



Planning and Development Board Agenda

**Thursday - March 21, 2019 4:00 PM
Clyde Park Rural Fire Hall**

CALL TO ORDER AND INTRODUCTIONS

CONFLICT OF INTEREST

PUBLIC COMMENT

REVIEW AND APPROVAL OF MINUTES FROM PREVIOUS MEETING

Meeting Minutes from February
[2.28.19 PB minutes.docx](#)

PUBLIC HEARING ON SUBDIVISION AMENDMENTS TO TRACT 10-D OF S/D 263 AND TRACT 2 OF S/D 240

Public Hearing on Subdivision Amendments to Tract 10-D of S/D 263 and Tract 2 of S/D 240
[FoggLot2SD240_DEQ-Submittal01.pdf](#)
[Tr10DNG_DEQ-submittal.pdf](#)
[Hearing Agenda 3-21-2019.docx](#)

DISCUSSION OF DRAFT DECAY ORDINANCE

Discuss/Recommend Incorporation of Public Comments from 2.28.19 Meeting
[Ken Cochran Comments Summarized from 2.28.19.docx](#)

PROJECT UPDATES

OLD BUSINESS

Discussion/Recommendation to Park County Commission to Apply for CDBG Funds for Neighborhood Planning Project

NEW BUSINESS

DISCUSSION OF NEXT AGENDA

PUBLIC COMMENT



ADJOURNMENT

Planning and Development Board Agenda Item Report

Meeting Date: March 21, 2019

Submitted by: Lawson Moorman

Submitting Department: PLANNING

Item Type: Minutes

Agenda Section:

Subject:

Meeting Minutes from February

Suggested Action:

Attachments:

[2.28.19 PB minutes.docx](#)

Planning & Development Board
Community Room City/County Complex
Livingston, MT
4:00pm, February 28, 2019

Attendance: Planning Board Members Peter Fox, John Heidke, Mike Dailey, Frank Schroeder, Frank O'Connor, Rich Baerg; Planning Staff Mike Inman, Lawson Moorman; Public Johnathan Hettinger, Ken Cochran.

Call to Order and Introductions: 4:00pm, Peter Fox called the meeting to order.

Review and Approval of Minutes from Previous Meeting: *Schroeder made a motion to approve the minutes as submitted, Baerg seconded, motion passed unanimously.*

Discussion of Draft Decay Ordinance: Inman reminded the Board that Staff and the Board had agreed to work through potential scenarios of what the Board thought might constitute public decay to determine how these individual situations might be handled under the current Park County Public Decay Draft. The Board indicated that due to the recent heavy snow fall they were unable to actually take pictures of scenarios they might believe to constitute public decay as everything was buried. Inman said they could postpone that workshop to a later date and reminded the Board to ensure that any photos submitted for the purposes of working through the Draft Ordinance needed to be anonymous. Inman also informed the Board that Staff would schedule in a standing public comment section of the Planning Board meeting agendas as the Board moves throughout the County to take in public consideration. Schroeder pointed out several typos to be corrected in the Draft and Fox made a sentence structure suggestion. Inman reiterated the process and Fox asked that the Draft be placed on the website.

City/County Planning Subcommittee Update: Inman updated the Board that the Subcommittee was working towards being an advisory body as the city looks into including a neighborhood plan for the doughnut area around the city as an addendum to their growth policy. Fox gave a brief overview of the history and structure of the subcommittee.

Project Updates: Inman updated the Board on the current state of the wind farm. Inman also mentioned the fact that Cooke City had a sewer district in place and was working towards a centralized sewer system which could open up the opportunity for higher density growth in the area.

Old Business: Inman informed the Board that an existing sign inventory had not begun yet.

New Business: Inman presented the Dome Mountain WMA Addition Conservation Easement update to the Board for review.

Dailey made a motion to accept the Conservation Easement without further comment. Schroeder seconded the motion. Motion passed unanimously.

Discussion of Next Agenda: Inman reminded the Board that the next meeting would be in Clyde Park which he would not be at. He also mentioned there would be several subdivision amendments that would require re-review by the Board. The Board made suggestions on the best way to advertise for that meeting.

Public Comment: Cochran made significant comment surrounding various aspects in the draft from a legal and application stand point. The Board requested a summary of those comments and requested staff put an item on next month's agenda to consider incorporating those comments. Cochran also commented on his desire to see the localized effects vacation rentals actively evaluated by the Board.

Adjournment: Fox adjourned the meeting at 4:57pm.

Planning and Development Board Agenda Item Report

Meeting Date: March 21, 2019

Submitted by: Lawson Moorman

Submitting Department: PLANNING

Item Type: Discussion / Decision

Agenda Section:

Subject:

Public Hearing on Subdivision Amendments to Tract 10-D of S/D 263 and Tract 2 of S/D 240

Suggested Action:

Attachments:

[FoggLot2SD240_DEQ-Submittal01.pdf](#)

[Tr10DNG_DEQ-submittal.pdf](#)

[Hearing Agenda 3-21-2019.docx](#)

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY /
LOCAL GOVERNMENT JOINT APPLICATION FORM

Pg 1

PART I. GENERAL DESCRIPTION & INFORMATION

Name of proposed development: Fogg Lot 2 of S/B 240 - Relocation of Drainfield
Location: Pray EQ# 97-2587

County: Park Geocode: 49-0520-33-4-50-10-0000

Legal description: 1/4 NW 1/4 SE of Section 33 Township 5S Range 9E

Type of Review

<input type="checkbox"/> Division of Land, Boundaries Relocated, or Removal of Restrictions	<input checked="" type="checkbox"/> Type of water supply system
<input type="checkbox"/> Condominiums/Townhomes/Mobile Homes/Recreational Vehicles	<input type="checkbox"/> Individual well
<input checked="" type="checkbox"/> Rewrite - No Boundaries Changing, Aggregation, Change of Use	<input type="checkbox"/> Individual surface water supply or spring
<input type="checkbox"/> Modified Site Plan	<input type="checkbox"/> Cistern

Descriptive Data

<input type="checkbox"/> Number of lots	<input type="checkbox"/> Type of wastewater treatment system
<input type="checkbox"/> Number of condominiums, townhomes, or spaces	<input checked="" type="checkbox"/> Individual wastewater treatment system
<u>6.99</u> Total acreage of lots being reviewed	<input type="checkbox"/> Shared wastewater treatment system (2 connections)

Indicate the proposed/existing use(s)

<input type="checkbox"/> Residential, single family	<input type="checkbox"/> Multiple-user (3-14 connections & < 25 people)
<input type="checkbox"/> Residential, multiple family	<input type="checkbox"/> Service connection to multiple-user
<input type="checkbox"/> Type of multiple family structure (e.g. duplex)	<input type="checkbox"/> Extension of multiple-user main
<input type="checkbox"/> Planned unit development	<input type="checkbox"/> Service connection to public system
<input type="checkbox"/> Condominium/townhomes	<input type="checkbox"/> Extension of public main
<input type="checkbox"/> Mobile home park	<input type="checkbox"/> New public system (15+ connections or serving 25+ people)
<input type="checkbox"/> Recreational vehicle park	
<input type="checkbox"/> Commercial or industrial	
<input type="checkbox"/> Other (please describe)	

Name of solid waste (garbage) disposal site: Park Co. Solid Waste System

Designated representative, if any (e.g. engineer, surveyor)
I designate William E Smith, PE of Octagon Consulting Engineers, LLC
Print name Print Company Name

as my representative for purposes of this application.
Address: PO Box 78 Emigrant, MT 59027
Street or P.O. Box, City, State, Zip Code

Email: william@octagonengineers.com Phone: 406-333-9040

Owner Name: Mark A Fogg & Patricia L Fogg
Print name of owner (s)

Address: 600 ShadyCrest Drive Littleton, CO 80120-4062
Street or P.O. Box, City, State, Zip Code

Email: mfogg@copec.com Phone: 303-506-5982

Date: 8/16/18

Reviewer Yes Missing NA	Applicant Initials	Page(s) in Report	ELEMENT DESCRIPTION
General			
Yes		1	Application form provided & signed by owner, plus contact info for consultant.
"		3	Filled out fee sheet & check made out to DEQ
"		415	Completed & signed copy of Part 4 Checklist
"		33&34	Vicinity Map Provided
"		10	Copy of plat or COS (or deed if aliquot parts or proposing Aggregation of lots)
"		23&24	4 copies of lot layout sheet(s); Facilities labeled as Existing or Proposed.
"		16-20	Copy of any existing COSA for reviewed lot(s)
"		35&36	Floodplains shown on drawings & any applicable documentation provided (LOMAS).
Onsite Wastewater			
N/A			Copy of any existing WWT'S permits for reviewed lot(s).
"			Proof of pumping for septic tanks within last 3 years, unless system less than 5 years old.
Yes		41&42	Soil profile descriptions
"		37	Seasonal high groundwater addressed (results or letter indicating in process)
Non-degradation			
"		51-55	Nondegradation info IF new development proposed, if expansion of existing development proposed, or for change in use (residential to commercial, etc.)
Onsite Water			
"		43-48	Copy of any existing well logs for wells on reviewed lot(s), for wells sampled, & for wells used for hydraulic conductivity estimates
"		50	Information about water quality, quantity & dependability (water tests & aquifer well logs)
Public Water or Sewer			
N/A			If extensions or connections to existing public water/wastewater proposed, "will serve" letter or copy of current bill from public facility owner if connected
Stormwater			
N/A			Stormwater drainage report & plans
Other documents			
N/A			Special Requests - Prior to full design (waivers, deviations, water availability analysis, non-degradation predetermination, etc.)
Yes		22	Sage Grouse documentation provided
N/A			Copy of submittal to DNRC requesting Water Rights review or, if available, review letter from DNRC.
Yes		23	Modified Site Plan

Copy of This checklist AND (circle one)

COMPLETE LETTER or INCOMPLETE LETTER sent on: _____

REVIEWED BY: _____ AGENCY: _____

TYPE OF LOTS

	Unit	Unit cost	Number of Units	Total (unit cost x no. of units)
Subdivision lot	lot or parcel	\$125		\$0
Condominium, townhouse, trailer court, RV campground	unit or space	\$50		\$0
Resubmittal fee - previously approved lot/boundaries not changed	lot or parcel	\$75	1.00	\$75

TYPE OF WATER SYSTEM

Individual or shared water supply system (existing/proposed)	unit	\$85		\$0
Multiple user water system (non-public)	unit*	\$315		\$0
*plus \$105 per hour for review in excess of 4 hours	hour	\$105	If Required	To be invoiced
new distributing system	lineal foot	\$0.25		\$0
connection to distribution system	lot/unit	\$70		\$0
Public water system				
DEQ 1 or DEQ 3 Water System	component		per 17,38,106	To be invoiced
new distribution system	lineal foot	\$0.25		\$0
connection to distribution system	lot or structure	\$70		\$0

TYPE OF WASTEWATER SYSTEM

Existing systems	unit	\$75		\$0
New gravity fed system	drainfield	\$95		\$0
New dosed systems, elevated sand mound, ET systems, intermittent sand filter, ETA system, recirculating sand filter, recirculating trickling filter, aerobic treatment unit, nutrient removal, and whole house subsurface drip irrigation	design*	\$190	1.00	\$190
	drainfield	\$50	1.00	\$50
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
Gray water reuse, holding tanks, sealed pit privies, unsealed pit privies, seepage pits, waste segregation systems, experimental systems	unit	\$95		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
New multiple user wastewater system (non-public)	unit*		Per Type Above	
*plus \$105 per hour for review in excess of 4 hours	hour	\$105	If Required	To be invoiced
new collection system	lineal foot	\$0.25		\$0
connection to system	lot/unit	\$70		\$0
Public wastewater system				
Treatment System	component		per 17,38,106	To be invoiced
new collection system	lineal foot	\$0.25		\$0
connection to system	lot/structure	\$70		\$0

OTHER

Deviation from Circular	request*	\$200		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
Waiver from Rules	request*	\$200		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
Reissuance of original approval statement	request	\$60		\$0
Review of revised lot layout document	request	\$125		\$0
Municipal Facilities Exemption Checklist	request	\$100		\$0
Nondegradation review - nonsignificance determinations				
individual/shared	drainfield	\$60		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
multiple-user	lot/structure	\$30		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
source specific mixing zone	drainfield	\$200		\$0
public	drainfield		per 17,38,106	To be invoiced
Storm drainage plan review - plan exempt from DEQ-8	lot	\$40		\$0
Storm drainage plan review - DEQ-8 review	design*	\$180		\$0
	lot	\$40		\$0
*plus \$105 per hour for review in excess of 30 minutes per lot	hour	\$105	If Required	To be invoiced
Preparation of environmental impact statements/EAS	actual		If Required	To be invoiced
Total Review Fee				\$315

Revised 04/22/16

Part IV SUBDIVISION CHECKLIST

Subdivision: *Foggy Lot 2 of S/D 240 - Relocate Drainfield (Eq# 97-2587)* County: *Park*
 E.Q. Number (provided by DEQ): _____ Date: *8/16/2018*

Please complete the checklist with your initials or N/A.

Applicant or Representative Initial or N/A	County Initial or N/A	DEQ Initial or N/A	Question	Refer to ARM 17.36 Subsections	Reviewer's Comments
N/A			1. Have deviation or waiver requests been submitted with appropriate fees?	17.36.601	
WS			2. Is check included with correct fee?	17.36.103 and 17.36.802	
WS			3. Is application included with owner's signature/address/phone/date?	17.36.102	
WS			4. Is legible copy of Preliminary Plat or COS included?	17.36.103	
WS			5. Is legal description included on the Preliminary Plat or COS?	17.36.103	
WS			6. Are all lots described on survey being reviewed and any exclusions clearly stated on Preliminary Plat or COS?	17.36.103, 17.36.605	
N/A			7. Are state letters of approval included (DNRC water rights permit, Groundwater discharge permit, public water etc.?	17.36.103	
<i>Under Separate Cover</i>			8. Is local health officer approval included?	17.36.103, 17.36.106, 17.36.108	
"			9. Are Planning Board or County Commissioner comments included?	17.36.103(1)(i)	
WS			10. Is a clear copy of USGS or other topo map included to show ground slope of property?	17.36.103 and 17.36.322 - subsurface wastewater treatment system (SWTS); 17.36.310 - stormwater.	
WS			11. Are 4 copies of lot layout included with the subdivision name on each?	17.36.103, 17.36.104, 17.36.112	
WS			12. Is all required information (e.g., scale, legend, north arrow, etc.) included on the lot layout?	17.36.104	
N/A			13. Are locations of water and sewer lines (extensions and connections) shown?	17.36.104	
WS			14. Are on-site sewer systems designed in conformance with DEQ 4?	17.36.320	
WS			15. Is the slope given for drainfield areas?	17.36.104, 17.36.322	
WS			16. Is sewage treatment system type allowed?	17.36.321	
WS			17. Are drainfield replacement areas shown?	17.36.104	
WS			18. Are minimum setback requirements met?	17.36.323	
WS			19. Are soil pits (test holes) labeled, and adequate soil pit data provided?	17.36.104, 17.36.325	
N/A			20. Are sewage system agreements, easements, O & M plan addressed?	17.36.326	
WS			21. Is information to verify depth to seasonal high ground water or bedrock provided?	17.36.325	
<i>Not Done</i>			22. If conducted, does perc test value(s) correspond to soil type?	17.36.325	
N/A			23. Is gray water reuse system proposed?	17.36.319	
WS			24. Is adequate water supply quantity substantiated?	17.36.103, 17.36.330	
WS			25. Are water quality analyses (nitrate, nitrite, specific conductivity, and bac-T (for existing wells) provided, along with well log and well location?	17.36.331 (proposed) 17.36.335 (existing)	

Applicant or Representative Initial or N/A	County Initial or N/A	DEQ Initial or N/A	Question	Refer to ARM 17.36 Subsections	Reviewer's Comments
			26. Is existing well over 25 ft. in depth and grouted to 25 feet?	17.36.335	
N/A			27. Will alternative water supply be used (cistern, spring)?	17.36.336	
WSS			28. Is nondegradation addressed and supporting data to determine background water quality, hydraulic conductivity and hydraulic gradient provided?	17.36.103, 17.36.312, 17.30.501-518, 17.30.715	
WSS			29. Is nitrate level at end of mixing zone < 5 ppm (< 7.5 ppm, if level 2 provided), and phosphorous breakthrough > 50 years and trigger analysis for n and p addressed?	17.36.103, 17.36.312, 17.30.715	
N/A			30. Are all supporting legal documents included (shared users agreements easements, covenants, HOA, water/sewer districts)?	17.36.103, 17.36.326, 17.36.310, 17.36.334	
N/A			31. Is a copy of the local septic permit (if issued) for an existing septic system provided?	17.36.327	
N/A			32. Is a septic pumper's report stating an existing septic tank has been pumped within the last 3 years provided?	17.36.327	
N/A			33. Is evidence demonstrating proper hydraulic functioning of an existing septic system provided?	17.36.327	
WSS			34. Are wells, drainfields and/or mixing zones within 100 ft. perimeter outside of subdivision boundaries shown?	17.36.103, 17.36.104	
N/D			35. Is proposed subdivision within 500 feet of public water supply and/or sewer system?	17.36.328	
N/A			36. Is authorized statement to connect to existing public water and/or sewer system and statement of adequate capacity provided?	17.36.328	
N/A			37. Is existing public water system approved by DEQ and PWS # provided?	17.36.328	
N/A			38. Do appropriate water rights exist for the public water connection?	17.36.328	
WSS			39. Are subdivisions adjacent to state waters addressed?	17.36.312	
N/A			40. Are plans and specs stamped and signed by PE?	17.36.314	
N/A			41. Is letter from owner stating PE certification of construction and "as-builts" will be submitted included?	17.36.314	
WSS			42. Are 100-year floodplain requirements met, and floodplains and drainages shown?	17.36.104, 17.36.323, 17.36.324	
WSS (N/A)			43. Is solid waste disposal addressed?	17.36.103, 17.36.309 (waste stored on-site)	
N/A For Resite			44. Has storm water drainage been addressed?	17.36.310, DEQ 8	

Notes:

Applicant/representative: Name William E Smith, PE Signature William E Smith Date 8/16/18

County reviewer: Name _____ Signature _____ Date / /

DEQ reviewer: Name _____ Signature _____ Date / /

Property Record Card

Summary

Primary Information

Property Category: RP
Geocode: 49-0520-33-4-50-10-0000
Primary Owner: FOGG MARK A &
 600 SHADYCROFT DR
 LITTLETON, CO 80120-4062

Subcategory: Real Property
Assessment Code: 0006749110
PropertyAddress: MILL CREEK RD
 PRAY, MT 59065
COS Parcel:

NOTE: See the Owner tab for all owner information

Certificate of Survey:
Subdivision: SUBDIVISION 240

Legal Description:
 SUBDIVISION 240, S33, T05 S, R09 E, Lot 2, LEMONT LAND CORP MINOR SUB
 (REFERENCE COS 1582)
Last Modified: 2/24/2016 9:35:22 PM

General Property Information

Neighborhood: 750 **Property Type:** VR - Vacant Land Rural
Living Units: 0 **Levy District:** 49-0C15-75
Zoning: **Ownership %:** 100

