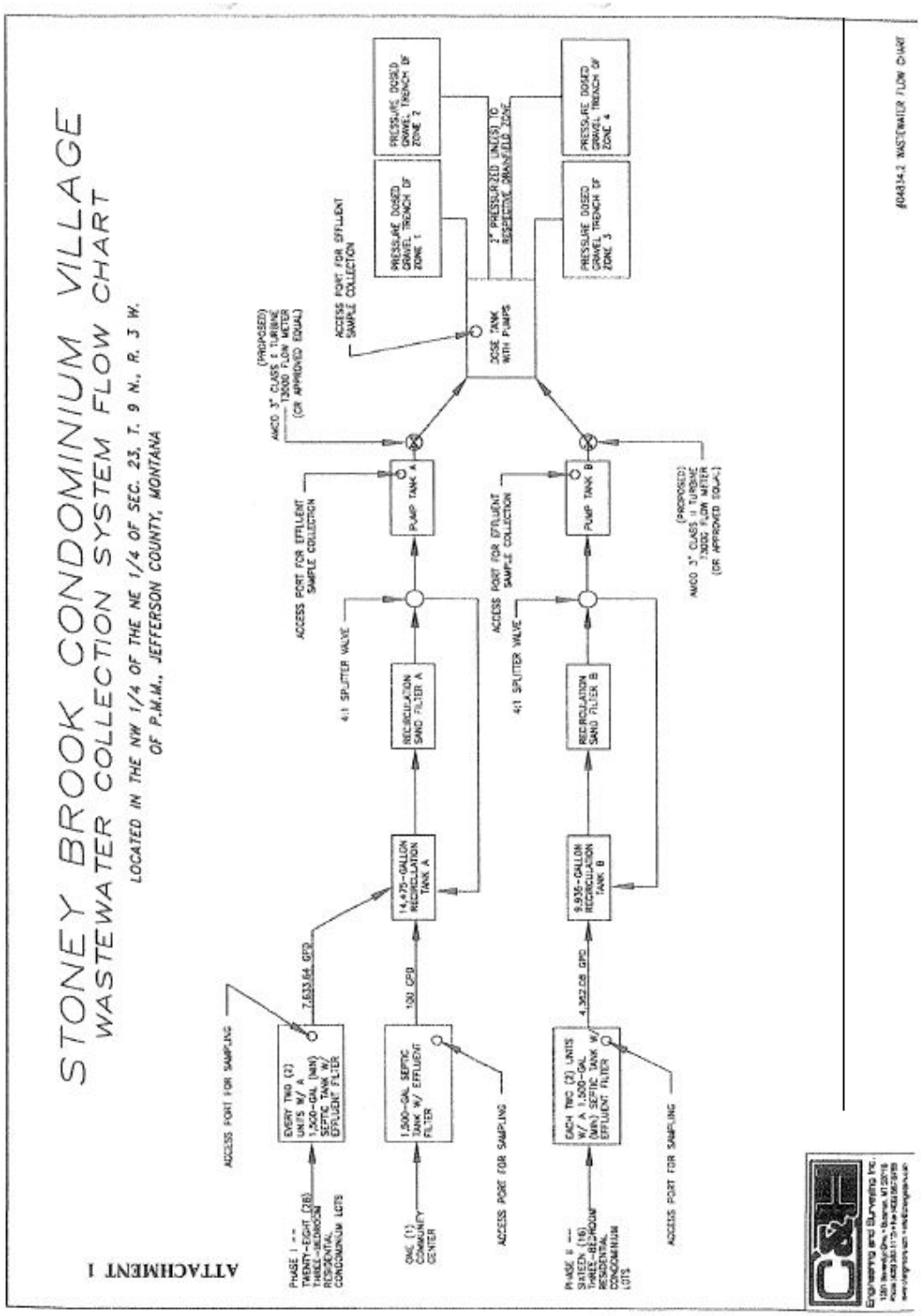


FIGURE 4. Phase 3 Line Diagram Showing Flow Meter Effluent Sample Locale and Flows

