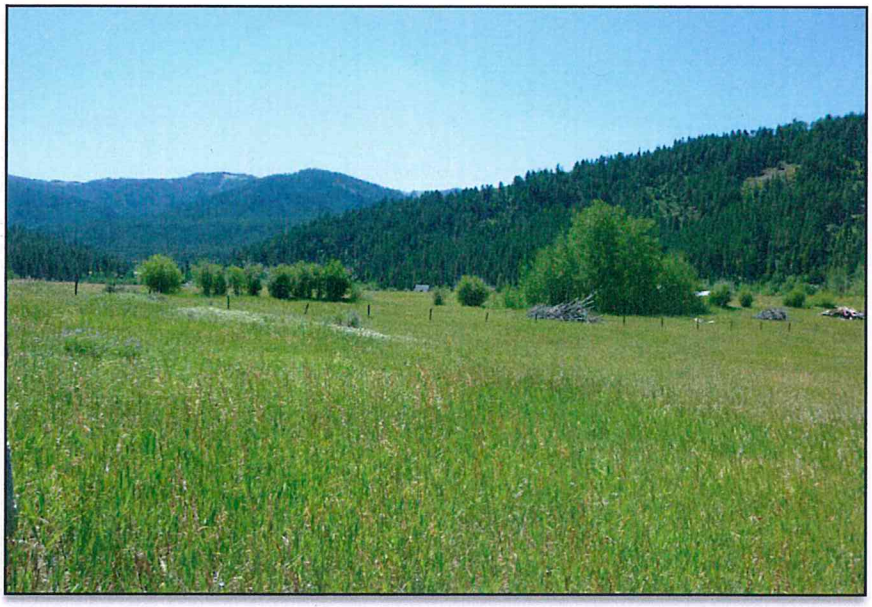
LEVEL I NUTRIENT/ PATHOGEN EVALUATION FOR WALIPINI SUBDIVISION



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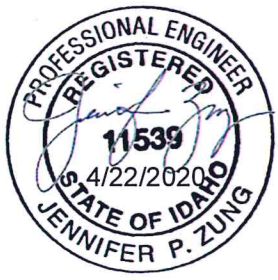

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1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The proposed Walipini Subdivision is located approximately 3-miles southeast of Victor, Idaho, and two miles northwest of the Idaho/Wyoming state line on a parcel approximately 8-acres in size. The property lies in the SE ¼ of Section 19, Township 3 North, Range 46 East, Boise Meridian, Teton County, Idaho. The site is surrounded by private undeveloped land to the south and east, Trail Creek to the west, and single family residential development to the north. (Figure 1). There is an existing single family residence on the west portion of the property with an address of 10645 Old Jackson Highway and the proposed project includes dividing the property into two 2.5-acre lots and one 3.0-acre lot (Figure 2). Each of the proposed lots will be served with a private well and individual on-site septic systems.

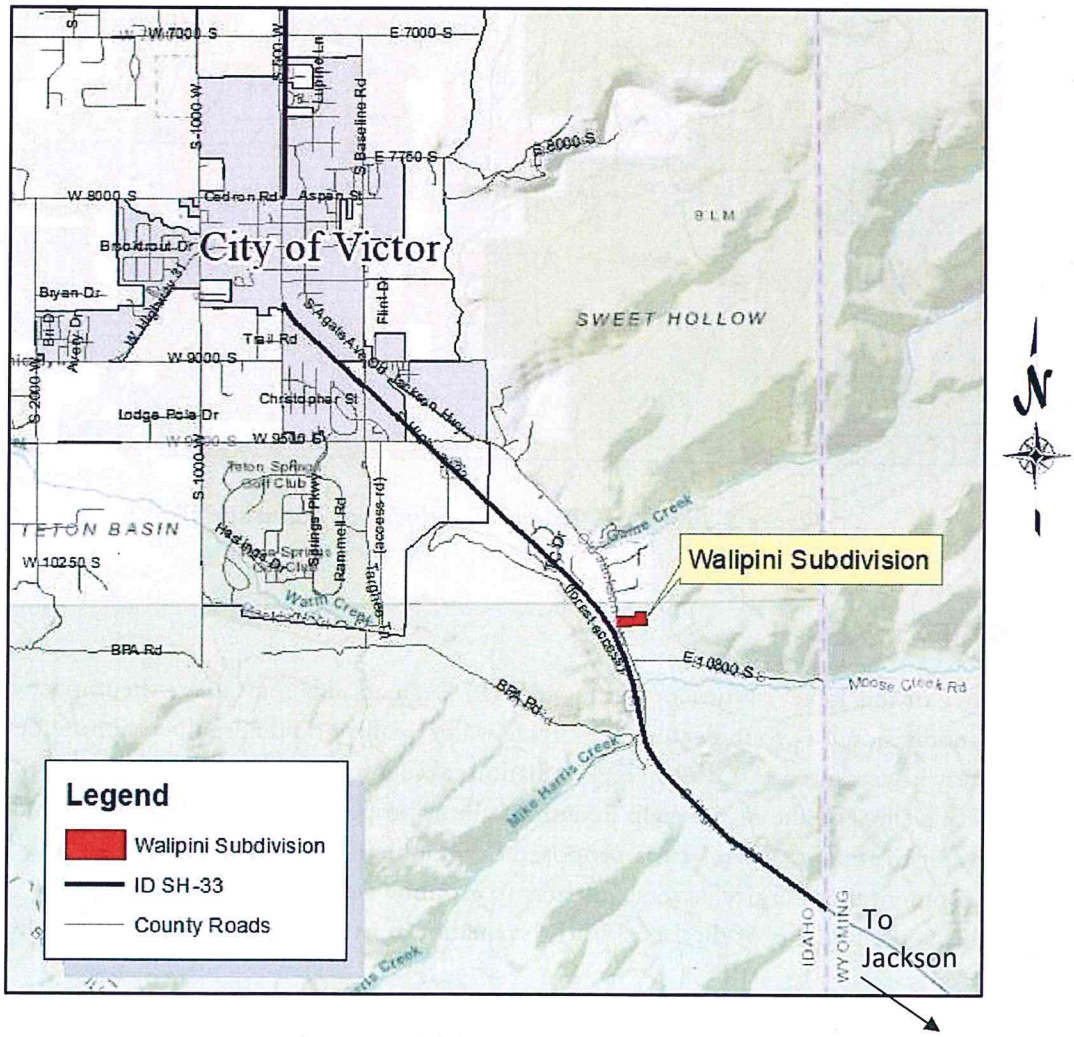

Figure 1. Vicinity Map (not to scale)

The site does not lie within a Nitrate Priority Area (NPA) identified by Idaho Department of Environmental Quality (DEQ), but the western portion of the site lies within the Wetland Waterway Overlay associated with Trail Creek. Due to the proximity of the site to Trail Creek, a Nutrient Pathogen Evaluation is required in accordance with Teton County Code, Title 9-3-2(C-3-B).

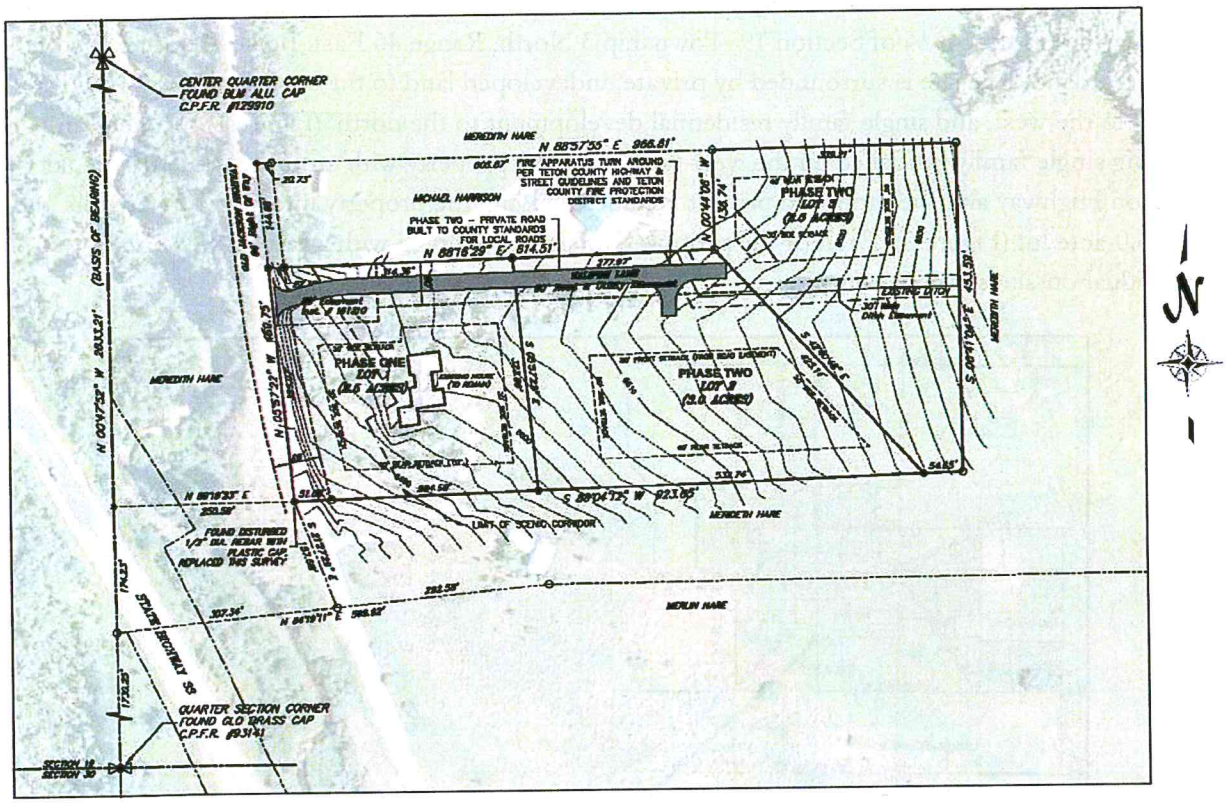

Figure 2. Proposed Walipini Subdivision (not to scale)

1.2 OBJECTIVES

The objective of this Level I Nutrient-Pathogen (NP) Evaluation is to evaluate the impact of the proposed subdivision on groundwater and surface water quality and determine if a more detailed Level II study is warranted. A Level I NP Evaluation takes into consideration the hydrogeologic conditions of a site, and the results help determine the appropriate number, type, and location of on-site wastewater treatment systems for a proposed development. The NP Evaluation is a tool to help guide development to minimize adverse impacts to groundwater and surface water quality. This report presents the findings of the Level I NP Evaluation for the proposed Walipini Subdivision.

1.3 GEOLOGIC AND HYDROLOGIC SETTING

Surface Hydrology

Trail Creek runs south to north just west of the subject property. There is a large elevation change from Trail Creek to Old Jackson Highway with the creek being approximately 50-ft below the elevation of the road. An old irrigation ditch bisects the site from the southeast to the northwest. Surface drainage on the site is generally from the east to west towards Trail Creek.

The average annual precipitation at the site is approximately 25 inches based on data from Idaho weather stations collected from 1961 – 1990 (Idaho State Climate Services, 1994).

Vegetation and Soils

The site slopes from east to west at slopes that range generally from 3 to 10%. There is an existing irrigation ditch that runs east to west across the site with denser trees and shrubs along this line. The site is vegetated with native grasses, trees, and shrubs. Additional information on vegetation and wildlife habitat is included in the Natural Resource Analysis for the project completed by Biota Research and Consulting.

The Natural Resources Conservation Service (NRCS) soil survey reports that the soil on the majority of the site is Dranyon silt loam, with a small amount of Foxcreek mucky peat and Baderton-Alpine complex on the western portion of the property adjacent to Old Jackson Highway (Figure 3).

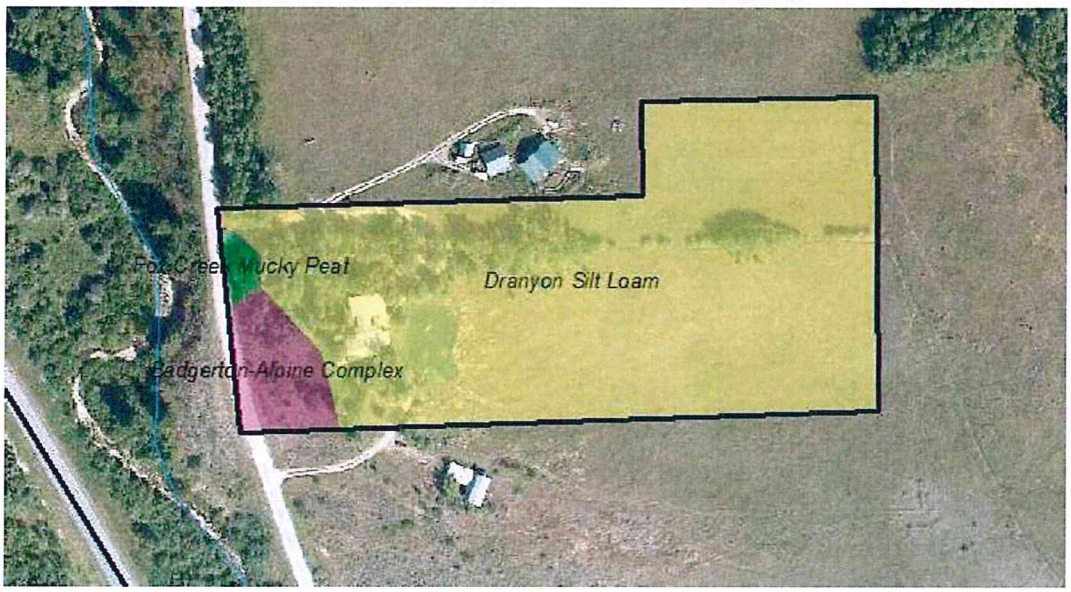

Figure 3. NRCS soil types

The proposed septic leachfields for the homes will be located in the Dranyon silt loam area. Dranyon silt loam is a well-drained soil with moderately low to moderately high capacity of the most limiting layer to transmit water with K_{sat} 0.06 to 0.20 in/hr. Its typical soil profile is silt loam over gravelly and silty clay loams. Detailed soil information from the Web Soil Survey by the NRCS (US Department of Agriculture, 2019) is included in Appendix A.

The NRCS soil assessments agree with an on-site evaluations conducted for septic leachfields for the existing home on the site and the home located immediately north of the site. A septic inspection for the home on Lot 1 on the site was conducted in 1992 and the soil was classified as "loam" to a depth of 13-ft. A septic inspection for the home north of the site currently owned by Michael Harrison was conducted in 2006 and the soil was classified as B-2 type soil, which is a loam and silt loam. Information from the septic permits for the existing homes is included in Appendix B.

Geology

The surficial recent geologic deposits in the lower meadow area of the site are classified as alluvium (Qal) with Pliocene age Kirkham Hollow Volcanics (Tk) in the upper northeastern portion of the site as shown on the Geologic Map of the Driggs Quadrangle, Bonneville and Teton Counties, Idaho, and Teton County, Wyoming (Figure 4). Kirkham Hollow Volcanics are mainly pinkish to yellowish-grey compact rhyolitic vitric-crystal tuff. The nearby geologic transect shows Woodside Formation (Tw) underlying the alluvium. The Woodside Formation is a reddish-brown siltstone and shale that forms a thick red soil.

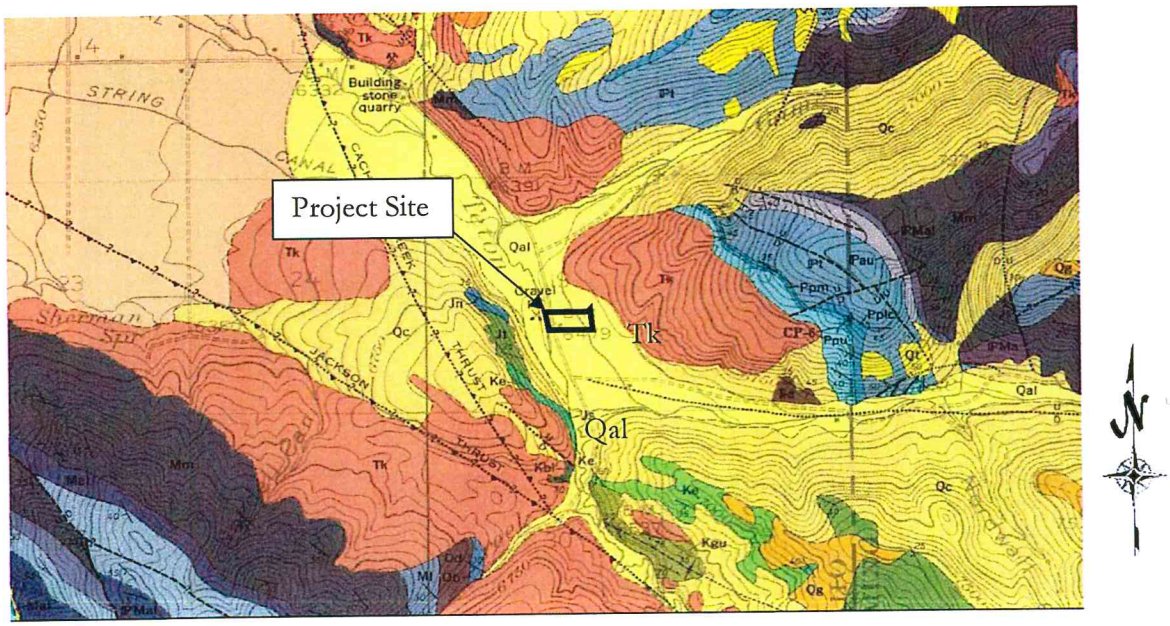

Figure 4. Excerpt from Geologic Map of the Driggs Quadrangle, Bonneville and Teton Counties, Idaho and Teton County, Wyoming

Groundwater

Well driller reports and geologic information available from the Idaho Geological Survey (Phillips, 2014) was used to assess the aquifer characteristics surrounding the project site. Well driller logs for wells in the surrounding area show the static water level is relatively shallow and ranges from 4- to 40-ft below ground surface (bgs) with the water bearing material being generally classified as sand and gravel with clay or fractured rock (Appendix C). Reddish, light brown, and grey rock and clay was observed in wells located to the southeast, which corresponds to the geologic information from the Idaho Geologic Survey.

Hydraulic Gradient

The hydraulic gradient is the difference between two or more hydraulic head measurements over the length of the flow path. Hydraulic head includes a velocity component and a potentiometric (water level) component. Assuming the velocity is similar throughout the aquifer or has a negligible effect on the total hydraulic head, the hydraulic gradient can be determined from maps of equal potentiometric head.