Linked Property: No linked properties exist for this property

Exemptions: No exemptions exist for this property

Condo Ownership: Limited: 0

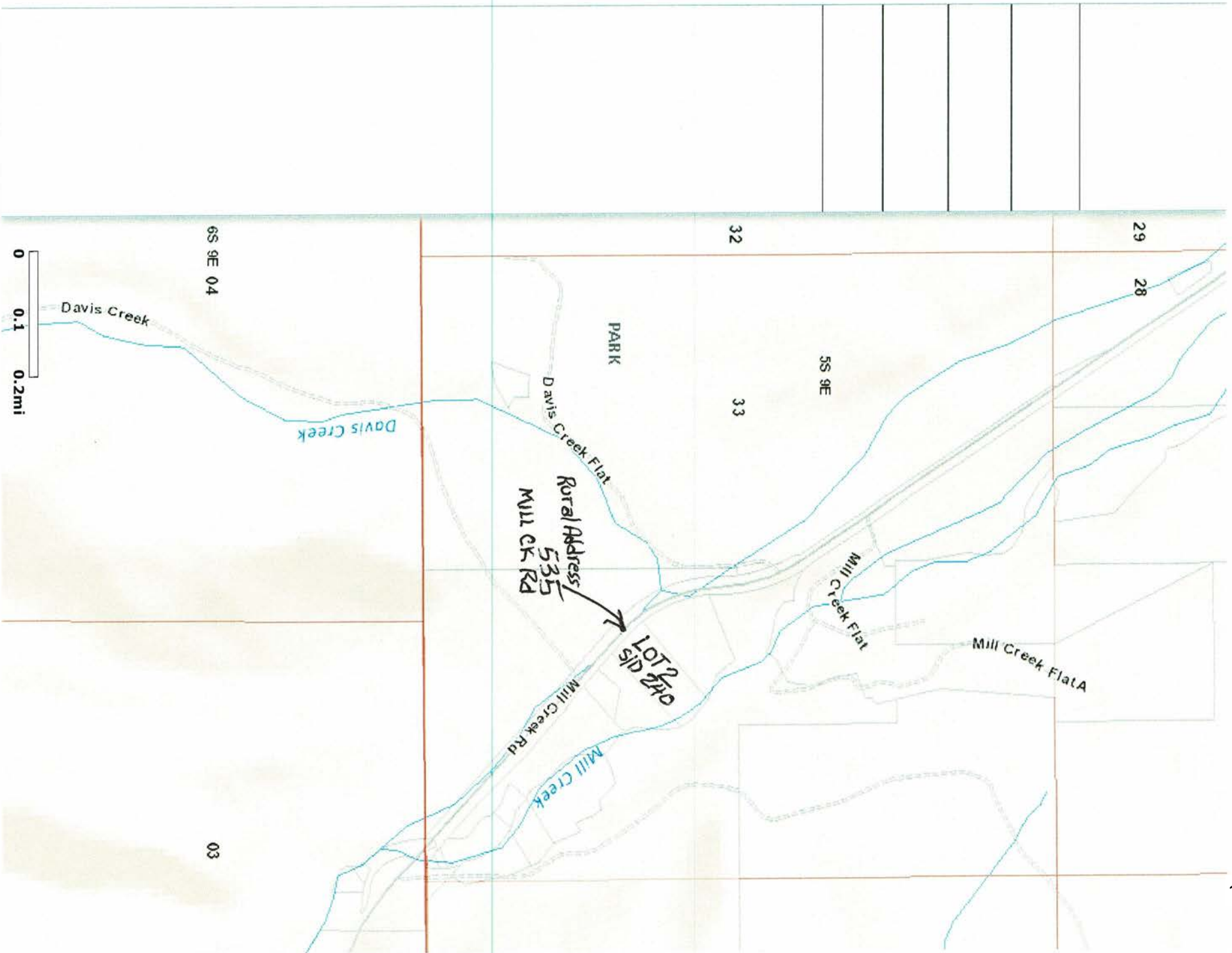
Property Factors

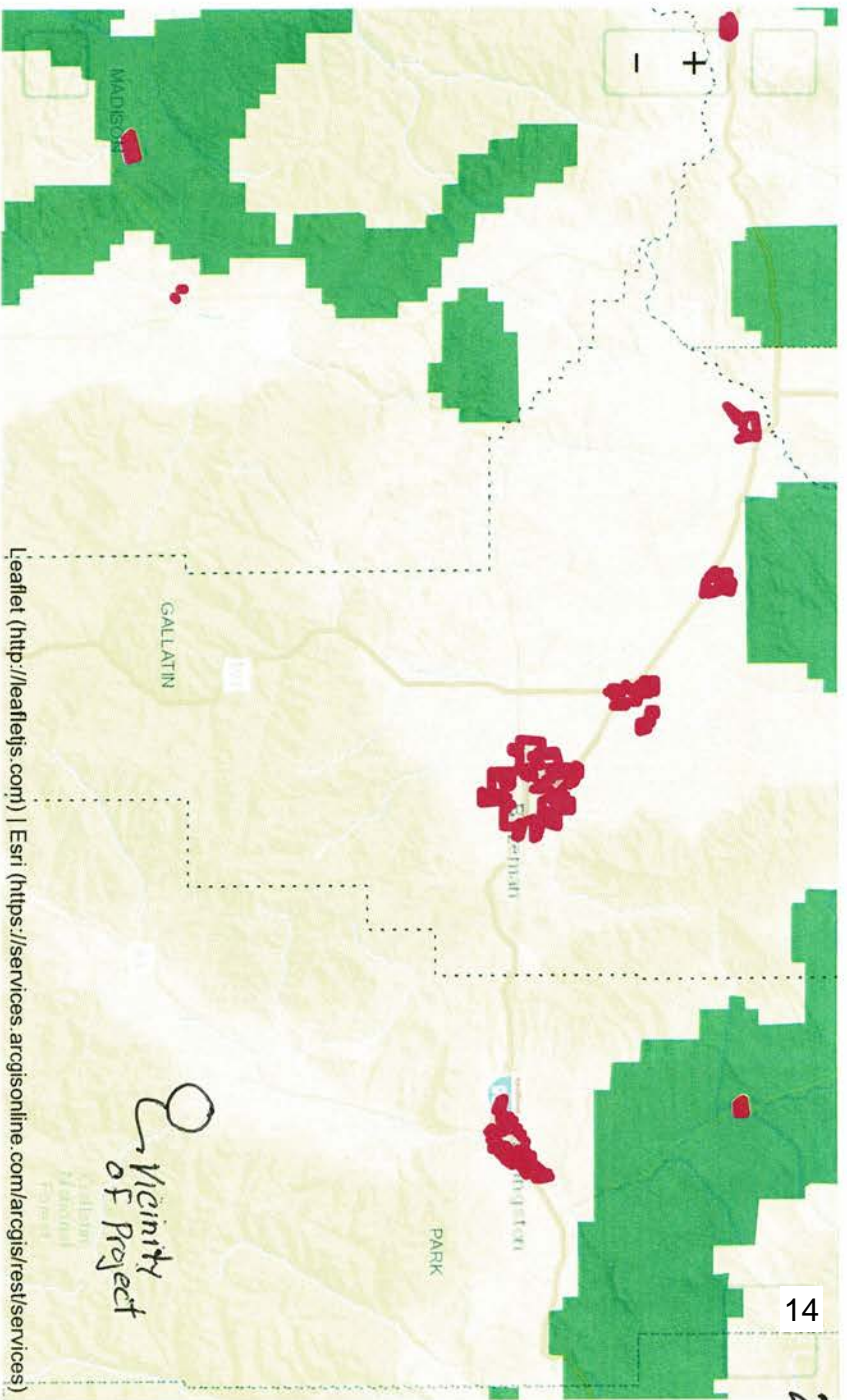
Topography: **Fronting:**
Utilities: **Parking Type:**
Access: 0 **Parking Quantity:**
Location: **Parking Proximity:**

Land Summary

Land Type	Acres	Value
Grazing	0.000	00.00
Fallow	0.000	00.00
Irrigated	0.000	00.00
Continuous Crop	0.000	00.00
Wild Hay	0.000	00.00
Farmsite	0.000	00.00
ROW	0.000	00.00
NonQual Land	0.000	00.00
Total Ag Land	0.000	00.00
Total Forest Land	0.000	00.00
Total Market Land	6.990	00.00

2 of 4





MT Sage Grouse Website Map
Project not within habitat.

Engineering Report

Fogg Lot 2 of S/D 240 Amended Plat
Relocation of Gravity-Flow Gravelless Drainfield

August 16, 2018

Rural Address: 535 Mill Creek Road
Pray, MT 59065

Location / Description of Property:
Being Lot 2 of S/D 240 within SE ¼ Section 33, T.6 south, R. 7 east, P.M.M.
Park County, Montana

Prepared for:
Mark Fogg, Land Owner
600 Shady Croft Drive
Littleton, CO 80120-4062

c/o Kirk Michels, Architect
108 North D St.
Livingston, MT 59047

Prepared by:
William E. Smith, P.E.
Octagon Consulting Engineers, LLC
P.O. Box 78
Emigrant, MT 59027-0078
(406) 333-9040

1. Background

- 1.1. The Lemont Minor Subdivision was reviewed and approved in spring/summer 1997 by Park County Planning Department, MDEQ and by Park County Commissioners as subdivision plat 240. The Park County Planning Office conditions of final approval and filed subdivision covenants are enclosed. This subdivision created three tracts of record within the SW ¼ Section 33, T. 5 south, R. 9 east PPM, Park County, Montana. Since subdivision approval, a residence has been built on Lot 3 (537 Mill Creek Road), Lot 1 enjoys seasonal use for camping and a residence will be under construction on Lot 2 (535 Mill Creek Road) later this summer/fall.
The Lemont Subdivision COSA with water and sanitation site layout map is enclosed. The approved location for the drainfield on Lot 2 (the subject property for this amended plat application) is immediately above the residence and approximately 65 LF minimum from the Mill Creek Irrigation Ditch beyond to the southwest. This drainfield is designed as pressure dosed with four laterals 95 LF by 3 ft wide set 7 ft on-center. The county's review of water and sanitation apparently included an assertion that high groundwater prevented placement of a drainfield in the lower area of Lot 2, although this Engineer has not found data or documentation in the county's file to support this assumption. This restriction with no data presented to the contrary appears to this Engineer to be the rational for locating the drainfield as approved.
 - 1.2. The purpose of this submittal is to relocate the proposed pressure-dosed drainfield from its currently approved location above the residence and less than 100 LF from the Mill Creek Irrigation Ditch to the toe of the steep slope below the residence in the upper southeast corner of the lower area. This relocation will in turn enable the proposed water supply well to be shifted slightly to a setback distance greater than 100 LF from the irrigation ditch, which is in accord with current MDEQ regulations. This proposal must be approved by MDEQ, Park County Planning/Commission and permitted by Park County Environmental Health Department prior to construction.
- This amended plat application will demonstrate to the Park County Planning Department and Board, Commissioners and Montana Department of Environmental Quality that a gravity pressure dosed drainfield constructed in the location shown on the enclosed "Revised Water and Sanitation Site Layout" prepared by Octagon Consulting Engineers, LLC meets current regulations. The required field measurements, surveyed elevations, maps and groundwater analysis are provided for your review.
- 1.3. Potable water will be supplied to the residence from a private on-site well. The proposed location of this well is shown on the Lemont

- Subdivision layout. The 100 ft radius zone of protection surrounding the well as required by DEQ regulations overlaps the irrigation ditch. That may have been acceptable at the time of approval in 1997, however today this zone of protection shall not overlap open channels of flowing water.
- 1.4. The specifications and information provided herein are a result of the Engineer's investigation of the conditions on the site which may affect placement and use of a private on-site wastewater treatment system in the proposed location. This report documents the justification for MDEQ's and Park County Commissioners' approval for the drainfield location.

2. Site Evaluation

- 2.1. The property, Lot 2 of S/D 240, lies between Mill Creek Road on its southwest boundary and Mill Creek channel on its northeast boundary over a distance of approximately 860 ft. The creek flows generally toward the northwest, in a sparsely developed area of gently to steeply sloping terrain. The proposed drainfield relocation has been set to ensure a minimum setback of over 100 ft from the creek's 100 year flood plain. A color copy of a portion of the USGS Montana 7.5 minute series topographic map and the FEMA FIRM are attached to show the vicinity of the property.
- 2.2. The northeast boundaries of these three lots are contiguous with Mill Creek and a significant portion of the lower area of Lot 2 lies within the designated 100 year flood plain of the creek. The natural terrain in the area slopes in a northeasterly direction from Mill Creek Road toward the creek channel. Existing topography and features crossing Lot 2 create three distinct areas: upper area between the county road and Mill Creek Irrigation Ditch in which the subdivision road, cul-de-sac and driveway access easements are located; middle area between the irrigation ditch and a very distinct 40+% downward slope in which all development is presently approved; and lower area. The attached Lemont Subdivision site map shows the residential development occurring within this middle area which also occupies the majority of the designated building envelope.
- 2.3. The seasonal high groundwater which underlies the lower area of Lot 2 has been monitored and studied through this year's high water runoff cycle. The two enclosed graphs documenting flow rates in the Yellowstone River at the USGS gauging stations located at Corwin Springs and Livingston Carters Bridge show that this highwater season was significantly larger than previously years. This indicates that the static water levels measured on this site could be higher than a normal year.
- On April 27, 2018, prior to the onset of high water/groundwater, a soil inspection pit (labeled Pit #1 on the site layout) was excavated in the lower area of Lot 2. The soil encountered was detailed and a PVC

pipe was placed vertically into the bottom of the pit to serve as a groundwater monitoring point. As described in the soil log description for pit # 1 to a depth of 10 ft, soil was "very damp and slightly cohesive" but no signs of high groundwater (i.e. saturated soil, seeping or standing water) were identified.

As presented in the enclosed table entitled "Groundwater Monitoring Test Results", by 5/30/18 groundwater in the pipe had risen to 3.34 ft below ground surface. On 6/4/18, a second soil inspection and groundwater monitoring pit was excavated 170 LF to the southeast. The soil profile encountered was detailed and a PVC monitoring pipe was placed vertically into the pit at a depth of 11 ft. Groundwater static water level (SWL) was encountered at 10 ft below ground surface. A third monitoring point was established where the backhoe tire dug out approximately 10 inches of saturated topsoil exposing the groundwater SWL at the point labeled GW monitoring point #3 on the site layout map. These 3 monitoring points were surveyed to tie locations and monitoring reference points into an established coordinate and elevation datum system. The elevations presented in the GW monitoring log are in this datum.

- 2.4. Groundwater levels were measured and recorded in the GW Monitoring spread sheet for more than 2 weeks beyond the seasonal peak which occurred on 6/20/18. SWL peaked at 2.45 ft below monitoring point # 1 where the ground surface elevation is 5190.69. SWL in monitoring point #2 peaked 9.56 ft below ground surface where the elevation is 5197.76. The GW elevations measured in monitoring point #3 on 6/4 and 7/9/18 (before and after seasonal high groundwater) were used in the 3-point solution computations to determine flow direction and gradient as presented in the enclosed layout entitled "Groundwater Analysis of Flow Direction and Gradient". This data and analysis demonstrate that high groundwater in the southeast corner of the lower area remains 7 ft below the bottom of the pressure-dosed drainfield laterals proposed to be placed in this location.
- 2.5. Several landowners in this area have active water rights out of Mill Creek irrigation ditch. Water users on this ditch may be able to run water through the length of ditch crossing the Lemont Subdivision for at least 90 days during the irrigation season. Therefore, a 100 LF setback from the ditch to the drainfield should be provided. The proposed relocation for the drainfield as shown on the "Revised Water and Sanitation Layout" allows the well location to respect a 100 ft setback from the irrigation ditch.
- 2.6. No additional water courses or streams exist within or adjacent to the proposed new location of the drainfield which may pose a significant threat of flooding. The proposed drainfield and 100% replacement area are greater than 100 ft horizontal from the 100 year flood plain boundary of the Mill Creek channel.

- 2.7. The Montana Sage Grouse website was accessed to confirm that this project is not within nor could it adversely affect sage grouse habitat. A copy of the map depicting this project's proximity to habitat is enclosed.
- 2.8. Soils in the area are described in the attached "USDA NRCS Custom Soils Resource Report, Park County, Montana". Soil type 845A—Vendome-Cetrack complex described as gravelly sandy loam, cobbly loam and sandy loam predominate in the stream terrace area of the middle level. Soil type 1303D—Niring-Clunton complex described as gravelly sandy loam, very gravelly sandy loam, loam, clay loam and silty clay loam predominate in the drainage way and flood-plain steps of the lower area.
- 2.9. The profile of soils observed in inspection pit #1 excavated in the northwest upper corner of the lower area on Friday 4/27/2018 is described in the enclosed Soil Description log labeled Pit #1. The profile of soils observed in inspection pit #2 excavated on Friday 6/4/18 in the southeast upper corner of the lower area and within the proposed new drainfield is described in the enclosed soil description log labeled Pit #2. No percolation tests were conducted in the proposed area of drainfield. The ground slope in the immediate area of the drainfield ranges between 5% and 25%. Consideration of slope stability in the proposed location of the drainfield has been made. The effluent dosed into the absorption area is not expected to destabilize the slope or result in effluent surfacing above ground level.

3. Design Standards and References

- 3.1. Design and specifications for the new private on-site septic tank and gravity-flow pressure dosed gravelless drainfield system shall conform to the requirements in Department Circular DEQ 4, "Montana Standards for On-Site Subsurface Sewage Treatment Systems", 2013 Edition.
- 3.2. Applicable sections and standards of the Administrative Rules of Montana shall apply to the design, materials, installation and testing of components.
4. **Description of Soil Profile Encountered in Inspection Pit**
(Refer to Revised Water and Sanitation Site Layout Map for locations of inspection pit within the area of proposed drainfield and 100% replacement.)
 - 4.1. Soil Profile Descriptions from Inspection Pits
Inspection pits were excavated to the depths shown in the enclosed tables. Inspections were performed by William E. Smith, P.E.
 - 4.2. Percolation Test Results
No perc tests were conducted.