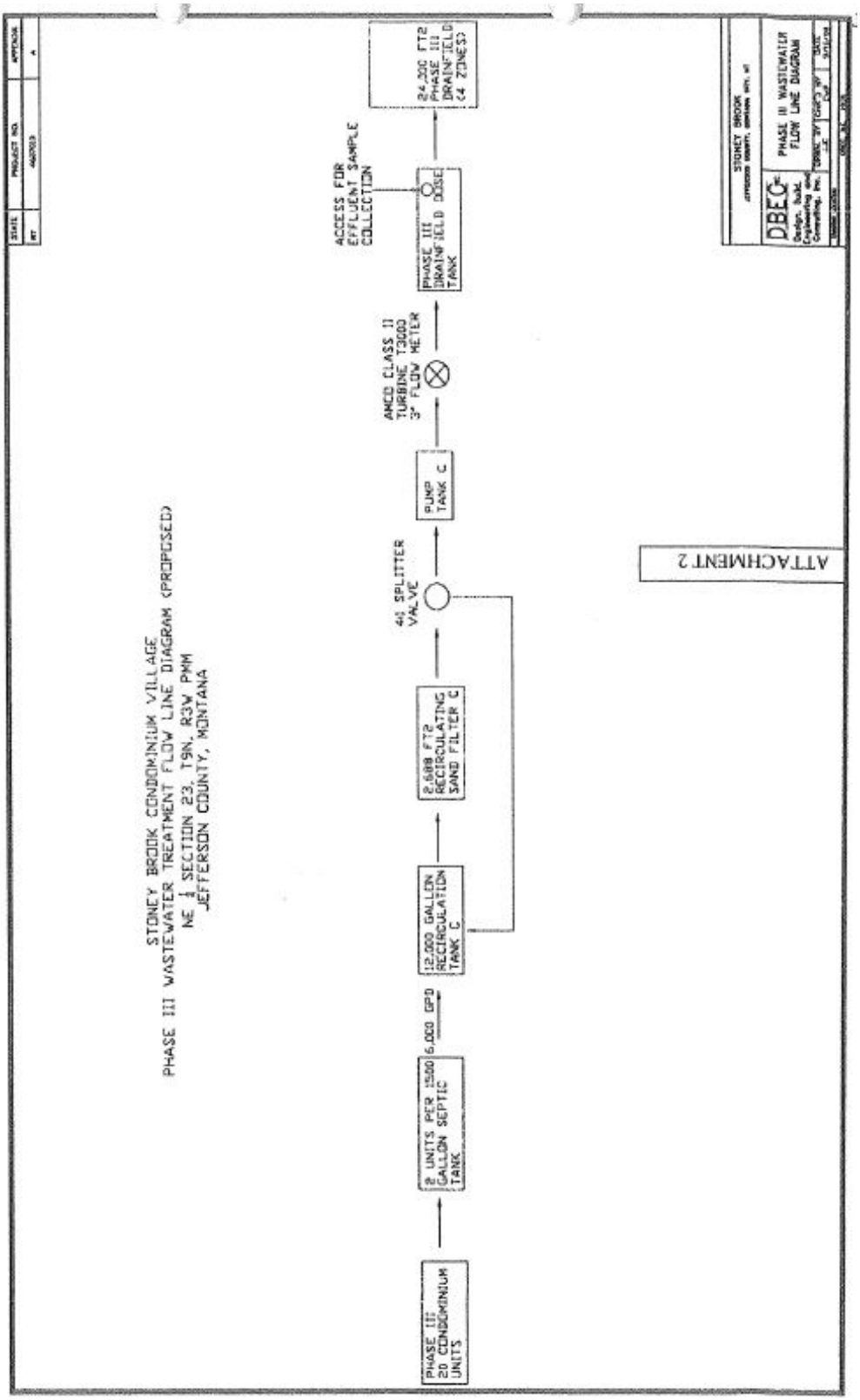


Figure 5. Monitoring Well and Ground Water Flow Map

Figure 5. Stoney Brook Condominium Village Monitoring Well & Ground Water Flow Map

Scale

200 100 0 200 Feet

N
W E
S

Legend

- Stoney Brook Monitoring Wells
- Ground Water Flow Direction
- Drainfield
- Subdivision Roads
- Northwestern Energy Gas Transmission Pipeline

Mapping by Carolyn DeMartino, DEQ, March 2016

APPENDICES

APPENDIX I - EFFLUENT QUALITY

Table 6. Effluent Quality for EFF-001 (for Outfall 001)