The groundwater flow direction and gradient were evaluated by comparing the static groundwater level within existing wells that have been drilled in the area. Existing wells were plotting on the map using latitude and longitude coordinates or the property address provided on the well log. Although some of the well logs indicated there was a clay layer between the near surface groundwater aquifer and the deeper water bearing aquifer, the majority of the logs indicate the aquifer is unconfined and connected to the near surface groundwater. Thus, groundwater elevations in each well was estimated by subtracting the observed static water level from the well drillers report from the ground elevation at the well obtained from the National Elevation Dataset Digital Elevation Model (DEM) (USGS, 2019). The DEM used has a horizontal grid spacing of 1/3 arc second (approximately 10-meters) and is dated 1999.

The resulting groundwater flow direction in the project area was found to generally follow the land slope and flow from the east to the west across the site towards Trail Creek (Figure 5). Hydraulic gradient ranges from 0.027 to 0.035 ft/ft with an average gradient of 0.03 ft/ft across the site.

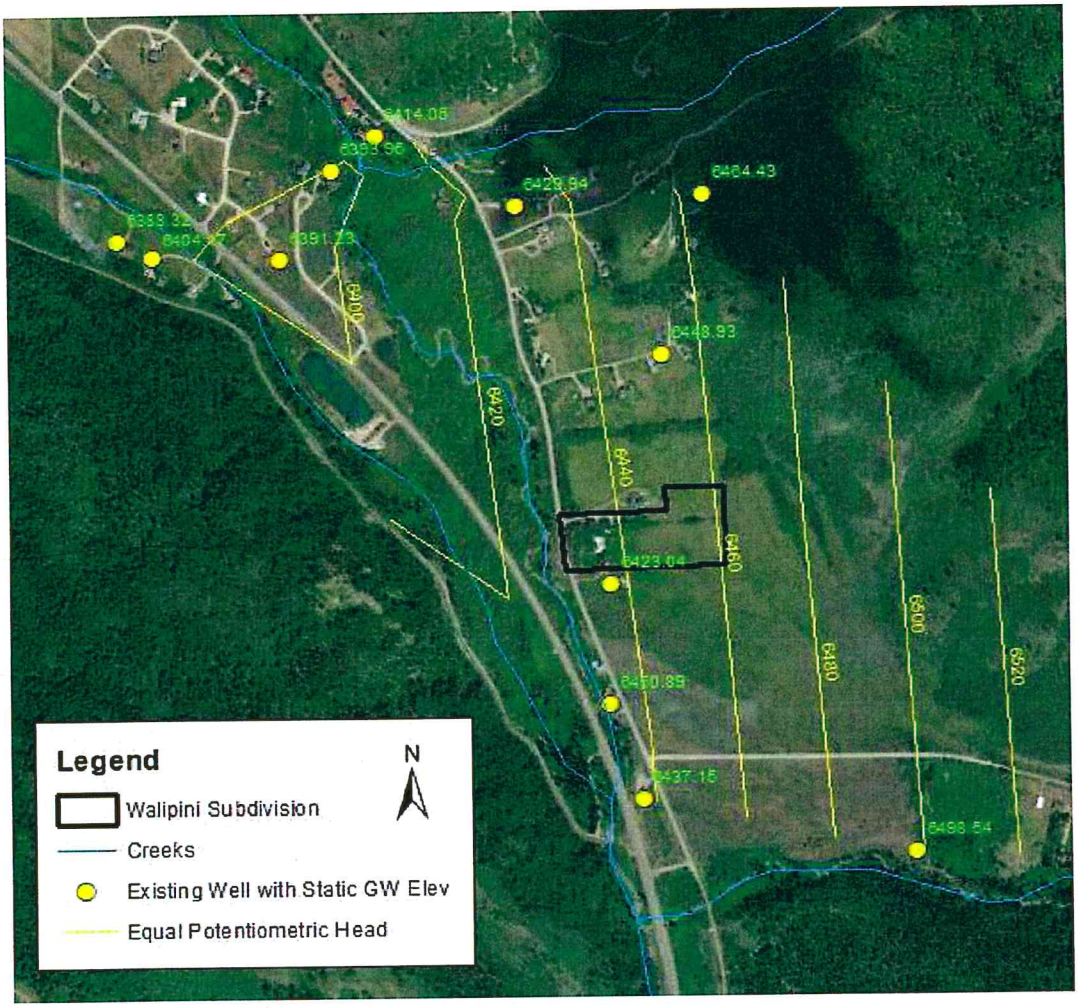

Figure 5. Existing Wells and Potentiometric Map

Hydraulic Conductivity

Saturated hydraulic conductivity (K_{sat}) is a measure of the ease with which water flows through the materials that make up the aquifer. Hydraulic conductivity is highly variable, and values can be estimated in the field using well pump tests or in the lab using empirical formulas related to grain size distribution. However, no record has been found of any conductivity investigations or grain size distribution analysis on wells in the study area.

Hydraulic conductivity for fractured rock, clay and gravels aquifers can range from 10^{-4} to 1000 ft/day (Heath, 2004), (Domenico & Schwartz, 1990). Groundwater studies in the area include those by Nicklen Earth & Water (2003), Kilburn (1964), and Cosgrove & Taylor (2007).

The Nicklin study included interpretations of hydraulic conductivity completed by Idaho National Engineering and Environmental Laboratory (INEEL) based on information from well driller logs. For alluvium, hydraulic conductivity was found to range from 1.5 to 14,000 ft/day. Also, higher hydraulic conductivities existed where fractured rock was present. Nicklin created a calibrated groundwater model that varied hydraulic conductivity until all model layers reasonably matched water level observations. The calibrated model resulted in higher hydraulic conductivities along main creek tributaries, including Trail Creek, which are in alluvial deposits. Extending the hydraulic conductivity for the upper aquifer map from the Nicklin study along Trail Creek would indicate a hydraulic conductivity of 330 ft/day for the project site. Nearby zones indicate hydraulic conductivity of 25 ft/day north of the site and 130 ft/day south of the site. Since the majority of the wells surrounding the site have driller logs that indicate that they lie in alluvium or fractured rock, a hydraulic conductivity of 150 ft/day was used for the site, which is on the conservative end of the expected range.

2. FIELD INVESTIGATION

2.1 TEST PITS AND MONITORING WELLS

Data from on-site investigation for the existing house on Lot 1 on the site is included in Appendix B. An additional test pit for Lot 2 will be completed when weather permits and close to peak groundwater elevations in May or June.

2.2 PATHOGEN TRANSPORT

Pathogens are biological disease causing agents such as bacteria, viruses, and fungi. Two factors that determine whether groundwater will be contaminated by pathogens are the ability of the organisms to survive and the availability of adequate transport mechanisms. Survival times and transport distances are affected by many conditions, such as soil properties, saturation levels, and pathogen characteristics. Environmental conditions such as high organic matter content, lower temperatures, and high moisture content favor longer survival times for pathogens (Teutsch, 1991). The presence of an adequate vadose zone is very important for bacteria and virus removal. Therefore, minimum separation distances from the bottom of the leachfield to normal high groundwater is specified in the *Technical Guidance Manual* (IDEQ, 2019) and IDAPA 58.03.01 and ranges, depending on soil type, from 3- to 6-feet for a standard residential leachfield.

Bacteria is primarily removed from effluent through filtration processes in the biomat (infiltration) zone that forms at the interface of the infiltration trench and the natural soil. With a mature biomat in place, most bacteria are removed within the first 1-foot vertically or horizontally from the trench-soil interface (University of Wisconsin, 1978), and studies of the movement of fecal coliform from a septic tank system through undisturbed soil have shown that there is limited mobility and survival of

fecal coliform 1- to 2-years after system start up (Brown, 1988). The vadose (unsaturated) zone located below the infiltration zone is also very important for slowing bacteria travel time, providing aeration, and facilitating bacteria die-off. Within 2- to 5-feet of unsaturated, aerobic soil, most if not all fecal indicators are retained or killed-off, and biochemical oxygen demand is removed (U.S. EPA, 2002). Since viruses are smaller than bacteria, their primary removal mechanism is through adsorption to soil particles, which also occurs primarily in the vadose zone.

Transport modeling of pathogens has been attempted using mathematical advection and dispersion models. However, organisms do not behave like dissolved contaminants and these models do not take into considerations changes in porosity and permeability due to the presence of bacteria and viruses. Therefore, as stated in the NP Evaluation guidelines (Howarth, 2002), pathogen transport modeling is difficult to achieve with enough certainty to be useful and a pathogen transport model has not been developed as part of this study. Instead, recommendations for leachfield design are included in Section 5 of this report to help ensure that pathogen removal is sufficient to prevent groundwater contamination.

2.3 PHOSPHOROUS TRANSPORT

Phosphorous is a contributor to eutrophication and depletion of dissolved oxygen in surface water and thus, is a chemical of concern if there is a possible connection between subsurface water and surface water. Phosphorous in septic effluent originates from detergents and human excreta (Brown, 1988). Phosphorous can easily be retained in the underlying soils through chemical precipitation, ion exchange, plant uptake, and adsorption and thus, is not usually transported through soil to groundwater. A study on modeling phosphorous transport to streams from septic systems in a developed mountain watershed found that on-site wastewater treatment systems were not likely the most significant source of phosphorous contamination in a nearby lake (McCray, 2004).

Since most of the nearby wells have static water levels that are equal to the approximate elevations of the adjacent creeks, it is likely that there is a connection between the upper water table and the downgradient creek, which is Trail Creek. Although Trail Creek is not a 303d listed stream and currently has no TMDL (Total Maximum Daily Load) for nutrients , the USEPA Gold Book (USEPA, 1986) guideline values for total phosphorous will be used in this evaluation. The water quality value for phosphorous for streams is 0.100 mg/L to prevent plant nuisances. The typical concentration of phosphorous entering the soil absorption system is 6-12 mg/L total phosphorous (IDEQ, 2019) and the percent removal of drain field percolate into ground water at a depth of 3 to 5 feet can vary greatly from 0 to 100% (EPA, 2002) depending on the above mentioned factors.

In order to estimate the possible phosphorous contamination to surface water, we can use a mass balance approach similar to that used for nitrogen evaluation. Since there are no simple methods for predicting phosphorus removal rates at the site level (EPA, 2002), the higher typical concentration of phosphorous entering the soil absorption system of 12 mg/L was used in the mass balance

analysis. This assumes 0% phosphorous removal by the drain field and we also assumed that 100% of the phosphorous leaving the septic system will reach the surface water. This is the same assumption used in the MANAGE (Method for Assessment, Nutrient-loading, and Geographic Evaluation) system when evaluating the impact of failed septic systems on surface water within 200 feet of the system (Kellogg, 2006).

Flowing water in Trail Creek will provide dilution, and the amount of dilution is directly proportional to stream flow rates. To determine the worst case impact, we will use the lowest average monthly flow. USGS stream gage No. 13051000 is located just upstream of the project site at the confluence of Trail Creek and Moose Creek and operated from 1946 to 1952. Data collected at this gage indicates the lowest average monthly flow is 33 cfs during the month of March. The lowest average flow using regression equations and basin characteristics was determined to be 45 cfs during the month of February (Hortness, 2003). Streamflow data and the phosphorous mass balance spreadsheet is included in Appendix D, and the results are summarized in the next section.

2.4 NITROGEN TRANSPORT

In contrast to phosphorous that reacts vigorously with soils, nitrate nitrogen is highly mobile and standard septic systems and drain fields are only able to achieve 10 to 20% removal rates (U.S. EPA, 2002). Thus, nitrate (measured as nitrogen) is the substance of most concern in wastewater system effluent because of its mobility and its impact on public health when concentrations exceed 10 mg/L in drinking water supplies. At concentrations above 10 mg/L, nitrate can cause a diminished capacity of the blood to transport oxygen in infants younger than 3 months, which leads to "Blue Baby Syndrome." DEQ considers an increase of 1.0 mg/L nitrate, or less, predicted to occur in the aquifer downstream of the project boundary to be a negligible impact (Howarth, 2002). Nitrate transport was evaluated to the drinking water aquifer using a mass balance approach. The nitrate mass balance spreadsheet is included in Appendix E and the results are summarized in the next section.

3. ANALYSIS AND RESULTS

3.1 PATHOGEN TRANSPORT ANALYSIS

As discussed in the previous section, pathogen transport modeling is too uncertain to be useful and was not conducted as part of this study. However, properly designed and maintained septic and drain field systems are very effective in removing pathogens, and design recommendations in Section 5 will help prevent pathogen contamination.

3.2 PHOSPHOROUS TRANSPORT ANALYSIS

Friends of the Teton River monitored phosphorus and other water quality parameters from 2002 to 2013 at six site locations that included Darby Creek, Fish Creek, Fox Creek, Six Springs, Teton Creek, Teton River, Warm Creek, and Woods Creek. This water quality data was included in the *Teton River Subbasin – 2016 Total Maximum Daily Loads and Five-Year Review* (IDEQ, 2016). The project site is most similar to the Fox Creek (Fox2), Darby Creek (Dar), and Warm Creek (Warm) sites that were monitored. These sites had a mean total phosphorus loading of 0.04 mg/L, which was used as the background concentration for this analysis. Data from the report is included in Appendix D.

Using an estimated mean monthly low flow of 33 cfs during the month of March, a mass balance calculation was completed by adding 100% of the expected septic system effluent to the creek and evaluating the resulting phosphorous concentration. The result was an increase of 0.001 mg/L resulting in a total 0.041 mg/L in Spring Creek, which is still below the US EPA water quality value of 0.100 mg/L. The mass balance spreadsheet is included in Appendix E.

3.3 NITROGEN TRANSPORT ANALYSIS

In accordance with the DEQ NP Evaluation program guidance, compliance boundaries that should be considered include:

1) Boundary of the first encountered ground water aquifer down-gradient from the proposed development
2) Surface water bodies
3) Down gradient property line
4) Down gradient drinking water wells

The upper water bearing aquifer generally flows in a westerly direction and locations of down gradient drinking water well are located northwest of the site. Thus, the groundwater compliance boundary that meets 1, 3, and 4 above is the northern and western property boundaries. Trail Creek lies along the western portion of the site so the surface water compliance boundary is just upgradient from the creek along the western property boundary (Figure 6).

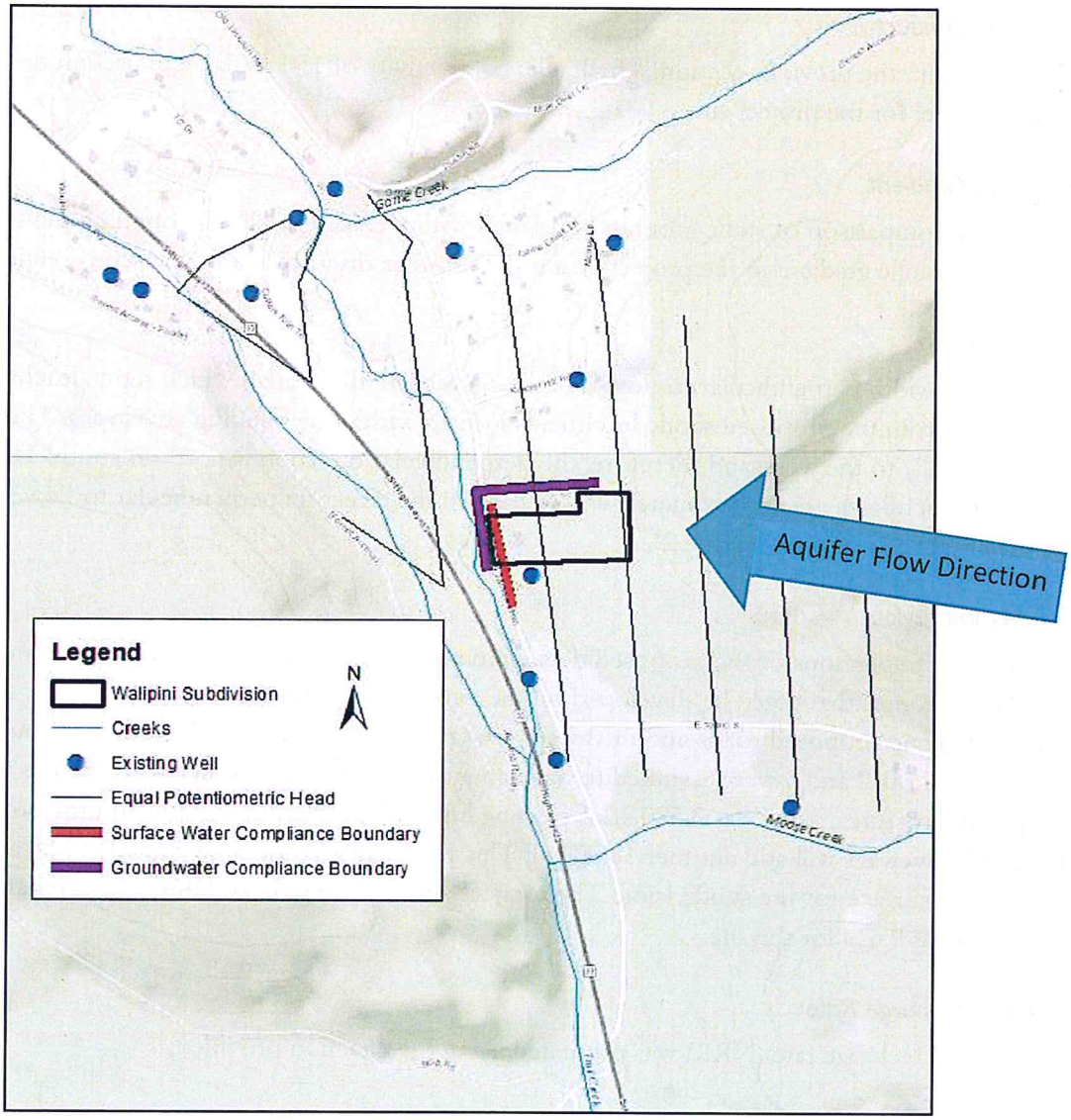

Figure 6. Compliance Boundaries for Walipini Subdivision

Groundwater Compliance Boundary Evaluation

Potential nitrate contamination to the water bearing aquifer was evaluated using the Level I nitrogen mass balance spreadsheet provided by Idaho DEQ as part of their NP Evaluation guidelines. The following paragraphs describe the origin or development of each parameter that was input into the nitrogen mass-balance spreadsheet for this project.

Hydraulic Conductivity

As discussed in the previous section, a hydraulic conductivity of 150 ft/day was used in the NP mass balance model for the project site.

Hydraulic Gradient

Based on a comparison of static groundwater levels within existing wells surrounding the site, the average hydraulic gradient in the project area is 0.03 ft/ft as discussed in the previous section.

Aquifer Width

The aquifer width perpendicular to flow is based on the length through which septic leachate will be distributed from the proposed septic leachfields located within the building envelopes. The aquifer flows generally to the west, and therefore, the perpendicular direction is north to south. The proposed leachfields are approximately 450-ft apart in the direction perpendicular to flow as shown on the proposed site plan (Figure 2).