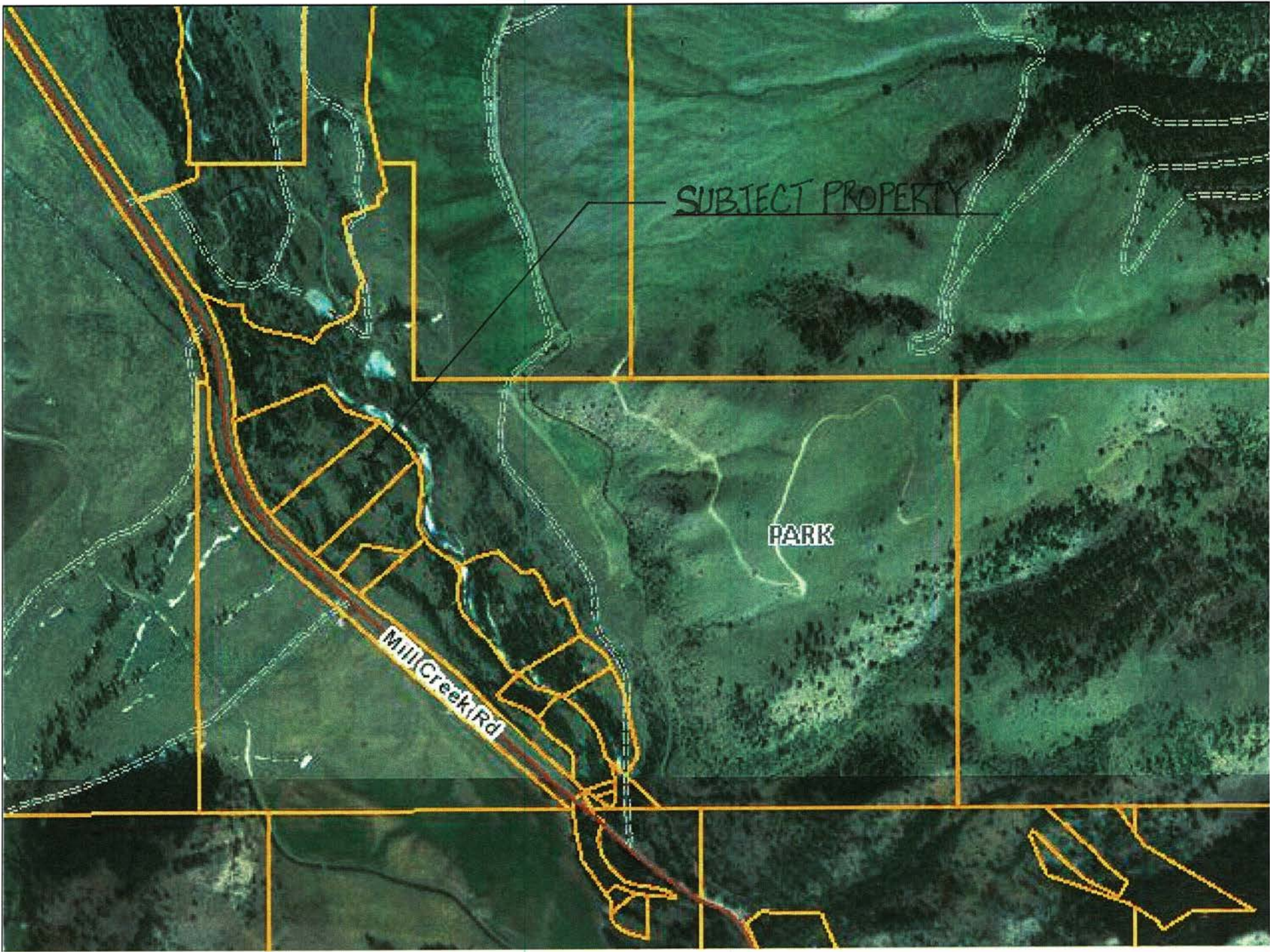
- 4.3. Observations and conclusions
No soil conditions which would prevent proper treatment or percolation of septic tank effluent were observed within the depth of the inspection pits. The entire area of the proposed drainfield and 100% replacement is expected to perc at an average rate as identified by the soil descriptions.
- 5. Determination of Impact from Proposed Relocated Drainfield on Groundwater in Accordance with Department of Environmental Quality Non-Degradation of Groundwater Regulations**
- 5.1. The attached calculation sheets document the results of nitrates analysis performed to predict impact on groundwater from the proposed new gravity-flow pressure dosed drainfield system. The proposed drainfield location does not align up gradient or down gradient at distances of over 300 ft with any known existing or proposed drainfield according to calculated groundwater flow direction.
- 5.2. The hydraulic conductivity (K) of the groundwater aquifer was determined by plugging the well log data for six wells into the Fetter equation for an unconfined aquifer: $T = 33.6[(Q/h_o - h)^{0.67}]$ and $K = T/b$, where Q is in units of cf/day. The data is documented in the enclosed table entitled "Calculation of Hydraulic Conductivity by Feters". The lithology described in the well logs indicate that the aquifers may be the shallowest groundwater that would be impacted by the new drainfield. The average K value is calculated at 189 ft/day for use in the NSA model.
- 5.3. The gradient (i) and flow direction of the groundwater underlying Lot 2 and used in the NSA was calculated to be 0.0178 ft/ft at a bearing of N 37°56'55" by plotting static water elevations and monitoring point locations determined by survey data into the 3-point solution. Refer to work sheet entitled "Fogg Groundwater 3-Point Solution Analysis Flow Direction and Gradient".
- 5.4. Water samples for measuring background nitrates concentration for use in the nitrates sensitivity analysis and specific conductance in groundwater were collected from the potable water well serving the single family residence at 539 Mill Creek Road (two properties upstream from Lot 2). The lab report shows background nitrates concentration of 0.25 ppm. Refer to attached lab analysis report.
- 5.5. A nitrates concentration of 50 ppm is used for drainfield effluent in accordance with DEQ guidelines for nitrates sensitivity analysis (NSA).
- 5.6. A standard mixing zone length of 200 ft is used for the relocated drainfield in accordance with ARM 17.36.517(1)(d)(viii)(D). The entire mixing zone remains on Lot 2 of S/D 240 in accordance with Dep't rules. The mixing zone from the new drainfield does not overlap a

- drainfield or 100 ft radius zone of protection around a potable water well on this or adjacent property.
- 5.7. The NSA spread sheet for a single drainfield predicts nitrates concentration of 0.49 ppm at the bottom of the standard mixing zone.
- 5.8. Due to the proximity of the new drainfield to Mill Creek, the effect on the nitrates concentration in the surface water from the discharge of drainfield effluent was calculated in accordance with Appendix Q "Trigger Value Calculation". Refer to the Trigger Calculation spread sheet attached. This resulting concentration is significantly less than 0.01 ppm, the allowable nitrates concentration per ARM for surface water.
- 5.9. The results of the NSA described herein, documented on the attached calculation sheet and shown on the Site Layout Map predict nitrates concentration less than the maximum value of 5.0 ppm allowed for drainfield effluent without secondary treatment. Based on this result, the Engineer concludes that this new proposed drainfield will result in a non-significant impact on the groundwater in the area.
- 5.10. Phosphorus break-through calculation was prepared to predict impact of the relocated drainfield. A depth to groundwater of 6 ft was used based on the depth to peak SWL being 9.5 ft and the distance between Mill Creek and the drainfield is measured at 360 ft. The attached analysis spread sheet shows a breakthrough time of 85 years which is greater than the minimum time of 50 years.
- 6. Description of Relocated Drainfield with Gravity-Flow Siphon Pressure Dosed Gravelless Chambers**
- 6.1. The new septic system shall be designed, approved and constructed in accordance with the engineering drawings entitled "Revised Water and Sanitation Layout to Relocate Drainfield" sheets 1 and 2 of 2 prepared by Octagon Consulting Engineers, LLC and issued by William E Smith, P.E.
- 6.2. Refer to attached document entitled "Gravity Flow Pressure-Dosed Drainfield System Specifications" for wastewater loading, absorption area sizing and system components.
- 6.3. The location of the drainfield and 100% drainfield replacement area intended to serve the four bedroom residence are shown on the attached "Revised Water and Sanitation Site Layout". The components are sized and configured to dose septic tank effluent into the one-zone drainfield using an approved gravity flow dosing siphon.
- 6.4. A standard concrete two compartment septic/dosing tank as shown and specified on the drawings shall be set at the correct elevation to receive sewage from the residence and discharge clarified effluent by gravity into the drainfield. Refer to the enclosed OCE engineering drawings sheets 1 and 2 of 2.

- 6.5. The gravity flow dosing siphon and components required by Circular DEQ 4 are specified in the document referenced in Section 6.2 above and the OCE drawings.
- 6.6. The drainfield shall be constructed using pressurized piping of the sizes, weights and configurations specified in the attached specification and drawings. The drainfield shall be sized according to the soil description provided in Section 4 of this report as required by Department Circular DEQ 4, 2013 Ed. Nominal depth of all drainfield trenches will not exceed 36". A minimum set back distance of 100 ft must be maintained between the new drainfield and the Mill Creek 100 year flood plain.
- 6.7. Construction equipment not needed to construct the system should be kept off the area to be utilized for the drainfield trench system to prevent undesirable compaction of the soils. The excavated surfaces of the drainfield trenches may need scarified with a hand rake or other tool where a shiny seal has occurred during excavation in these clay soils.

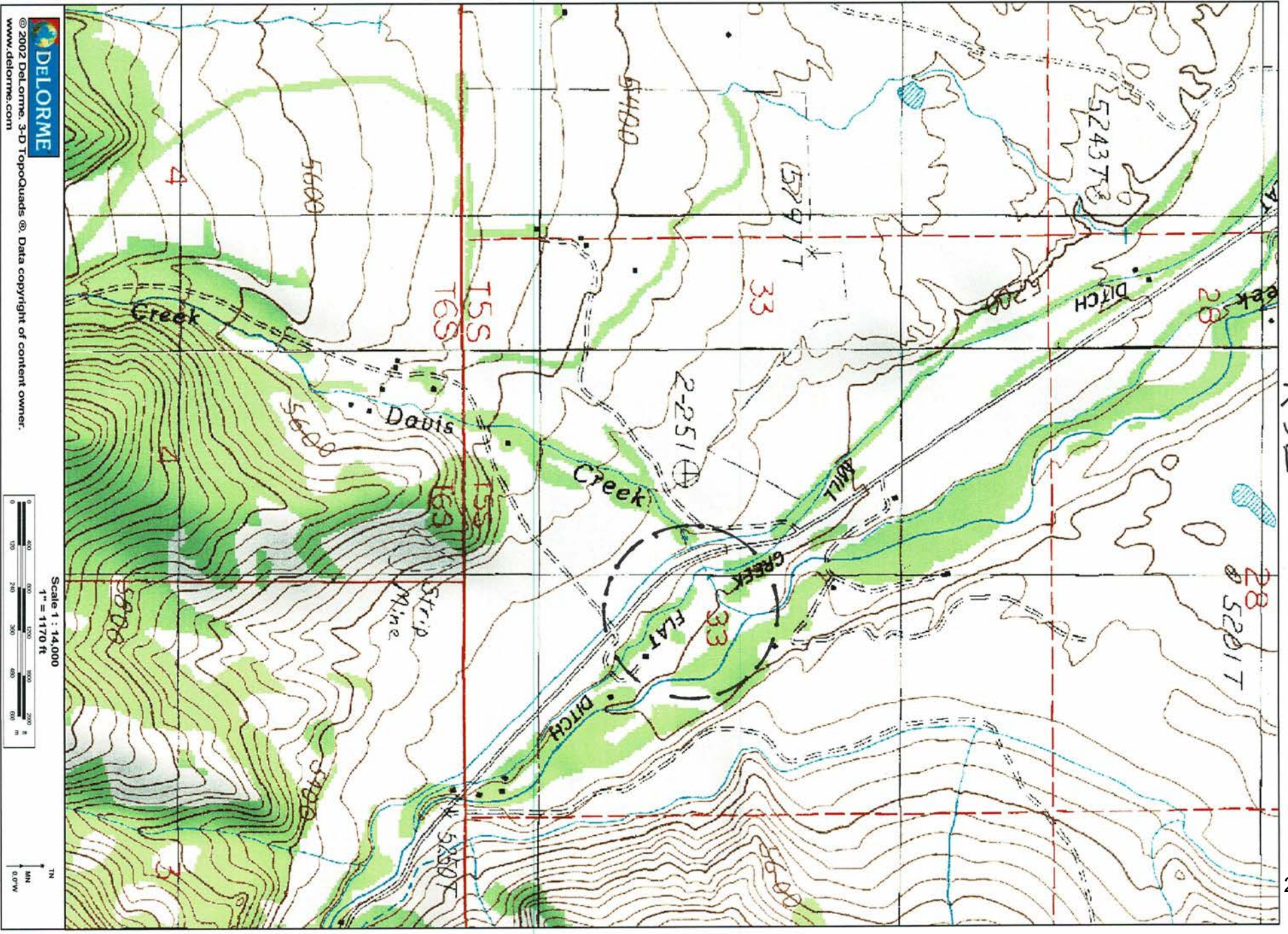
7. Relocation of Potable Water Well to Serve the Fogg Residence

- 7.1. Pursuant to the proposed relocation of the drainfield from the middle level area of the house site, the proposed location of the well has been adjusted within the middle area to provide a 100 ft setback from the Mill Creek irrigation ditch. This is shown on the Revised Site Layout.



R 9E

24
34



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www.delorme.com

Scale 1 : 14,000
1" = 1170 ft

0 100 200 300 400 500 ft
0 100 200 300 400 500 m

TN
N
0.0°W

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) Zone A, V, A99
 - With BFE or Depth Zone AE, AO, AH, VE, AR
 - Regulatory Floodway

- OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
 - Future Conditions 1% Annual Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee. See Notes, Zone X
 - Area with Flood Risk due to Levee Zone D

- OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard Zone X
 - Effective LOMRs
 - Area of Undetermined Flood Hazard Zone
- GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
 - Levee, Dike, or Floodwall

- OTHER FEATURES**
- Cross Sections with 1% Annual Chance Water Surface Elevation
 - Coastal Transect
 - Base Flood Elevation Line (BFE)
 - Limit of Study
 - Jurisdiction Boundary
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature

- MAP PANELS**
- Digital Data Available
 - No Digital Data Available
 - Unmapped

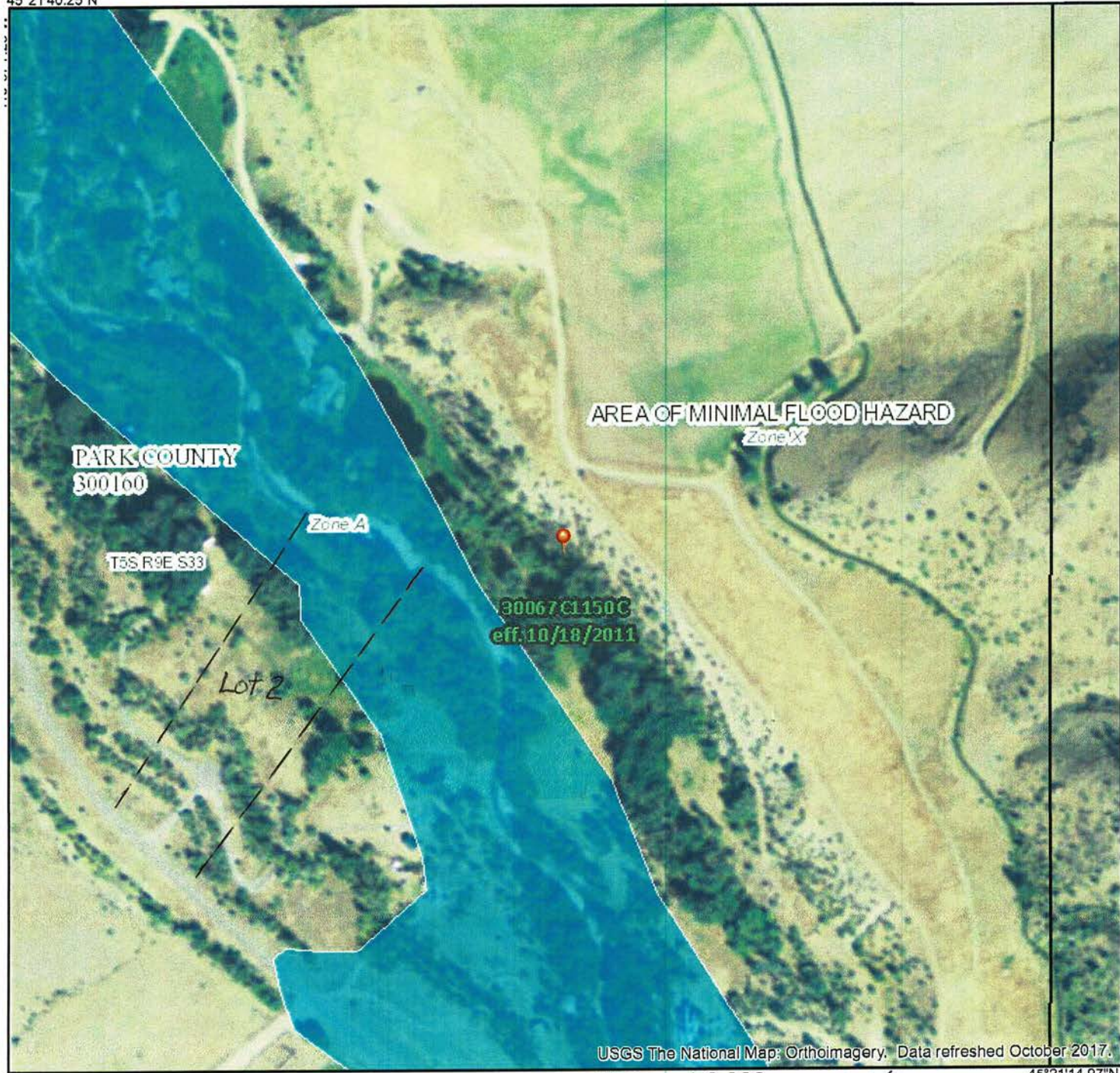
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/31/2018 at 11:42:22 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

45°21'40.25"N



USGS The National Map: Orthoimagery. Data refreshed October 2017.



1:6,000 1" = 500'