Parameter(1)	Location	Units	Reported Minimum Value	Reported Average Value	Reported Maximum(2) Value	# of Samples	Source of Data
Biochemical Oxygen Demand (BOD_5)	EFF-001	mg/L	3	11	47	25	DMR
Flow rate, Discharge	FM-001	gpd	2,678	3,823	4,741	25	DMR
Nitrogen, Nitrate + Nitrite (as N)	EFF-001	mg/L	5.2	12.0	33.4	25	DMR
Nitrogen, Total Kjeldahl (as N)	EFF-001	mg/L	3	10	26	25	DMR
Nitrogen, total (as N)	EFF-001	mg/L	14	24	37	28	DMR
		lbs/day	0.41	0.71	1.18	24	DMR
Phosphorus, Total (as P)	EFF-001	mg/L	---	---	---	---	---
		lbs/day	0.01	0.61	5.8	26	DMR
Total Suspended Solids (TSS)	EFF-001	mg/L	0	15	93	18	DMR

DMR = Self-Reported Discharge Monitoring Reports

EFF-001: Effluent sample site located off of the NE corner of Outfall 002 (Figure 2).

FM-001 = Effluent flow meter located after the pump tank prior to the dose tank and prior to discharging to Outfall 001.

Period of Record: 06/2009 through 06/2015.

(1) Conventional and nonconventional pollutants only, table does not include all possible toxics.

(2) Maximum value recorded of all quarterly reported Daily Maximum Values.

Table 7: Effluent Quality for EFF – 002 (for Phase 3)

Parameter(1)	Location	Units	Reported Minimum Value	Reported Average Value	Reported Maximum(2) Value	# of Samples	Source of Data
Biochemical Oxygen Demand (BOD_5)	EFF-002	mg/L	15	25	43	8	DMR
Flow rate, Discharge	EFF-002	gpd	85	357	720	8	DMR
Nitrogen, Nitrate + Nitrite (as N)	EFF-002	mg/L	0.1	1.9	3.8	8	DMR
Nitrogen, Total Kjeldahl (as N)	EFF-002	mg/L	21	32	43	8	DMR
Nitrogen, total (as N)	EFF-002	mg/L	24	33	44	10	DMR
		lbs/day	0.02	0.09	0.23	7	DMR
Phosphorus, Total (as P)	EFF-002	mg/L	---	---	---	---	---
		lbs/day	0.00	0.9	6.02	7	DMR
Total Suspended Solids (TSS)	EFF-002	mg/L	0	11	26	8	DMR

DMR = Self-Reported Discharge Monitoring Reports

EFF-002: Effluent sample site is located west of recirculating sand filter C (Figure 2).

FM-002 = Effluent flow meter located after the pump tank prior to the dose tank and prior to discharging to Outfall 002

Period of Record: 06/30/2009 through 06/30/2015.

(1) Conventional and nonconventional pollutants only, table does not include all possible toxics.

(2) Maximum value recorded of all quarterly reported Daily Maximum Values.

APPENDIX II – MONITORING WELL SUMMARY

Table 8: Monitoring Well Summary
Monitoring Well: **MW-1**
MBMG GWIC #: 241744
Status: Well completion date December 19, 2007
Location: NW1/4NE1/4 Section 23, Township 09 North, Range 03 West Latitude: 46.52760 Longitude: -111.94224
Representation: Side gradient ground water flow.
Monitoring Well: **MW-2**
MBMG GWIC #: Unknown
Status: Well completion date unknown
Location: NW1/4NE1/4 Section 23, Township 09 North, Range 03 West Latitude: 46.52646 Longitude: -111.94323
Representation: Immediately downgradient of Phase III drainfield
Monitoring Well: **MW-3**
MBMG GWIC #: 241743
Status: Well completion date December 20, 2007
Location: NW1/4NE1/4 Section 23, Township 09 North, Range 03 West Latitude: 46.52765 Longitude: -111.94455
Representation: Downgradient groundwater flow

APPENDIX III - GROUND WATER QUALITY MONITORING RESULTS

Table 9. Ground Water Monitoring Results

Monitor Source[1]	Representation	Parameter	Units	Reported Minimum Value	Reported Average Value	Reported Maximum[2] Value	# of Samples	Source of Data
MW-1	Ambient Ground Water Quality Shallow ground water, 200 feet up/sidegradient from Outfall 002	Chloride (as Cl)	mg/L	NR	13	NR	1	APP
		Escherichia coli Bacteria	CFU/100 ml	NR	1.00	NR	1	APP
		Nitrogen, Nitrate + Nitrite (as N)	mg/L	NR	0.65	NR	1	APP
		Nitrogen, Total Kjeldahl (as N)	mg/L	NR	3.60	NR	1	APP
		Organic Carbon	mg/L	NR	1	NR	1	APP
		pH	s.u.	NR	7.7	NR	1	APP
		Specific Conductivity (@ 25°C)	µS/cm	NR	603	NR	1	APP
		Static Water Level (SWL)	ft.-bgs	NR	16.00	NR	1	APP
		Total Dissolved Solids (TDS)	mg/L	NR	342	NR	1	APP
MW-2	Shallow ground water, immediately downgradient from drainfields	*Escherichia coli* Bacteria	CFU/100 ml	1.00	1.00	1.00	25	DMR
		Nitrogen, Nitrate + Nitrite (as N)	mg/L	<0.0	6.50	24.00	25	DMR
		Static Water Level (SWL)	ft.-bgs	14.00	36.00	25.00	25	DMR