Percent Impervious

The percent impervious of the proposed development was estimated based on the maximum number of homes that could be developed on the two parcels, with associated driveways. Although the existing and proposed roads and driveways are gravel, they were considered impervious for this calculation. Lots 2 and 3 were assumed to have an average 6,000 sf of impervious surface for proposed structures, Lot 1 has 3,500 sf of existing impervious from the house, and the proposed road and driveways will add another 18,000 sf. This results in an estimated 33,500 sf (0.8 ac) of impervious surface for the subdivision. The total site is 8.0 ac in size, and thus, the estimated percent impervious is 9.6% for the site.

Natural Recharge Rate

The natural recharge rate (NRR) was estimated using the equation provided,

$$NRR = (TAP)^2 \times 0.0046$$

where NRR = natural recharge rate, in/yr
TAP = total annual precipitation, in/yr

Based on the average annual precipitation at the project site of 25 in/yr, the resulting NRR is 2.875 in/yr.

Background Nitrate Concentration

The background concentration was derived from the Idaho DEQ 2014 Nitrate Priority Areas interactive mapping tool and GIS data download (IDEQ, 2014). The wells used in nitrate priority testing are shown in Figure 7. Well #433407111040801 is located on the project site and has a

higher nitrate concentration than surrounding wells of 3.19 mg/L sampled in 2002. The background concentration was set to 3.2 mg/L and the maximum allowable down-gradient nitrate concentration was set to 1 mg/L greater than the background concentration, or 4.2 mg/L.

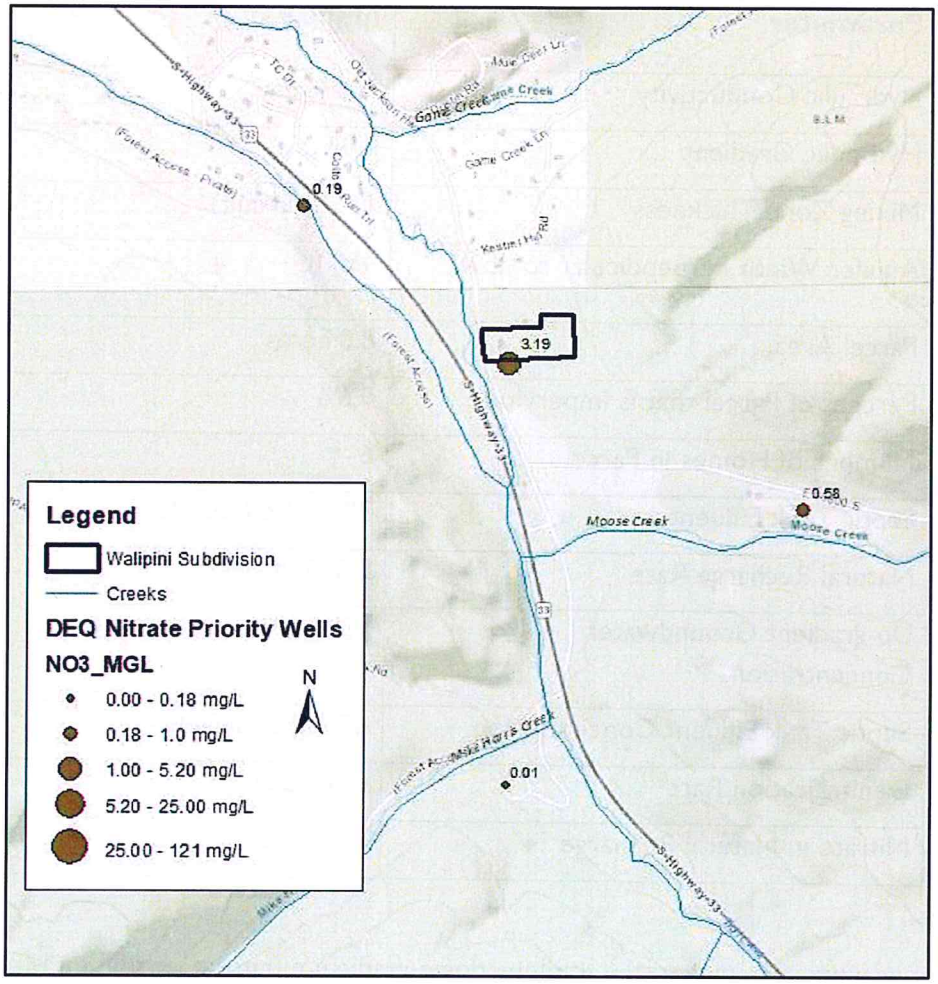

Figure 7. Background Nitrate Concentrations in existing wells (DEQ, 2014)

Effluent Nitrate Concentration

The nitrate concentration in the effluent from septic tanks depends on the type of septic system proposed for the development. The default value of 45 mg/L represents a typical septic system. A septic tank effluent concentration equal to the default value of 45 mg/L was used to evaluate the development with standard septic tanks and leach fields.

Other Parameters

The default values for mixing zone thickness, septic tank effluent flow rate, denitrification rate, and nitrate in natural recharge were used. A total of 6 homes were evaluated to represent a potential

main house and guest house on each proposed lot. Table 1 summarizes all parameters used in the nitrogen mass balance spreadsheet.

Table 1. Nitrogen Mass Balance Input Values

Parameter	Input Value
Hydraulic Conductivity	150 ft/day
Hydraulic Gradient	0.03 ft/ft
Mixing Zone Thickness	15 ft (default)
Aquifer Width Perpendicular to flow	450 ft
Parcel Area	8.0 acres
Percent of Parcel that is Impervious	9.6%
Number of Homes in Parcel	6
Septic Tank Effluent	300 gal/d (default)
Natural Recharge Rate	2.875 in/yr
Up-gradient Groundwater Concentration	3.2 mg/L
Septic Tank Effluent Concentration	45 mg/L (default)
Denitrification Rate	0 (default)
Nitrate in Natural Recharge	0.3 mg/L (default)

Given the above inputs parameters, the resulting down-gradient nitrate concentration is predicted to increase from 3.2 mg/L to 3.5 mg/L, which is an increase of 0.3 mg/L. If the downgradient concentration is limited to a 1 mg/L increase to 4.2 mg/L, up to 19 homes would be allowed.

Surface Water Compliance Boundary Evaluation

Background concentration of nitrate in Teton Creek was estimated from FTR monitoring for Darby Creek, Fox Creek, Warm Creek, and the upper Teton River from 2002 to 2012. The mean total nitrate concentration was found to be 0.45 mg/L. Using the mass balance approach similar to that used for phosphorus transport, the proposed Walipini Subdivision would increase the nitrate concentration by 0.004 mg/L to 0.454 mg/L in Trail Creek, which is less than the recommended TMDL for nitrate of 0.60 mg/L.

4. CONCLUSIONS

Phosphorous, nitrate, and pathogen contamination to groundwater and surface water is unlikely from the proposed Walipini Subdivision, which includes 3 proposed lots with 1 lot already developed on 8-acres, if each standard septic system and leach field is properly designed, constructed, and maintained. The evaluation included up to 6 residences with 4 bedrooms each with drainfields separated 450-ft apart in the perpendicular direction to the aquifer flow. Even if no attenuation or degradation of nitrates occurs through the vadose zone, increase in nitrate concentration in groundwater at the compliance boundaries is less than 1.0 mg/L and is considered to be a negligible impact per DEQ standards. Similarly, concentrations of nitrate and phosphorus in Trail Creek is not expected to exceed recommended TMDLs for surface water due to the proposed project.

5. RECOMMENDATIONS

It is important that the septic systems are designed, installed, and maintained properly. Having an adequate unsaturated zone below the septic drain field is critical to ensure that good aeration and slow travel of effluent is achieved through the soil. This is important to achieve adequate pathogen decomposition and die-off, promote soil-based removal of bacteria, and adequate adsorption of phosphorous.

Adequate separation distances and proper well construction is also recommended. For design soil group B-2 the required minimum separation distance from the bottom of the drain field to normal high groundwater is 4-feet and to seasonal high groundwater the minimum distance is 1 foot (Idaho Department of Environmental Quality, October 2018). Horizontal separation of 200-feet is required between drain fields and permanent or intermittent surface water and a distance of 50-feet is required between drain fields and irrigation canals. Wells must be a minimum of 50-feet from the drain fields and should be constructed with adequate casing and sealing to prevent cross contamination between higher groundwater layers and the water bearing formation.

At this time, we do not feel that further on-site investigation or reporting is necessary. All data included in this report adequately supports the recommendations included herein. Interpretations are based on the data are accurate and represent sound, unbiased professional judgment.

6. REFERENCES

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APPENDIX A

NRCS SOIL INFORMATION

Soil Map—Teton Area, Idaho and Wyoming
(Walipini Subdivision)

Map Scale: 1:1,590 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)
- 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: Teton Area, Idaho and Wyoming
Survey Area Data: Version 8, Sep 16, 2019

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

Date(s) aerial images were photographed: Jul 22, 2012—Nov 2, 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
43B725	Dranyon silt loam, 2 to 25 percent slopes	7.4	92.0%
13113	Foxcreek mucky peat, 0 to 2 percent slopes	0.1	1.3%
13425	Badgerton-Alpine complex, 2 to 8 percent slopes	0.5	6.7%
Totals for Area of Interest		**8.0**	**100.0%**

Teton Area, Idaho and Wyoming

43B725—Dranyon silt loam, 2 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2mhsn
Elevation: 6,080 to 7,190 feet
Mean annual precipitation: 21 to 36 inches
Mean annual air temperature: 36 to 40 degrees F
Frost-free period: 35 to 55 days
Farmland classification: Not prime farmland

Map Unit Composition

Dranyon and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dranyon

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Colluvium derived from sandstone or rhyolite with loess infulence

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 4 inches: silt loam
A2 - 4 to 7 inches: silt loam
AB - 7 to 13 inches: silt loam
Bt1 - 13 to 21 inches: gravelly silty clay loam
Bt2 - 21 to 30 inches: very stony silty clay loam
Bt3 - 30 to 40 inches: silty clay loam
Bt4 - 40 to 60 inches: clay loam

Properties and qualities

Slope: 2 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: C
Ecological site: MOIST MOUNTAIN LOAM 20+ POTR5 (R013XY016ID)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Teton Area, Idaho and Wyoming
Survey Area Data: Version 8, Sep 16, 2019

Teton Area, Idaho and Wyoming

13425—Badgerton-Alpine complex, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1vggt
Elevation: 6,040 to 6,680 feet
Mean annual precipitation: 16 to 26 inches
Mean annual air temperature: 36 to 44 degrees F
Frost-free period: 20 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Badgerton, rarely flooded, and similar soils: 55 percent
Alpine and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badgerton, Rarely Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Mixed alluvium

Typical profile

A - 0 to 9 inches: loam
AB - 9 to 17 inches: very gravelly loam
BC - 17 to 31 inches: extremely gravelly loamy sand
C1 - 31 to 43 inches: extremely gravelly loamy coarse sand
C2 - 43 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
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: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 4 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 6c
Land capability classification (nonirrigated): 6c

Hydrologic Soil Group: B
Ecological site: RIVERBOTTOM 10-18 POAN3/LECI4 (R013XY049ID)
Hydric soil rating: No

Description of Alpine

Setting

Landform: Fan remnants, stream terraces
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Mixed alluvium

Typical profile

A1 - 0 to 2 inches: gravelly loam
A2 - 2 to 11 inches: very gravelly loam
ABk - 11 to 17 inches: extremely gravelly loam
Bk - 17 to 25 inches: extremely gravelly sandy loam
Bkq - 25 to 31 inches: extremely gravelly loamy sand
Bk' - 31 to 35 inches: extremely gravelly sandy loam
Bkq' - 35 to 44 inches: extremely gravelly loamy sand
Bk1" - 44 to 51 inches: extremely gravelly sandy loam
Bk2" - 51 to 60 inches: gravel

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
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: 75 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): 4c
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: SHALLOW GRAVELLY 12-16 ARTRV/PSSPS (R013XY004ID)
Hydric soil rating: No

Minor Components

Redfish, wooded

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave, linear

Ecological site: RIVERBOTTOM 10-18 POAN3/LECI4 (R013XY049ID)
Hydric soil rating: Yes

Foxcreek, wooded
Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: RIVERBOTTOM 10-18 POAN3/LECI4 (R013XY049ID)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Teton Area, Idaho and Wyoming
Survey Area Data: Version 8, Sep 16, 2019

Teton Area, Idaho and Wyoming

13113—Foxcreek mucky peat, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1qmks
Elevation: 5,920 to 6,520 feet
Mean annual precipitation: 16 to 18 inches
Mean annual air temperature: 38 to 44 degrees F
Frost-free period: 20 to 50 days
Farmland classification: Not prime farmland

Map Unit Composition

Foxcreek and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Foxcreek

Setting

Landform: Flood plains, drainageways
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Mixed alluvium

Typical profile

Oe - 0 to 2 inches: mucky peat
Ag - 2 to 8 inches: loam
ABg - 8 to 15 inches: loam
Bg1 - 15 to 21 inches: loam
2Bg2 - 21 to 26 inches: very gravelly coarse sandy loam
2Bkg - 26 to 42 inches: very gravelly loamy sand
2Cg - 42 to 60 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: About 0 to 10 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 6c

Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: C/D
Ecological site: RIPARIAN WET MEADOW SALIX/CAREX (R013XY050ID)
Hydric soil rating: Yes

Minor Components

Zufelt, occasionally flooded
Percent of map unit: 10 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Convex, linear
Ecological site: DRY MEADOW PONE-PHAL2 (R013XY039ID)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Teton Area, Idaho and Wyoming
Survey Area Data: Version 8, Sep 16, 2019

APPENDIX B

EXISTING SEPTIC PERMITS

~ 10645 Old Jackson Hwy

SEPTIC SYSTEM INSPECTION REPORT

District Seven Health Department

ENVIRONMENTAL SECTION

254 E Street • P.O. Box 1855 • Idaho Falls, ID 83403-1855

(208) 523-5382

PERMIT NO. T-8.3-92

COUNTY Teton

INSPECTED BY Jerry Woods | INSTALLED BY Steve Matkin | PHONE | DATE 8-11-92

NAME David Hare

TOWNSHIP 3 N S | RANGE 46 E | SECTION 19

SUBDIVISION | DIVISION | LOT | BLOCK

STREET NUMBER, CITY, STATE, ZIP OF SEPTIC SYSTEM SITE LOCATION

1061 S old Jackson Hwy Victor Id 83455

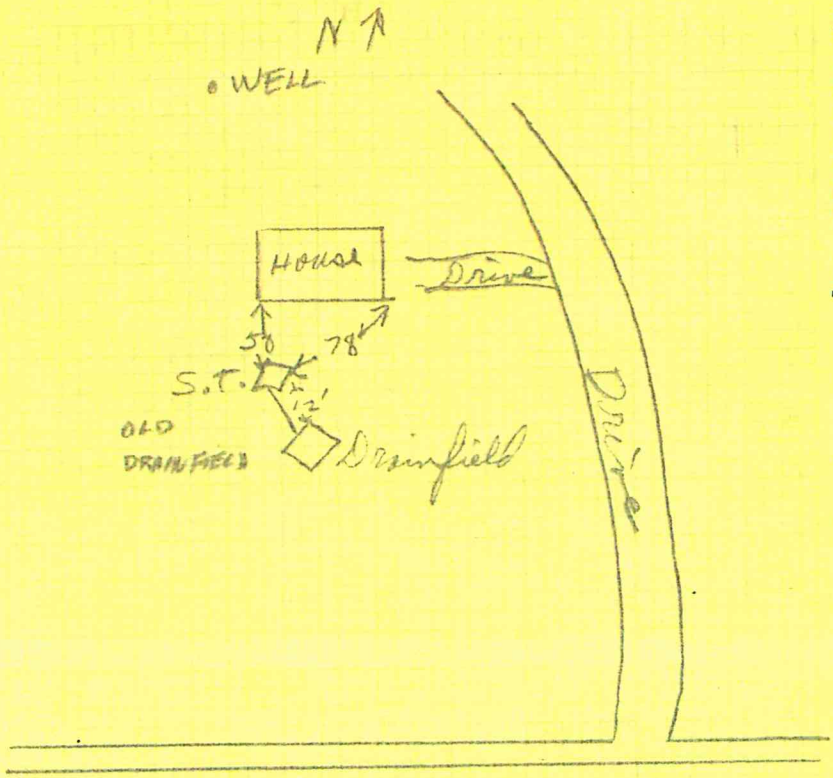
SEPTIC TANK (see Note)

1. Was Owner/Installer advised that sewer from building to tank must be inspected by Plumbing Inspector? Y N
2. Capacity Gallons 1000 3. Manufactured by _____
4a. Baffles OK? Y N b. Inlet/Outlet both grouted? Y N
5. Final Depth to Manhole 6" 6. Extension length _____
7. Distance in feet from Tank to: Well _____ Water Line _____ Property Line _____ Building _____
   Absorption Area _____ Surface Water _____

ABSORPTION AREA (see Note)

1. Type System Installed Pit 10 x 10 x 12.5 2a. Maximum Final Excavation Depth 13' ft.
3. Disposal Area 500 sq. ft. b. Soil Profile observed loam
4. Is Sewer Rock properly sized and installed? (Y) N
5. Soil Barrier used straw
6. Distance in feet from absorption area to: Lake/River 200' Canal 50' Down Slope/Scarp 0-2%
   Closest Drinking Water Source/Well 100 Water Line 25 Building 60' Property Line 5'+

NOTE: See back for Distance Limits, Sample Drawing and Soil Profile and other information.