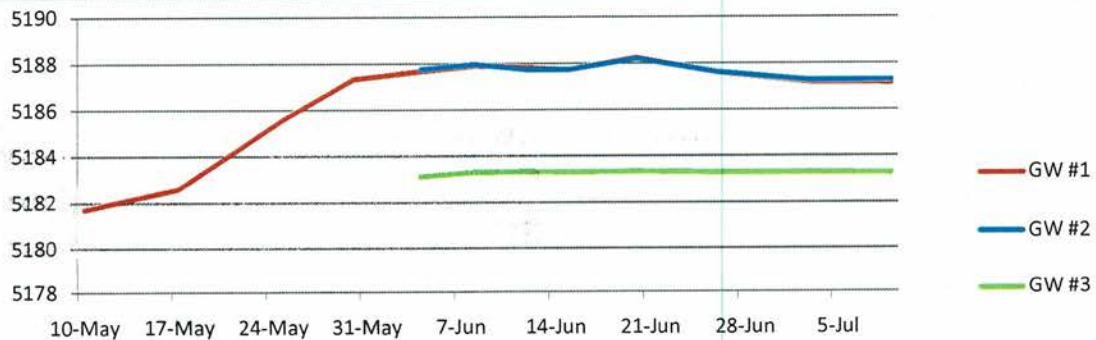
45°21'14.97"N

110°36'29.77"W

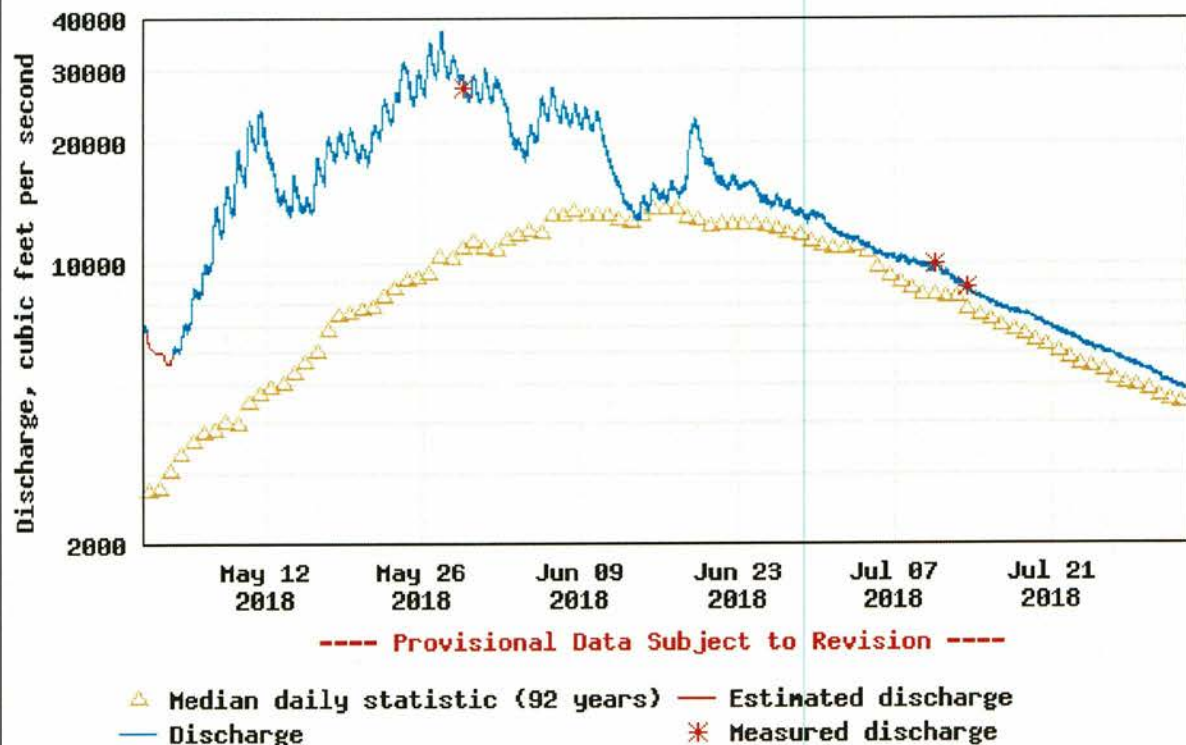


25
35

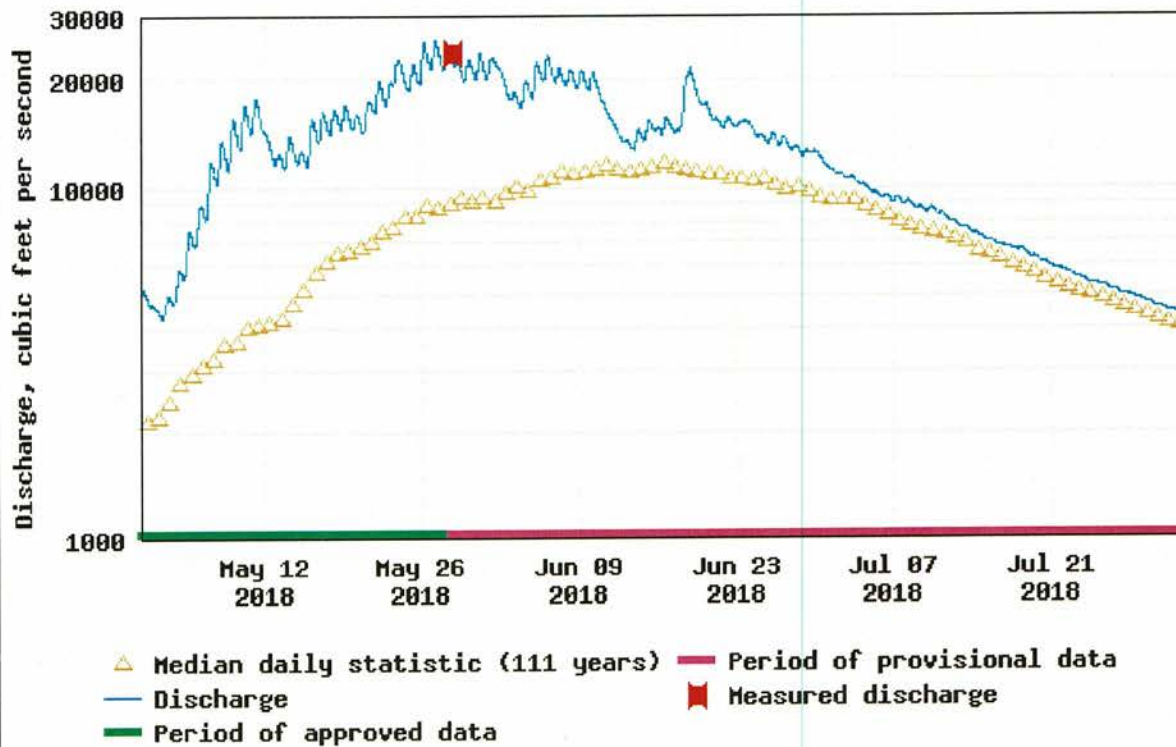
Groundwater Monitoring Test Results				Owner: Mark Fogg			Date: 8/15/2018		
Date	GW Monitoring Pipe #1			GW Monitoring Pipe #2			GW Monitoring Point #3		
	Pipe Elev.	Ground Elev.		Pipe Elev.	Ground Elev.		Stop Elev.	Ground Elev.	
	5194.02	5190.69		5198.11	5197.76		5183.42	5184.08	
	Meas.	Meas.		Meas.	Meas.		Meas.	Meas.	
	From Pipe	From Grd.	SWE	From Pipe	From Grd.	SWE	From Stop	From Grd.	SWE
4/27	Monitoring Pipe installed. No groundwater to 12.87' depth below top of pipe.								
5/4	No Groundwater above bottom of pit								
5/10	-12.30	-8.97	5181.72	Monitoring Pipe Installed 6/4/2018 Depth to bottom of pit below top of pipe = 11.0 ft.			Monitoring Stop Installed 6/4/2018 Groundwater standing ~8" deep in tire track made by backhoe.		
5/17	-11.40	-8.07	5182.62						
5/25	-8.33	-5.00	5185.69						
5/30	-6.67	-3.34	5187.35						
6/4	-6.34	-3.01	5187.68						
6/8	-6.09	-2.76	5187.93	-10.34	-9.99	5187.77	-0.29	-0.95	5183.13
6/12	-6.19	-2.86	5187.83	-10.13	-9.78	5187.98	-0.10	-0.76	5183.32
6/15	-6.19	-2.86	5187.83	-10.37	-10.02	5187.74	-0.08	-0.74	5183.34
6/15	-6.28	-2.95	5187.74	-10.38	-10.03	5187.73	-0.09	-0.75	5183.33
6/20	-5.78	-2.45	5188.24	-9.91	-9.56	5188.20	-0.08	-0.74	5183.34
6/26	-6.41	-3.08	5187.61	-10.49	-10.14	5187.62	-0.12	-0.78	5183.30
7/3	-6.81	-3.48	5187.21	-10.84	-10.49	5187.27	-0.12	-0.78	5183.30
7/9	-6.82	-3.49	5187.20	-10.81	-10.46	5187.30	-0.14	-0.80	5183.28



USGS 06192500 Yellowstone River near Livingston, MT



USGS 06191500 Yellowstone River at Corwin Springs MT





United States
Department of
Agriculture

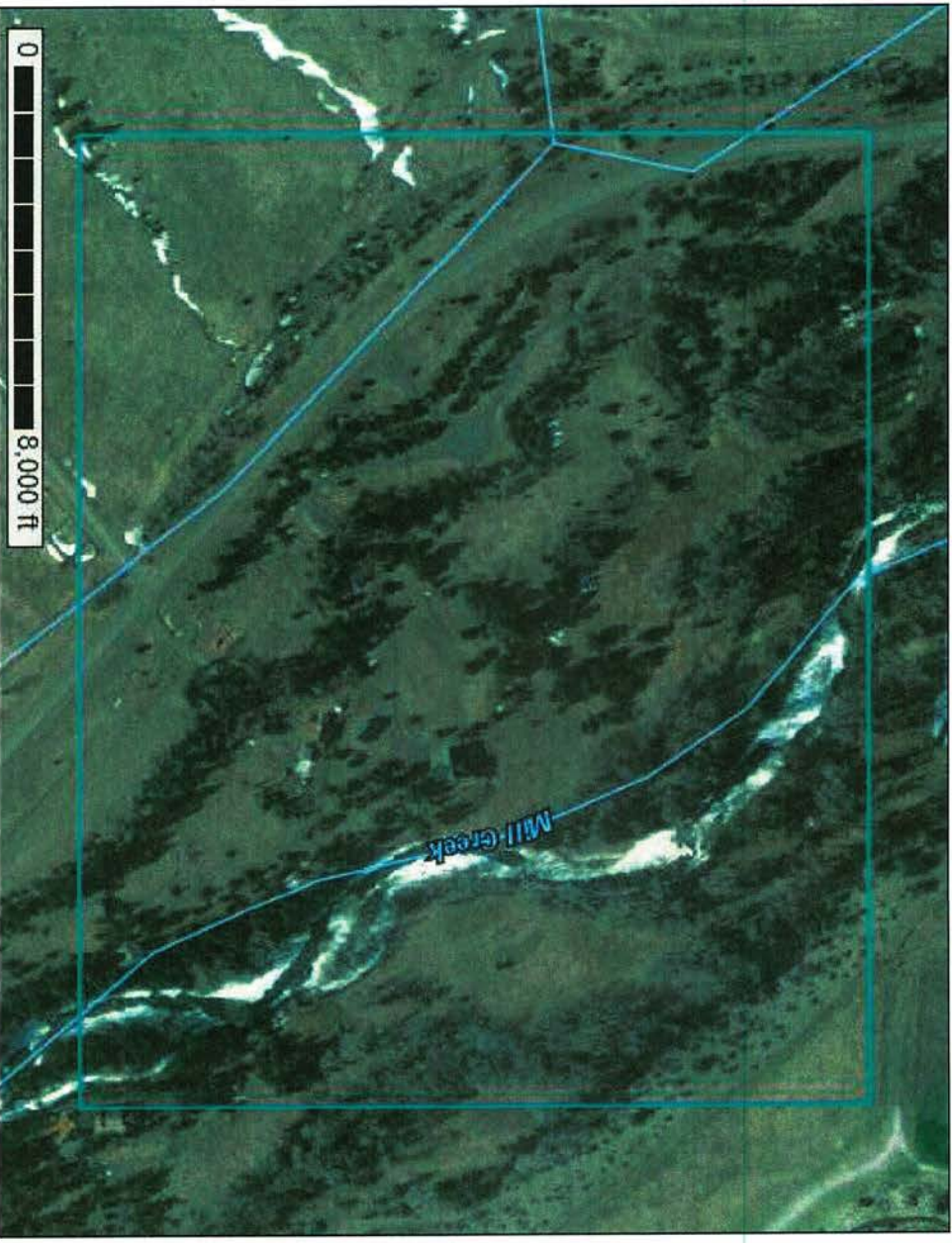


Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Park County Area, Montana

Fogg Lot 2 S/D 240 Amended Plat to Relocate Gravity-Flow Drainfield

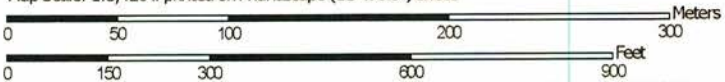


Custom Soil Resource Report
Soil Map



Soil Map may not be valid at this scale.





































Map Scale: 1:3,420 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84



MAP LEGEND

-  Area of Interest (AOI)
- Soils**
-  Soil Map Unit Polygons
-  Soil Map Unit Lines
-  Soil Map Unit Points
- Special Point Features**
-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features
- Water Features**
-  Streams and Canals
- Transportation**
-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads
- Background**
-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Park County Area, Montana
 Survey Area Data: Version 9, Oct 3, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 1, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
65C	Shawmut-Beaverton, extremely stony-Meagher complex, 4 to 8 percent slopes	0.1	0.1%
824E	Notter-Kremlin-Chinook complex, 2 to 25 percent slopes	5.2	10.3%
845A	Vendome-Cetrack complex, 0 to 2 percent slopes	18.1	35.8%
1303D	Niriling-Clunton complex, 0 to 10 percent slopes, occasionally flooded	19.0	37.7%
2407E	Corby-Beaverton, very stony-Perma, extremely stony complex, 4 to 25 percent slopes	8.1	16.1%
Totals for Area of Interest		50.5	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor

components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps.

The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

845A—Vendome-Cetrack complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 58bh
Elevation: 4,800 to 5,000 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Vendome and similar soils: 55 percent
Cetrack and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vendome

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 5 inches: cobbly loam
Bw - 5 to 8 inches: sandy loam
2Bk - 8 to 60 inches: very cobbly loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Custom Soil Resource Report

Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: Shallow to Gravel (SwGr) 9-14" p.z. (R044XS338MT)
Hydric soil rating: No

Description of Cetrack**Setting**

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Calcareous loamy alluvium over calcareous sandy and gravelly alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 6 inches: gravelly sandy loam
Bw - 6 to 12 inches: loam
Bk1 - 12 to 16 inches: loam
Bk2 - 16 to 32 inches: loam
2C - 32 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: Silty (Si) 9-14" p.z. (R044XS339MT)
Hydric soil rating: No

Minor Components**Vendome, very cobbly sandy loam**

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Shallow to Gravel (SwGr) 9-14" p.z. (R044XS338MT)
Hydric soil rating: No

Scravo

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Limy (LY) 9-14" p.z. (R044XS341MT)
Hydric soil rating: No

Vendome, very stony

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Shallow to Gravel (SwGr) 9-14" p.z. (R044XS338MT)
Hydric soil rating: No

1303D—Nirling-Clunton complex, 0 to 10 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 57vh
Elevation: 4,680 to 5,400 feet
Mean annual precipitation: 12 to 17 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Nirling and similar soils: 60 percent
Clunton and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nirling

Setting

Landform: Drainageways, flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Sandy and gravelly alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

A1 - 0 to 6 inches: gravelly sandy loam
A2 - 6 to 14 inches: very gravelly sandy loam
Bw - 14 to 21 inches: very gravelly sandy loam
2C - 21 to 60 inches: extremely cobbly loamy sand

Properties and qualities

Slope: 0 to 10 percent

Custom Soil Resource Report

Depth to restrictive feature: More than 80 inches
 Natural drainage class: Somewhat poorly drained
 Runoff class: Low
 Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: About 24 to 42 inches
 Frequency of flooding: Occasional
 Frequency of ponding: None
 Calcium carbonate, maximum in profile: 5 percent
 Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 6w
 Land capability classification (nonirrigated): 6w
 Hydrologic Soil Group: A
 Other vegetative classification: narrowleaf cottonwood/western snowberry c.t. (HP213)
 Hydric soil rating: No

Description of Clunton

Setting

Landform: Drainageways, flood-plain steps
 Landform position (three-dimensional): Tread
 Down-slope shape: Concave, linear
 Across-slope shape: Linear, concave
 Parent material: Loamy alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

A1 - 0 to 7 inches: loam
 A2 - 7 to 13 inches: clay loam
 Bg - 13 to 27 inches: silty clay loam
 Cg1 - 27 to 42 inches: silty clay loam
 2Cg2 - 42 to 60 inches: stratified sandy clay loam to loam

Properties and qualities

Slope: 0 to 8 percent
 Depth to restrictive feature: More than 80 inches
 Natural drainage class: Very poorly drained
 Runoff class: Medium
 Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
 Depth to water table: About 0 to 12 inches
 Frequency of flooding: Occasional
 Frequency of ponding: Frequent
 Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): 5w
 Land capability classification (nonirrigated): 5w
 Hydrologic Soil Group: D
 Ecological site: Wet Meadow (WMM) 9-14" p.z. (R044XSS349MTT)
 Hydric soil rating: Yes

Minor Components**Vendome**

Percent of map unit: 10 percent

Landform: Drainageways, flood-plain steps

Landform position (three-dimensional): Tread

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Ecological site: Shallow to Gravel (SwGr) 9-14" p.z. (R044XS338MT)

Hydric soil rating: No

Cozdomo

Percent of map unit: 10 percent

Landform: Drainageways, flood-plain steps

Landform position (three-dimensional): Tread

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Ecological site: Shallow to Gravel (SwGr) 9-14" p.z. (R044XS338MT)

Hydric soil rating: No

2407E—Corbly-Beaverton, very stony-Perma, extremely stony complex, 4 to 25 percent slopes**Map Unit Setting**

National map unit symbol: 581z

Elevation: 5,200 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Mean annual air temperature: 39 to 42 degrees F

Frost-free period: 70 to 90 days

Map Unit Composition

Corbly and similar soils: 50 percent

Perma, stony extremely, and similar soils: 15 percent

Beaverton, very stony, and similar soils: 15 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Corbly**Setting**

Landform: Fan remnants

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Sandy and gravelly alluvium derived from igneous, metamorphic and sedimentary rock

**Fogg Amended Plat to Relocate Gravity Flow Drainfield
Lot 2 of S/D 240**

**Description of Soil Profile Encountered in
Soil Inspection and Groundwater Monitoring Pit #1
Excavated within SW Corner of Lower Area**

Refer to attached site plan entitled "Fogg Amended Plat: Water and Sanitation Site Layout" for location of soil inspection pit.
 Inspection pit was excavated to the depth shown in the table below.
 Date of Inspection: Friday April 27, 2018
 Inspection performed by: William E. Smith, P.E.

Number of Stratum	Depth below natural ground surface	Description of Soil Stratum
Soil Inspection Pit #1.		
1	0 to 1.5 ft	Sandy clay loam topsoil with small percent gravel; uniform very dark gray to black coloration (2.5Y 3/1 to 2.5/1 Munsell Color Chart).
2	1.5 ft to 4 ft	Sandy clay loam with small percentage fine gravel; roots to ~36"; damp and cohesive texture in-situ forming a medium strong rod 2 inch; uniform olive brown coloration (2.5Y 5/3 Munsell Color Chart).
3	4 ft to 7 ft	Sandy clay loam with increased percentage fine to medium gravel and few cobbles to 5"; damp and cohesive texture in-situ forming a weak rod <2 inch; uniform light yellowish brown coloration (2.5Y 6/3 to 6/4 Munsell Color Chart).
4	7 ft to 10 ft	Sandy clay loam with moderate to large percentage fine gravel, cobbles to 8" and boulders 14" to 20"; soil very damp and slightly cohesive texture forming a weak crumbly ball but not a rod; no signs of high groundwater encountered above bottom of pit. Vertical monitoring pipe set in pit with top of pipe being 12'-10½" above bottom of pit. Grdwtr SWL measured at 12.3 ft on 5/10/18 (refer to separate grdwtr monitoring log).

Observations and conclusions

No limiting layers which would compromise the treatment and infiltration of drainfield effluent were found within the depth of the pit. High groundwater found in monitoring pipe and tracked through peak of seasonal high water. When seasonal high water was measured at 3.34 ft below ground surface on 5/30/18, the second soil inspection pit was excavated and grdwtr monitoring pipe installed. (Refer to Pit #2 soil description log.)

**Fogg Amended Plat to Relocate Gravity Flow Drainfield
Lot 2 of S/D 240**

**Description of Soil Profile Encountered in
Soil Inspection and Groundwater Monitoring Pit #2
Excavated within SE Corner of Lower Area**

Refer to attached site plan entitled "Fogg Amended Plat: Water and Sanitation Site Layout" for location of soil inspection pit.

Inspection pit was excavated to the depth shown in the table below.

Date of Inspection: Friday June 4, 2018

Inspection performed by: William E. Smith, P.E.

Number of Stratum	Depth below natural ground surface	Description of Soil Stratum
Soil Inspection Pit #1.		
1	0 to 2.5 ft	Sandy clay loam topsoil with small percent fine to medium gravel; cohesive in-situ forming a weak rod 2" long due to percentage of gravel; uniform very dark grayish brown to dark brown coloration (10YR 3/2 to 3/3 Munsell Color Chart).
2	2.5 ft to 6.5 ft	Clayey sandy loam with large percentage well-graded gravel and cobbles to 8"; roots to ~48"; damp and crumbly slightly cohesive texture in-situ forming a weak crumbly rod < 1 inch due to amount of sand and gravel present; uniform yellowish brown coloration (10YR 5/4 Munsell Color Chart).
3	6.5 ft to 11 ft	Clayey sandy loam with moderate percentage well-graded gravel, damp and slightly cohesive, cobbles to 8" and few round boulders to 24"; lens of sandy clay (limited to ~5 ft in width) making a weak rod ~1+" long due to the sand present; sand and gravel content increased deeper in stratum; high groundwater encountered above bottom of pit. Vertical monitoring PVC pipe set into groundwater ~8" prior to backfilling.

Observations and conclusions

No limiting layers which could compromise the treatment and infiltration of drainfield effluent were found within the depth of the pit. Therefore, septic tank effluent will be applied to the drainfield absorption area at a design rate of 0.4 gpd/sf.

Calculation of Hydraulic Conductivity
 by Fetters Equation
 (k = ft/day)
 Fogg Single Family Residence
 Standard Septic System

Well ID	Well Yield Q (gpm)	Well Yield Q (cf/day)	Static leve h (ft)	Pump leve h0 (ft)	Drawdown (ft)	Aqu depth b (ft)	Conductiv k (ft/day)	GWIC Id
Arr Pk Ldg	50.0	9,626	57.0	95.0	38.0	10.0	137.02	215153
Shapiro, N	42.0	8,085	49.0	58.0	9.0	10.0	320.01	189428
LeMont	35.0	6,738	6.0	35.0	29.0	10.0	129.31	138821
Jensen	60.0	11,551	14.0	35.0	21.0	10.0	230.35	268735
Anderson	20.0	3,850	27.0	37.0	10.0	10.0	181.39	102643
Shapiro, D	25.0	4,813	16.0	35.0	19.0	10.0	137.02	162883

Average K value

189.18

MONTANA WELL LOG REPORT

Other Options

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

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Site Name: SHAPIRO NORMA

GWIC Id: 189128

DNRC Water Right: C116462-00

Section 7: Well Test Data

Total Depth: 60
 Static Water Level: 49
 Water Temperature:

Air Test *

42 gpm with drill stem set at 58 feet for 1 hours.
 Time of recovery hours.
 Recovery water level feet.
 Pumping water level feet.