Table 9. Ground Water Monitoring Results (cont.)

Monitor Source[1]	Representation	Parameter	Units	Reported Minimum Value	Reported Average Value	Reported Maximum[2] Value	# of Samples	Source of Data
MW3	Shallow ground water, 500 feet downgradient from Outfall 002	Chloride (as Cl)	mg/L	15.0	48.0	160.0	25	DMR
		Escherichia coli Bacteria	CFU/100 ml	1.0	1.0	1.0	25	DMR
		Nitrogen, Total Kjeldahl (as N)	mg/L	0.0	2.3	5.0	23	DMR
		Nitrogen, Nitrate + Nitrite (as N)	mg/L	0.0	0.5	1.4	23	DMR
		Nitrogen, total (as N)	mg/L	0.0	3.7	33.0	25	DMR
		Phosphorus, total [as P]	mg/L	0.01	0.4	3.4	23	DMR
		Specific Conductivity (@ 25°C)	µS/cm	3.0	1309.0	1930.0	25	DMR

Footnotes:

APP = Application Form GW-2 and supplemental materials.

Period of Record : May 2012 through October 2012.

bgs = below ground surface

CFU = Colony Forming Units

DMR = Self-Reported Discharge Monitoring Reports

NR = Not Reported

Period of Record: 06/30/2009 through 06/30/2015.

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

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. Mixing zones are subject to the conditions imposed by DEQ and consistent with the rules adopted by the Board of Environmental Review (Board).

The applicant has requested reauthorization of one Department modified standard mixing zone. 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 to determine if and what type of mixing zone may be authorized. A person applying to DEQ for a mixing zone must indicate the type of mixing zone requested and supply information of sufficient detail for DEQ to make a determination regarding the authorization of the mixing zone (ARM 17.30.515).

For purposes of reauthorization determination, DEQ will reference the following rules listed below for water quality assessment of the mixing zone. A mixing zone may be granted for individual parameters in a discharge (ARM 17.30.505). 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 to determine if the discharge qualifies for a ground water mixing zone. After an assessment of the application information (ARM 17.30.505), DEQ will reauthorize the 380-foot Department modified mixing zone established in the previous permit (DEQ, 2011) for the parameters listed within the table below as the potential impact to beneficial uses may be minimal (Section II and Section IV).

Pursuant to ARM 17.30.502 a “Mixing Zone" is defined as a limited area of a 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. DEQ will reauthorize the mixing zone based on the hydrogeologic and mixing zone information as previously established (DEQ, 20011). ARM 17.30.517, states that a specific depth and width are necessary to determine the aquifer cross-section area (A) for a mixing zone. The width of the outfall structures perpendicular to ground water flow direction are reported within the table below. The depth of this ground water mixing zone extends from the top of the water table beneath the source down to 13 feet below the water table (DEQ, 2011).

The cross sectional area (A) is the area of the ground water flux boundary at the terminus of the mixing zone (ARM 17.30.517). The down gradient boundary mixing zone width is the width of the source (drainfield width perpendicular to ground water flow direction), plus the distance determined by the tangent of 5° (0.0875) times the length of the mixing zone times two (2) (ARM 17.30.517). The calculated widths and respective cross section areas (A) are listed within the table below.

Based on the dimensions of the standard mixing zones, and the hydrogeologic characteristics (Section II), the volume of ground water (QGW) available to mix with the effluent is calculated using Darcy's Equation (ARM 17.30.517):

$$Q_{GW}=KIA$$

Where:

Q_{GW} = ground water flow volume (ft3/day)
K = hydraulic conductivity (ft. /day)
I = hydraulic gradient (ft. /ft.)
A = cross-sectional area (ft2) of flow at the downgradient boundary of the mixing zone.

The mixing zone dimensions, characteristics, and volume of ground water available to mix at Outfalls 001 and 002 are listed within the table below.

Based on the description of the mixing zone above, and analysis presented in Section III, DEQ has determined pursuant to ARM 17.30.505 that a Department modified groundwater mixing zone is still applicable and will be reauthorized only for the individual parameters listed in Table 10 for Outfalls 001 and 002. Therefore, pursuant to DEQ procedures (ARM 17.30.515), DEQ will renew the mixing zone for this permit cycle.

Table 10: Mixing Zone Information - Outfall 001 & Outfall 002

Parameter	Units	Outfall 001 Values	Outfall 002 Values
Mixing Zone Type	---	DMGW*	DMGW*
Authorized Parameters	---	Total Nitrogen	Total Nitrogen
Ambient Ground Water Concentrations, Nitrate + Nitrite as N	mg/L	0.65	0.65
Ground Water Flow Direction	azimuth/bearing	N55°W	N55°W
Length of Mixing Zone	feet	380	380
Thickness of Mixing Zone	feet	13	13
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	294	146
Width of Mixing Zone at Down Gradient Boundary	feet	360.5	212.5
Cross Sectional Area of Mixing Zone (A)	ft^2	4686.5	2762.5
Hydraulic Conductivity (K)	feet/day	335	335
Hydraulic Gradient (I)	ft./ft.	0.005	0.005
Volume of Ground Water Available for Mixing (Q_{gw})	ft^3/day	7,850	4,627

*Department Modified Ground Water Mixing Zone

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, MCA et seq. 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 I ground water and high quality waters of the state (75-5-301, MCA). The quality of Class I ground water must be maintained so that these waters are suitable for the following beneficial uses with little or no treatment (ARM 17.30.1006):

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

Persons may not cause a violation of the following specific water quality standards in Class I 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 I water. DEQ may use any pertinent credible information to determine these levels; and,
- No increase of a parameter that causes a violation of the non-degradation provisions of 75-5-303, MCA.

The non-degradation rules (ARM 17.30.701, et seq.) implement Montana's non-degradation policy, which applies to any activity of man resulting in a new or increased source which may cause degradation (ARM 17.30.705). In accordance with ARM 17.30.706, 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, 2009). The determination established that the proposed discharge is a new or increased source (ARM 17.30.702) because it is an activity resulting in a change of existing water quality occurring on or after April 29, 1993. Discharges in compliance with the non-degradation/non-significance criteria established within this permit, constitute nonsignificant degradation.

The applicable ground water standards pursuant to ARM 17.30.1006 and the non-degradation/ non-significance criteria at ARM 17.30.715 for the identified parameters are summarized in the table below and will be used as the basis for developing effluent limitations in the permit.

Table 11. Applicable Ground Water Quality Standards.

Parameter[(1)]	**Units**	**17.30.1006(1)(b)(i) Human Health Standards - Ground Water**	**17.30.1006(1)(b)(ii) Beneficial Uses - Ground Water**	**Pollutant Category**[(2)]	**17.30.715 Nondegradation - Nonsignificance Criteria**[(3)]
Nitrogen, Nitrate + Nitrite (as N)	mg/L	10.0	-	T	7.5
Nitrogen, Total (TN)	mg/L	-	10.0	-	7.5
Phosphorus, Total Inorganic	-	-	-	H	Surface water breakthrough time greater than 50 years[(5)]

Footnotes:

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.

(2) Circular DEQ-7 (2012): Carcinogen (C), Harmful (H), and Toxic (T) parameter. Toxic pollutant with a Bioconcentrator (B) factor.

(3) Discharges in compliance with the non-degradation significance criteria constitute nonsignificant degradation.

(5) Changes in receiving ground water quality are not significant if water quality protection practices approved by the DEQ have been fully implemented and if the listed non-significance criteria is met.

B. Pollutants and Parameters of Interest (POI)

DEQ identified pollutants/ parameters of interest (POI's) that are associated with normal domestic discharges (DEQ, 2011). The POIs include nitrogen and phosphorus.

C. Development of Effluent Limits

ARM 17.30.1006 and 17.30.715 set 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.

a. Nitrogen

1) Water Quality Based Effluent Limit (WQBEL) for Outfall 001

Nitrogen in raw wastewater is primarily in the form of organic matter and ammonia. After primary treatment wastewater is primarily 85% ammonia. After discharge to the drainfield, ammonia is almost entirely converted to nitrite, and ultimately to nitrate (EPA 2002). For the purposes of predicting the nitrate plus nitrite concentration in the ground water at the end of mixing zone, DEQ assumes that the entire nitrogen load in the treated wastewater is converted and enters the ground water as nitrate. DEQ will retain and update the limit for total nitrogen (TN) in this permit.

For Outfall 001, the allowable discharge concentration is derived from a mass balance equation, which considers available dilution and background concentration of the receiving water. As shown in Appendix IV, Table 4, the volume of receiving water available to mix with effluent (Q_{GW}) is 7,850 ft^3/d (or 58,722 gpd) as determined using Darcy's equation. Q_{GW} (in gallons per day) is used in the mass balance equation (ARM 17.30.517(1)(d)(vi) and (vii)) to determine the applicable water quality based effluent limit for TN. The mass balance equation has been rearranged to the following form to determine the allowable discharge load such that the applicable ground water standard is not exceeded.

$$\boldsymbol{L}_{EFF} = (\boldsymbol{C}_{STD}(\boldsymbol{Q}_{GW} + \boldsymbol{Q}_{EFF}))\boldsymbol{X} - \boldsymbol{C}_{AMB}\boldsymbol{Q}_{GW}\boldsymbol{X}$$

Where:

$\boldsymbol{L}_{EFF}$ = the daily maximum load (lbs/day)
$\boldsymbol{C}_{STD}$ = ground water quality standard
$\boldsymbol{C}_{AMB}$ = ambient ground water concentration of NO_2+NO_3 (as N) mg/L
$\boldsymbol{Q}_{GW}$ = ground water volume (gpd) available for mixing at the end of the mixing zone
$\boldsymbol{Q}_{EFF}$ = volume of effluent (gpd)
$\boldsymbol{X}$ = [$8.34 \times 10^{\wedge -6}$] the conversion factor to convert conc. and flow into load (lbs/day).

As indicated in Table 10 on the preceding page; the most stringent applicable ground water quality standard ($\boldsymbol{C}_{STD}$) for NO_2+NO_3 is 7.50 mg/L. The ambient concentration of NO_2+NO_3 (as N) in the receiving water ($\mathbf{C}_{AMB}$) is 0.65 mg/L, as collected from the ambient ground water monitoring well (Appendix III). As described in Section III, $\mathbf{Q}_{GW}$ has been calculated to be 7,850 ft^3/d (or 58,722 gpd). Finally, the applicant has proposed a daily discharge flow ($\mathbf{Q}_{EFF}$) of up to 1619 ft^3/d (or 12,112 gpd) as based on the design capacity flow of the system. Solving for $\mathbf{L}_{EFF}$, the TN WQBEL limit is 4.4 lbs/day. This limit has been updated from the original 2009 permit limit due to the updated on-site ambient water quality samples. The daily maximum TN load must not exceed 4.4 lbs/day.

2) Water Quality Based Effluent Limit (WQBEL) for Outfall 001WQBEL for 002

As indicated in Table 10 on the preceding page; the most stringent applicable ground water quality standard ($\boldsymbol{C}_{STD}$) for NO_2+NO_3 is 7.50 mg/L. The ambient concentration of NO_2+NO_3 (as N) in the receiving water ($\mathbf{C}_{AMB}$) is 0.65 mg/L, as collected from the ambient ground water monitoring well (Appendix III). As described in Section III, $\mathbf{Q}_{GW}$ has been calculated to be 4627 ft^3/d (or 34612 gpd).

Finally, the applicant has proposed a daily discharge flow ($\mathbf{Q}_{EFF}$) of up to 802 ft^3/d (or 6000 gpd) as based on the design capacity flow of the system. Solving for $\mathbf{L}_{EFF}$, the TN WQBEL limit is 2.19 lbs/day. This limit has been updated from the original 2009 permit limit due to the updated on-site ambient water quality samples. The daily maximum TN load must not exceed 2.19 lbs/day.

b. Phosphorus Outfalls 001 & 002

Phosphorus levels in surface waters are measured as Total Phosphorus as P (TP). As such, any permit condition regarding phosphorus and its potential effect on surface water will be measured as TP. The non-degradation-non-significance criteria set forth in ARM 17.30.715 state that the phosphorus concentration must be removed for a period of 50 years prior to discharge to any surface water. Phosphorus in wastewater is removed mainly through soil sorption processes, which vary based on soil composition. The 50-year breakthrough non-degradation 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. The implementation of a limitation, if needed, ensures that the quality of the effluent meets the non-degradation-non-significance criteria developed to prevent the discharge of phosphorus to surface water.

In 2009, DEQ conducted a phosphorous breakthrough analysis which was calculated based on the shallow ground water flow direction of N55°W at the site and a distance of 413 feet to the nearest hydraulically downgradient surface water, which is SBVC's fire suppression pond. The analysis shows the breakthrough time to the surface water for Outfall 001 is 52.8 years. Therefore, the discharge is considered nonsignificant degradation pursuant to the criteria of ARM 17.30.715(1)(e). These 2009 effluent limitations will be maintained within this proposed permit renewal.

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 to establish numerical effluent limitations. The 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 at 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.

The 2009 permit established Total Nitrogen (TN) load limits based on 24 mg/L (ARM17.30.702). TN for Outfall 001 is 2.42 lbs. /day; and for Outfall 002 TN is 1.20 lbs. / day. These limits were compared to the Water Quality Based Effluent Limit (WQBEL). The most restrictive limit shall be established as the effluent limit for both outfalls. For Outfall 001, 2.24 lbs. / day TN is the most restrictive limit. For Outfall-002, 1.20 lbs. / day TN is the most restrictive limit. These limits are the established TN effluent limits.

APPENDIX VI – PHOSPHORUS BREAKTHROUGH ANALYSIS

A phosphorous breakthrough analysis was conducted by DEQ (DEQ, 2011) using information submitted by the applicant; as part of the permit application materials. At the proposed discharge rate, the phosphorous breakthrough is expected to occur in 52.8 years. A phosphorus breakthrough that would occur within 50 years would be considered significant (ARM 17.30.715). The 2011 permit established an effluent limit in order to maintain the 50-year breakthrough. These 2011 effluent limitations will be maintained within this proposed permit renewal.

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. Effluent monitoring and ground water monitoring requirements 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. Effluent Monitoring - Sampling Location

Samples shall be representative of the nature of the monitored discharge (Permit Part II.A.). As discussed in Section II.C, the effluent sample locations have been established at EFF-001 (Dose Tank 001) for Phases I and II and at EFF-002 (Dose Tank 002) for Phase III (Figure 3).

C. Discharge Monitoring

Measurements shall be representative of the volume of the monitored discharge (Permit Part II.A.). The applicant will be 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.). AMCO 3-inch Class II turbine T3000 totalizing flow meters shall be located after each "pump tank", prior to the effluent entering the single dose tank that pressure-doses the 4-zone subsurface drainfields, which discharge to ground water.

Flow monitoring and reporting requirements are summarized in the following tables.

Table 12. Effluent Monitoring and Reporting Requirements for EFF-001 and EFF-002

Parameter/Method	Monitor Location	Units	Sample Type(1)	Minimum Sample Frequency	Reporting Requirements(1)(2)(9)(10)(12)	Report Freq	Rationale
Flow Rate, Effluent(6)	FM-001 FM-002	gpd	Contin-uous	Contin-uous	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
Nitrogen, Nitrite+Nitrate (as N)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
Nitrogen, Total Ammonia (as N)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
Nitrogen, Total Kjeldahl (TKN)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
Nitrogen, Total (as N)(7)	EFF-001 EFF-002	mg/L	Calculate	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Permit Compliance
		lbs/day(8)	Calculate	1/Quarter	Daily Maximum(9) Quarterly Average(10)	Quarterly	Permit Compliance
Phosphorus, Total (as P)	EFF-001 EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	Surface water breakthrough time greater than 50 years (52.8 years)
		lbs/day(8)	Calculate	1/Quarter	Quarterly Average(10)	Quarterly	
		lbs/year(11)	Calculate	1/Year	Annual Maximum(12)	Annually(13)	

Footnotes:

EFF-001: located at effluent collection tank just prior to release of wastewater into the disposal pond.

FM-001: located between wastewater sumps and prior to release into the collection tank.

If no discharge occurs during the reporting period, “no discharge” shall be recorded on the effluent Discharge Monitoring Report (DMR) report forms.

Grab sample will represent concentration for a 24 hour period.

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

(6) Requires recording device or totalizing meter, must record daily effluent volume.

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

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

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

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

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

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

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

D. Ground Water Quality Monitoring

ARM 17.30.706(6) specifies that in order to ensure that a proposed activity will not result in degradation, the Department may require monitoring to verify compliance with this subchapter and 75-5-303, MCA.

In addition, ARM 17.30.505(1)(e) states, "estimated parameter levels in the mixing zone area will be calculated, unless the Department determines that monitoring is necessary due to the potential harm to the impacted water and its beneficial uses." To ensure compliance with applicable water quality standards and beneficial uses at the hydraulically downgradient boundary of the ground water mixing zone, monitoring may be required. Ground water monitoring is particularly applicable if there is an overriding site-specific impact related reason to require monitoring and the mixing zone is within 500 feet of surface water, another ground water mixing zone, or a drinking water well or if there is some other overriding site-specific, impact related reason to require monitoring [ARM17.30.517(1)(d)(ix)]. MW-3 is located in a downgradient position and is intended to fulfill the needs described above.

Ground water monitoring will be required in this permit due to the following site-specific criteria:

- The proximity of hydraulically downgradient potential receivers, such as the fire suppression pond, which is located adjacent to the northwest boundary of the proposed Department modified ground water mixing zone. Public water supply (PWS) Well #1is located approximately 100 feet west of the proposed mixing zone. Prickly Pear Creek is located approximately 187 feet from the proposed mixing zone boundary.

- The depth to shallow ground water beneath the existing and proposed drainfield areas ranges from 17 feet below the TOC at MW-1 (north side of Phases I and II drainfield area), to 30 feet below the TOC in MW-2 (west side of Phase I and II drainfield area). In the PPC floodplain hydraulically downgradient from Outfall 001, the average SWL in MW-3 is 6.57 feet below the TOC.

- Hydraulic connection of the shallow ground water to nearby surface water at the fire-suppression pond and Prickly Pear Creek is anticipated during at least some months of the year (seasonally low surface water level).

- Potential pollutant migration pathways (vertically downward and horizontally) may be highly variable due to the following: soils and subsoils that consist of colluvium, which are composed of angular and blocky limestone-gravel with clay and cobbles generally providing rapid travel times in the subsurface and subcrops and shallow weathered and fractured limestone bedrock directly beneath the thin veneer of colluvial soils and subsoils. None of the above offers much opportunity for sufficient natural treatment in the subsurface in this area.

Ground water monitoring and reporting requirements are summarized in Table 16. All analytical methods are in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter.

Table 13. Ground Water Monitoring and Reporting Requirements For MW-2.

Parameter/Method	Monitor Location(1)	Units	Sample Type(2)	Minimum Sampling Frequency	Reporting(2)(3)(5) Requirements	Reporting Frequency	Rationale
Escherichia coli Bacteria	MW-2	CFU/100ml	Grab	1/Quarter	Daily Maximum Quarterly Average(6)	Quarterly	Current Permit Requirement
Nitrogen, Nitrate + Nitrite (as N)	MW-2	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
Static Water Level (SWL)(7)	MW-2	ft.-bmp	Instant-aneous	1/Quarter	Quarterly Average	Quarterly	Current Permit Requirement

Footnotes:

CFU = Colony Forming Units

ft.-bmp = feet below measuring point

s.u. = standard units

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

- 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 Section X of the Fact Sheet for the existing location of MW-2.

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

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

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

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

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

Table 14. Ground Water Monitoring and Reporting Requirements For MW-3.

Parameter/Method	Monitor Location(1)	Units	Sample Type(2)	Minimum Sampling Frequency	Reporting(2)(3)(5) Requirements	Reporting Frequency	Rationale
Chloride (as Cl)	MW-3	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
Escherichia coli Bacteria	MW-3	CFU/100ml	Grab	1/Quarter	Daily Maximum Quarterly Average(6)	Quarterly	Current Permit Requirement
Nitrogen, Nitrate + Nitrite (as N)	MW-3	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
Nitrogen, Total Kjeldahl (TKN)	MW-3	mg/L	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
Specific Conductivity @ 25°C	MW-3	µS/cm	Grab	1/Quarter	Daily Maximum Quarterly Average	Quarterly	Current Permit Requirement
Static Water Level (SWL)(7)	MW-3	ft.-bmp	Instant-aneous	1/Quarter	Quarterly Average	Quarterly	Current Permit Requirement

Footnotes:

CFU = Colony Forming Units

ft.-bmp = feet below measuring point

s.u. = standard units

- At no time shall the permittee mark or state "no discharge" on any monitoring well DMR form.
- 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 Section X. and Section X. of the Fact Sheet for the existing or proposed location of the monitoring wells.

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

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

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

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

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

APPENDIX VIII - REFERENCES CITED

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- 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.

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