DRAWING: Show Buildings, Septic System Components, Water Lines, Wells, Trees, Surface Water, and other significant items within 300 ft. radius of Septic System. *IMPORTANT: Show measurements, especially for locating Septic Tank Manhole*

SIGNATURE OF PERSON CERTIFYING THAT INFORMATION SHOWN HERE IS ACCURATE. (I.E. INSTALLER OR OWNER)

X

HEALTH DEPARTMENT USE ONLY

INSPECTION/REVIEW SUMMARY

The System appears to:

1. be in substantial compliance with Regulations, Standards and Specifications. (Y) N
2. have MINOR deficiencies which could decrease capacity/life of the system. Y N
3. have MAJOR deficiencies which are violations that must be corrected. (list violations below) Y N

INSTALLER-INSPECTION AUTHORIZED BY _____

DATE _____

REVIEWED BY Jerry Woods EHS

DATE 8-11-92

Pink Copy - Installer Yellow Copy - D7HD Files Finalized White Copy - Owner of System

SSINSP2 RV 4/7/92

PERMIT FOR ON-SITE SEPTIC SYSTEM

White — Owner Yellow — Office Pink — Installer

DISTRICT SEVEN HEALTH DEPARTMENT

This permit is for a:
- ☐ Site Survey
- ☒ Conventional System
- ☐ Alternative Design System
- ☐ New
- ☒ Replacement

FOR OFFICIAL USE ONLY	
Permit No. T-83-92	Receipt No. 6802
Date 8/7/92	Fee 30.00
County 4100	EHS No. 163

*Application Fee Is Non-Refundable

PERMIT

Name of property owner: DAVID HARE | Home phone: 787-2278 | Work phone:

Current mailing address — Street address: 1061 S. Old Jackson Hy | City: VICTOR | State: ID | Zip: 83455

Legal description: Township 3N | Range 46E | Section 19 | ¼ section:

Subdivision name: | Lot: | Block:

Directions to property (include street address if available): 200 YDS N of Moose Cr. Junction on E side of Hwy

MAP 63

Lot size	Depth to ground Water	Depth to ground Bedrock
	>40+	NA

Soil type: *(at proposed depth)* — Drainfield: GeD or RPE Loam 0-84+ 5-8%

Water supply:
- a. Public ☐ Name of system:
- b. Private ☒ Well ☒ or Spring ☐

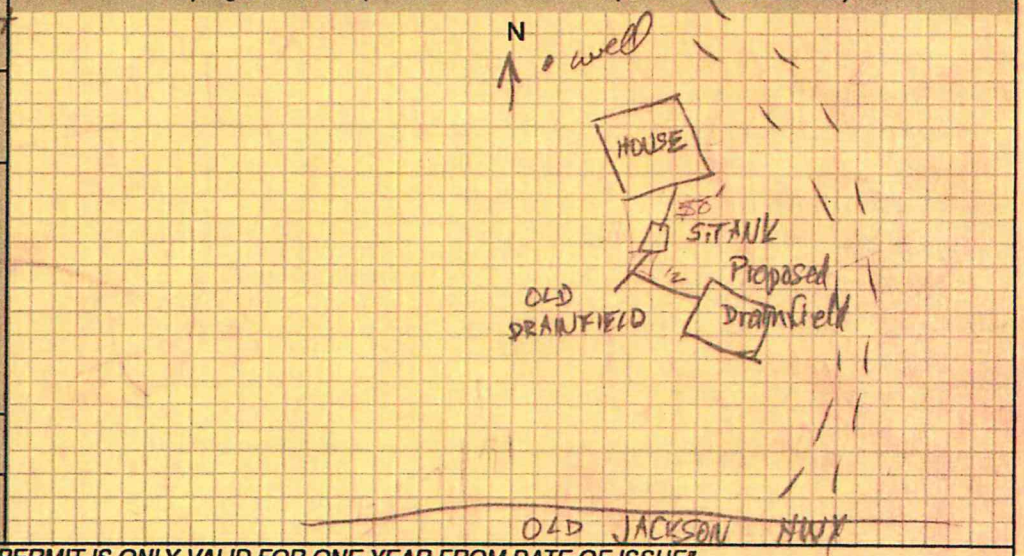
Type of dwelling or building served:
- a. Single family dwelling ☒
  - Basement: Yes ☐ No ☐
  - # bedrooms: 3
- b. Other type of building ☐
  - Describe:
  - # people served:
  - # wastewater flow (GPD): 250

Excavation/Installer (Licensed): S. MATKIN

Proposed installation date:

APPLICANT'S PROPOSAL

Indicate house, all adjacent wells, sewage disposal system replacement area, surface waters, canals, springs, waterlines, *(dimension between all components — indicate north)*



"THIS PERMIT IS ONLY VALID FOR ONE YEAR FROM DATE OF ISSUE"

"Installation shall comply with all requirements of Health District and/or State of Idaho sewage disposal rules, regulations, and standards."

MINIMUM SPECIFICATIONS

Septic tank size	Disposal system type	Disposal area	Maximum depth of system excavation
EXISTING gal.	PIT 10X10X12.5' Deep	500 ft²	AS EXISTING

Distance to well (100' minimum)	Waterline	Stream, lake	Ditch, canal, etc.	Dwelling	Property line
100'	25'	200'	50'	20'	5'

Comments:

Application's/Agent's signature • I hereby certify that the system will be installed as per the rules and hereby authorize the health authority access to this property for purposes of inspecting the sewage system until final approval of this system has been granted by the health authority.

X Steve Matt Date 8-7-92

Issued By: R L Webster Date: 8/7/92

INSPECTION

- ☒ System is in substantial compliance with the regulations and the permit specifications.
- ☐ System has minor deficiencies that could decrease the life of the system.
- ☐ System has major deficiencies that must be corrected.

COMMENTS

FOR OFFICIAL USE ONLY
- ☒ APPROVED
- ☐ DISAPPROVED

Reviewed by: Jerry Marks Date: 8-11-92

WG-447 4/92

Bonneville	Custer/Lemhi	Fremont	Jefferson/Clark	Madison/Teton
254 E. St. Box 1855	117 Lillian Ave.	P.O. Box 490	County Courthouse	400 E. Main #2
Idaho Falls, ID 83403	Salmon, ID 83467	St. Anthony, ID 83445	Rigby, ID 83442	Rexburg, ID 83440
208-523-5382	208-756-2123	208-624-7585	208-745-7297	208-356-3239

787-2278

DISTRICT SEVEN HEALTH DEPARTMENT
INDIVIDUAL SEWAGE DISPOSAL INSTALLATION PERMIT

Permit No. 7731 Date 8-16-77

Installation for David Hone (Name) at RFD- Section 13, T3N R45E (Legal description of property)

Address of Installation Old Hiway to Jackson from Victor, approx 1/2 miles

No. Living Units 1 Bedrooms 2 People Served 2 Water Supply--Private ✓ Public _____ Applicant is: Owner ___ Contractor ___ Other ___

FHA _____ FARM HOME _____ VA _____ CONV. _____ EXISTING _____ NO. _____

Septic Tank 1000 gal. Perc. Rate 2 Min./in. Min. Depth to Ground Water 120 ft.

Effluent Disposal: Effective Area Required 300 sq. ft. Soil System: Soil Profile Gravel

Field Drain _____ Absorption Bed ✓ Standard _____ Modified _____ Seepage Pit _____ Dimensions 10 X 30

Distance from Disposal Area to:

Property Lines: Front 80 ft. Back 1/4 mile ft. Side 100+ ft. Dwelling Foundation 30 ft. Well 100+ ft.

Surface Water 500 ft. Nearest Neighbor's Well 600 ft. Plot Plan Submitted and Approved _____ Septic Tank 20 ft.

Remarks: _____

Applicant Driggs Plumbing Paid _____ Bill _____ No Fee _____

Address " / Idaho Permit Issued by _____

INSPECTION: Septic Tank Size _____ Standpipe _____ Depth to Manhole _____

Distance from Septic Tank to: Dwelling Foundation _____ ft. Well _____ ft. Nearest Neighbor's Well _____ ft.

Effluent Disposal: Effective Area _____ sq. ft.

Field Drain _____ Absorption Bed _____ Standard _____ Modified _____ Seepage Pit _____ Dimensions _____

Pipe Size _____ No. of Lines _____ Length _____ Depth _____

Distance from Disposal Area to:

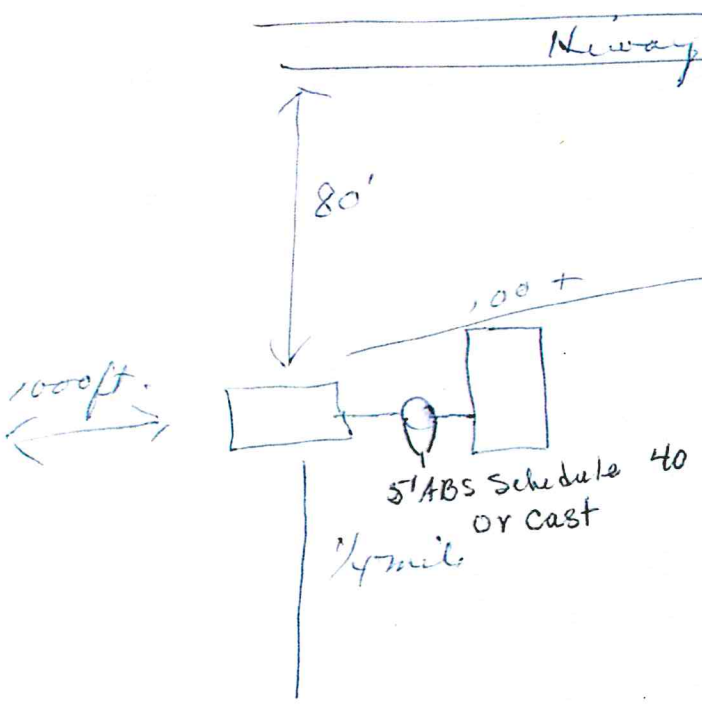
Property Lines: Front _____ ft. Back _____ ft. Side _____ ft. Dwelling Foundation _____ ft. Well _____ ft.

Surface Water _____ ft. Water Service Piping _____ ft. Depth to Gravel _____ ft. Nearest Neighbor's Well _____ ft.

Approved _____ Not Approved _____ Inspected _____ (Date) by _____ Installed by _____

Remarks _____

Applicant's sketch of house, proposed sewage layout and all adjacent wells (dimension between all components) --



DISTRICT SEVEN HEALTH DEPARTMENT

APPROVED WITH THE FOLLOWING CONDITIONS:

____ A 4 ft. separation between bottom of sewage installations and highest ground or sub water must be maintained.

____ Installation must be at least ____ feet from any body of water.

____ ____ Separation between well and installation needed.

____ ____ Additional absorption area needed.

✓ Approved without conditions.

____ Other

Date 08/18/77 Signature Stephen D. Lance

Reference: RULES AND REGULATIONS FOR INDIVIDUAL AND SUBSURFACE SEWAGE DISPOSAL SYSTEMS
Idaho Department of Health, Environmental Improvement Division, August 1971

Bill Wawro 624-7585

TO THE APPLICANT: The S.D. installation must be inspected by the local sanitarian before it is used or covered. Call the above number to arrange for inspection.

APPLICATION TO CONNECT TO AN EXISTING SUBSURFACE SEWAGE DISPOSAL SYSTEM 113940

APPLICANT Therry Frey PHONE 787-2278 DATE 9-16-96

ADDRESS 1061 Old Jackson Hwy, P.O.B. 241 CITY Victor ST ID ZIP 834

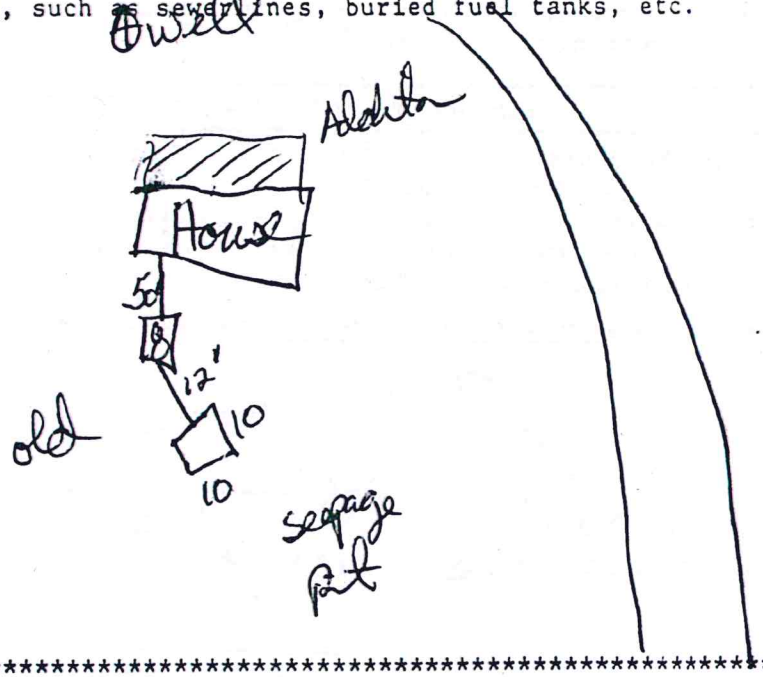
LEGAL DESCRIPTION: TWNSHP 3N RANGE 46E SECTION 19

SUBDIVISION NAME _____ LOT _____ BLOCK _____

****

PLOT PLAN OF PROPERTY

Please show house, well, septic location and lot lines, where applicable. Include possible sources of contamination to well, such as sewer lines, buried fuel tanks, etc.



R-Code 180 T-Code _____ S-Code _____

Activity _____ Action Taken _____

Inspection Time 30 Travel Time 0

****

DISCLAIMER:

I UNDERSTAND THAT APPROVAL IS GIVEN FOR HOOK-UP TO EXISTING SYSTEM. IF THIS CHANGE CAUSES ANY SEPTIC FAILURE OR NUISANCES, I HEREBY AGREE TO CORRECT THE PROBLEM IMMEDIATELY IN ACCORDANCE WITH CURRENT REGULATIONS. I ALSO UNDERSTAND THAT THIS AUTHORIZATION IN NO WAY GRANTS PERMISSION TO CONNECT ADDITIONAL DWELLING UNITS, OR TO SIGNIFICANTLY INCREASE THE WASTEWATER FLOW TO THE EXISTING SYSTEM.

SIGNED Therry Frey DATE 9-16-96

****

AUTHORIZATION TO CONNECT TO AN EXSISTING SYSTEM: GRANTED X DENIED _____

BY _____ DATE 16 Sept 96

E.H.S. Signature

ENVIRONMENTAL HEALTH SPECIALIST REGISTERED STATE OF IDAHO RAYMOND KEATING

E.H.S. NO. 242

REASON FOR ACTION: existing drain field sized for 3 BEDROOM

CC -

F

DISTRICT SEVEN HEALTH DEPARTMENT
SEPTIC SYSTEM INSPECTION REPORT

1/2005

Travel Time: 20 Inspection Time 30

INSPECTION CONDUCTED FOR: Name MICHAEL HARRISON Permit No 4106117

LOCATION OF INSPECTION: Street Address 1055 OLD JACKSON HWY City VICTOR

Legal Description: ¼ Section — Section 15 Township 3N Range 4E

Subdivision: — Lot — Block —

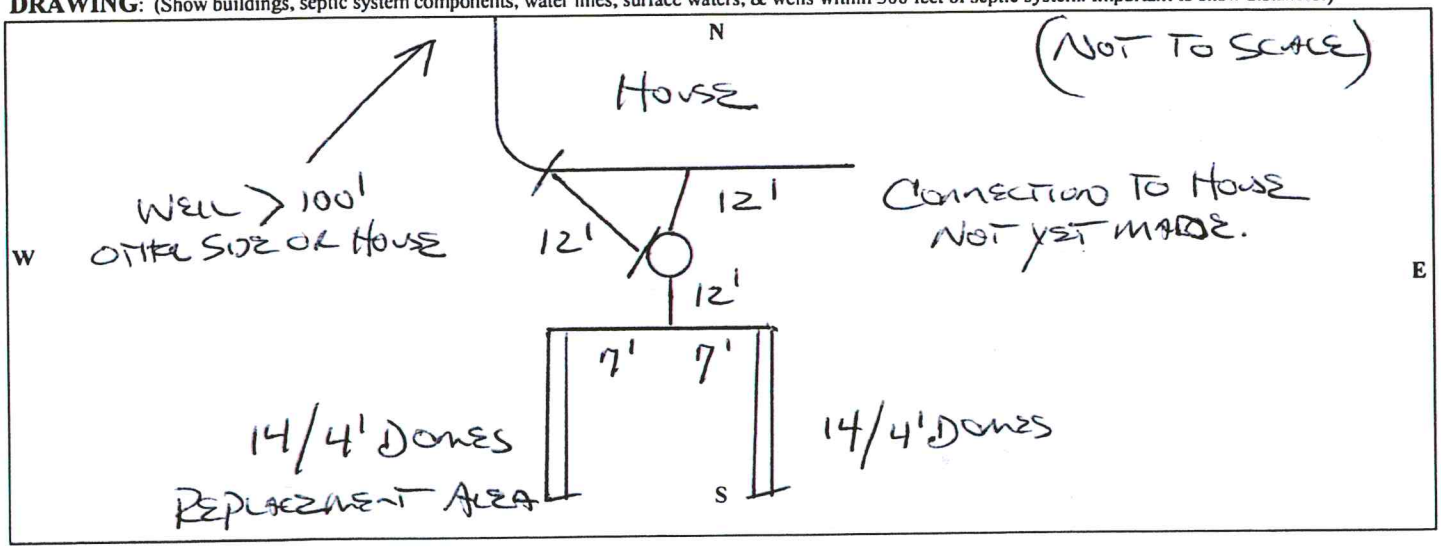
SEPTIC TANK INSPECTION

• Capacity Tank 1000 gallons. ATU — gpd. Septic Tank capacity = or greater than permit requirements?	(Yes)	No	N/A
• Was Septic Tank construction in compliance with State regulations and was tank State approved?	(Yes)	No	
• Were inlet and outlet properly sealed?	(Yes)	No	(1)
• Did Septic Tank meet minimum separation requirements as required by permit?	(Yes)	No	
• Was extension of manhole required? (Yes) (No) Depth from final grade to manhole. 1 feet			

SUBSURFACE DISPOSAL (DRAINFIELD) INSPECTION

• Type of Disposal System installed GRAVELLESS TRENCH	Meets permit requirements?	(Yes)	No N/A
• Disposal Area Size 336 Square Feet	In compliance with Permit Issued?	(Yes)	No
• Did Disposal System meet the minimum separation distance as required by the Permit?		(Yes)	No
• Was Disposal System constructed in compliance with the State Technical Guidance Manual?		(Yes)	No
• Maximum depth of Disposal System 3 Feet.	In compliance with Permit Issued?	(Yes)	No

DRAWING: (Show buildings, septic system components, water lines, surface waters, & wells within 300 feet of septic system. Important to show distances.)



SELF-INSPECTION; If given approval for self inspection, Installer certifies that information provided is accurate and system was installed as shown.