** 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 1: Well Owner(s)
 1) SHAPIRO, NORMA (MAIL)
 575 MILL CR RD
 LIVINGSTON MT 59047 [03/10/2001]

Section 2: Location
 Township Range Section Quarter Sections
 05S 09E 33 SW¼, NE¼ SE¼
 County Geocode

PARK
 Latitude Longitude Geomethod Datum
 45.355326 -110.612817 TRS-SEC NAD83
 Ground Surface Altitude Ground Surface Method Datum Date

Addition Block Lot

Section 8: Remarks

Section 3: Proposed Use of Water
 DOMESTIC (1)

Section 9: Well Log
 Geologic Source

Section 4: Type of Work
 Drilling Method: ROTARY
 Status: NEWWELL

Unassigned

Section 5: Well Completion Date
 Date well completed: Saturday, March 10, 2001

Section 6: Well Construction Details
 Borehole dimensions

From	To	Diameter
0	60	6

Casing					
From	To	Diameter	Wall Thickness	Pressure Rating	Joint Type
-2	60	6	0.250		STEEL

Completion (Perf/Screen)					
From	To	Diameter	# of Openings	Size of Openings	Description
60	60	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)			
From	To	Description	Cont. Fed?
0	20	BENTONITE	

From	To	Description
0	1	TOPSOIL
1	18	SAND GRAVEL
18	20	SAND GRAVEL SOME CLAY
20	48	SAND GRAVEL
48	53	SAND GRAVEL CLAY
53	60	SAND GRAVEL

Driller Certification

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

Name: Company: HILLMAN DRILLING License No: WWC-608 Date Completed: 3/10/2001
--

MONTANA WELL LOG REPORT

Other Options

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

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Site Name: LEMONT LAND INC
GWIC Id: 138821
DNRC Water Right: C084013-00

Section 7: Well Test Data

Total Depth: 40
 Static Water Level: 6
 Water Temperature:

Section 1: Well Owner(s)
 1) LEMONT LAND INC (MAIL)
 PO BOX 516
 GLENBROOK NY 59413 [09/30/1992]

Air Test *

35 gpm with drill stem set at feet for 1 hours.
 Time of recovery hours.
 Recovery water level feet.
 Pumping water level 35 feet.

Section 2: Location
 Township 05S Range 09E Section 33 Quarter Sections NE¼,NW¼,SE¼
 County PARK Geocode

* 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.

Addition Block Lot

Section 8: Remarks

Section 3: Proposed Use of Water
 DOMESTIC (1)

Section 9: Well Log
 Geologic Source

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

Section 5: Well Completion Date
 Date well completed: Wednesday, September 30, 1992

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	40	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint Type
-2	38	6			STEEL

There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

From	To	Description	Fed?	Cont.
0	20	BENTONITE		

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:	HILLMAN DRILLING
Company:	HILLMAN DRILLING
License No.:	WWC-436
Date Completed:	9/30/1992

MONTANA WELL LOG REPORT

Other Options

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

Site Name: JENSEN, CHRISTOPHER J & LYDIA A
GWIC Id: 268735

Section 7: Well Test Data

Total Depth: 40
 Static Water Level: 14
 Water Temperature:

Air Test *

60 gpm with drill stem set at 35 feet for 1 hours.
 Time of recovery 0.5 hours.
 Recovery water level 40 feet.
 Pumping water level feet.

Section 1: Well Owner(s)
 1) JENSEN, CHRISTOPHER J & LYDIA A (MAIL)
 18 AVENIDA REFLEXION
 SAN CLEMENTE CA 92673-6828 [10/09/2012]
 2) JENSEN, CHRISTOPHER J & LYDIA A (WELL)
 MILL CREEK RD
 PRAY MT 59065 [10/09/2012]

Section 2: Location

Township Range Section **Quarter Sections**
 05S 09E 33 NE¼ NW¼ SE¼ SE¼
County Geocode
 PARK 49-0520-33-4-20-3
Latitude Longitude **Geomethod** **Datum**
 45.3539525574 -110.61216145475 TRS-SEC NAD83
Ground Surface Altitude **Ground Surface Method** **Datum** **Date**

Addition Block Lot

Section 8: Remarks

* 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 9: Well Log

Geologic Source

Unassigned

Section 3: Proposed Use of Water
 DOMESTIC (1)

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

From	To	Description
0	16	SAND, GRAVEL & LARGE BOULDERS
16	40	SAND & GRAVEL

Section 5: Well Completion Date
 Date well completed: Tuesday, October 09, 2012

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	40	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	38.5	6	0.25		WELDED	A53B STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
38.5	40	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Fed?	Cont.
0	20	BENTONITE	Y	

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: WILL HAYES Company: HAYES DRILLING License No: WWC:361 Date Completed: 10/9/2012

MONTANA WELL LOG REPORT

Other Options

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

Site Name: ANDERSON JOHN

GWIC Id: 102643

DNRC Water Right: C010479-00

Section 7: Well Test Data

Total Depth: 46
Static Water Level: 27
Water Temperature:

Air Test *

20 gpm with drill stem set at feet for 1 hours.

Time of recovery hours.

Recovery water level feet.

Pumping water level 37 feet.

** 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

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY

Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Wednesday, November 10, 1976

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
	0	46
		6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint Type
-1.5	46	6			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
36	46	6			4 SLOTS

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 9: Well Log

Geologic Source

110ALVM - ALLUVIUM (QUATERNARY)

From	To	Description
0	10	GRAVEL BOULDERS
10	20	SAND GRAVEL CLAY
20	30	SAND CLAY
30	40	GRAVEL WITH WATER

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.

<p>Name: Company: JEROME AND OKEEFE DRILLING CO License No: WWC-249 Date Completed: 11/10/1976</p>

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Octagon Consulting Engineers
Project: Fogg Lot2
Lab ID: B18060100-001
Client Sample ID: Mill Ck Rd #539 Well

Report Date: 06/09/18
Collection Date: 05/30/18 18:05
Date Received: 06/01/18
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/		Analysis Date / By
					QCL	Method	

PHYSICAL PROPERTIES

Conductivity @ 25 C	300	umhos/cm		5	A2510 B	06/04/18 10:48 / pjw
---------------------	-----	----------	--	---	---------	----------------------

NUTRIENTS

Nitrogen, Nitrate+Nitrite as N	0.25	mg/L		0.01	E353.2	06/04/18 12:25 / taw
--------------------------------	------	------	--	------	--------	----------------------

Report Definitions: RL - Analyte reporting limit.

QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

Appendix E

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
NITRATE SENSITIVITY ANALYSIS

SITE NAME: Fogg Lot 2 Amended Plat to Relocate Drainfield

COUNTY:

Park

LOT #:

Lot 2 of S/D 240 5.97 ac. within SE1/4 S 32 T 5S, R.9E

NOTES:

Single family on-site septic tank and gravity-flow drainfield system

<u>VARIABLES</u>	<u>DESCRIPTION</u>	<u>VALUE UNITS</u>
K	Hydraulic Conductivity	189.00 ft/day
L	Hydraulic Gradient	0.0178 ft/ft
D	Mixing Zone Thickness (usually constant)	15.0 ft
L	Mixing Zone Length (see ARM 17.30.517(1)(d)(viii))	200 ft
Y	Width of Drainfield Perpendicular to Ground Water Flow	76 ft
Ng	Background Nitrate (as Nitrogen) Concentration	0.25 mg/L
Nr	Nitrate (as Nitrogen) Concentration in Precipitation (usually constant)	1.0 mg/L
Ne	Nitrate (as Nitrogen) Concentration in Effluent	50.00 mg/L
#1	Number of Single Family Homes on the Drainfield	1.0
Q1	Quantity of Effluent per Single Family Home	26.70 ft ³ /day
P	Precipitation	15.0 in/year
V	Percent of Precipitation Recharging Ground Water (usually constant)	0.20

EQUATIONS

W	Width of Mixing Zone Perpendicular to Ground Water Flow = (0.175)(L)+(V)	111.00 ft
Am	Cross Sectional Area of Aquifer Mixing Zone = (D)(W)	1665.00 ft ²
As	Surface Area of Mixing Zone = (L)(W)	22200.00 ft ²
Qg	Ground Water Flow Rate = (K)(l)(Am)	5601.39 ft ³ /day
Qr	Recharge Flow Rate = (As)(P/12/365)(V)	15.21 ft ³ /day
Qe	Effluent Flow Rate = (#1)(Q1)	26.70 ft ³ /day

SOLUTION

Nitrate (as Nitrogen) Concentration at End of Mixing Zone
 =((Ng)(Qg)+(Nr)(Qr)+(Ne)(Qe)) / ((Qg)+(Qr)+(Qe))

0.49 mg/L

BY: William Smith, P.E.
 DATE: August 15, 2018

Appendix N

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME: Fogg Lot 2 Amended Plat to Relocate Drainfield

COUNTY: Park

LOT #: Lot 2 of S/D 240 5.97 ac. within SE 1/4 S 33 T. 5S, R. 9E, P/M

NOTES: Single family on-site septic tank and gravity-flow drainfield system

<u>VARIABLES</u>	<u>DESCRIPTION</u>	<u>VALUE UNITS</u>
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	76.0 ft
L	Length of Primary Drainfield's Long Axis	76.0 ft
W	Width of Primary Drainfield's Short Axis	18.0 ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	6.0 ft
D	Distance from Drainfield to Surface Water - Mill Creek	360.0 ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**	0.5 ft
Sw	Soil Weight (usually constant)	100.0 lb/ft ³
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200.0 ppm
#1	Number of Single Family Homes on the Drainfield	1.0

<u>CONSTANTS</u>		
P1	Phosphorous Load per Single Family Home (constant)	6.44 lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06

<u>EQUATIONS</u>		
Pt	Total Phosphorous Load = (P1)(#1)	6.44 lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	820800.0 lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	1935000.0 lbs
P	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	551.2 lbs

<u>SOLUTION</u>		
BT	Breakthrough Time to Surface Water = P / Pt	85.6 years

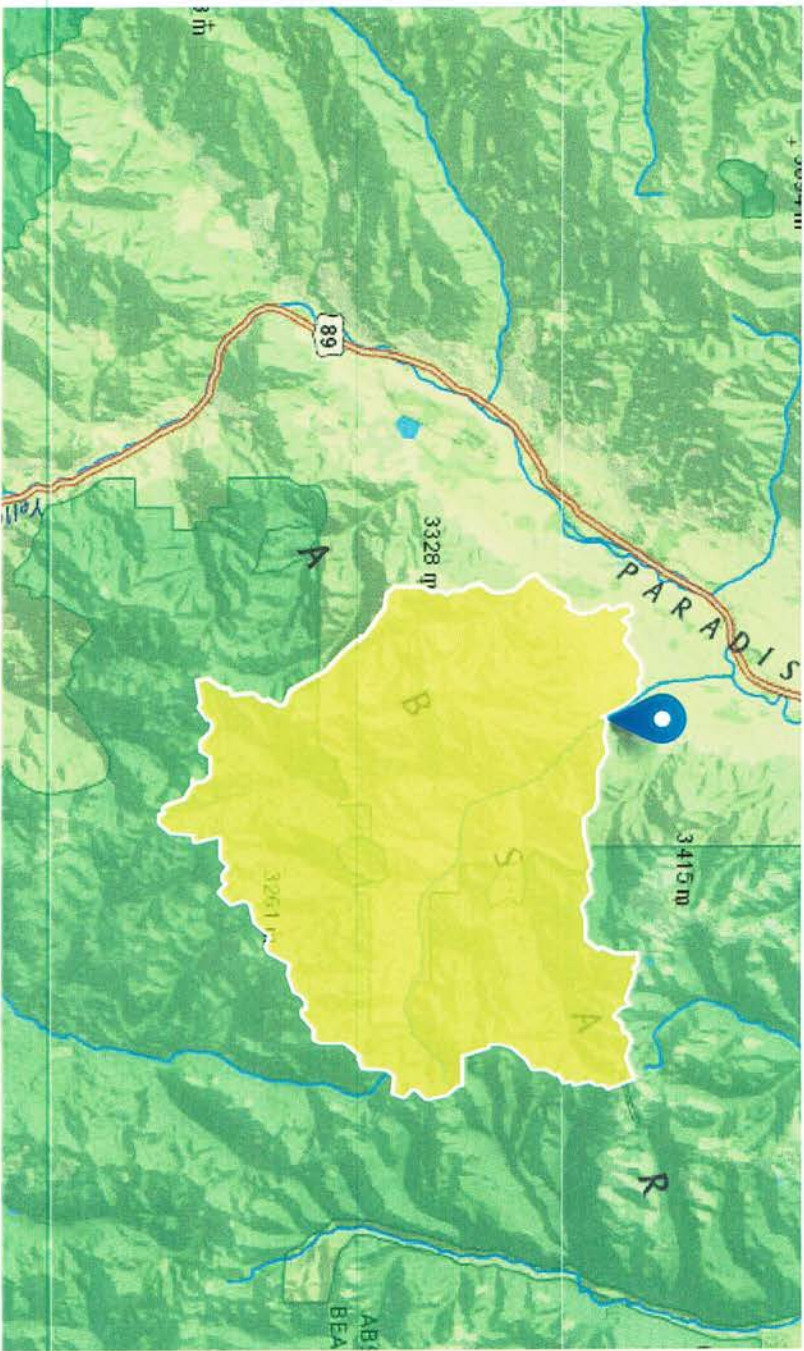
BY: William E Smith, P.E.
DATE: August 1, 2018

NOTES:

- * Depth to limiting layer is typically based on depth to a limiting layer (such as clay, bedrock or water) in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.
- ** Material type is usually based on test pit. A soil that can be described as loam (e.g. gravelly loam, sandy loam, etc.) or finer according to the USDA soil texture classification system is considered a "fine" soil.

StreamStats Report

Region ID: MT
Workspace ID: MT20180724013830429000
Clicked Point (Latitude, Longitude): 45.35771, -110.61550
Time: 2018-07-23 19:38:48 -0600



for Fogg Lot 2 Amended Plat 535 Mill Creek Road

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CONTDA	Area that contributes flow to a point on a stream	187.7	square miles
PRECIP	Mean Annual Precipitation	27.19	inches

General Disclaimers

Upstream regulation was checked for this watershed.

Seasonal Flow Statistics Parameters [upYellow Central Region LowFlow GLS 2015 5019G]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CONTDA	Contributing Drainage Area	187.7	square miles	28.1	2620
PRECIP	Mean Annual Precipitation	27.19	inches	16.4	38.9

Seasonal Flow Statistics Flow Report [upYellow Central Region LowFlow GLS 2015 5019G]

PI: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEP: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEP
JUL_to_Oct_14_Day_5_Yr_Low_Flow	23.6	ft ³ /s	4.45	126	135

Seasonal Flow Statistics Citations

McCarthy, P.M., Sando, Roy, Sando, S.K., and Dutton, D.M., 2016, Methods for estimating streamflow characteristics at unaged sites in western Montana based on data through water year 2009: U.S. Geological Survey Scientific Investigations Report 2015-5019-G, 19 p. (<http://dx.doi.org/10.3133/sir20155019G>)

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Application Version: 4.2.1

Appendix Q

TRIGGER VALUE CALCULATION FOR ADJACENT TO SURFACE WATER DILUTION ANALYSIS

"An analysis of the effect of the proposed drainfield system on the quality of any adjacent surface water is required by ARM 17.36.312 and 17.30.715(1c). The increase in the nutrient concentration in the surface water cannot exceed the trigger value (T.V. of 0.01 mg/L nitrate and 0.001 mg/L phosphorous as set forth in Circular DEQ 7."

$$\text{DILUTION EQUATION: } \frac{(\text{QD})(\text{CD}) + (\text{QL})(\text{CL})}{\text{QD} + \text{QL}} < \text{T.V.} = \text{non-significant}$$

Note: Effluent flow rate (QD) must be multiplied by the number of drainfields in the subdivision.

NITRATE CALCULATION:

QD =	1.00	Number of drainfields in subdivision
CD =	26.70	Effluent flow rate from drainfield in cubic feet per day (commonly 200 gpd or 26.7 ft ³ /d for a 2 - 5 bedroom home)
QL =	50.00	Nitrate concentration in mg/L (50 mg/L nitrate-N for standard drainfield, 24 mg/L for Level 2 wastewater treatment system)
CL =	23.60	Flow rate in ft ³ /s into (or out of) surface water determined by stream gauge (usually the 14-day, 5-year low flow or 14Q5)
	0.00	Nitrate concentration (in mg/L) in surface water; can typically assume zero since increase, not total, is important

$$0.0006547 \text{ mg/L} = \text{final result, must be} < 0.01 \text{ mg/L to be considered nonsignificant nitrate increase}$$

PHOSPHOROUS CALCULATION:

QD =	1	Number of drainfields in subdivision
CD =	26.7	Effluent flow rate from drainfield in cubic feet per day (commonly 200 gpd or 26.7 ft ³ /d for a 2 - 5 bedroom home)
QL =	10.6	Phosphorous concentration in mg/L (commonly 10.6 mg/L) in effluent
CL =	23.6	Flow rate in ft ³ /s into (or out of) surface water determined by stream gauge (usually the 14-day, 5-year low flow or 14Q5)
	0	Phosphorous concentration (in mg/L) in surface water; can typically assume zero since increase, not total, is important

$$0.0001388 \text{ mg/L} = \text{final result, must be} < 0.001 \text{ mg/L to be considered nonsignificant for phosphorous increase}$$

**FOG AMENDED PLAN FOR DRAINFIELD RELOCATION
SINGLE FAMILY RESIDENCE ON LOT 2 OF S/D 240
GRAVITY FLOW PRESSURE-DOSED DRAINFIELD SYSTEM SPECIFICATIONS
SPECIFY MINIMUM DRAINFIELD AREA AND COMPONENTS**

1. **Determined Maximum Design Day Volume, Minimum Septic Tank Volume, and Required Absorption Area**
 1. Per Circular DEQ 4, 2013 Edition, Section 3.1 "Residential Wastewater Flows", typical design flows shall be as follows:
Four bedroom single family residence generates 350 gpd
Size absorption area with application rate specified in Table 2.1-1.
 2. Size drainfield absorption area:
Per Circular DEQ 4, 2013 Edition Table 2.1-1 "Application Rates" for sandy clay loam soils (percolation rates 16 to <31 min/in.), an application rate of 0.4 gpd/sf is specified. With use of gravelless chambers in accordance with Circular DEQ 4 Section 6.6.2.3, the absorption area may be reduced in size by 25%.
Total absorption area = 350 gpd ÷ 0.4 gpd/sf x 0.75 = 656 sq. ft
Width of trench for gravity siphon pressure-dosed laterals = 3 ft
Total length of trenches = 219 lin. ft.
Total number of trenches = 3
Nominal length of each trench = 76 lin. ft
(rounded up to even increment of 4 ft long for gravelless chambers.)
 3. Drainfield capacity = 3 trenches x 76 ft x 3 ft wide x (0.4 gpd/sf ÷ 0.75) = 364 gpd
 4. 100% Replacement Area shall be sized for standard gravel trenches per Circular DEQ 4 requirement.
Absorption area = 350 gpd ÷ 0.4 gpd/sf = 875 sq. ft.
Trench width of 3 ft = 292 lin. ft.
Therefore, use 3 trenches = 98 ft long or 4 trenches = 76 ft long.
Designated area for 100% replacement (98 ft x 20 ft) allows for installation of pressure-dosed gravel drainfield trenches spaced 8 ft on-center.
2. **Design and Specification of Effluent Transport and Drainfield Piping System**
 1. Schedule 40 PVC 4" diameter piping is specified to convey sewage from the house into the septic tank.
 2. Transport force main from the outlet of the dosing siphon in the septic tank to the manifold of the drainfield shall be 4 inch schedule 40 PVC to ensure an unobstructed flow into the drainfield laterals. Piping filled with water will be sloped toward the drainfield manifold in order to drain empty and protect from freezing temperatures. Therefore, the force main can be buried to a depth of 30" to 36" to protect from incidental digging.
 3. The drainfield manifold piping connected to the distribution laterals shall be 4 inch PVC sch. 40. Refer to installation details specified on the OCE drawing entitled "Revised Water and Sanitation Layout to Relocate Drainfield" sheets 1 and 2 of 2.

4. Drainfield laterals shall be 1½ inch schedule 40 PVC fastened into the top of each gravelless chamber in accordance with manufacturer's requirements. One straight line of 1/8 inch diameter orifices spaced at 5.0 ft on-center shall be provided in each distribution lateral. All orifices shall be deburred. Orifices 1, 6, 11 and 15 shall be drilled through pipe bottom-dead-center in order to enable the lateral to drain empty. All other orifices shall be drilled through the pipe top-dead-center to increase uniform distribution of effluent.
- 3. Size Standard Concrete Septic Tank**
1. Septic tank volume shall meet Circular DEQ 4 Section 5.1.6.2, A "Sizing Septic Tank for 4 to 5 bedrooms". Standard reinforced concrete tank with 1500 gallon capacity primary chamber and 500 gallon capacity dosing chamber is specified.
 2. One Orenco Systems (OSI) 316, or approved equal, gravity flow siphon shall be installed in the dosing chamber in accordance with manufacturers specifications. The siphon inlet shall be equipped with an effluent filter which meets the requirements of Circular DEQ 4, Section 5.1.5 and all wastewater discharging from the tank must pass through the effluent filter. Refer to manufacturer's spec sheets enclosed.
 3. The OSI digital dose counter shall be mounted above the tank or in the residence. One OSIMF1A float switch with adjustable PVC float collar shall be installed in the dosing chamber and connected to the digital counter to monitor and confirm on-going operation of the gravity dose siphon. Refer to manufacturer's spec sheets enclosed.

Fogg Amended Plat for Drainfield Relocation
 Single Family Residence on Lot 2 of S/D 240
 Pressure-Dosed into Gravelless Drainfield Chambers
 Interior Volume of Distribution Piping in
 Pressure Dosed Drainfield and Volume per Dose

The drainfield consisting of 3 trenches 76 ft long each will be dosed as one zone. The three equal length laterals will be dosed by one 316 gravity flow siphon.

Interior volume of laterals: 3 – 1 1/2" diameter sch. 40 @ 0.106 gal/LF

Length of lateral = 76 ft.

Total volume of 3 laterals =

24.2 gal

Interior volume of manifold: 4" diameter sch. 40 @ 0.661 gal/LF

Length of manifold = 16 ft.

Total volume of manifold =

10.6 gal

Drained vol. of 4" sch. 40 transport pipe = 60 LF x 0.661 gal/LF

40 gal

Vol. of laterals x 10 = 24.2 x 10 =

242 gal

Vol. of laterals x 5 = 24.2 x 5 =

121 gal

Vol. of manifold and transport pipe

50.6 gal

Minimum volume of dose based on pipe volume =

172 gal

Maximum volume of dose based on pipe volume =

293 gal

Number of doses per zone per day does not exceed

2 doses

Total number of zones in drainfield =

1 zone

Maximum number of doses per day =

2 doses

Design daily wastewater volume =

350 gal

Dose volume = 350 gpd ÷ 2 doses/day =

175 gal/dose

Dosed vol. >75% of internal volume of laterals

Dose volume based on absorption area of drainfield:

Absorption area = 76' long x 3' wide x 3 trenches = 684 s.f.

Allowable application rate = 0.4 gpd/sf. ÷ 0.75 = 0.533 gpd/sf.

Design wastewater capacity per day = 364.8 gal.

Allow 2 doses per day, therefore design dosing volume =

182 gal/dose

Dosing tank size = 500 gal ÷ 47 in. (liquid depth) =

10.64 gal/in.

Dosing tank drawdown = 175 gal dose ÷ 10.64 gal/in. =

16.45 in.

Drawdown used in design 16 1/2 in.

Volume of dose to drainfield = 175 gal

Conclusion:

The volume per dose is 2.3 times the interior volume of the distribution laterals plus drained volume of manifold and transport piping. The transport piping from the dosing tank to the manifold is configured to drain empty. Therefore, the force-main can be buried at nominal depth of 2.5 to 3 ft soil cover over the pipe to protect from incidental digging. The dosing volume and configuration of drainfield piping ensure that the drainfield absorption area will not receive more than the specified application rate per day at design flow into the septic system. The gravity dosing siphon discharge rate of 74 gpm into three laterals with a total discharge rate of 52 gpm will discharge the dosing volume into the drainfield in 3.5 minutes. Therefore, the dosing volume meets the requirements of Circular DEQ 4 for the gravity siphon dosed drainfield.

Design of Pressurized Drainfield
 Verify Adequate Pressure Within Length of Distribution Lateral
 Prepared by William E. Smith, P.E.
 8/1/2018

Project Name: Fogg Amended Plat Drainfield Relocation

Project Location: Park County, Montana

Number of orifices per Distribution Lateral: 15

Spacing of orifices (ft.): 5.0

Diameter of orifices (in.): 0.1875 1/8" dia.

Inside diameter of Distribution Lateral (in.): 1.610 1-1/2" Sch. 40 PVC

Residual pressure at last orifice in Lateral (ft.): 7.000

Orifice #	Orifice Pressure Head (ft)	Orifice flow (gpm)	Segment Headloss (ft)	Lateral Length (ft)	Sum Flow (gpm)	Sum Headloss (ft)	% Increase in flow
1	7.0000	1.15152	0.00064	0	1.15152	0.00064	0.00%
2	7.0006	1.15157	0.00229	5	2.30310	0.00292	0.00%
3	7.0023	1.15171	0.00485	10	3.45481	0.00777	0.02%
4	7.0048	1.15192	0.00826	15	4.60673	0.01603	0.03%
5	7.0083	1.15220	0.01248	20	5.75893	0.02851	0.06%
6	7.0125	1.15255	0.01749	25	6.91148	0.04599	0.09%
7	7.0175	1.15296	0.02326	30	8.06443	0.06926	0.12%
8	7.0233	1.15343	0.02979	35	9.21787	0.09905	0.17%
9	7.0298	1.15397	0.03705	40	10.37184	0.13610	0.21%
10	7.0371	1.15457	0.04504	45	11.52640	0.18114	0.26%
11	7.0450	1.15522	0.05375	50	12.68162	0.23489	0.32%
12	7.0537	1.15593	0.06316	55	13.83756	0.29806	0.38%
13	7.0632	1.15671	0.07328	60	14.99426	0.37133	0.45%
14	7.0733	1.15753	0.08408	65	16.15180	0.45542	0.52%
15	7.0841	1.15842	0.09558	70	17.31022	0.55099	0.60%

Design of Pressurized Drainfield
 Verify Adequate Pressure Within Length of Drainfield Manifold
 Prepared by William E. Smith, P.E.
 8/1/2018

Project Name: Fogg Amended Plat Drainfield Relocation
 Project Location: Park County, Montana
 Number of Lateral junctions on manifold (ea.): 3
 Number of Laterals per junction: 1
 Spacing of Lateral junctions on manifold (ft.): 7
 Inside diameter of manifold (in.): 4.026 4" Sch. 40 PVC
 Actual or assumed elevation of highest manifold junction (ft.) 100
 Uniform change in elevation between junctions (ft.): -0.340
 Flow per Distribution Lateral (from sheet 1) (gpm): 17.3102
 Pressure at orifice closest to manifold (from sheet 1) (ft.): 7.0841

Junction #	Lateral Flow (gpm)	Manifold Flow (gpm)	Segment Headloss (ft.)	Manifold Pressure (ft.)	Req'd Latrl Pressure (ft.)	Orifice Pressure Head (ft.)	Orifice Coefficient (C)	Orifice Diameter (32nds in.)	Specified Orifice Diameter (in.)	% Change in Manifd Pres. w/out orifice
1	17.31022	51.9306	0.0118	107.0841	107.0841	0.0000	None	None	None	0.00%
2	17.31022	34.6204	0.0056	107.4185	107.0841	0.3344	1.02	39.11	None	4.72%
3	17.31022	17.3102	0.0015	107.7570	107.0841	0.6729	0.84	36.18	31/32	9.50%

Prep by: Octagon Consulting Eng'rs 8/1/2018
 Pump Selection for Pressurized System
 PROJECT: Fogg Lot 2 Gravity Siphon Pressure Dosed Drainfield

Orifice Size	0.188	inches	
Residual Head at Last Orifice	7.00	feet	
Lateral Length	75	feet	
Total Number of Laterals per Cell	3		
Orifice Spacing	5.00	feet	
Distributing Valve Model (# of Zones)	none		None used
Lift to Manifold	-15	feet	
Discharge Assembly Size	3.00	inches	Not a standard size. Headloss will be approximat
Transport Line Size	4.00	inches	
Pipe Class/Schedule	40		
Transport Length	60	feet	
Manifold Size	4.00	inches	
Pipe Class/Schedule	40		
Length of Distribution Header	16.00	feet	
Lateral Size	1.50	inches	
Pipe Class/Schedule	40		
Flow Meter	none		None used
'Add-on' Friction Losses	0.00	feet	

Calculation

Minimum Flow Rate per Orifice	1.15 gpm
Number of Orifices per Zone	45
Total Actual Flow Rate	52.3 gpm
Number of Laterals per Zone	3
Total Dynamic Head:	
Lift to Manifold	-15.0 feet
Residual Head at Last Orifice	7.0 feet

Frictional Head Losses:

Head Loss in Transport Pipe	0.1 feet
Head Loss through Discharge Assembly	0.5 feet (approximation)
Head Loss in Distribution Header	0.0 feet
Head Loss in Laterals	0.6 feet
'Add-on' Friction Losses	0.0 feet
Head Loss through Distributing Valve	0.0 feet None Used
Head Loss through Flow Meter	0.0 feet None Used

Size Pump for:

TOTAL FLOW RATE	52.3 gpm
	@
TOTAL DYNAMIC HEAD	-6.8 feet

Dosing Siphons: 3 and 4-inch (75- and 100-mm)

Applications

Dosing siphons are typically used for converting small, continuous flows into large, intermittent dosing flows in onsite sewage systems. Applications are limited to pressurized distribution systems that are at elevations lower than the siphon.

General

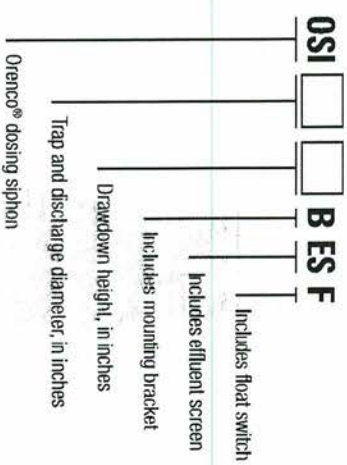
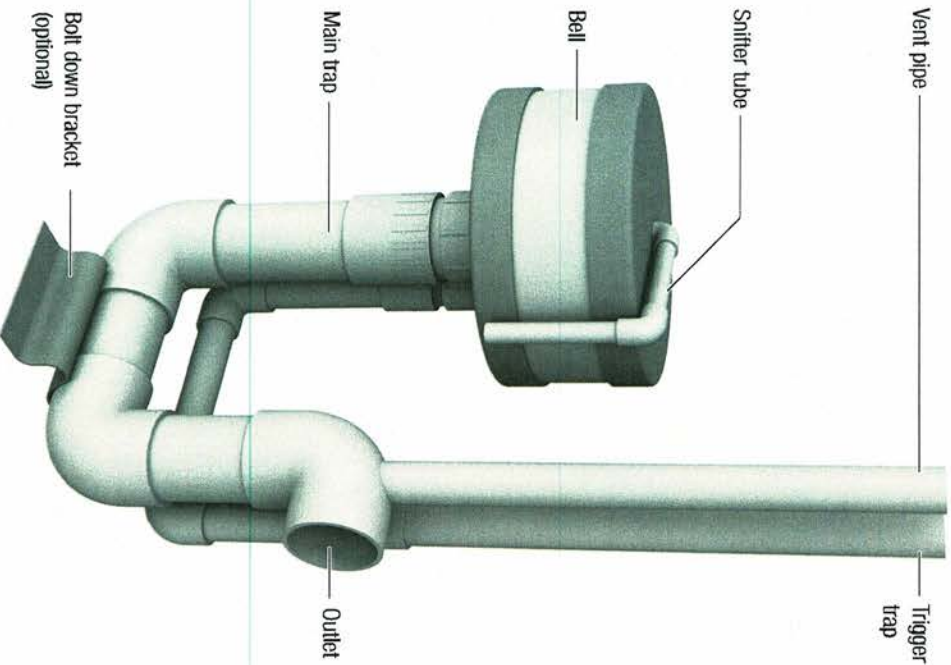
Orenco's 3- and 4-inch (75- and 100-mm) Dosing Siphons are available in a variety of drawdowns. Bolt-down brackets are available for both sizes. The trigger trap feature is only required on some models (indicated with an asterisk in the specifications on page 2).

The trap and vent are joined to the bell by threaded connections. The vent pipe is joined to the main trap with a slip connection that should not be solvent-welded. All of the other connections are solvent-welded slip joints.

Dosing counters are also available for these siphons. For more information, refer to Orenco's Technical Data Sheets on digital dosing counters and digital dosing counter kits (NTD-SI-AM-1 and NTD-SI-AM-2).

Standard Models

All of the standard models for 3- and 4-inch (75- and 100-mm) dosing siphons are listed on page 2. For information on 2 in. (50-mm) siphons, refer to NTD-SI-SI-1. For information on custom-sized dosing siphons, call Orenco.



Product Code Diagram

Materials of Construction

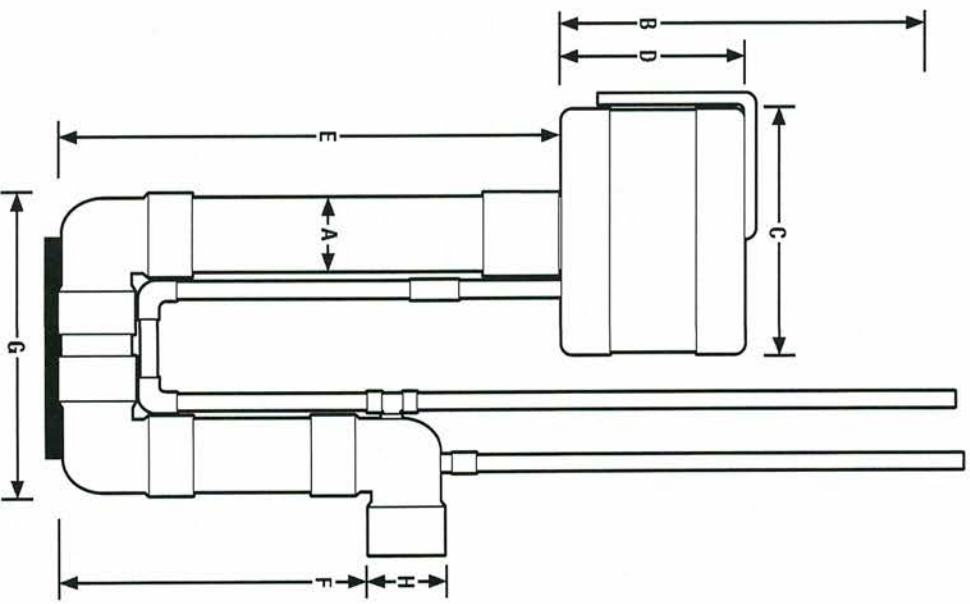
Pipe	PVC per ASTM sch. 40 specification
Fittings	PVC per ASTM sch. 40 specification
Bolt-down bracket	Injection-molded fiberglass
Bell	PVC per ASTM sch. 40 specification and injection molded fiberglass

Large Dosing Siphon (With Trigger Trap Feature)

Specifications

Model	Nominal Dimensions, in. (mm)								Flow Rate, gpm (L/sec)
	A	B	C	D	E	F	G	H	
310*	3 (79)	10 (254)	12 (305)	6 (152)	15 (381)	11 (279)	14 (356)	3 (79)	68 (4.3)
312*	3 (79)	12 (305)	12 (305)	8 (203)	17 (432)	14 (356)	14 (356)	3 (79)	70 (4.4)
314*	3 (79)	14 (356)	12 (305)	8 (203)	18 (457)	14 (356)	14 (356)	3 (79)	72 (4.5)
316	3 (79)	16 (406)	12 (305)	8 (203)	21 (533)	16 (406)	14 (356)	3 (79)	74 (4.7)
318	3 (79)	18 (457)	12 (305)	8 (203)	21 (533)	16 (406)	14 (356)	3 (79)	76 (4.8)
320	3 (79)	20 (508)	12 (305)	8 (203)	23 (594)	18 (457)	14 (356)	3 (79)	80 (5.0)
324	3 (79)	24 (610)	12 (305)	12 (305)	27 (686)	20 (508)	14 (356)	3 (79)	90 (5.7)
330	3 (79)	30 (762)	12 (305)	12 (305)	34 (864)	27 (686)	14 (356)	3 (79)	100 (6.3)
336	3 (79)	36 (914)	12 (305)	12 (305)	39 (991)	32 (813)	14 (356)	3 (79)	110 (6.9)
342	3 (79)	42 (1067)	12 (305)	12 (305)	45 (1143)	38 (965)	14 (356)	3 (79)	120 (7.6)
348	3 (79)	48 (1219)	12 (305)	12 (305)	51 (1299)	44 (1118)	14 (356)	3 (79)	130 (8.2)
412*	4 (100)	12 (305)	15 (381)	7 (178)	26 (660)	14 (356)	17 (432)	4 (100)	140 (8.8)
414*	4 (100)	14 (356)	15 (381)	7 (178)	23 (594)	16 (406)	17 (432)	4 (100)	144 (9.0)
416*	4 (100)	16 (406)	15 (381)	12 (305)	21 (533)	14 (356)	17 (432)	4 (100)	148 (9.3)
418*	4 (100)	18 (457)	15 (381)	12 (305)	23 (594)	16 (406)	17 (432)	4 (100)	152 (9.5)
420*	4 (100)	20 (508)	15 (381)	12 (305)	26 (660)	18 (457)	17 (432)	4 (100)	156 (9.8)
424	4 (100)	24 (610)	15 (381)	12 (305)	31 (787)	24 (610)	17 (432)	4 (100)	160 (10.0)
430	4 (100)	30 (762)	15 (381)	12 (305)	36 (914)	29 (737)	17 (432)	4 (100)	170 (10.7)
436	4 (100)	36 (914)	15 (381)	12 (305)	41 (1041)	34 (864)	17 (432)	4 (100)	185 (11.7)
442	4 (100)	42 (1067)	15 (381)	12 (305)	47 (1199)	40 (1016)	17 (432)	4 (100)	205 (12.9)
448	4 (100)	48 (1219)	15 (381)	14 (356)	52 (1321)	45 (1143)	17 (432)	4 (100)	230 (14.5)

* *Trigger trap model*



- A — Main trap diameter (PPS nominal)
- B — Drawdown height
- C — Bell diameter
- D — Bell height
- E — Trap height
- F — Discharge height
- G — Trap width
- H — Discharge diameter (PPS nominal)

Notes

- 1) For pressurized systems, a siphon must be selected with an average discharge rate higher than the desired design discharge rate. In many cases, the siphon must be capable of flow rates 1.3 times or more than the desired design discharge rate. Please call Orenco if you need assistance.
- 2) To allow proper transport pipe venting, Orenco normally recommends that 4-inch (100-mm) diameter siphons and smaller be used with transport lines that are one size larger than the siphon discharge diameter. Under optimal conditions, 4-inch (100-mm) siphons can use "same size" transport lines.
- 3) If an Orenco mounting bracket is going to be used on a 3- or 4-inch (75- or 100-mm) model, add 1/2 inch to the E and F dimensions.
- 4) For additional design information, refer to *Design, Use, and Installation of Dosing Siphons for Onsite Wastewater Treatment Systems (NTP-OSH-ESB-2)* and *Pressure Dosing: Attention to Detail (NTP-OSH-ESB-1)*.