Installers Signature X _____ **License #:** _____ **Date:** _____

Official Use Only

Installed by: LAVOUSKY HERTZ License #: 26308

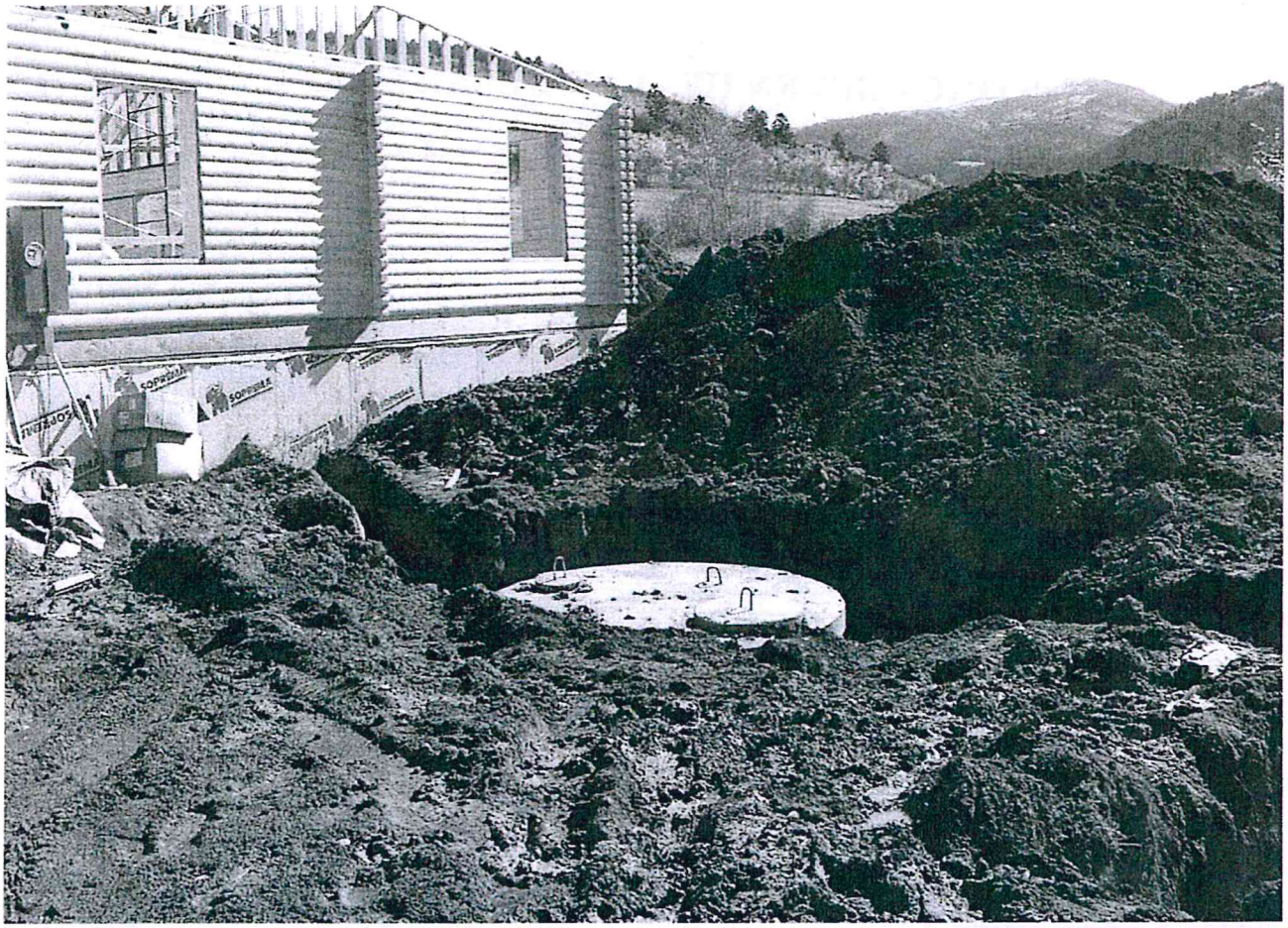
This System appears to:

1. Be in ***Substantial Compliance*** with permit and is approved.	(Yes)	
2. Have ***Minor deficiencies*** which could cause premature failure, but still in substantial compliance with Intent of Rules. Recommend that deficiencies be corrected, which could improve your system, but system is still approved.	Yes*	
3. Have ***Major deficiencies*** which violate the Intent of Rules and must be corrected, system not approved.	Yes*	

*See Comments

Comments (1) INLET SEALED PROPERLY, LINE NOT YET CONNECTED TO THE HOUSE.

INSPECTED/REVIEWED BY EHS: MEP #: 55 DATE: 5 OCT 06



DISTRICT SEVEN HEALTH DEPARTMENT
SEPTIC PERMIT

NOTE *THIS PERMIT IS ONLY VALID FOR ONE YEAR FROM DATE OF ISSUE and IS NOT TRANSFERABLE*

Installation shall comply with all the requirements of Idaho's Individual Subsurface Sewage Disposal Regulations as stated below.
Failure to install the system in compliance with permit may be grounds for disapproval and may result in further legal action being taken.

CDP No _____ T-Code: 232 Time: 10 Permit No 4106117 Receipt No 82302

Permit Issued To: Name MICHAEL HARRISON Phone (208) 201-4807

For Location: Address 1055 OLD Jackson HW City VICTOR Zip 83455

Legal Description: 1/4 Section — Section 15 Township 3N Range 46E

Subdivision — Lot — Block —

SEPTIC TANK SPECIFICATIONS (minimums)

Size of Septic Tank: 1000 gallons

Multiple tank (If using or required): — Total gallons
First tank: — gallons Second tank: — gallons

Pump Chamber (If required): — gallons

ATU: Company: — Model: —

SEWAGE DISPOSAL (DRAINFIELD) SPECIFICATIONS (minimums)

Type of *Standard & Basic Alternative* System Permitted: GRAVELESS TRENCH
* 40% REDUCTION ALLOWED FOR JONES CHAMBER SYSTEM → 336 SQFT

Type of Complex Alternative System Permitted: —

**Note* A licensed complex installer is required to install a complex system. A homeowner cannot install complex systems.*

MAXIMUM DEPTH OF EXCAVATION: 4 Feet
SOIL TYPE: Bc
DISTANCE TO NEAREST SURFACE WATER (explanation): NA

DISPOSAL AREA SIZE: 556/336* Sq. Ft.
APPLICATION RATE: 0.45 gals/day/ft2

SPECIAL CONDITIONS

INSPECTION REQUIRED BEFORE COVER

REFER TO EXPIRED PERMIT # 4104088. CALL IF YOU HAVE ANY QUESTIONS, 354-2220. READ REVERSE SIDE.

I hereby agree that the system will be installed as per the permit and will not make any changes from the permit without written approval from District 7. I also hereby authorize access to this property for purpose of inspection.

Applicant/Agent Signature X Michael Harrison

ISSUED BY EHS [signature] # 55 **Date Issued:** 5 OCT 06
Expiration Date: 5 OCT 07

Other requirements on reverse side of permit

3/17/06

Name of Permit Holder MICHAEL HARRISON **Permit #** 4106117

ON-SITE EVALUATION

Date(s) On-Site Evaluations Conducted.	10/5/06	/ /	/ /
Travel Time associated with evaluation.	20		
Inspection Time associated with evaluation.	10		

CURRENT LAND USE: PASTURE

SITE SUITABILITY:

Slope: Does slope prohibit installation of proposed system? Yes (No.)

Soil Types:

Based on SCS maps. Type A B C Unacceptable
Based on Engineering Report. Type A B C Unacceptable
Based on Test Hole. Type A (B) C Unacceptable

Test Hole Information:

Depth of Test hole. REFER TO PREVIOUS PERMIT # 4104088
Predominant soil type observed. SITE CONDITIONS CONSISTENT
Bedrock encountered. WITH PREVIOUS EVALUATION
Any ground water encountered. & PERMIT.
Other concerns.

Effective Soil Depth: Has sufficient soil depth below bottom of proposed system to meet rules? (Yes) No

Depth to nearest Groundwater. >10' **Depth to nearest impermeable layer.** >10'

Separation Distances: (Property has sufficient area for system and replacement to meet all separation requirements?)

Well location (owners property)	(Yes)	No	Nearest neighbor's well	(Yes)	No
Water Distribution lines	(Yes)	No	Downslope Cut or Scarp	(Yes)	No
Temporary Surface Waters	(Yes)	No	Property lines.	(Yes)	No
Permanent or Intermittent Surface Water	(Yes)	No			

PLOT PLAN: (Show proposed building sites, well location, septic site, replacement area, any surface waters, property lines, and utilities if known.)

PERMIT # 4104088 EXPIRES 8/23/06. NEW PERMIT PURCHASED.

Comments: INFO ABOUT THIS PROPERTY CONTAINED IN PREVIOUS ON-SITE EVALUATION & PERMIT

By EHS. WY 5 OCT 06

ON-SITE EVALUATION

Date(s) On-Site Evaluations Conducted.	8/20/04	__/__/__	__/__/__
Travel Time associated with evaluation.	45		
Inspection Time associated with evaluation.	15		

CURRENT LAND USE: Pasture

SITE SUITABILITY:

Slope: Does slope prohibit installation of proposed system? Yes (No)

Soil Types:

Based on SCS maps.	Type	A	(B)	C	Unacceptable
Based on Engineering Report.	Type	A	B	C	Unacceptable
Based on Test Hole.	Type	A	B	C	Unacceptable

Test Hole Information: (If applicable)

Depth of Test hole: _____

Predominant soil type observed: _____

Bedrock encountered: _____

Any ground water encountered: _____

Other concerns: _____

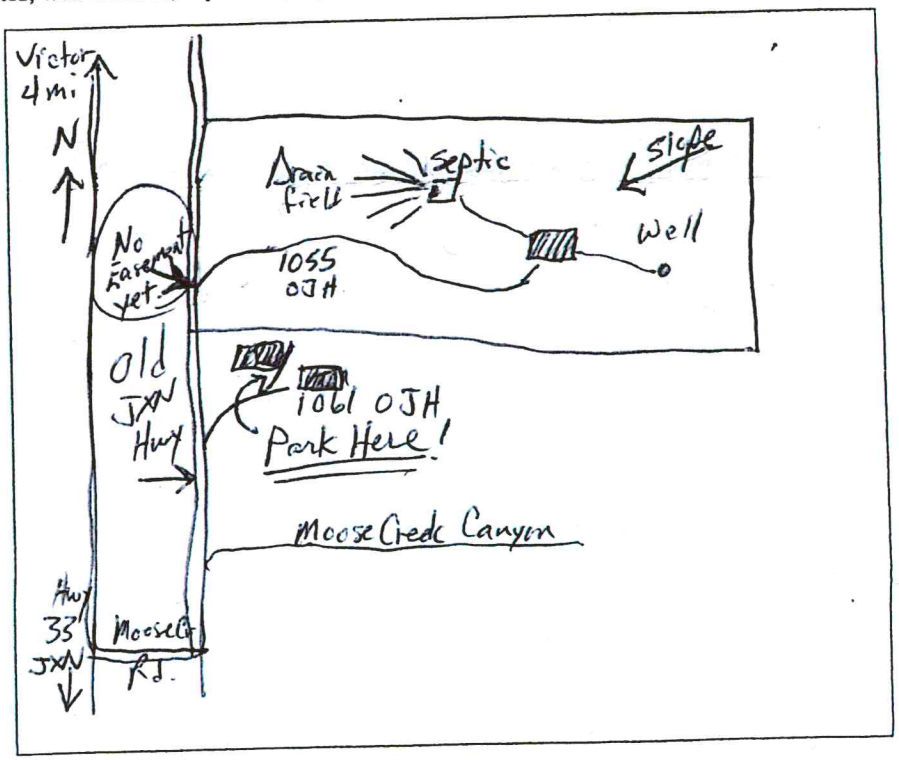
Effective Soil Depth: Has sufficient soil depth below bottom of proposed system to meet rules? (Yes) No

Depth to nearest Groundwater. 715 **Depth to nearest impermeable layer.** 715

Separation Distances: (Property has sufficient area for system and replacement to meet all separation requirements?)

Well location (owners property)	(Yes)	No	Nearest neighbor's well	(Yes)	No
Water Distribution lines	(Yes)	No	Downslope Cut or Scarp	(Yes)	No
Temporary Surface Waters	(Yes)	No	Property lines.	(Yes)	No
Permanent or Intermittent Surface Water	(Yes)	No.			

PLOT PLAN: (Show proposed building sites, well location, septic site, replacement area, any surface waters, property lines, and utilities if known.)



Comments: _____

By EHS. _____

APPENDIX C

IDWR WELL DRILLER REPORTS

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

22

Office Use Only
Well ID No.
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0037870
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Todd Stiff
Address 1021 Old Jackson Hwy
City Victor State ____ Zip 83455

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 3 North ☒ or South ☐
Rge. 46 East ☒ or West ☐
Sec. 19, ____ 1/4 (10 acres) SW 1/4 (40 acres) SE 1/4 (160 acres)
Gov't Lot ____ County Teton
Lat: : : Long: : :
Address of Well Site Same As Above
City
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD:
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0	20	400 lb	over Bore

Was drive shoe used? ☐Y ☐N Shoe Depth(s)
Was drive shoe seal tested? ☐Y ☐N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6	+2	38	200	Steel	☒	☐	☒	☐
5	-8	108	150	Steel	☐	☒	☒	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe
Packer ☐Y ☐N Type

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method
Screen Type & Method of Installation

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
108	60	1/8x8	30	5"	Steel	☐	☒
						☐	☐
						☐	☐

10. ~~FILTER PACK~~

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
12 ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices:

12. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
15-18	4/50 @	250	2 hrs

Water Temp. Cool Bottom hole temp Cool
Water Quality test or comments:
Depth first Water Encountered 20'

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8	0	20	Sand & gravel	X	
6	20	38	Sand & gravel w/ Boulders	X	
6	38	43	Bed Rock trace Limestone		X
6	84	88	Brn Clay	X	
6	88	105	Sand & gravel w/ Clays		
6	105	120	Sand & gravel w/ Clays Boul	X	
5	112	120	Sand & gravel w/o Clays & Boulder		

RECEIVED
NOV 28 2005
Department of Water Resources
Eastern Region

Completed Depth 120' (Measurable)
Date: Started 11-9-05 Completed 11-23-05

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Mark Mitchell Weirdr Firm No. 662
Principal Driller [signature] Date 11-23-05
and
Driller or Operator II ____ Date ____
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

22

Form 238-7
11/97

DMO

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 00 11702
DRILLING PERMIT NO. 763-128
Other IDWR No. _____

2. OWNER:
Name Travis Van Orden
Address 1052 Jackson Hiway
City Victor State ID Zip 83455

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 3 North ☒ or South ☐
Rge. 46 East ☒ or West ☐
Sec. 19, ____ 1/4 SW 1/4 SE 1/4
Gov't Lot ____ County Teton
Lat: : : Long: : :
Address of Well Site _____
City _____
(Give at least name of road + Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. Name _____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or	METHOD
bentonite	0	40	20	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 148, 160
Was drive shoe seal tested? ☐ Y ☒ N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6	+2	148	250	steel	☒	☐	☒	☐
4	38	148	250	steel	☒	☐	☒	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
Perforations Method _____
Screens Screen Type _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
30 ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: well cap

11. WELL TESTS:
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
7	130	160	4 days

Water Temp. 48° Bottom hole temp. _____
Water Quality test or comments: _____
Depth first Water Encounter 30

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8	0	20	clay & Boulders		X
8	20	28	boulders		X
8	28	60	sand & clay		X
8	60	90	boulders & clay		X
6	90	120	clay		X
6	120	148	clay & sand		X
6	148	160	grey mountain Rock		X
6	160	190	grey mountain Rock	X	
6	190	200	grey sticky clay		X

Finished
7 PM
RECEIVED
MAR 20 2000
Department of Water Resources

Completed Depth 200' (Measurable)
Date: Started 1-18-2000 Completed 1-29-2000

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name High Plains Firm No 299
Firm Official Marcus Tanner Date 1-30-2000
and
Driller or Operator _____ Date _____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
3/95

DMD

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

057412

Office Use Only
Inspected by
Twp ____ Rge ____ Sec ____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 22 - 96 - E - 0128 - 000
Other IDWR No.

2. OWNER:
Name William R. Miller
Address Box 371
City Mucan State Wy Zip 83013

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 3 North ☒ or South ☐
Rge. 46 East ☒ or West ☐
Sec. 19 ____ 1/4 SW 1/4 NE 1/4
(10 acres / 40 acres / 160 acres)
Gov't Lot ____ County Teton
Lat: : : Long: : :
Address of Well Site Moose Creek Rd City
(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name Tract #4 Miles Dustin Sub Div

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	20'	1000 LBS	Outer Bore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s)
Was drive shoe seal tested? ☐ Y ☒ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	96'	.220	Steel	☒	☐	☐	☐
5"	95'	200'	.250	Steel	☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS
☒ Perforations Method Torch
☐ Screens Screen Type

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
182'	198'	⅛ x 4"	3 per over	2"		☒	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
55' ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices:

11. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments:
Depth first Water Encountered ____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0	8'	Clay		X
8"	8"	25'	Clay Gravel		X
8"	25'	30'	Clay Sand Gravel	X	
8"	30'	45'	Clay		
8"	45'	62'	Clay Gravel		
8"	62'	95'	Rock		
6"	95	110'	Rock		
6"	110	145'	Clay Sand		
6"	145'	155'	Yellow Clay		
6"	155'	180'	Clay Sand		
6"	180	200	Fractured Rock	X	

RECEIVED
OCT 28 1996
Department of Water Resources

RECEIVED
OCT 10 1996
Department of Water Resources
Eastern District Office

MICROFILMED
DEC 06 1996

Completed Depth 200' (Measurable)
Date: Started 9/12/96 Completed

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Denning Drilling Inc Firm No. 518
Firm Official Daniel Denning Date
and
Supervisor or Operator Date
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0023852
Drilling Permit No. _____
Water right or injection well # _____
2. OWNER: Tom + Linda Woolstenhulme
Name _____
Address 10150 Old Jackson Hwy
City Victor State ID Zip 83
3. WELL LOCATION:
Twp. 3 North ☒ or South ☐ Rge. 46 East ☒ or West ☐
Sec. 19 _____ 1/4 SE 1/4 NW 1/4
Gov't Lot _____ County Teton
Lat. 43 ° 34.33 (Deg. and Decimal minutes)
Long. 111 ° 04.31 (Deg. and Decimal minutes)
Address of Well Site 10150 Old Jackson Hwy
(Give at least name of road + Distance to Road or Landmark) City Victor
Lot _____ Blk. _____ Sub. Name _____
4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection
☐ Other _____
5. TYPE OF WORK:
☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other _____
6. DRILL METHOD:
☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other _____
7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
bentonite	0'	38'	1100 lbs.	10" temp
cement	138'	148'	4 yard	under reamed

Grout 80 gallons dissipates in formation

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+2'	148'	250	steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 148'
9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method _____
Manufactured screen ☐ Y ☒ N Type _____
Method of installation _____

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule

Length of Headpipe _____ Length of Tailpipe _____
Packer ☐ Y ☒ N Type _____
10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method

11. FLOWING ARTESIAN:
Flowing Artesian? ☒ Y Artesian Pressure (PSIG) _____
Describe control device Well seal w/ valve

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft) 4' Static water level (ft) N/A
Water temp. (°F) _____ Bottom hole temp. (°F) _____
Describe access port _____
Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Test method: Pump	Bailer	Air	Flowing artesian
100'	30+	120 min.	☐	☐	☒	☐
			☐	☐	☐	☐

Water quality test or comments: _____
13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
10"	0'	38'	clay + boulders	X	
6"	38'	65'	fractured boulders	X	
6"	65'	75'	dark brown rock		X
6"	75'	95'	clay + gravels	X	
6"	95'	118'	boulders	X	
6"	118'	138'	light brown clay + gravel	X	
7+	138'	148'	conglomerate	X	
6"	148'	160'	conglomerate	dry	

RECEIVED
JUN 22 2017
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 160'
Date Started: 5-25-17 Date Completed: 5-30-17
14. DRILLER'S CERTIFICATION:
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name Dewayne D. Hinton Co. No. 518
*Principal Driller Dewayne D. Hinton Date 5-31-17
*Driller John Bunn Date 5-30-17
*Operator II _____ Date _____
Operator I _____ Date _____
* Signature of Principal Driller and rig operator are required.

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

22

Office Use Only
Well ID No.
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0044264
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Gabrial Vazquez c/o Jason Stalker Const.
Address 174 East Peterson Lane
City Sugar City State Id Zip 83448

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 3 North ☑ or South ☐
Rge. 44 East ☑ or West ☐
Sec. 19, ____ 1/4 (10 acres) SW 1/4 (40 acres) NE 1/4 (160 acres)
Gov't Lot ____ County ____
Lat: : : Long: : :
Address of Well Site 1019 Colter Trail
(Moose Creek) City Victor
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name Colter Park

4. USE:
☑ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply (Replacement etc.)
☐ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD:
☑ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0'	20'	300#	Overbore

Was drive shoe used? ☑ Y ☐ N Shoe Depth(s) 140'
Was drive shoe seal tested? ☐ Y ☐ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1'	140'	250		☑	☐	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____
Packer ☐ Y ☐ N Type

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method
Screen Type & Method of Installation

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
12' ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices:
Well Cap

12. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments:
Depth first Water Encounter ____

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0'	26'	Cobbles boulders		X
6"	26'	48'	Cobbles, boulders	X	
6"	48'	68'	Cobbles, boulders		
6"	68'	88'	Cobbles, boulders		
6"	88'	108'	Cobbles boulders		
6"	108'	128'	Cobbles		
6"	128'	136'	Cobbles		
6"	136	140'	Bed Rock, (Rhyolite)	X	

RECEIVED
OCT 30 2006
Department of Water Resources
Eastern Region

Completed Depth 140' (Measurable)
Date: Started 10-5-06 Completed 10-6-06

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name Denning Drilling Firm No. 518
Principal Driller [signature] Date 10-6-06
and
Driller or Operator II [signature] Date 10-6-06
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0073875
Drilling Permit No.
Water right or injection well #
2. OWNER: Robert K Rothfuss
Name
Address 8254 South 300E
City Sandy State UT Zip 84070
3. WELL LOCATION:
Twp. 3 North ☒ or South ☐ Rge. 46 East ☒ or West ☐
Sec. 19 10 acres 1/4 40 acres SE 1/4 160 acres SE 1/4
Gov't Lot County Teton
Lat. 43° 33.836 (Deg and Decimal minutes)
Long. 111° 3.777 (Deg and Decimal minutes)
Address of Well Site corner of Old Jackson Hwy & 10800 South City Victor
(Give at least two of road + Distance to Road or Landmark)
Lot. Blk. Sub Name
4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection
☐ Other
5. TYPE OF WORK:
☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other
6. DRILL METHOD:
☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other
7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
bentonite	0'	38'	1100 lbs	12" tremie

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
8"	+2	38'	.223	steel	☒	☐	☐	☒
6"	36'	210'	.250	steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 210'
9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method
Manufactured screen ☐ Y ☒ N Type
Method of installation

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule

Length of Headpipe Length of Tailpipe
Packer ☐ Y ☒ N Type
10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method

11. FLOWING ARTESIAN:
Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG)
Describe control device

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft) 10' Static water level (ft) 10'
Water temp (°F) Bottom hole temp. (°F)
Describe access port
Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Test method: Pump	Bailer	Air	Flowing artesian
200'	15 gpm	60 min.	☐	☐	☒	☐
			☐	☐	☐	☐

Water quality test or comments:
13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
12"	0'	20'	large boulders	X	
	20'	38'	rock clay stone	X	
8"	38'	150'	red, shale soft	X	
	150'	175'	light brown rock	X	
	175'	210'	broken rock	X	
6"	210'	220'	fractured rock	X	

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Eastern Region

Completed Depth (Measurable): 220'
Date Started: 7-21-17 Date Completed: 7-25-17
14. DRILLER'S CERTIFICATION:
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name David L Denney Drilling No 518
*Principal Driller David L Denney Date 8-2-17
*Driller Jake Denney Date 7-25-17
*Operator II Date
Operator I Date
* Signature of Principal Driller and rig operator are required

Form 238-7
4/92

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER
Name Bill Carpentar
Address 1032 S. Hwy 33 Victor, Id 83455
Drilling Permit No. 2293E-064-000
Water Right Permit No. _____

2. NATURE OF WORK
☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase ☐ Modification
☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)

3. PROPOSED USE
☒ Domestic ☐ Irrigation ☐ Monitor
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED
☐ Rotary ☐ Air ☐ Auger ☐ Reverse rotary
☒ Cable ☐ Mud ☐ Other _____ (backhoe, hydraulic, etc.)

5. WELL CONSTRUCTION
Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.250 inches	6 inches	+ 0 feet	83 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation? _____ inches by _____ inches

Number		From	To
_____	perforations	_____ feet	_____ feet
_____	perforations	_____ feet	_____ feet
_____	perforations	_____ feet	_____ feet

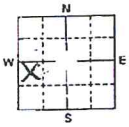
Well screen installed? ☐ Yes ☒ No
Manufacturer _____ Type _____
Top Packer or Headpipe _____
Bottom of Tailpipe _____

Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Gravel packed? ☐ Yes ☐ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet

Surface seal depth 20 Material used in seal: ☐ Cement grout
☒ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit
☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded
☐ Solvent Weld ☐ Cemented between strata

Describe access port _____

6. LOCATION OF WELL
FEB 09 1994
Sketch map location must agree with written location.



Subdivision Name Woolstenhume Subdivision
Lot No. 3 Block No. _____
County Teton
Address of Well Site _____ (give at least name of road)
SW ¼ NW ¼ Sec. 19 T. 3 N ☒ or S ☐ R. 46EBM E ☐ or W ☐

7. WATER LEVEL
Static water level 40 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature _____ °F. Quality _____
Describe artesian or temperature zones below

8. WELL TEST DATA
☒ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
12	78	30

106985

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
6	0	14	topsoil		X
	14	18	brown clay gravel & big rocks		X
	18	40	white clay & gravel		X
	40	45	red clay & gravel		X
	45	60	red clay		X
	60	65	tan clay & coarse sand	X	
	65	80	tan clay & coarse black sandy gravel	X	

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Department of Water Resources
Eastern District Office
RECEIVED
AUG 09 1993
Department of Water Resources

10.
Work started June 10,93 finished July 20,93

11. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Firm Name Teton Water Works Firm No. 506
Address Shelley, ID Date 7/21/93
Signed by Drilling Supervisor _____
and
(Operator) _____ (If different than the Drilling Supervisor)

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0071270
Drilling Permit No. _____
Water right or injection well # _____
2. OWNER: Siddoway Sheep Company, Inc
Name _____
Address 1764 East 1200 N
City Teton State ID Zip 83450
3. WELL LOCATION:
Twp 3 North ☒ or South ☐ Rge. 46 East ☒ or West ☐
Sec. 20 SW 1/4 SE 1/4 SW 1/4
Gov't Lot _____ County Teton
Lat. 43 ° 33.816 (Deg. and Decimal minutes)
Long. 111 ° 3.197 (Deg. and Decimal minutes)
Address of Well Site 2233 E. 1080 S.
(Give at least name of road + Distance to Road or Landmark) City Victor
Lot _____ Blk. _____ Sub. Name _____
4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection
☐ Other _____
5. TYPE OF WORK:
☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other _____
6. DRILL METHOD:
☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other _____
7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
bentonite	0'	38'	1200 lbs.	10" temp. casing

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+2'	78'	250	steel	☒	☐	☐	☒
4½"	60'	260'	40	pvc	☐	☒	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 78'
9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method _____
Manufactured screen ☒ Y ☐ N Type Certalock
Method of installation lowed to bottom

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
180'	260'	.020	4	4½	pvc	40

Length of Headpipe _____ Length of Tailpipe _____
Packer ☐ Y ☒ N Type _____
10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method

11. FLOWING ARTESIAN:
Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) _____
Describe control device _____

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft) 8' Static water level (ft) 8'
Water temp. (°F) _____ Bottom hole temp. (°F) _____
Describe access port _____
Well test: **Test method:**

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
240'	20+	45 min.	☐	☐	☒	☐
			☐	☐	☐	☐

Water quality test or comments: _____
13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
10"	0'	30'	clay + boulders	X	
	30'	38'	hard rock	X	
6"	38'	145'	red basalt	X	
	145'	180'	grey rock	X	
	180'	260'	broken red cinder	X	

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SEP 06 2016
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 260'
Date Started: 8-19-16 Date Completed: 8-23-16
14. DRILLER'S CERTIFICATION:
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name Downing Drilling Co. No. 518
*Principal Driller _____ Date 8-29-16
*Driller _____ Date 8-23-16
*Operator II _____ Date _____
Operator I _____ Date _____
* Signature of Principal Driller and rig operator are required.

Form 238-7 11/91

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

USE TYPEWRITER OR BALLPOINT PEN

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Lyndell Klingler
Address P.O. Box 8271 Jackson Wyo.
Drilling Permit No. 22-92-G-099
Water Right Permit No. ______

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase ☐ Modification
☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Monitor
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other ______ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Auger ☐ Reverse rotary
☐ Cable ☐ Mud ☐ Other ______ (backhoe, hydraulic, etc.)

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other ______

Thickness	Diameter	From	To
.250" inches	6" inches	+ 1 feet	60' feet
.250" inches	5" inches	57' feet	120' feet
inches	inches	feet	feet

Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☒ Yes ☐ No
How perforated? ☐ Factory ☒ Knife ☐ Torch ☐ Gun
Size of perforation? 1/4" inches by 2" inches

Number		From	To
4 per ft.	perforations	60' feet	118' feet
	perforations	feet	feet
	perforations	feet	feet

Well screen installed? ☐ Yes ☒ No
Manufacturer ______ Type ______
Top Packer or Headpipe ______
Bottom of Tailpipe ______

Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel ______
Placed from ______ feet to ______ feet

Surface seal depth 20' Material used in seal: ☐ Cement grout
☒ Bentonite ☐ Puddling clay ☐ ______
Sealing procedure used: ☐ Slurry pit
☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded
☐ Solvent Weld ☐ Cemented between strata

Describe access port ______

6. LOCATION OF WELL

Sketch map location must agree with written location.

Subdivision Name T-C
well site - 123 Purple Aster Circle
Lot No. 2 Block No. 2

County Teton

SE 1/4 SE 1/4 Sec. 19, T. 3 N ☒ S ☐ R. 45 E ☒ W ☐

7. WATER LEVEL

Static water level 30' feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow ______
Artesian closed-in pressure ______ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature ______ °F. Quality ______
Describe artesian or temperature zones below.

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other ______

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG 84903

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
8"	0	55'	Clay & Boulders first water 30'	X	
6"	55'	70'	Shale Rock		X
6"	70'	75'	Clay + Gravel	X	
6"	75'	110'	Shale		X
6"	110	120'	Fractured Shale	X	

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RECEIVED JUL 27 1992 Department of Water Resources Eastern District Office

RECEIVED DEC 03 1992

10. Work started 7-9-92 finished 7-11-92

11. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Dunning Drilling Firm No. 10
Address Box 410 Iona Idaho Date 7-?-92
Signed by Drilling Supervisor [signature]
and
(Operator) [signature]
(If different than the Drilling Supervisor)

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238-7 6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

22

Office Use Only
Well ID No. ______
Inspected by ______
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0035647

DRILLING PERMIT NO. ______

Water Right or Injection Well No. ______

2. OWNER:

Name DOUG Colonel

Address P.O. BOX 111

City MOOSE State WYO Zip 83012

3. LOCATION OF WELL by legal description:

You must provide address or Lot, Blk, Sub. or Directions to well.

Twp. 3N North ☐ or South ☐

Rge. 46E East ☐ or West ☐

Sec. 19, ____ 1/4 (10 acres) SW 1/4 (40 acres) NE 1/4 (160 acres)

Gov't Lot ______ County TETON

Lat: : : Long: : :

Address of Well Site DUSTIN SUB.

______ City ______

(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name ______

4. USE:

☑ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other ______

5. TYPE OF WORK check all that apply (Replacement etc.)

☑ New Well ☐ Modify ☐ Abandonment ☐ Other ______

6. DRILL METHOD:

☑ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ______

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
BETONITE	0	20	300#	overbore

Was drive shoe used? ☐Y ☐N Shoe Depth(s) ______

Was drive shoe seal tested? ☐Y ☐N How? ______

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1'	43'	.025	STEEL	☑	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ______ Length of Tailpipe ______

Packer ☐Y ☐N Type ______

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method ______

Screen Type & Method of Installation ______

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

15' ft. below ground Artesian pressure ______ lb.

Depth flow encountered ______ ft. Describe access port or control devices: ______

12. WELL TESTS:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ______ Bottom hole temp. ______

Water Quality test or comments: ______

______ Depth first Water Encounter ______

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0'	20'	BOLDERS		X
6"	20'	40'	BOLDERS / GRAVELS	X	

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NOV 22 2004

Department of Water Resources
Eastern Region

Completed Depth 80' (Measurable)

Date: Started 11-10-04 Completed 11-11-04

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name DENNING WELL DRILLING Firm No. 518

Principal Driller [signature] Date 11-11-04

and

Driller or Operator II [signature] Date 11-11-04

Operator I ______ Date ______

Principal Driller and Rig Operator *Required.*

Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
3/95

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT
Use Typewriter or Ballpoint Pen

57060

Office Use Only
Inspected by _____
Twp ____ Rge ____ Sec ____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 22-96-E-0109-000
Other IDWR No. _____

2. OWNER:
Name BRIAN Foss
Address PO, Box 8726
City Jackson State Wyo Zip 83001

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 3 North ☒ or South ☐
Rge. 46 East ☒ or West ☐
Sec. 19, ____ 1/4 SW 1/4 NE 1/4
(10 acres, 40 acres, 160 acres)
Gov't Lot ____ County Teton
Lat: : : Long: : :

Address of Well Site _____
So of Victor City Victor
(Give at least name of road + Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. Name T-C Sub

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0'	80'	400LBS	OverBore

Was drive shoe used? ☒Y ☐N Shoe Depth(s) _____
Was drive shoe seal tested? ☐Y ☒N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1'	100'	.250	Steel	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
☐ Perforations Method _____
☐ Screens Screen Type _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
19' ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Describe access port or control devices: _____

11. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. _____ Bottom hole temp. _____
Water Quality test or comments: _____
Depth first Water Encountered _____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0'	20'	Boulders Clay Gravel		X
6"	20'	100'	Clay Gravel Cobble Rocks	1	

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SEP 13 1996
Department of Water Resources

RECEIVED
SEP 06 1996
Department of Water Resources
Eastern Region

Completed Depth 100' (Measurable)
Date: Started 8-6-96 Completed 8-6-96

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Denning Drilling Inc Firm No. 518
Firm Official Dennis Denning Date 8-6-96
and
Supervisor or Operator _____ Date _____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

APPENDIX D

EXCERPTS FROM REFERENCE DOCUMENTS

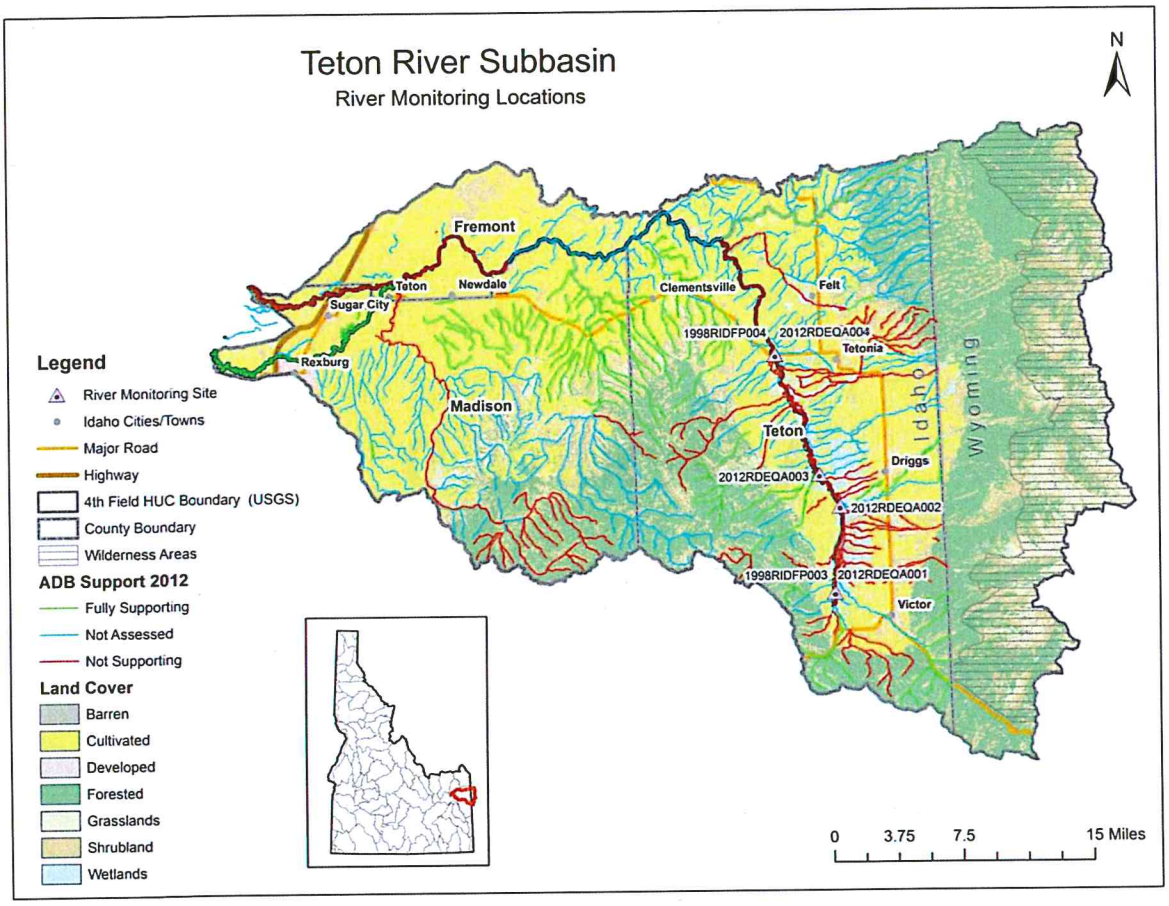

Figure 21. River monitoring locations, 1998 and 2012.

4.2.5 Friends of the Teton River

FTR have been regularly monitoring water quality in the Teton River subbasin since 2002. Water quality data are collected 2–4 times per year at multiple locations within the subbasin, including the Wyoming portion of the subbasin. There are 12 sample locations (see bullet list below and Figure 22.) FTR laboratory information and detection limits are listed in Table 13. FTR data are summarized in Appendix D and analyses of the nutrient data are included in Appendix I. Raw data, maps, and laboratory information were supplied by FTR; data were summarized by DEQ staff. The detection limit value was used in the descriptive statistics summarization; no attempt was made to estimate a value below that detection limit based on distribution (i.e., normally distributed).

Site Locations

- DAR = Darby Creek (in Wyoming)
- FISH = Fish Creek
- FOX 1 = Fox Creek (downstream)
- FOX 2 = Fox Creek (upstream, in Wyoming)
- SIX = Six Springs
- TC2 = Teton Creek (in Wyoming)

- TR1 = Teton River (below confluence Warm and Drake Creeks)
- TR2 = Teton River (South Bates Road)
- TR3 = Teton River (Bates Road)
- TR4 = Teton River (Highway 33)
- WARM = Warm Creek
- WOODS = Woods Creek

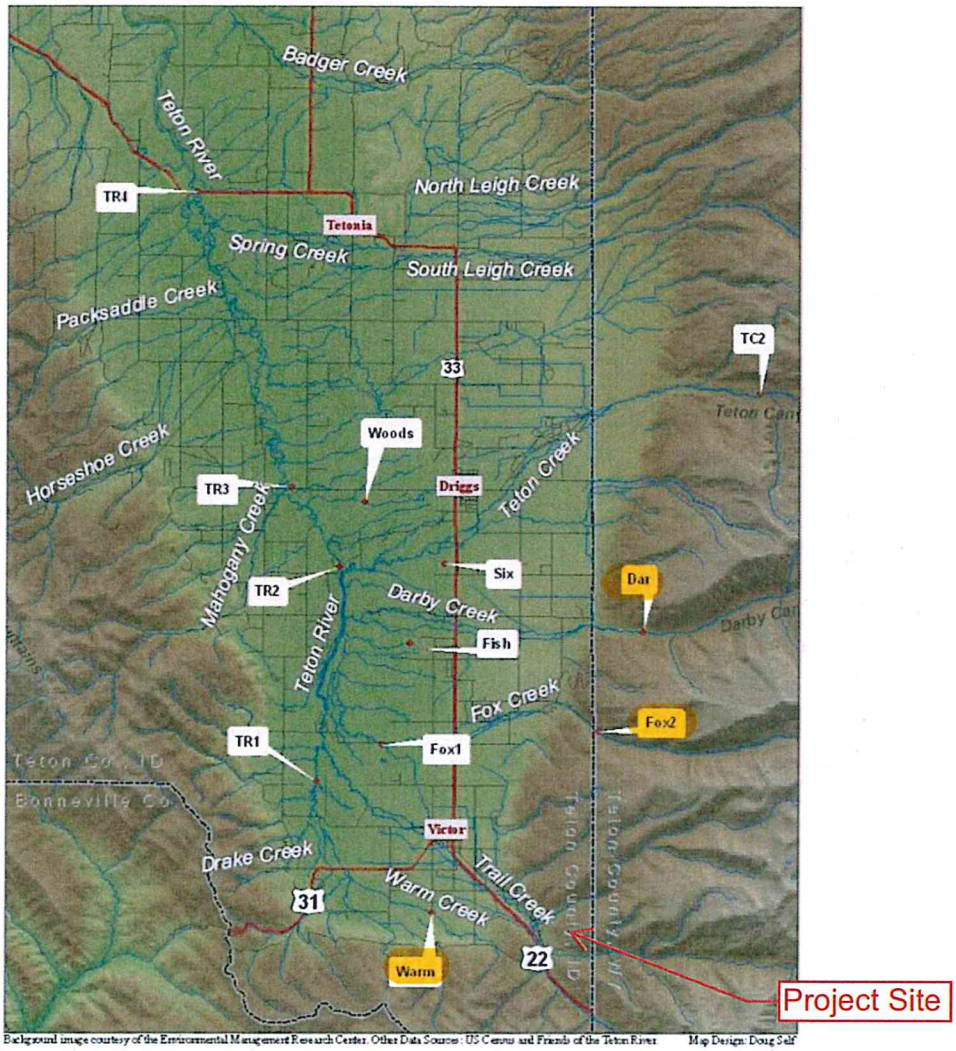

Figure 22. FTR map of sample locations within the upper Teton River valley.

Table D4. FTR nitrogen monitoring measurements (2002–2013).

Variable	Site	Count	Mean	Minimum	Median	Maximum	Count Below Detection	Standard Deviation
Ammonia:N (mg/L)	DAR	39	0.05	0.05	0.05	0.05	38	0.000
	FISH	45	0.05	0.05	0.05	0.07	43	0.003
	FOX 1	45	0.05	0.05	0.05	0.06	43	0.002
	FOX 2	43	0.05	0.05	0.05	0.05	39	0.000
	SIX	46	0.05	0.05	0.05	0.05	1	0.000
	TC2	37	0.05	0.05	0.05	0.05	44	0.000
	TR1	49	0.05	0.05	0.05	0.10	35	0.008
	TR2	27	0.07	0.05	0.05	0.21	44	0.036
	TR3	50	0.06	0.05	0.05	0.15	13	0.028
	TR4	48	0.06	0.05	0.05	0.13	35	0.020
	WARM	45	0.05	0.05	0.05	0.05	35	0.000
	WOODS	44	0.36	0.05	0.05	3.73	44	0.711
NO_2+NO_3:N (mg/L)	DAR	39	0.50	0.05	0.49	1.18	1	0.313
	FISH	45	0.89	0.14	0.72	2.01		0.497
	FOX 1	45	1.96	0.12	2.03	2.62		0.467
	FOX 2	43	0.51	0.05	0.47	1.78	2	0.365
	SIX	46	3.68	1.08	3.76	5.61		0.834
	TC2	37	0.44	0.05	0.44	1.10		0.315
	TR1	49	1.56	0.85	1.51	2.39	2	0.349
	TR2	27	1.33	0.52	1.40	1.80		0.311
	TR3	50	1.13	0.44	1.08	1.70		0.291
	TR4	48	0.91	0.14	0.86	1.94		0.351
	WARM	45	0.34	0.05	0.22	1.40		0.339
	WOODS	44	1.21	0.53	1.16	2.52	16	0.387

Table D5. FTR phosphorus monitoring measurements (2002–2013).

Variable	Site	Count	Mean	Minimum	Median	Maximum	Count Below Detection	Standard Deviation
Ortho-phos:P (mg/L)	DAR	39	0.05	0.01	0.05	0.05	18	0.013
	FISH	45	0.05	0.01	0.05	0.05	25	0.011
	FOX 1	45	0.05	0.01	0.05	0.05	24	0.011
	FOX 2	43	0.05	0.01	0.05	0.05	19	0.012
	SIX	46	0.05	0.01	0.05	0.05	1	0.011
	TC2	37	0.05	0.01	0.05	0.05	25	0.014
	TR1	49	0.05	0.01	0.05	0.05	16	0.011
	TR2	27	0.05	0.05	0.05	0.05	25	0.000
	TR3	50	0.05	0.01	0.05	0.08	22	0.013
	TR4	48	0.05	0.01	0.05	0.05	24	0.012
	WARM	45	0.05	0.01	0.05	0.05	23	0.011
	WOODS	44	0.13	0.04	0.11	0.52	25	0.106
T-phos:P (mg/L)	DAR	39	0.04	0.01	0.05	0.08	20	0.016
	FISH	45	0.05	0.01	0.05	0.10	20	0.020
	FOX 1	45	0.04	0.01	0.05	0.08	25	0.014
	FOX 2	43	0.05	0.01	0.05	0.37	20	0.055
	SIX	46	0.04	0.01	0.05	0.05	1	0.014
	TC2	37	0.04	0.01	0.04	0.10	27	0.018
	TR1	49	0.05	0.01	0.05	0.15	19	0.024
	TR2	27	0.05	0.05	0.05	0.06	24	0.003
	TR3	50	0.05	0.01	0.05	0.12	23	0.021
	TR4	48	0.04	0.01	0.05	0.12	26	0.019
	WARM	45	0.04	0.01	0.05	0.07	27	0.015
	WOODS	44	0.17	0.02	0.16	0.50	27	0.111

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USGS 13051000 TRAIL CREEK NR VICTOR ID

Available data for this site Time-series: Monthly statistics ▼ GO

Teton County, Idaho
Hydrologic Unit Code 17040204
Latitude 43°33'48", Longitude 111°04'06" NAD27
Drainage area 47.6 square miles
Contributing drainage area 47.6 square miles
Gage datum 6,470 feet above NGVD29

Output formats
HTML table of all data
Tab-separated data
Reselect output format

00060, Discharge, cubic feet per second,

YEAR	Monthly mean in ft3/s (Calculation Period: 1946-06-01 -> 1952-10-31)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1946						232.7	113.8	65.7	50.9	49.6	40.9	39.2
1947	36.6	33.0	32.9	44.3	221.2	230.6	126.5	73.7	55.9	49.0	42.1	37.3
1948	37.5	35.5	34.0	38.8	164.0	278.9	114.3	66.7	55.5	48.6	42.9	36.0
1949	33.5	32.1	29.8	53.4	193.1	231.3	112.8	67.6	50.7	48.3	43.5	39.8
1950	36.7	33.0	33.0	42.3	106.4	282.3	205.8	80.6	59.5	52.0	45.6	41.6
1951	35.6	35.7	34.6	46.1	147.9	261.1	163.7	83.8	63.4	54.3	48.1	44.8
1952	37.9	35.7	31.6	43.2	180.0	276.8	117.5	71.5	54.9	44.8		
Mean of monthly Discharge	36	34	33	45	169	256	136	73	56	50	44	40

** No Incomplete data have been used for statistical calculation

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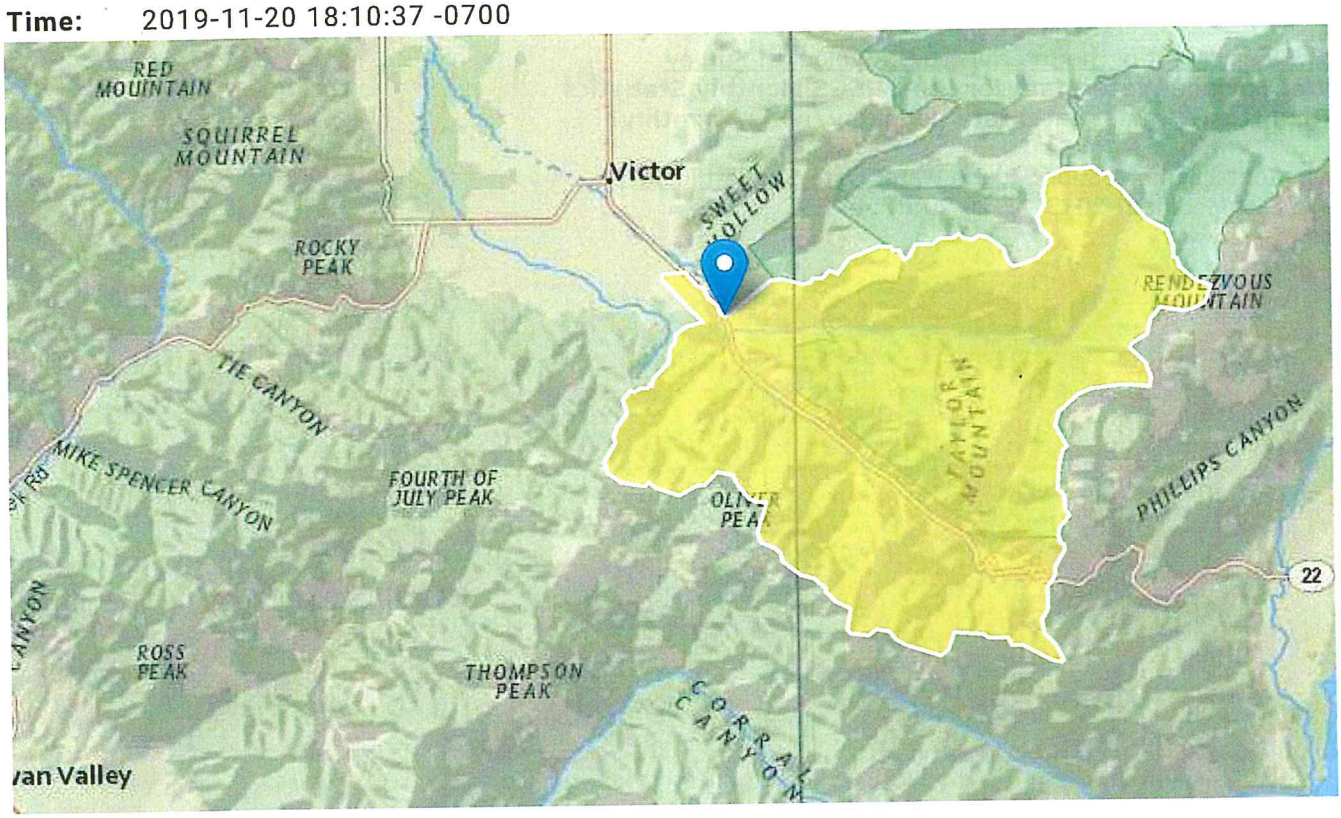
Title: Surface Water data for USA: USGS Monthly Statistics
URL: https://nwis.waterdata.usgs.gov/nwis/monthly?

Page Contact Information: Idaho Water Data Support Team
Page Last Modified: 2019-11-20 20:07:44 EST
0.33 0.2 nadww02

StreamStats Report - Trail Creek

Region ID: ID
Workspace ID: ID20191121011019370000
Clicked Point (Latitude, Longitude): 43.56749, -111.07038
Time: 2019-11-20 18:10:37 -0700



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	49.2	square miles
BSLDEM30M	Mean basin slope computed from 30 m DEM	40.5	percent
FOREST	Percentage of area covered by forest	60	percent
PRECIP	Mean Annual Precipitation	46.2	inches
ELEV	Mean Basin Elevation	8190	feet
SLOP30_30M	Percent area with slopes greater than 30 percent from 30-meter DEM.	70	percent

March Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56
ELEV	Mean Basin Elevation	8190	feet	5691.9	8951

March Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

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

Statistic	Value	Unit	SE
March 20 Percent Duration	56.7	ft^3/s	63.2
March 50 Percent Duration	48.1	ft^3/s	66.6
March 80 Percent Duration	41.8	ft^3/s	72.8

March Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

February Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56
ELEV	Mean Basin Elevation	8190	feet	5691.9	8951

February Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

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

Statistic	Value	Unit	SE

Statistic	Value	Unit	SE
February 20 Percent Duration	55	ft^3/s	67
February 50 Percent Duration	45.8	ft^3/s	74.3
February 80 Percent Duration	39.4	ft^3/s	82.8

February Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

April Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56
ELEV	Mean Basin Elevation	8190	feet	5691.9	8951
BSLDEM30M	Mean Basin Slope from 30m DEM	40.5	percent	6.15	53.2

April Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

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

Statistic	Value	Unit	SE
April 20 Percent Duration	102	ft^3/s	36.5
April 50 Percent Duration	63.3	ft^3/s	46.1
April 80 Percent Duration	42.7	ft^3/s	57.2

April Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

January Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56
ELEV	Mean Basin Elevation	8190	feet	5691.9	8951

January Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

PIl: Prediction Interval-Lower, Plu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE
January 20 Percent Duration	56.5	ft^3/s	66.8
January 50 Percent Duration	48	ft^3/s	74.8
January 80 Percent Duration	42.2	ft^3/s	85.8

January Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

December Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56
ELEV	Mean Basin Elevation	8190	feet	5691.9	8951

December Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

PIl: Prediction Interval-Lower, Plu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE
December 20 Percent Duration	61.3	ft^3/s	65.4
December 50 Percent Duration	52.6	ft^3/s	71.2
December 80 Percent Duration	47.1	ft^3/s	86.5

December Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

November Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56

November Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

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

Statistic	Value	Unit	SE
November 20 Percent Duration	76.2	ft^3/s	66.9
November 50 Percent Duration	67.1	ft^3/s	75.6
November 80 Percent Duration	56.5	ft^3/s	92

November Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

May Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56
ELEV	Mean Basin Elevation	8190	feet	5691.9	8951
BSLDEM30M	Mean Basin Slope from 30m DEM	40.5	percent	6.15	53.2

May Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

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

Statistic	Value	Unit	SE
May 20 Percent Duration	393	ft^3/s	59.3
May 50 Percent Duration	238	ft^3/s	60.2
May 80 Percent Duration	143	ft^3/s	60.3

May Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

June Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56
BSLDEM30M	Mean Basin Slope from 30m DEM	40.5	percent	6.15	53.2

June Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

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

Statistic	Value	Unit	SE
June 20 Percent Duration	771	ft^3/s	65.4
June 50 Percent Duration	567	ft^3/s	64.8
June 80 Percent Duration	355	ft^3/s	71

June Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

July Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56
SLOP30_30M	Slopes gt 30pct from 30m DEM	70	percent	1.2	86.6

July Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

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

Statistic	Value	Unit	SE
July 20 Percent Duration	368	ft^3/s	64.8
July 50 Percent Duration	255	ft^3/s	74.3
July 80 Percent Duration	189	ft^3/s	90.8

July Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

August Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56
SLOP30_30M	Slopes gt 30pct from 30m DEM	70	percent	1.2	86.6

August Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

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

Statistic	Value	Unit	SE
August 20 Percent Duration	182	ft^3/s	68.5
August 50 Percent Duration	158	ft^3/s	84.2
August 80 Percent Duration	114	ft^3/s	97.1

August Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

September Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56

September Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

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

Statistic	Value	Unit	SE
September 20 Percent Duration	100	ft^3/s	80.9
September 50 Percent Duration	77.6	ft^3/s	95.9
September 80 Percent Duration	63.5	ft^3/s	101

September Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

October Flow-Duration Statistics Parameters[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	49.2	square miles	6.6	874.8
FOREST	Percent Forest	60	percent	2.3	93.9
PRECIP	Mean Annual Precipitation	46.2	inches	14.2	56

October Flow-Duration Statistics Flow Report[100 Percent (49.1 square miles) Monthly Annual Region 8 2001 4093]

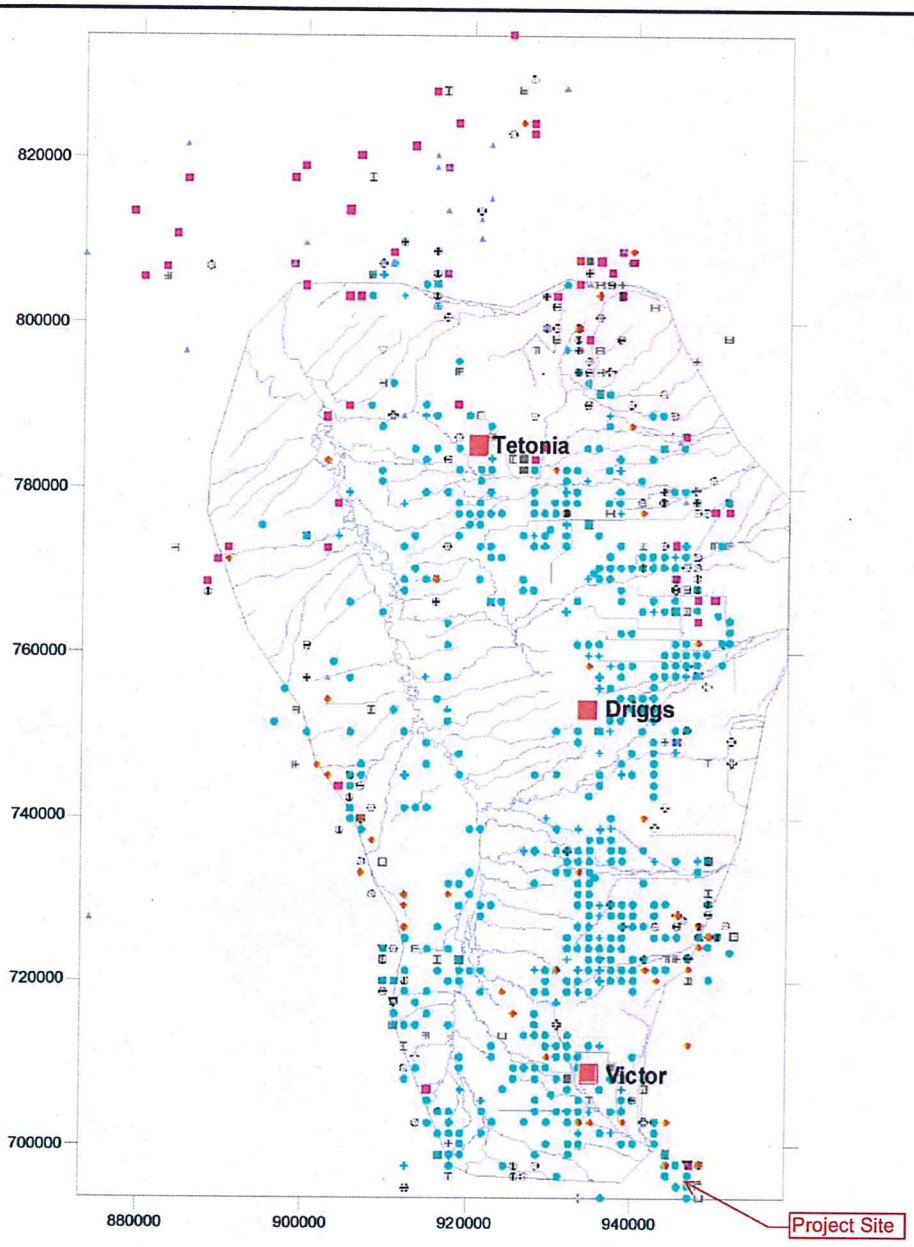
PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE
October 20 Percent Duration	82.5	ft^3/s	67.6
October 50 Percent Duration	74	ft^3/s	89.5
October 80 Percent Duration	61.1	ft^3/s	95.1

October Flow-Duration Statistics Citations

Hortness, J.E., and Berenbrock, Charles,2001, Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho: U.S. Geological Survey Water-Resources Investigations Report 01–4093, 36 p. (http://idaho.usgs.gov/PDF/wri014093/index.html)

Application Version: 4.3.8



Driller Classification Summary

- Alluvium, sand & gravel
- Clay
- Alluvium, sand, gravel & clay
- Silicic Volcanics
- Alluvium & Silicic Volcanics
- Fractured Formation
- Shale
- Limestone
- Sandstone

CES Natural Solutions for Water

N

Coordinate system is Idaho State Plane (Feet, NAD 83).

Not all wells may be visible on drawing as many wells have identical location descripters since they are located to the nearest 40 acres on IDWR logs. Note that several classifications may be present on a log. The representative above is an interpretative assessment of the main classification.

Date: September 27, 2002
File: c:\2002-146\plot_16.dsf
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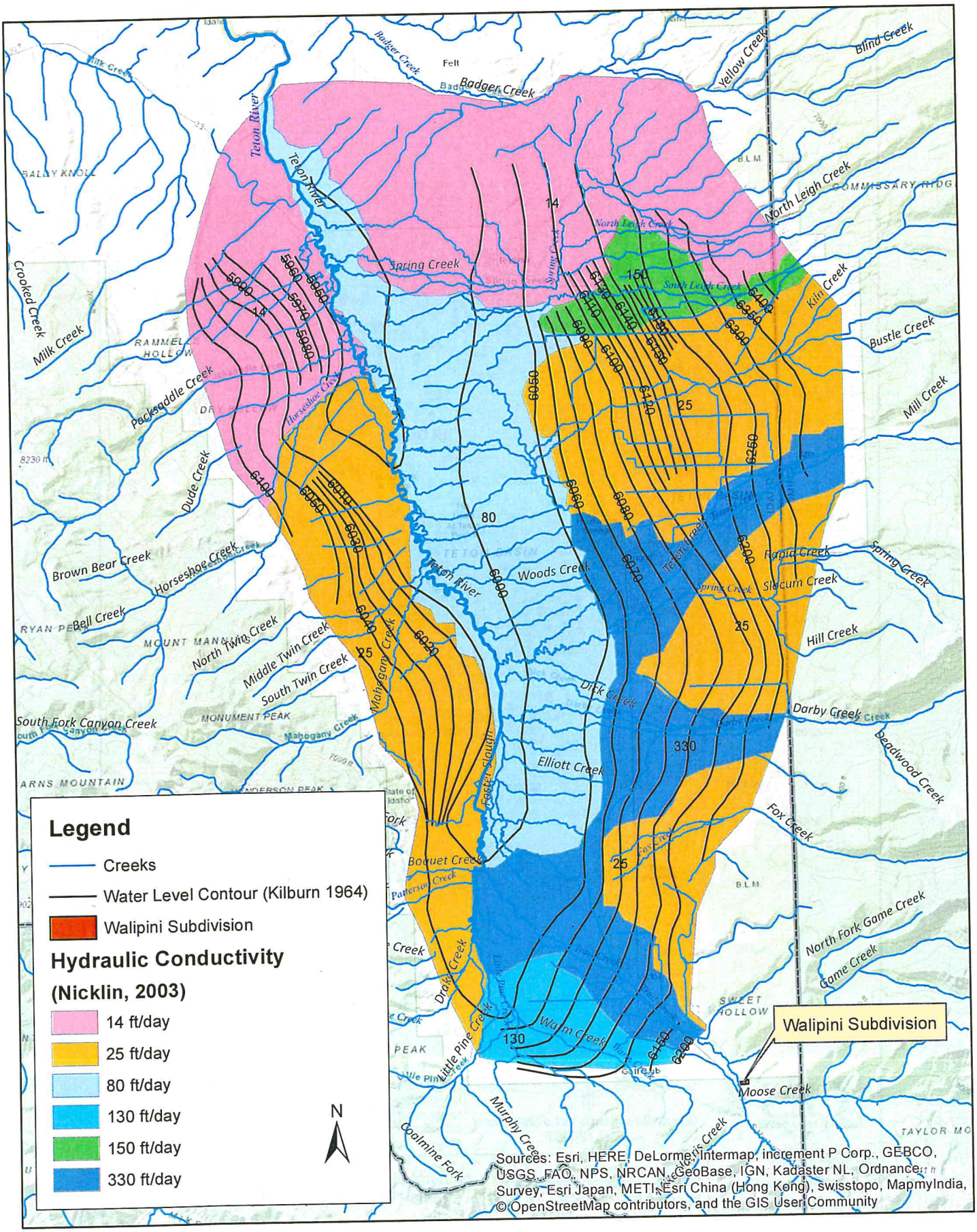
NICKLIN EARTH & WATER, INC.

General Material Classification Wells - Upper Teton Basin

Figure 16

Map of Hydraulic Conductivity and Gradient



APPENDIX E

NP MASS BALANCE SPREADSHEETS

IDEQ LEVEL 1 NUTRIENT-PATHOGEN EVALUATION NITROGEN MASS-BALANCE SPREADSHEET

V. 1.3 5/2/2002

This spreadsheet is based on the mass balance approach documented in: 1985.Bauman, B.J. and W.M. Schaefer.Estimating Ground-Water Quality Impacts From On-Site Sewage Treatment Systems. In Proceedings of 5th Northwest On-Site Wastewater Treatment Shortcourse, September 10-11, 1985. University of Washington, Seattle, WA. Pages 23-41. See **Instructions for Use** below.

INPUT

Water Budget	Input Value	Default Value	
Hydraulic Conductivity (ft/day)	150.000	Site-specific	
Hydraulic Gradient	0.03	Site-specific	
Mixing Zone Thickness (ft)	15	15	Default
Aquifer Width Perpendicular to Flow (ft)	450	Site-specific	
Parcel Area (acres)	8	Site-specific	
Percent of Parcel That Is Impervious (Percent)	8.5	Site-specific	
Current/Acceptable Number of Homes in Parcel	6.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	300	300	Default
Natural Recharge rate (inches/yr)	2.875	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	3.2	Site-specific	
Septic Tank Effluent Concentration (mg/l)	45.0	45.0	Default
Denitrification Rate (decimal fraction)	0	0	Default
Nitrate in Natural Recharge (mg/l)	0.3	0.3	Default

OUTPUT

Yearly Water Budget	Volume (m^3)	% of Total
Ground Water	3.14E+05	98.5
Effluent	2.49E+03	0.8
Recharge	2.16E+03	0.7
Total Water Volume	**3.19E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**4.2**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.5**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget	Mass (mg)	% of Total
Background GW Nitrate Mass	1.01E+09	89.9
Septic Tank Effluent Nitrate Mass	1.12E+08	10.0
Recharge Nitrate Mass	6.49E+05	0.1
Total Nitrate Mass	**1.12E+09**	

Instructions for Use

Input parameter values appropriate to conditions at the site under consideration are entered in the blue shaded cells on the *INPUT* side of the spreadsheet. These input values form the basis for calculating yearly water and nitrogen budgets. Default values for selected parameters are provided, as described in the accompanying N-P guidance. Selecting values other than these defaults will require providing adequate justification. Sources of water and nitrogen include ground water inflow from upgradient, natural recharge on pervious portions of the site, and from septic tank effluent. The total yearly nitrogen mass input is then divided by the total yearly volume of water available to recharge groundwater to arrive at an estimated **Average Downgradient Nitrate Concentration in GW** (shown in the *OUTPUT* side of the spreadsheet).

As values are input into the blue shaded cells the totals and percent of total for various components of the water and nitrogen budgets are calculated and shown on the *OUTPUT* side of the spreadsheet. The **Avg. Downgradient Nitrate Concentration in GW** is also calculated. The Density button allows the calculation of both the Acceptable Number of Homes in the Parcel (shown in the *INPUT* area) as well as the acceptable lot size. Clicking the Density button opens an input box that allows the input of the **Point of Compliance Nitrate Concentration Goal**. The number of homes in the parcel is then adjusted to meet the specified goal.This calculation can be redone iteratively along with changing other site input parameters to examine the resultant impact on nitrate concentrations.

Aquifer Width Perpendicular to Flow: For land development projects not completely oriented perpendicular to ground water flow, the site specific aquifer width value is determined using the average property width that is perpendicular to flow.

Ranges of Hydraulic Conductivity (K) for Unconsolidated Sediments (feet/day)	
Silt and sandy silt	0.003 to 0.3
Silty sands and fine sands	0.03 to 3
Well-sorted sands and glacial outwash	3 to 300
Well-sorted gravel	30 to 3000
Typical Range of Hydraulic Gradient	0.0001 to 0.1

Natural Recharge Rate (NRR) can be estimated from total annual precipitation (TAP) using the equation: NRR (inches/yr) = $(TAP)^2 * 0.0046$
TAP is input in inches/yr.

SITE INFORMATION

Walipini Subdivision	Site Name
Old Jackson Highway	Parcel Identification
4/22/2020	Date
Jennifer Zung	Prepared By

IDEQ LEVEL 1 NUTRIENT-PATHOGEN EVALUATION NITROGEN MASS-BALANCE SPREADSHEET

V. 1.3 5/2/2002

This spreadsheet is based on the mass balance approach documented in: 1985.Bauman, B.J. and W.M. Schaefer.Estimating Ground-Water Quality Impacts From On-Site Sewage Treatment Systems. In Proceedings of 5th Northwest On-Site Wastewater Treatment Shortcourse, September 10-11, 1985. University of Washington, Seattle, WA. Pages 23-41. See **Instructions for Use** below.

INPUT

Water Budget	Input Value	Default Value	
Hydraulic Conductivity (ft/day)	150.000	Site-specific	
Hydraulic Gradient	0.03	Site-specific	
Mixing Zone Thickness (ft)	15	15	Default
Aquifer Width Perpendicular to Flow (ft)	450	Site-specific	
Parcel Area (acres)	8	Site-specific	
Percent of Parcel That Is Impervious (Percent)	9.6	Site-specific	
Current/Acceptable Number of Homes in Parcel	19.1	Site-specific	
Septic Tank Effluent (gallons/d/home)	300	300	Default
Natural Recharge rate (inches/yr)	2.875	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	3.2	Site-specific	
Septic Tank Effluent Concentration (mg/l)	45.0	45.0	Default
Denitrification Rate (decimal fraction)	0	0	Default
Nitrate in Natural Recharge (mg/l)	0.3	0.3	Default

OUTPUT

Yearly Water Budget	Volume (m^3)	% of Total
Ground Water	3.14E+05	96.9
Eflluent	7.90E+03	2.4
Recharge	2.14E+03	0.7
Total Water Volume	**3.24E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**4.2**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**4.2**
Current/Acceptable Lot Size (Acres)	**0.4**

Yearly Nitrogen Budget	Mass (mg)	% of Total
Background GW Nitrate Mass	1.01E+09	73.8
Septic Tank Effluent Nitrate Mass	3.56E+08	26.1
Recharge Nitrate Mass	6.41E+05	0.0
Total Nitrate Mass	**1.36E+09**	

Instructions for Use

Input parameter values appropriate to conditions at the site under consideration are entered in the blue shaded cells on the *INPUT* side of the spreadsheet. These input values form the basis for calculating yearly water and nitrogen budgets. Default values for selected parameters are provided, as described in the accompanying N-P guidance. Selecting values other than these defaults will require providing adequate justification. Sources of water and nitrogen include ground water inflow from upgradient, natural recharge on pervious portions of the site, and from septic tank effluent. The total yearly nitrogen mass input is then divided by the total yearly volume of water available to recharge groundwater to arrive at an estimated **Average Downgradient Nitrate Concentration in GW** (shown in the *OUTPUT* side of the spreadsheet).

As values are input into the blue shaded cells the totals and percent of total for various components of the water and nitrogen budgets are calculated and shown on the *OUTPUT* side of the spreadsheet. The **Avg. Downgradient Nitrate Concentration in GW** is also calculated. The Density button allows the calculation of both the Acceptable Number of Homes in the Parcel (shown in the *INPUT* area) as well as the acceptable lot size. Clicking the Density button opens an input box that allows the input of the **Point of Compliance Nitrate Concentration Goal**. The number of homes in the parcel is then adjusted to meet the specified goal.This calculation can be redone iteratively along with changing other site input parameters to examine the resultant impact on nitrate concentrations.

Aquifer Width Perpendicular to Flow: For land development projects not completely oriented perpendicular to ground water flow, the site specific aquifer width value is determined using the average property width that is perpendicular to flow.

Ranges of Hydraulic Conductivity (K) for Unconsolidated Sediments (feet/day)	
Silt and sandy silt	0.003 to 0.3
Silty sands and fine sands	0.03 to 3
Well-sorted sands and glacial outwash	3 to 300
Well-sorted gravel	30 to 3000
Typical Range of Hydraulic Gradient	0.0001 to 0.1

Natural Recharge Rate (NRR) can be estimated from total annual precipitation (TAP) using the equation: NRR (inches/yr) = $(TAP)^2 * 0.0046$
TAP is input in inches/yr.

SITE INFORMATION

Walipini Subdivision	Site Name
Old Jackson Highway	Parcel Identification
4/22/2020	Date
Jennifer Zung	Prepared By

Phosphorous Surface Water Mass-Balance Spreadsheet

Site Name: Walipini Subdivision
Stream Name: Trail Creek
Date: 4/22/2020
Prepared By: Harmony Design & Engineering

Input

Septic Tank		
Septic tank effluent flow rate	300	gallons/day/unit
Number of units	6	
Phosphorous concentration in effluent	12	mg/L
Stream		
Minimum average monthly flow rate	33	cfs
Background P concentration	0.04	mg/L

Output

Daily Water Budget	Volume		% Total
Effluent	6,804	L	0.01%
Stream	80,615,969	L	100.0%
Total Water Volume	**80,622,773**	**L**	

Daily Phosphorous Budget	Mass		% Total
Septic tank effluent	81,648	mg P	2.47%
Background stream	3,224,639	mg P	97.5%
Total Mass	**3,306,287**	**mg P**	

Results

Avg. downstream phosphorous concentration	0.041	mg/L
TMDL for total phosphorous for streams	0.100	mg/L
Compliance check	**OK**	

Nitrate Surface Water Mass-Balance Spreadsheet

Site Name: Walipini Subdivision
Stream Name: Trail Creek
Date: 4/22/2020
Prepared By: Harmony Design & Engineering

Input

Septic Tank		
Septic tank effluent flow rate	300	gallons/day/home
Number of homes	6	
Total N concentration in effluent	45	mg/L

Stream		
Minimum average monthly flow rate	33	cfs
Background Total N concentration	0.45	mg/L

Output

Daily Water Budget	Volume		% Total
Effluent	6,804	L	0.01%
Stream	80,615,969	L	100.0%
Total Water Volume	**80,622,773**	**L**	

Daily Phosphorous Budget	Mass		% Total
Septic tank effluent	306,180	mg P	0.84%
Background stream	36,277,186	mg P	99.2%
Total Mass	**36,583,366**	**mg P**	

Results

Avg. downstream total nitrate concentration	0.454	mg/L
TMDL for total nitrate for streams	0.600	mg/L

Compliance check OK
with background concentration