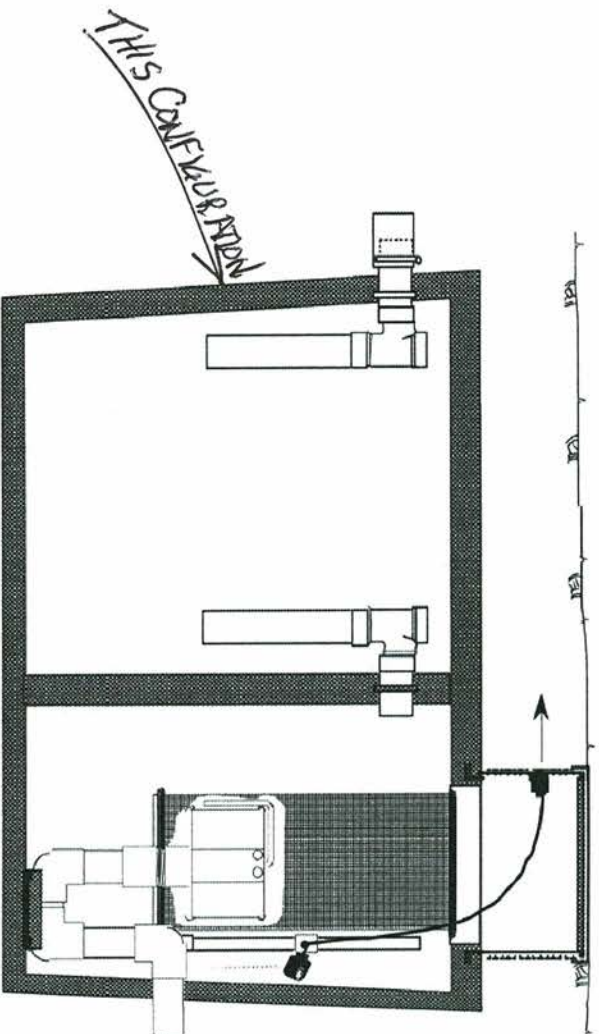


Figure 6: Bolt-In method of installation in a two-compartment dosing tank

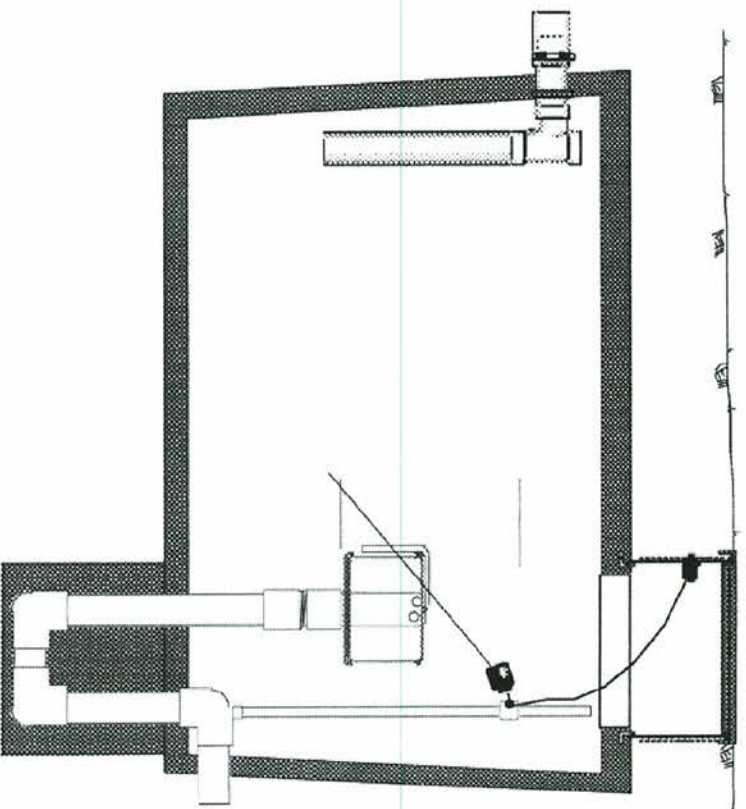


Figure 7: Cast-In method of installation (through tank floor)

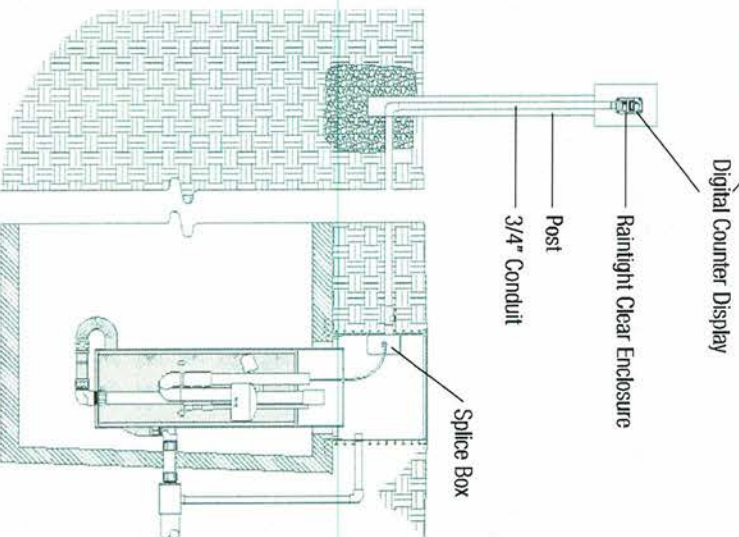
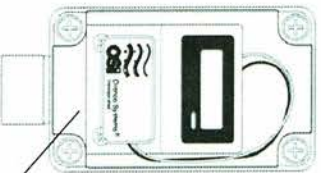
Siphon Applications

In on-site treatment systems, siphons commonly discharge to gravity or pressurized drainfields. Distribution to gravity drainfields is done most effectively by directing the siphon discharge to a Hydrosplitter. Pressurized by the siphon, a Hydrosplitter distributes flow evenly to each individual trench. Flow can be split unevenly (with the use of flow control orifices in the Hydrosplitter) to

Digital Dose Counter

Applications

Orenco Digital Dose Counters are used to monitor the reliability of siphons. The advancing of the counter assures that the siphon is dosing.



Side view of dosing siphon with digital dose counter.

General

Orenco's Digital Dose Counter is composed of a battery powered digital counter in a clear, rain-tight electrical enclosure. The counter registers one count for every siphon dose by monitoring the tank level. The watertight enclosure can be installed either indoors or outdoors. An MF-1A Float Switch with adjustable PVC float collar should be ordered separately.

Standard Models

AMDDC

Materials of Construction:

Battery:	Lithium; has a 7-year expected life
3/4" Conduit Fitting:	PVC
Counter:	Red Lion® CUB7 digital counter with LCD display.
Operating voltage:	3V Display height: 0.35"
Electrical Enclosure:	Clear cover, watertight; measures 5" x 3" x 3". NEMA 4X rated
Float Collar:	PVC
Float Switch:	UL listed and CSA certified*.

*See the Float Switches submittal data sheet for more information.

Float Switch Assemblies

Applications

Float switches are used to signal liquid level positions for alarm and pump control applications. Orenco float switch assemblies can be mounted in pump vaults, effluent screens, pump basins, and risers.

General

All models listed are UL listed and CSA certified for use in water or sewage. Non-mercury float switches (models B, C, N, and P) are used where components containing mercury are prohibited.

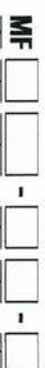
Float switches are typically ordered in assemblies that include one or more switches mounted on a 1-inch PVC float stem. ABS float collars are used to provide secure mounting that is easily adjustable.

Normally-open "P" float switches have a blue cap for easy identification; normally-closed "N" float switches have a red cap.

Standard Models

B, C, G, N, P

Product Code Diagram



Cord length option:
Blank = 10 ft (3 m), standard
20 = 20 ft (6 m)
30 = 30 ft (9 m)
50 = 50 ft (15 m)

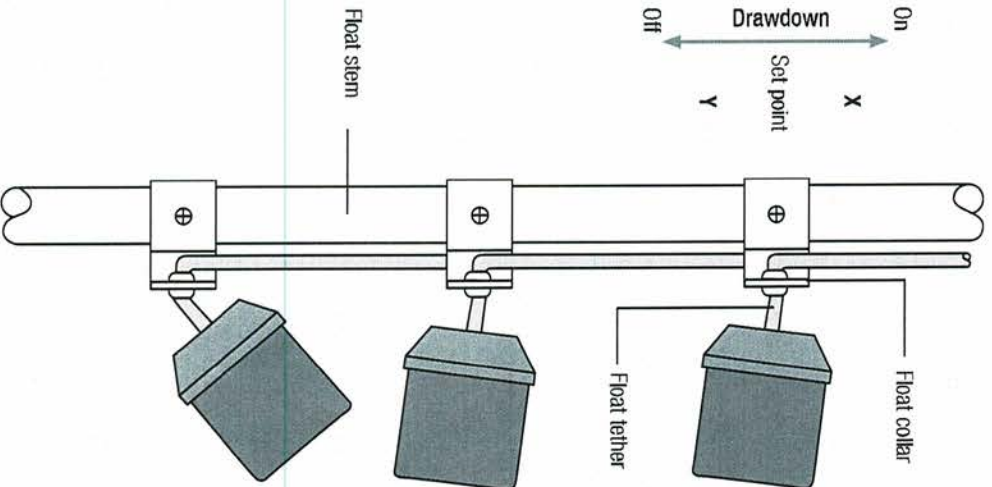
Application:
FS = field set
FTL = elbow-style (fasci-fiber only)
P8 = pump basin
V = pump vault (standard float settings)
STP = Standard float settings for STP
SIFR0 = Standard float settings for SIF with redundant off
SFCOM = Standard float settings for VCOM simplex

Float stem length:
Blank = no float stem (floats and collars only)
19, 21, 27, 33, 37, 39, 45, 51, 57, 66 = stem length, in.
5, 11 = stem length, in. (for elbow-style float brackets)

Float switch models (listed in order from the top of the float stem down):
B, C, G, N, P

Number of float switches (when using multiples of the same float switch model):
Blank = no multiples of the same float switch model

Float switch assembly



The "On" and "Off" positions describe normally open floats. For normally closed floats, the functions are reversed.

Materials of Construction

Float housing	Impact-resistant, noncorrosive PVC plastic for use in liquids up to 140° F (60° C)
Float cord	Flexible 2-conductor (UL, CSA) SJOOW; CPE cord jacketed with EPDM insulated conductors
Float collar	ABS

Note:
When ordering float switch assemblies, remember to list float switches from the top of the float stem down. An "MFBN-" product code indicates one "P" switch at the top of the stem, one "B" in the middle of the stem, and one "N" switch at the bottom of the stem; an "MF2PN-" indicates "P" switches at the top and middle of the stem, and one "N" switch at the bottom of the stem.

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY/
LOCAL GOVERNMENT JOINT APPLICATION FORM

PART I. GENERAL DESCRIPTION & INFORMATION

Name of proposed development: Tract 10-D New Private Well

Location: _____

City: Emigrant

County: Park Geocode: 49-0519-32-2-10-10-0000

Legal description: SE 1/4 NE 1/4 NW 1/4 of Section 32 Township 5S Range 8E

- Type of Review
- Division of Land, Boundaries Relocated, or Removal of Restrictions
 - Condominiums/Townhomes/Mobile Homes/Recreational Vehicles
 - Rewrite - No Boundaries Changing
 - Aggregation, Change of Use
 - Modified Site Plan

Descriptive Data

- 1 Number of lots
- 0 Number of condominiums, townhomes, or spaces
- 2.894 Total acreage of lots being reviewed

- Indicate the proposed/existing use(s)
- Residential, single family
 - Residential, multiple family
 - Type of multiple family structure (e.g. duplex)
 - Planned unit development
 - Condominium/townhomes
 - Mobile home park
 - Recreational vehicle park
 - Commercial or industrial
 - Other (please describe)

Name of solid waste (garbage) disposal site: Park Co. Solid Waste Collection System

Designated representative, if any (e.g., engineer, surveyor)

I designate William E. Smith, P.E. of Octagon Consulting Engineers, LLC.

as my representative for purposes of this application.

Address: P.O. Box 78, Emigrant, MT, 59027

Street or P.O. Box, City, State, Zip Code

Email: William@octagonengineers.com Phone: (406) 223-9040

Owner Name: Cristin Dhieux-Fowle Print name of owner (s)

Address: P.O. Box 78, Emigrant, MT, 59027 Street or P.O. Box, City, State, Zip Code

Email: Chris.Fowle@gmail.com Phone: (406) 223-8521

Date: Oct 24, 2018

Reviewer Yes Missing NA	Applicant Initials	Page(s) in Report	ELEMENT DESCRIPTION
General			
	WS	1-2	Application form provided & signed by owner, plus contact info for consultant.
	WS	3	Filled out fee sheet & check made out to DEQ
	WS	4-5	Completed & signed copy of Part 4 Checklist
	WS	6	Vicinity Map Provided
	WS	27	Copy of plat or COS (or deed if aliquot parts or proposing Aggregation of lots)
	WS	7	4 copies of lot layout sheet(s); Facilities labeled as Existing or Proposed.
	WS	8-11	Copy of any existing COSA for reviewed lot(s)
	WS	12	Floodplains shown on drawings & any applicable documentation provided (LOMAS).
Onsite Wastewater			
	WS	26	Copy of any existing WWTs permits for reviewed lot(s).
	WS	N/A	Proof of pumping for septic tanks within last 3 years, unless system less than 5 years old.
	WS	N/A	Soil profile descriptions
	WS	N/A	Seasonal high groundwater addressed (results or letter indicating in process)
Non-degradation			
	WS	N/A	Nondegradation info IF new development proposed, if expansion of existing development proposed, or for change in use (residential to commercial, etc.)
Onsite Water			
	WS	13-17	Copy of any existing well logs for wells on reviewed lot(s), for wells sampled, & for wells used for hydraulic conductivity estimates
	WS	13-17	Information about water quality, quantity & dependability (water tests & aquifer well logs)
Public Water or Sewer			
	WS	N/A	If extensions or connections to existing public water/wastewater proposed, "will serve" letter or copy of current bill from public facility owner if connected
Stormwater			
	WS	N/A	Stormwater drainage report & plans
Other documents			
	WS	N/A	Special Requests - Prior to full design (waivers, deviations, water availability analysis, non-degradation pre-determination, etc.)
	WS	18	Sage Grouse documentation provided
	WS	19	Copy of submittal to DNRC requesting Water Rights review or, if available, review letter from DNRC.
	WS	N/A	Modified Site Plan
<p>Copy of This checklist AND (circle one) COMPLETE LETTER or INCOMPLETE LETTER sent on: Complete Letter _____</p>			
<p>REVIEWED BY: _____ AGENCY: _____</p>			

	Unit	Unit cost	Number of Units	Total (unit cost x no. of units)
Subdivision lot	lot or parcel	\$125	1	\$125
Condominium, townhouse, trailer court, RV campground	unit or space	\$50		\$0
Resubmittal fee - previously approved lot/boundaries not changed	lot or parcel	\$75		\$0

TYPE OF WATER SYSTEM

Individual or shared water supply system (existing/proposed)	unit	\$85	1.00	\$85
Multiple user water system (non-public)	unit*	\$315		\$0
*plus \$105 per hour for review in excess of 4 hours	hour	\$105	If Required	To be invoiced
new distributing system	lineal foot	\$0.25		\$0
connection to distribution system	lot/unit	\$70		\$0
Public water system				
DEQ 1 or DEQ 3 Water System	component		per 17.38,106	To be invoiced
new distribution system	lineal foot	\$0.25		\$0
connection to distribution system	lot or structure	\$70		\$0

TYPE OF WASTEWATER SYSTEM

Existing systems	unit	\$75		\$0
New gravity fed system	drainfield	\$95		\$0
New dosed systems, elevated sand mound, ET systems, intermittent sand filter, ETA system, recirculating sand filter, recirculating trickling filter, aerobic treatment unit, nutrient removal, and whole house subsurface drip irrigation	design*	\$190		\$0
	drainfield	\$50		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
Gray water reuse, holding tanks, sealed pit privies, unsealed pit privies, seepage pits, waste segregation systems, experimental systems	unit	\$95		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
New multiple user wastewater system (non-public)	unit*		Per Type Above	
*plus \$105 per hour for review in excess of 4 hours	hour	\$105	If Required	To be invoiced
new collection system	lineal foot	\$0.25		\$0
connection to system	lot/unit	\$70		\$0
Public wastewater system				
Treatment System	component		per 17.38,106	To be invoiced
new collection system	lineal foot	\$0.25		\$0
connection to system	lot/structure	\$70		\$0

OTHER

Deviation from Circular	request*	\$200		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
Waiver from Rules	request*	\$200		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
Reissuance of original approval statement	request	\$60		\$0
Review of revised lot layout document	request	\$125		\$0
Municipal Facilities Exemption Checklist	request	\$100		\$0
Nondegradation review - nonsignificance determinations individual/shared	drainfield	\$60		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
multiple-user	lot/structure	\$30		\$0
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
source specific mixing zone	drainfield	\$200		\$0
public	drainfield		per 17.38,106	To be invoiced
Storm drainage plan review - plan exempt from DEQ-8	lot	\$40		\$0
Storm drainage plan review - DEQ-8 review	design*	\$180		\$0
	lot	\$40		\$0
*plus \$105 per hour for review in excess of 30 minutes per lot	hour	\$105	If Required	To be invoiced
Preparation of environmental impact statements/EAs	actual	\$105	If Required	To be invoiced
Total Review Fee				\$210

Revised 04/22/16

Part IV SUBDIVISION CHECKLIST

Subdivision: County: *Park*
 E.O. Number (provided by DEQ): Date: *Dec 19, 2018*
 Please complete the checklist with your initials or N/A.

Applicant or Representative Initial or N/A	County Initial or N/A	DEQ Initial or N/A	Question	Refer to ARM 17.36 Subsections	Reviewer's Comments
N/A			1. Have deviation or waiver requests been submitted with appropriate fees?	17.36.801	
WSP			2. Is check included with correct fee?	17.36.103 and 17.36.802	
WSP			3. Is application included with owner's signature/address/phone/date?	17.36.102	
WSP			4. Is legible copy of Preliminary Plat or COS included?	17.36.103	
WSP			5. Is legal description included on the Preliminary Plat or COS?	17.36.103	
WSP			6. Are all lots described on survey being reviewed and any exclusions clearly stated on Preliminary Plat or COS?	17.36.103, 17.36.805	
Separate cover			7. Are state letters of approval included (DNRC water rights permit, Groundwater discharge permit, public water, etc.?)	17.36.103	
Separate cover			8. Is local health officer approval included?	17.36.103, 17.36.106, 17.36.108	
ii			9. Are Planning Board or County Commissioner comments included?	17.36.103(1)(f)	
WSP			10. Is a clear copy of USGS or other topo map included to show ground slope of property?	17.36.103 and 17.36.322 - subsurface wastewater treatment system (SWTS); 17.36.310 - stormwater;	
WSP			11. Are 4 copies of lot layout included with the subdivision name on each?	17.36.103, 17.36.104, 17.36.112	
WSP			12. Is all required information (e.g., scale, legend, north arrow, etc.) included on the lot layout?	17.36.104	
WSP			13. Are locations of water and sewer lines (extensions and connections) shown?	17.36.104	
N/A			14. Are on-site sewer systems designed in conformance with DEQ 4?	17.36.320	
N/A			15. Is the slope given for drainfield areas?	17.36.104, 17.36.322	
N/A			16. Is sewage treatment system type allowed?	17.36.321	
N/A			17. Are drainfield replacement areas shown?	17.36.104	
WSP			18. Are minimum setback requirements met?	17.36.323	
N/A			19. Are soil pits (test holes) labeled, and adequate soil pit data provided?	17.36.104, 17.36.325	
N/A			20. Are sewage system agreements, easements, O & M plan addressed?	17.36.326	
N/A			21. Is information to verify depth to seasonal high ground water or bedrock provided?	17.36.325	
N/A			22. If conducted, does perc test value(s) correspond to soil type?	17.36.325	
N/A			23. Is gray water reuse system proposed?	17.36.319	
WSP			24. Is adequate water supply quantity substantiated?	17.36.103, 17.36.330	
JH			25. Are water quality analyses (nitrate, nitrite, specific conductivity, and bac-T (for existing wells) provided, along with well log and well location?	17.36.331 (proposed) 17.36.335 (existing)	

Applicant or Representative Initial or N/A	County Initial or N/A	DEQ Initial or N/A	Question	Refer to ARM 17.36 Subsections	Reviewer's Comments
			26. Is existing well over 25 ft. in depth and grouted to 25 feet?	17.36.335	
N/A			27. Will alternative water supply be used (cistern, spring)?	17.36.336	
N/A			28. Is nondegradation addressed and supporting data to determine background water quality, hydraulic conductivity and hydraulic gradient provided?	17.36.103, 17.36.312, 17.30.501-518, 17.30.715	
N/A			29. Is nitrate level at end of mixing zone < 5 ppm (< 7.5 ppm, if level 2 provided), and phosphorous breakthrough > 50 years and trigger analysis for n and p addressed?	17.36.103, 17.36.312, 17.30.715	
W/S			30. Are all supporting legal documents included (shared users agreements easements, covenants, HOA, water/sewer districts)?	17.36.103, 17.36.326, 17.36.310, 17.36.334	
N/A			31. Is a copy of the local septic permit (if issued) for an existing septic system provided?	17.36.327	
N/A			32. Is a septic pumpers report stating an existing septic tank has been pumped within the last 3 years provided?	17.36.327	
N/A			33. Is evidence demonstrating proper hydraulic functioning of an existing septic system provided?	17.36.327	
JH			34. Are wells, drainfields and/or mixing zones within 100 ft. perimeter outside of subdivision boundaries shown?	17.36.103, 17.36.104	
N/A			35. Is proposed subdivision within 500 feet of public water supply and/or sewer system?	17.36.328	
N/A			36. Is authorized statement to connect to existing public water and/or sewer system and statement of adequate capacity provided?	17.36.328	
N/A			37. Is existing public water system approved by DEQ and PWS # provided?	17.36.328	
N/A			38. Do appropriate water rights exist for the public water connection?	17.36.328	
N/A			39. Are subdivisions adjacent to state waters addressed?	17.36.312	
N/A			40. Are plans and specs stamped and signed by PE?	17.36.314	
N/A			41. Is letter from owner stating PE certification of construction and "as-built" will be submitted included?	17.36.314	
N/A			42. Are 100-year floodplain requirements met, and floodplains and drainages shown?	17.36.104, 17.36.323, 17.36.324	
W/S			43. Is solid waste disposal addressed?	17.36.103, 17.36.309 (waste stored on-site)	
N/A			44. Has storm water drainage been addressed?	17.36.310, DEQ 8	

Notes:

Applicant/representative: Name _____ Signature _____ Date / /

County reviewer: Name _____ Signature _____ Date / /

DEQ reviewer: Name _____ Signature _____ Date / /

MINOR SUBDIVISION No. _____

A TRACT OF LAND BEING PARCEL 10 OF CERTIFICATE OF SURVEY No. 615A,
SITUATED IN THE NE1/4 NW1/4 OF SECTION 32, T5S, R8E, P.M.M.,
PARK COUNTY, MONTANA

PREPARED FOR: JACK BAUGHMAN

SCALE: 1" = 100'

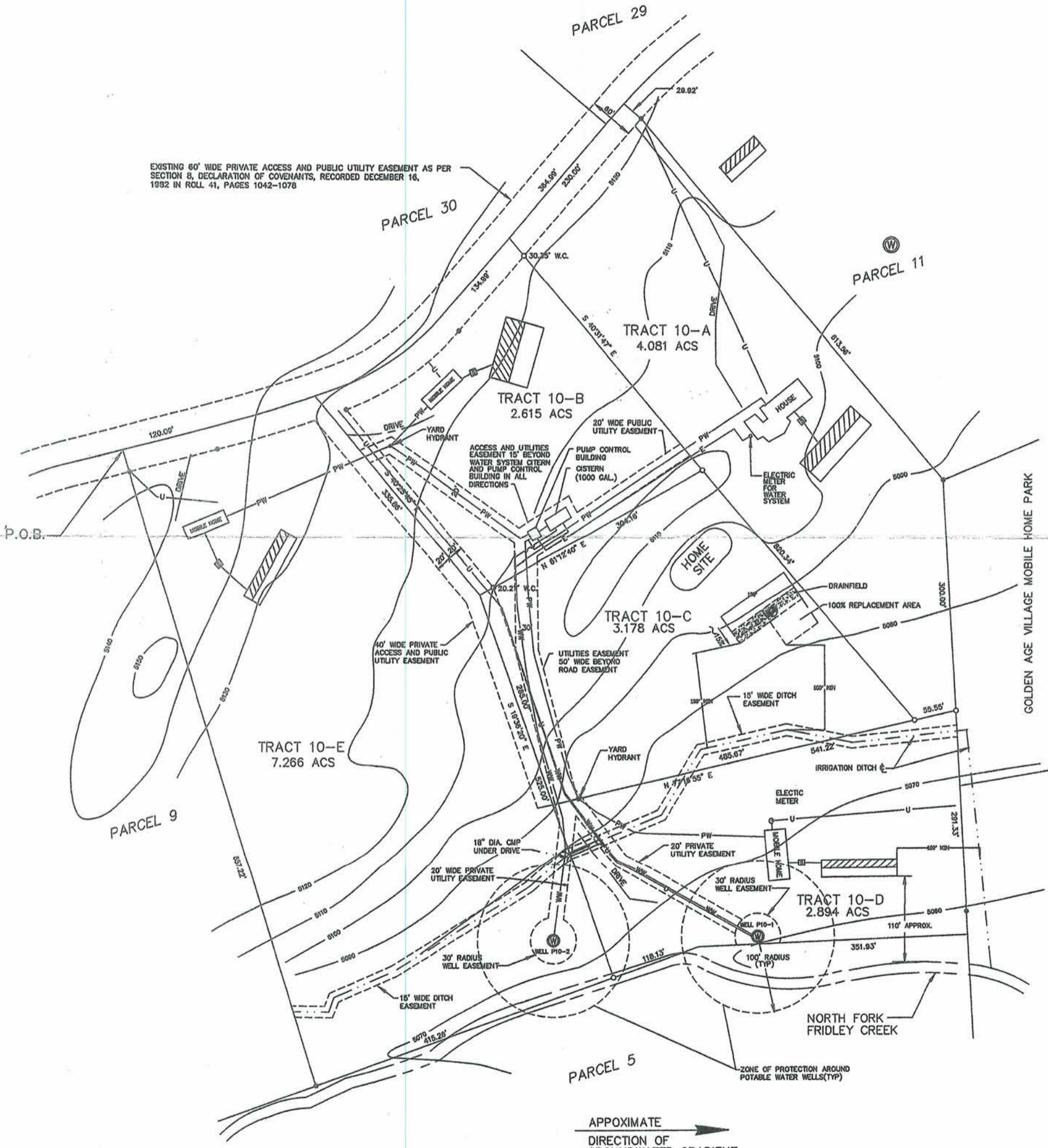
TOTAL AREA: 20.034 ACS

GRAPHIC SCALE



(IN FEET)
1 inch = 100 ft.

EXISTING 60' WIDE PRIVATE ACCESS AND PUBLIC UTILITY EASEMENT AS PER SECTION 8, DECLARATION OF COVENANTS, RECORDED DECEMBER 16, 1982 IN ROLL 41, PAGES 1042-1076



LEGEND	
	TEST PIT & PERC TEST SITE FOR DRAINFIELD
	EXISTING POTABLE WATER WELL
	PROPOSED POTABLE WATER WELL
	PROPOSED HOME SITE
	POTABLE WATER MAIN FROM WELLS TO CISTERN
	POTABLE WATER SUPPLY TO RESIDENCES
	EXISTING DRAINFIELD AND 100% REPLACEMENT
	PROPOSED DRAINFIELD AND 100% REPLACEMENT

APPROXIMATE
DIRECTION OF
GROUNDWATER GRADIENT



UTILITIES SITE MAP
PARCEL 10 NORTH C.O.G.
PREPARED BY: WILLIAM E. SMITH, P.E.
OCTAGON CONSULTING ENGINEERS

THAT a "Multiple-Family Water Well Zone of Exclusion" easement has been prepared and will be filed along with this Certificate of Subdivision Plat Approval, and,

THAT "as-built" plans will be provided to the Department within 60 days of the modifications to the multi-family water supply system and prior to a individual on-site sewage disposal permit being issued by Park County Health Department for Tract 10-C, and,

THAT when the present sewage treatment systems for Tract 10-A, 10-B, 10-D, and 10-E are in need of extensive repairs or replacement it shall be replaced by a septic tank and subsurface drainfield of such size and description as will comply with Title 17, Chapter 36, Sub-Chapters 1, 3, and 6 ARM, and,

THAT the bottom of the drainfield shall be at least four feet above the water table, and,

THAT no sewage treatment system shall be constructed within 100 feet of the maximum highwater level of a 100 year flood of any stream, lake, watercourse, or irrigation ditch, nor within 100 feet of any domestic water supply source, and,

THAT water supply systems, sewage treatment systems and storm drainage systems will be located as shown on the approved plans, and,

THAT all sanitary facilities must be located as shown on the attached lot layout, and,

THAT the developer and/or owner of record shall provide any purchaser of property with a copy of the Plat, approved location of water supply and sewage treatment system as shown on the attached lot layout, and a copy of this document, and,

THAT instruments of transfer for this property shall contain reference to these conditions, and,

THAT departure from any criteria set forth in the approved plans and specifications and Title 17, Chapter 36, Sub-Chapters 1, 3, and 6 ARM when erecting a structure and appurtenant facilities in said subdivision without Department approval, is grounds for injunction by the Department of Environmental Quality.

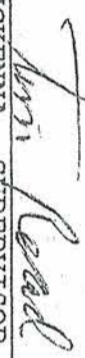
Page 3 of 3
Glastonbury Parcel 10 North
Park County
E.O.#98-1022

Pursuant to Section 76-4-122 (2)(a), MCA, a person must obtain the approval of both the State under Title 76, Chapter 4, MCA, and local board of health under section 50-2-116(1)(i), before filing a subdivision plat with the county clerk and recorder.

YOU ARE REQUESTED to record this certificate by attaching it to the Plat filed in your office as required by law.

DATED this 19th day of February, 1998.

MARK SIMONICH
DIRECTOR

By: 
DENNIS MCKENNA, SUPERVISOR
SUBDIVISION SECTION
PERMITTING AND COMPLIANCE DIVISION
DEPARTMENT OF ENVIRONMENTAL QUALITY

Owner's Name: Jack Baughman

Engineer's Report

Community of Glastonbury North
Tract 10-D of S/D No. 263
Release of Sanitary Restrictions for
New Individual Potable Well to
Replace Existing Connection to
Multiple User Water Supply Approved by
Montana Dept. Environmental Quality E.Q. #98-1022

October 4, 2018

Location of Property:

Within NE1/4 NW1/4 Section 32, T.5S., R.8E., P.M.M.
Rural Address: 241 Capricorn Drive, North Glastonbury,
Park County, Montana

Prepared for:

Cristin Dhieux-Fowle
Box 486
Emigrant, MT 59027

Prepared by:

William E. Smith, P.E.
Octagon Consulting Engineers
P.O. Box 78
Emigrant, MT 59027
(406) 333-9040

1. Introduction

1.1. Cristin Dhioux-Fowle, owner of Tract 10-D, intends to disconnect from the existing on-site multiple family water system originally approved by DEQ (COSA E.Q. #98-1022 copy attached) to serve the subdivision and drill an individual private water supply well. Her neighbors on the Parcel 10 subdivision are in mutual agreement with her in this decision. Cristin is an avid gardener and raises chickens. Having her own private well will give her the water supply required to maintain her current lifestyle without impacting her neighbors. One single-family residence is developed on Tract 10-D. The existing development is shown on the attached Water & Sanitation Site Layout. No additional residence, drainfield or other development is proposed, and no changes to existing tract boundaries will occur.

1.2. The specifications and information provided herein are a result of the Engineer's investigation of the conditions on the site which may affect the placement and use of water supply systems. This report documents the justification for Department of Environmental Quality approval for the modification to sanitary restrictions for this existing tract.

2. Site Evaluation

2.1. Tract 10-D is 2.894 acres in size and is located within the Community of Glastonbury North and described as Tract 10-D of S/D No. 263.

2.2. Tract 10-D lies in an area of gently rolling, wind blown hills where surface vegetation is substantial and large vegetation is relatively sparse, except along the creek. This subdivision lies at a horizontal distance of over 5000 ft from and a vertical elevation of over 160 ft above the closest point on the Yellowstone River. The tract is adjacent to North Fork Fidelity Creek which forms approximately 118 LF of its south boundary. The river, creek and a small irrigation ditch are the only surface water courses in the area. The elevation of the property is well above the 100 year flood plain of the Yellowstone River. No 100 year flood plain has been defined for North Fork Fidelity Creek (which has a 14Q5 flow of 20 gpm) but no signs of high water rising above the creek banks exist in the lower portion of the tract. The flow of water from North Fork Fidelity Creek into the irrigation ditch is controlled by a headgate located approximately 1000LF upstream. The only purpose for the irrigation ditch, since the development of Golden Age Village Mobile Home Park in 1986, is to supply water to trees growing along the ditch. Therefore, the irrigation ditch flows seasonally only during growing season. The route of the ditch as it passes through the tract and returns to the creek is shown on the attached Site Layout.

2.3. Tract 10-D has an existing septic system and drainfield approved by DEQ COSA E.Q. #98-1022 and permitted by Park County Sanitarian Office. Copy of the county permit is attached. The minimum horizontal distances between the proposed well and the drainfield and irrigation ditch on Tract 10-D are over 100 ft. Distance is 400 ft to the creek.

- 2.4. The distances from Tract 10-D to neighboring wells on surrounding tracts are greater than 350 ft. All wells and drainfields located on any neighboring property within 100 ft of Tract 10-D are located on the Site Layout.
- 2.5. Two public water supply wells serving Golden Age Village are located on the attached Vicinity Map. These wells have tested yields of 100 gpm (well logs are attached).
- 2.6. No adverse affects on groundwater quality are anticipated due to the construction of the well proposed for this Tract.
- 3. Design Standards and References
Design and specifications for the single-family potable water system conform to the following standards:
 - 3.1. Montana A.R.M.'s applicable to DNRC and DEQ regulations for private wells.
- 4. Description of the Existing Multiple-Family Water System Serving the Single Family Residences on Tract 10.
 - 4.1. The existing multiple-family water system serves the five existing residences on Tracts 10-A through 10-E.
 - 4.2. The two wells which supply water to this system were pump tested at stable pumping water level for a period of six hours at a stable continuous discharge rate of 26.3 gpm for well P10-1 and 4.6 gpm for well P10-2. The well logs for these wells are attached for reference and the well locations are shown on the Site Layout and Vicinity Map.
 - 4.3. The submersible pumps installed in the wells to serve this system are capable of delivering a combined flow of 31 gpm into the cistern at atmospheric pressure.
 - 4.4. Due to the sloping terrain and change in vertical elevation from the pump control building, the residences on Tracts 10-B and 10-E lose up to 16 psi, and the residences on Tracts 10-C and 10-D gain up to 13 psi. The residence on Tract 10-A approximately breaks even after pipe losses. Two submersible pumps boost pressure from atmospheric in the cistern to system pressure in the distribution piping.
- 5. Description of the Proposed Well to Serve One Single Family Residence on Tract 10-D
 - 5.1. The single-family residence on Tract 10-D intends to disconnect from the on-site multiple user system and be served by a private well.
 - 5.2. The existing infrastructure will not be disturbed, with the exception of the water lateral serving the residence on Tract 10-D. This line will be abandoned in place at the pump control building if it is confirmed that the residence on Tract 10-C is not served by the lateral. The intention is to eliminate any unused piping as a dead-end lateral, which would accumulate stagnant water & bacteria. The segment of this pipe which connects into the residence on Tract 10-D will be used to connect with the new water line from the pitless connection into the well casing.

6. Disinfection of New Well and Connected Piping

6.1. Following the completion of the well and prior to placing the water system into service, the entire system, including the well and connected supply piping should be disinfected in accordance with recognized disinfection procedure. After the disinfection is complete and the entire system has been thoroughly flushed, the water should be tested for bacteriological contamination by a state approved laboratory. Acceptable test results should be received before the system is put into service.

Return to: Cristin Dheux-Fowle
PO Box 486
Emigrant, MT 59027

400823 Fee: \$7.00 Page(s): 1
Park County, MT Recorded 10/27/2017 At 10:43 AM
Maritza H Reddington, Clk & Rcdr By JB PS Return To:
CRISTIN DHEUX-FOWLE PO BOX 486
EMIGRANT, MT 59027

PERSONAL REPRESENTATIVE'S DEED

Deed made this 26 day of October, 2017, between CRISTIN DHEUX-FOWLE, of PO Box 486, Emigrant, Montana 59027, as Personal Representative of the ESTATE OF RANDY CHARLES FOWLE, Deceased, late of the County of Park, State of Montana, herein referred to as Personal Representative and Grantor, and CRISTIN DHEUX-FOWLE, of PO Box 486, Emigrant, Montana 59027, Grantee.


Pursuant to the provisions of Title 72, Chapter 3, Part 6, M.C.A., Personal Representative hereby conveys to Grantee the following described real property:

That part of land in the NW1/4 of Section 32, Township 5 South, Range 8 East, of the Principal Montana Meridian, Park County, Montana, described as Tract 10-D, of Minor Subdivision No. Plat 263 on file in the office of the Clerk and Recorder of said County, under Document No. 266099.

TOGETHER with all appurtenances thereto and the reversion and reversions, remainder and remainders, rents, issues, and profits thereof, and all the estate, right, title, interest, property, possession, claim and demand whatsoever, both in law and equity, which RANDY CHARLES FOWLE, Deceased, had in his lifetime and at the time of his death, and which Personal Representative has, by virtue of law.

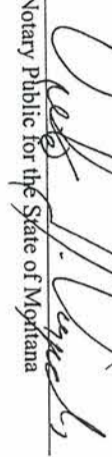
TO HAVE AND TO HOLD all the above granted premises, together with the appurtenances, and every part thereof, to Grantee, her heirs and assigns forever.

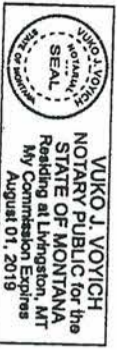
IN WITNESS WHEREOF, the personal representative has executed this deed at Park County, Montana, the day and year first above written.


CRISTIN DHEUX-FOWLE,
Personal Representative of
the Estate of Randy Charles Fowle

STATE OF MONTANA)
) ss.
County of Park)

This instrument was acknowledged before me on the 26 day of October, 2017, by CRISTIN DHEUX-FOWLE, as Personal Representative of the ESTATE OF RANDY CHARLES FOWLE, Deceased.


Notary Public for the State of Montana



REALTY TRANSFER RECEIVED

Park County Planning and Development Board Public Hearing

Agenda

March 21, 2019 at 4:00pm

Clyde Park Rural Fire Station

- Public Hearing on proposed amendments to Tract 10-D of Subdivision 263:
 - Presentation by Applicant
 - Question from Board members
 - Open of Public Hearing
 - Public Comments may be limited in duration depending on the total number of expected participants
 - Close of Public Hearing
 - Discussion by the Planning and Development Board
 - Findings of Fact and Recommendation to the Park County Commission

- Public Hearing on proposed amendments to Tract 2 of Subdivision 240:
 - Presentation by Applicant
 - Question from Board members
 - Open of Public Hearing
 - Public Comments may be limited in duration depending on the total number of expected participants
 - Close of Public Hearing
 - Discussion by the Planning and Development Board
 - Findings of Fact and Recommendation to the Park County Commission

Planning and Development Board Agenda Item Report

Meeting Date: March 21, 2019

Submitted by: Lawson Moorman

Submitting Department: PLANNING

Item Type: Discussion / Decision

Agenda Section:

Subject:

Discuss/Recommend Incorporation of Public Comments from 2.28.19 Meeting

Suggested Action:

Attachments:

[Ken Cochran Comments Summarized from 2.28.19.docx](#)

Ken Cochran Comments Summarized from 2.28.19

1. Section 3 under purpose, incorporate more specific purposes. Cochran recommends largely mimicking the purpose section from the US Hwy 89/ East River Rd/ Old Yellowstone Trail South Zoning District.
2. Change definition of public view. Current definition states 6 feet. Cochran recommends changing to 8 feet.
3. Change definition of responsible person. Cochran suggests changing the definition to property owner as that is the legal standard.
4. Section 9 should include a mention of fines to give the regulations more teeth.

Planning and Development Board Agenda Item Report

Meeting Date: March 21, 2019

Submitted by: Lawson Moorman

Submitting Department: PLANNING

Item Type: Discussion / Decision

Agenda Section:

Subject:

Discussion/Recommendation to Park County Commission to Apply for CDBG Funds for Neighborhood Planning Project

Suggested Action:

Attachments: