# BLACKHORSE RANCH SUBDIVISION
# NUTRIENT PATHOGEN EVALUATION

## NW ¼ SW ¼ OF SECTION 15, T3N R45E
## OF THE BOISE P.M.
## TETON COUNTY, IDAHO

PREPARED FOR:
**BELICE RANCH HOLDINGS, LLC**
LA JOLLA, CALIFORNIA

PREPARED BY:
**NELSON ENGINEERING**
VICTOR, IDAHO


SEPTEMBER 2022
Project No. 21-563-03

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## PROJECT DESCRIPTION

The proposed Blackhorse Ranch subdivision divides a 20.03-acre parcel into six 2.5 to 5.03 acre lots. On-site wastewater treatment systems are proposed; therefore Title 9 of the Teton County Code directs that a Nutrient-Pathogen (NP) Study be conducted if any of applicability criteria in Appendix A are met. The Wetland and Waterways Overlay area lies within the parcel; specifically, the waterway of Warm Creek, therefore an NP study must be conducted.

## SITE INFORMATION

The parcel is located on alluvial fan deposits at the southern end of the Teton Valley as shown on the Site Vicinity Map and Conceptual Master Plan. Warm Creek, a spring creek that arises to the southeast, flows through the southern two proposed lots from east to west. The property is currently undeveloped historic wheel-line and flood irrigated hay/alfalfa field. Topography gently slopes from east to west at about 1.5%. Topography, stream, wells, and the current and proposed property boundaries are shown on the NP Study Map drawing in the Appendix.

### Soils and Geologic Mapping

The USDA-NRCS Web-based Soil Survey of Teton County maps the Alpine gravelly silt loam on the northern half of the subdivision and the Badgerton-Alpine complex on the southern half. The USDA-NRCS Soils Report containing a soils map is an Appendix. Alpine gravelly silt loam soils are mixed alluvial deposits on 0 to 2 percent slopes described as very deep, well drained, and composed of gravelly silt loam, very gravelly loam, extremely gravelly loam, extremely gravelly sandy loam, extremely gravelly loamy sand and gravel. Badgerton-Alpine complex soils are mixed alluvial deposits on 2 to 8 percent slopes described as very deep, well drained, and composed of the Alpine gravelly silt loam soils described above.

The area's surface geology is mapped on the USGS "Geologic Map of the Driggs Quadrangle, Bonneville and Teton Counties, Idaho, and Teton County, Wyoming," Pampeyan, E.H., Schroeder, M.L., Schell, E.M., and Cressman, E.R., 1967. Mapped deposits throughout the subdivision are "Qf – Alluvial fan deposits." These deposits are commonly described as water transported gravel, sand, silt, and clay the spread from the mouths of canyons and drainages.

### Field Investigation

On June 9, 2022, four test pits, TP-1 through TP-4, were excavated within the property as shown on the **NP Study Map** drawing in the Appendix. Test pits were located approximately using a Leica Zeno 20 GPS unit. Test pit locations and depths were selected to determine subsurface conditions as directed by Kathleen Price of the Eastern Idaho Health District. All test pits were backfilled with excavated material after logging was completed. Monitoring wells were installed in TP-3 and TP-4, test pits adjacent to Warm Creek.

Granite Basin Earthworks of Victor, Idaho, excavated the test pits with a Case 580 backhoe. Andy Pruett, a Professional Geologist at Nelson Engineering, and Kathleen Price logged the test pits and directed the sampling. Soils were classified in the field and logged by the geologists. The soil classifications, moisture conditions, and presence of organic or other notable features were recorded in the field logs. Bulk samples were sealed in plastic bags and transported to our laboratory for testing and further classification. Groundwater

observations were made at the time of the excavation based on field observations of soil moisture conditions. Field observations are presented on the test pit logs in the Appendix.

The stratification lines shown on the test pit logs represent the approximate boundary between soil types. The actual in-situ transition may be either gradual or abrupt. Due to the nature and depositional characteristics of natural soils and fills, care should be taken in interpolating subsurface conditions beyond the location of the test pits. Soil conditions can change rapidly in both the lateral and vertical directions. Groundwater conditions shown on the logs are only for the dates indicated. The subsurface conditions were interpreted from the described test pits at the site. The soil properties inferred from the field and laboratory analyses supported by our experience formed the basis for developing our conclusions and recommendations.

**Soil Profiles**

Surficial soils in TP-1 were 1 foot of dry, dark brown gravelly silt loam topsoil with abundant roots. Surficial soils in all other test pits were 1 to 1.5 feet of slightly moist, dark brown/black silty clay loam topsoil with minor to moderate roots. Below topsoil in TP-2, TP-3, and TP-4 to depths of 2.5 to 3.25 feet was moist, dark brown/brown gravelly clay loam/clay silt loam/silt loam composed of approximately 65 percent silt/clay loam matrix and 35 percent gravels. Gravelly clay loam in TP-2 is in soil design sub-group C-2; gravelly clay silt loam in TP-3 and gravelly silt loam in TP-4 are both in soil design sub-group B-2. Underlying soils in all pits were alluvial fan deposits composed of moist, brown extremely gravelly loamy coarse sand with cobbles up to 12-inches maximum dimension lying in soil design sub-group B-2. Alluvial fan deposits were very dense, poorly-graded, and contained approximately 80-percent sub-round to round gravels and cobbles and 20-percent sand matrix. Groundwater was not encountered in any test pit. No indications of historic groundwater levels were observed in TP-1. Orange oxidation staining was observed up to 1 to 1.5 feet in gravelly clay/clay silt loams in TP-2 and TP-3 and throughout deep alluvial fan gravel deposits in TP-2, TP-3, and TP-4. The presence of near surface oxidation staining is indicative of historic flood irrigation. Excavation was characterized as easy digging through topsoil and gravelly silt/clay loams and moderate digging through alluvial fan deposits to the bottom of each test pit. No caving of test pit walls was observed.

**Groundwater Data and Analysis**

Groundwater information was obtained from local well logs, geologic mapping, test pit excavations, and published studies. Teton Valley Groundwater studies referenced are:

- "Ground Water in the Upper Part of the Teton Valley, Teton Counties, Idaho and Wyoming," C. Kilburn, Geological Survey Water-Supply Paper 1789, 1965
- "Final Report - Ground-Water Model for the Upper Teton Watershed", Nicklin Earth & Water, Inc., 2003.

Vicinity water well data was collected from the Idaho Department of Water Resources Well Construction and Drilling "GIS database. Well logs from within an approximate 500-feet offset from the subdivision boundaries are included in the Appendix. General locations are shown on the NP Study Map. Summary water well information from wells within a half mile of the subdivision is given in table in the Appendix. The area of well data collection is shown on the Vicinity Map.

The referenced groundwater studies area well logs show the area is underlain by an unconfined aquifer within alluvial fan deposits. Local well logs show alluvial fan deposits

for the full well depth with the deepest wells at 200 feet. Within the half mile zone around the property, well logs show static water level depths between 30 and 130 feet. Within the SW 1/4 of Section 15, static depths reported range from 78 to 125 feet. Within the NW ¼ of Section 15 static depths range from 32 to 120 feet with a 32-foot depth reported at a well on the SW corner. Within the SE ¼ of Section 16, immediately to the west, reported static depths range from 30 to 60 feet. While the data scatter is considerable, the well data appears to show decreasing depth to groundwater from east to west in the project vicinity. Contour maps in both the referenced groundwater studies support this conclusion.

Groundwater was not observed the 10-foot-deep test pits excavated on June 9, 2022. Peak snowmelt runoff occurred around this date. Test pit and monitoring well data was available from a Level I NP Evaluation for the Canyon Wren subdivision adjoining to the east. On Canyon Wren, a monitoring well adjacent to Warm Creek was measured in the period from March 2 to June 14, 2021. The well remained dry throughout. The field observations show that shallow groundwater does not occur on the parcel, even in close proximity to the creek. We conclude the creek is at least partially hydraulically isolated from the underlying unconfined aquifer, likely by clay and silt size depositions within the creek bed. Seepage from the creek bed may occur, however the seepage does not extend a significant distance beyond the creek bed, flowing downward vertically. The creek surface water flow is hydraulically isolated from leachfield effluent from the planned cross gradient leachfields located at a setback of 50 feet. Therefore, there will be no impact on nitrate or phosphorus to the surface waters of Warm Springs Creek.

Hydraulic conductivity of the alluvial aquifer is estimated by Nicklin to be greater than 150 ft/day in the project area. Well logs within the half mile radius show completion in gravel and sand alluvium, standard correlations in the literature of between 30 and 3000 ft/day are given in the IDEQ NP spreadsheet. 325 feet per day is selected as the hydraulic conductivity as reasonable and conservative.

Kilburn's map of the contours of groundwater (see Drawings in the Appendix) shows a gradient of 0.41 percent from southeast to northwest paralleling Warm Creek. Nicklin Earth and Waters static model results shown in Figure 34 (see Drawings) shows a gradient direction parallel to Warm Creek, gradient magnitude not calculated. Kilburn's contour map is approximately commensurate with a depth to static water depth in range of 45 feet at the Bagley Well Permit ID 776998 located at 9790 S 2000 W and the Swope well static depth at 30 feet.

The nearest public water supply wells are within the Teton Springs Subdivision upgradient to the south east.

**Background Nitrates**

The Teton Springs public water supply wells are regularly tested for nitrates. Non detect for nitrates was found in recent testing in both wells, testing data is included in the appendix.

**N-P Analysis**

The 20-acre parcel will be developed into four 2.5-acre lots and two 5-acre lots. Zoning allows for the construction of two residences on each lot. Wastewater disposal will be conventional septic tanks and leachfields, water will be supplied by on-lot domestic wells.

The IDEQ guideline for NP studies includes evaluation of nitrate and pathogens at three categories of compliance boundaries:

1. Downgradient individual lot boundaries.
2. Downgradient boundary of the overall subdivision.
3. Surface waterbodies.

Surface water in Warm Creek was evaluated for compliance. Monitoring wells in close proximity to the creek on this parcel and on the parcel to the east were dry through the spring runoff and irrigation season. From this we conclude the creek is at least partially hydraulically isolated from the underlying unconfined aquifer, likely by clay and silt size depositions within the creek bed. Seepage from the creek bed may occur, however the evidence shows the seepage does not extend a significant distance beyond the creek bed, flowing downward vertically. The creek surface water flow is hydraulically isolated from leachfield effluent from the planned cross gradient leachfields which seep into the water table well below the creek bottom. Leachfields will be located at a setback of 50 feet from the creek further ensuring compliance. There will be no impact on nitrate or phosphorus to the surface waters of Warm Springs Creek.

The IDEQ Level 1 Nutrient-Pathogen Evaluation Nitrogen Mass-Balance Spread Sheet was used to predict downgradient nitrate concentration for three compliance boundaries. The entire 20-acre subdivision parcel compliance boundary was evaluated with 12 total homes at 400 gpd wastewater production. 400 gpd per home was utilized to maximize the allowable wastewater to allow for larger homes and outbuildings with bathrooms. Lots 3 and 4 are 5 acre lots transected by Warm Springs Creek. The lots have two building areas each, one north and one south of Warm Springs Creek. The worst-case scenario is represented by the northern building area on Lot 4 with an area of 0.67 acres and a cross gradient distance of 147 feet. A single home at 400 gpd was evaluated for this building area. Analysis of the four 2.5 acre lots was performed with 2 homes with a maximum combined total of wastewater production of 800 gpd. Model input parameters are summarized in Table 1.

Table 1. Model Input Parameters for Single Family Residences

| **Water Budget** | | |
|---|---|---|
| **Parameters** | **Input Value** | **Justification** |
| Hydraulic Conductivity (ft/day) | 325 ft/d | Conservative estimate for gravel and sand alluvium found in well logs throughout the area |
| Hydraulic Gradient | 0.00041 | Kilburn Mapping |
| Mixing Zone Thickness (ft) | 15 | Default Value |
| Aquifer Width Perpendicular to Flow (ft) | Varies | See NP Study Drawing |
| Parcel Area (acres) | Varies | 20 acres total, 2.5 and 5 acre lots |
| Percent of Parcel That Is Impervious (Percent) | 5% | Area of Roads and structures |
| Current/Acceptable Number of Homes in Parcel | 2 | Two homes per lot |
| Septic Tank Effluent (gallons/d/home) | 400 | Maximum value for acceptable results for the 20-acre parcel. Allows for larger homes. |
| Natural Recharge rate (inches/yr.) | 1.2 | Annual precipitation of 16 inches as per Driggs Airport long term average<br>and the formula:<br>$NRR = TAP^2*0.0046$ |
| **Nitrogen Budget** | | |
| Upgradient Ground Water Concentration (mg/l) | 0.0 | Nitrate concentration from Teton Springs PWS wells |
| Septic Tank Effluent Concentration (mg/l) | 45 | Default |
| Denitrification Rate (decimal fraction) | 0 | Default |
| Nitrate in Natural Recharge (mg/l) | 0.3 | Default |

**PATHOGEN FATE AND TRANSPORT DISCUSSION**

Pathogen fate and transport cannot be modeled accurately through the unsaturated overlying soil using our available software. Existing literature shows that pathogen survival in the unsaturated subsurface is limited. Below is a portion of Table 3-19, "Wastewater constituents of concern and representative concentrations in the effluent of various treatment units", of EPA's Onsite Wastewater Treatment Systems Manual.

| Constituents of Concern | Example direct or indirect measures (units) | Domestic Septic Tank Effluent | SWIS percolate into ground water at 3 to 5 ft depth (% removal) |
|---|---|---|---|
| Bacteria | Fecal Coliform (organisms per 100 ml) | $10^6$ to $10^8$ | >99.99% |
| Viruses | Specific Viruses (pfu/ml) | 0 to $10^5$ | >99.9% |

*"Normal operation of septic tank/subsurface infiltration systems results in retention and die-off of most, if not all, observed pathogenic bacterial indicators within 2 to 3 feet of the infiltrative surface" (Anderson et al., 1994; Ayres Associates, 1993a, c; Bouma et al., 1972, McGauhey and Krone, 1967)*.

Based on this information in conjunction with the depth to groundwater of greater than 8 feet in the area of the subdivision planned for development, live pathogen concentration will have undergone 5 or more log cycles of treatment prior to entering the underlying groundwater. Pathogen survival rates in the unsaturated subsurface preclude transport in groundwater.

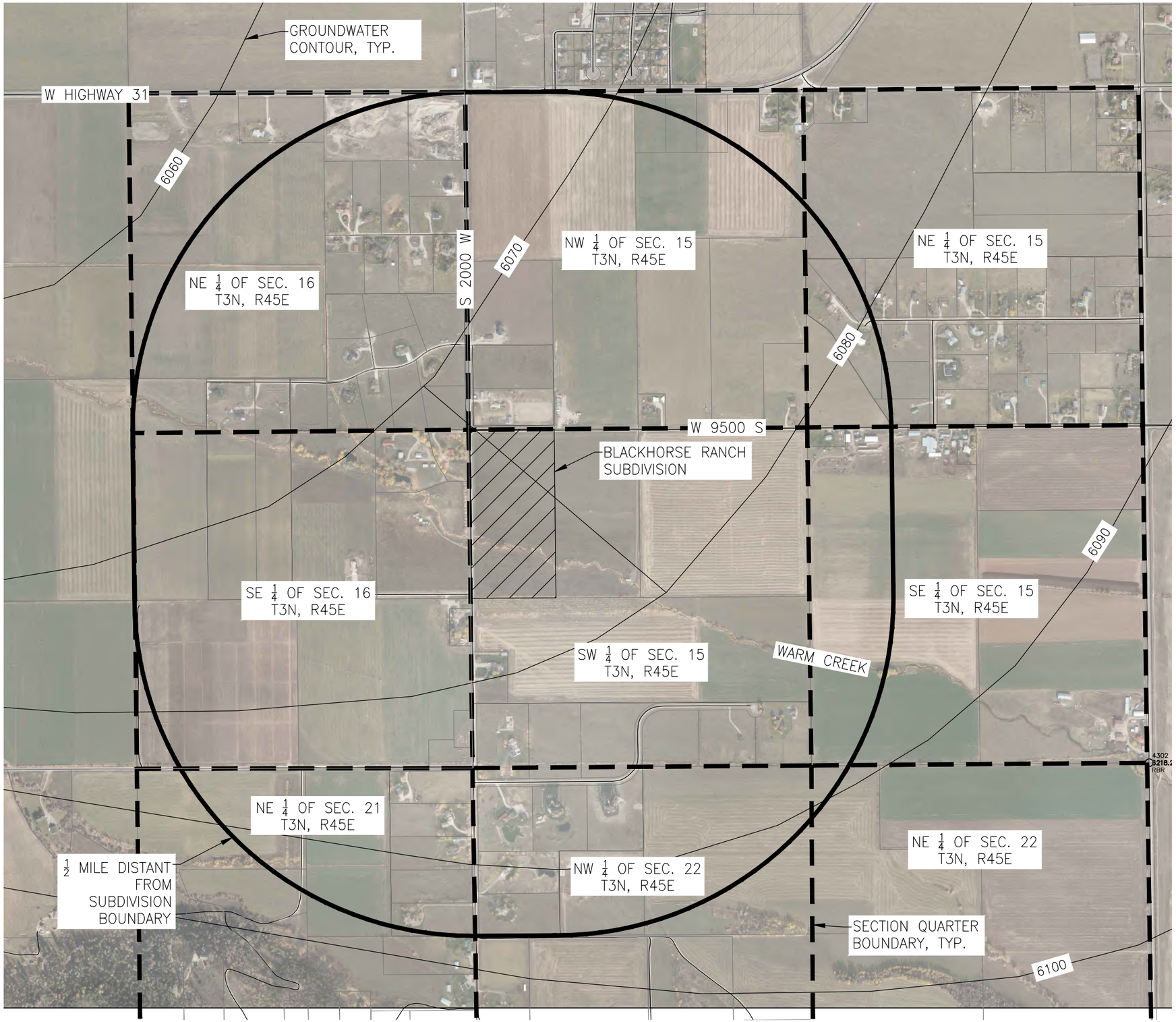
**Results**

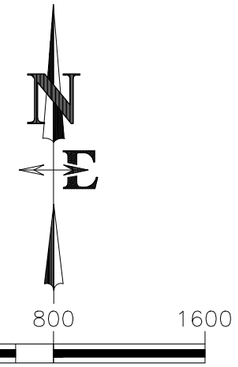
Downgradient nitrogen concentrations at the compliance boundaries analyzed are within acceptable limits with the following limitations.

- A total of 800 gpd of wastewater generation is allowed on Lots 1, 2, 5 and 6.
- Lot 3 and Lot 4 are transected by Warm Creek with creek setbacks of 50 feet for leachfields. A total of 800 gpd of wastewater generation is allowed on each lot with a maximum of 400 gpd of wastewater production on the allowable building areas north of Warm Springs Creek.

# APPENDIX

# DRAWINGS




NOTES:

1. PROPERTY BOUNDARIES AND 2021 AERIAL PHOTOGRAPHY FROM TETON COUNTY GIS.
2. GROUNDWATER CONTOURS FROM "MAP SHOWING APPROXIMATE CONFIGURATION OF THE WATER TABLE IN THE UPPER TETON VALLEY, IDAHO AND WYOMING" AS PART OF "GROUNDWATER IN THE UPPER PART OF THE TETON VALLEY, TETON COUNTIES, IDAHO AND WYOMING," USGS WATER–SUPPLY PAPER 1789, C. KILBURN, 1965.

| | | REV. |
|---|---|---|
| DATE | 7/11/2022 | |
| SURVEYED | - | |
| ENGINEERED | AP | |
| DRAWN | AP | |
| CHECKED | PG | |
| APPROVED | PG | |

NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733-2087

DRAWING TITLE
VICINITY MAP

JOB TITLE
BLACKHORSE RANCH SUBDIVISION
2000 W 9500S, TETON COUNTY, ID
LEVEL I NP EVALUATION

DRAWING NO
1

JOB NO
21-563-03

EXISTING PROPERTY BOUNDARY, TYP.

500 FEET FROM SUBDIVISION BOUNDARY

ERIC TUCKER
PERMIT ID–895240
SWL–75'

W 9500 S

GRADIENT DIRECTION

WARM CREEK TOP OF BANK

BLACKHORSE RANCH SUBDIVISION EXTERNAL PROP. BOUNDARY

TP–1

TP–3

CROSS GRADIENT LENGTH 1400±

SETBACKS 50' FROM BANK

LOT 1
2.503 ACRES

LOT 2
2.503 ACRES

LOT 3
5.03 ACRES

LOT 6
2.50 ACRES

CROSS GRADIENT LENGTH 252'

LOT 5
2.50 ACRES

CROSS GRADIENT LENGTH 147'

LOT 4
5.00 ACRES

TP–2

TP–4

SUBDIVISION LOT BOUNDARY, TYP.

6145
6140
6135

S 2000 W

WILLIAM SWOPE
PERMIT ID–701681
SWL–32'

RODGER CANAAN
PERMIT ID–701795
SWL–95'

SHANE ANDERSON
PERMIT ID–702401
SWL–80'

KRISTINA GOETZ
PERMIT ID–873531
SWL=50'

STEVE BAGLEY
PERMIT ID–776998
SWL–45'

WATER TREATMENT SOLUTIONS
PERMIT ID–848156
SWL=30'

0 100 200

NOTES:
CONTOURS SHOWN PER SITE SURVEY
WELL LOCATIONS ARE APPROXIMATE BASED ON IDWR DATA.

LEGEND
NEIGHBORING WELLS NAME
PERMIT #
SWL=STATIC WATER LEVEL REPORTED IN WELL COMPLETION LOG.

=TEST PIT LOCATION,

NOTES:
TEST PITS LOCATED WITHIN ±3 FEET BY GPS. MONITORING WELLS INSTALLED IN ALL TEST PITS

| REV. | | |
|---|---|---|
| DATE | 7/11/2022 | |
| SURVEYED | NE | |
| ENGINEERED | AP | |
| DRAWN | AP | |
| CHECKED | PG | |
| APPROVED | PG | |

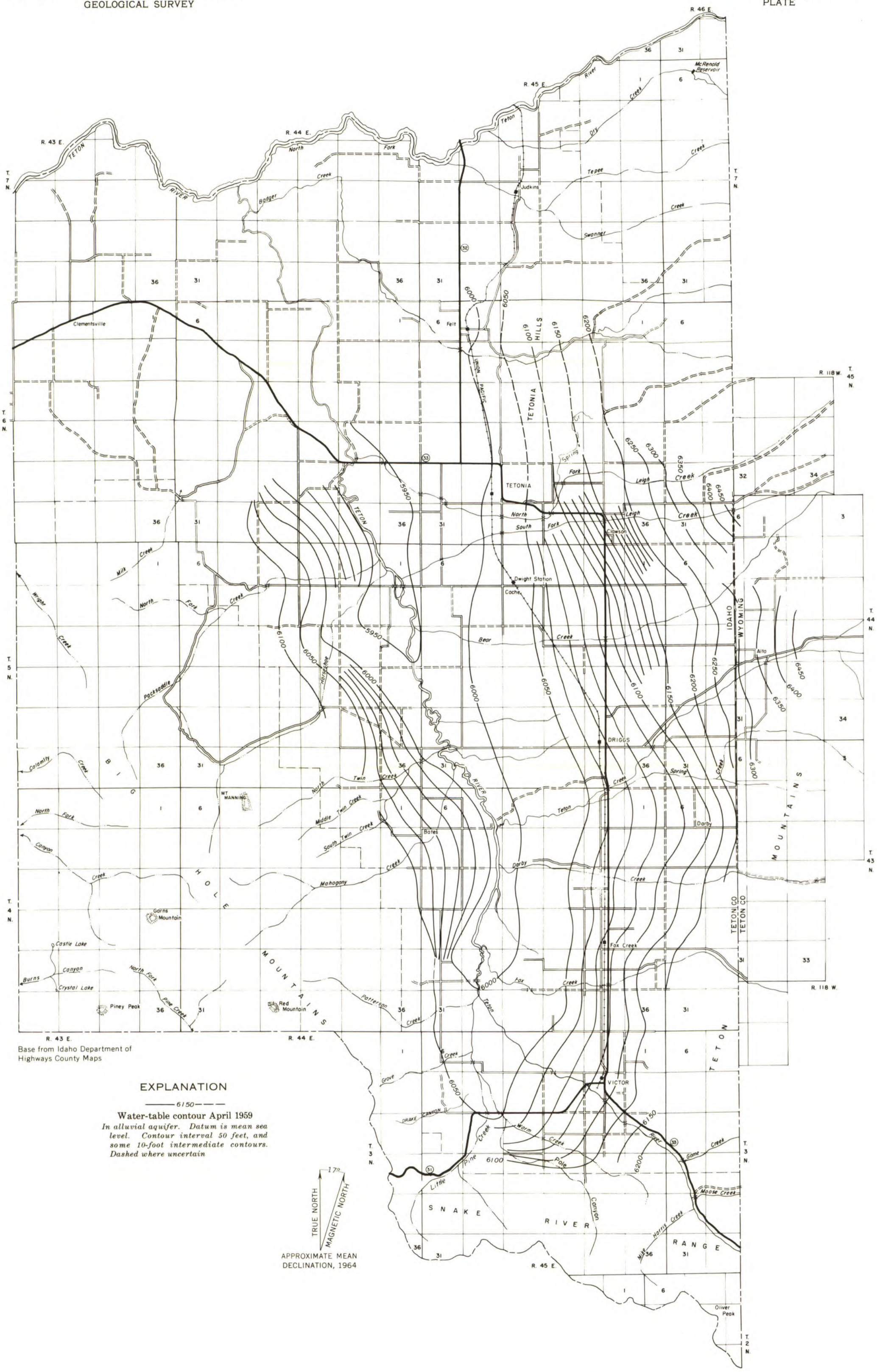
NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733–2087

DRAWING TITLE
NP STUDY MAP
BLACKHORSE RANCH SUBDIVISION

JOB TITLE
BLACKHORSE RANCH SUBDIVISION
2000W 9500S, TETON COUNTY, ID
LEVEL 1 NP EVALUATION

DRAWING NO 2

JOB NO 21–563–03




Base from Idaho Department of Highways County Maps

## EXPLANATION

6150

**Water-table contour April 1959**

*In alluvial aquifer. Datum is mean sea level. Contour interval 50 feet, and some 10-foot intermediate contours. Dashed where uncertain*

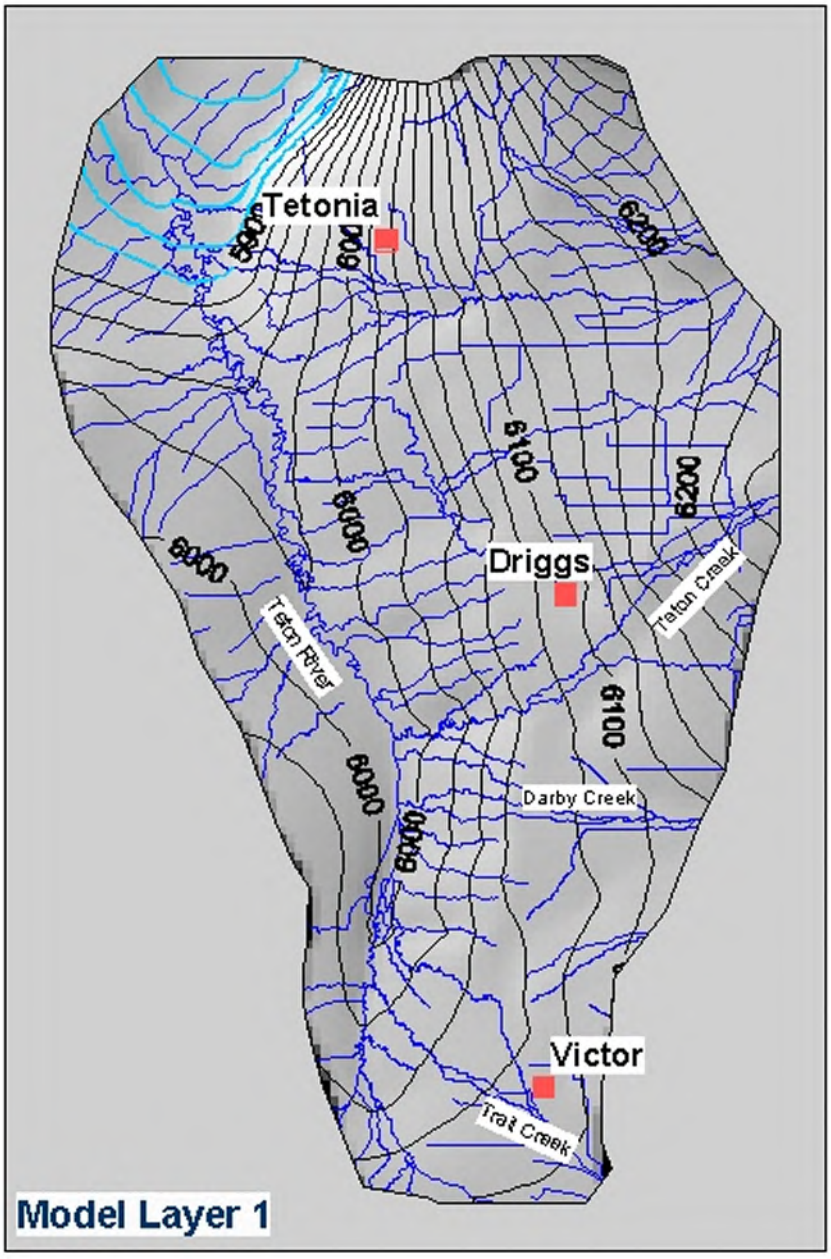
# MAP SHOWING APPROXIMATE CONFIGURATION OF THE WATER TABLE IN THE UPPER TETON VALLEY, IDAHO AND WYOMING

SCALE 1:125 000

2 0 2 4 6 MILES

2 0 2 4 6 KILOMETERS

735-911 O - 64 (In pocket)



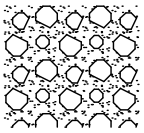

CES
Natural Solutions for Water

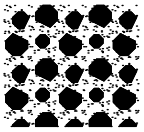
Scale Not Indicated

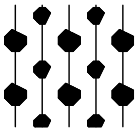
| | | | |
|---|---|---|---|
| Date : October 12, 2002<br>File: c:\2002-146\figure_34.drf<br>Issued for Cascade Earth Science | NICKLIN EARTH & WATER, INC. | Simulated Potentiometric Head<br>Steady State Model | Figure 34 |

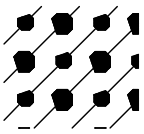
# TEST PIT LOGS

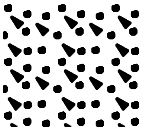
# SOIL GRAPHICS

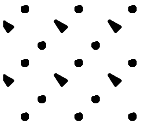
GW 

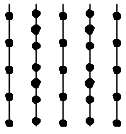
GP 

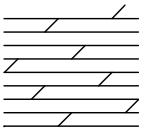
GM 

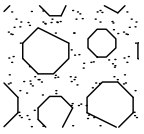
GC 

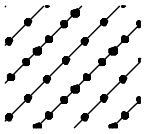
SW 

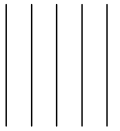
SP 

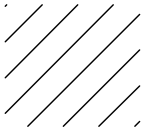
SM 

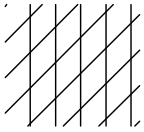
BEDROCK 

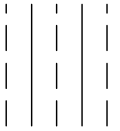
COBBLES/BOULDERS 

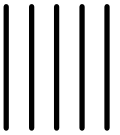
SC 

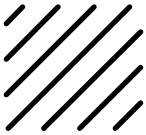
ML 

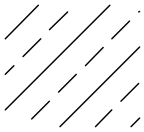
CL 

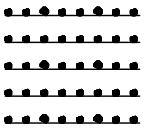
ML–CL 

OL 

MH 

CH 

OH 

PT 

NOTE: ANGLED DEMARCATIONS ON THE LOGS INDICATE APPROXIMATE OR POORLY DEFINED BOUNDARIES BETWEEN SOIL TYPES.

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## GEOTECHNICAL GENERAL NOTES

**CORRECTED SPT**: Standard Penetration Test values corrected to $N1_{60}$ correcting for theoretical free-fall hammer energy and overburden pressure per 7th edition of the AASHTO Bridge Design Specifications.

**DRILLING, SAMPLING, AND SOIL PROPERTIES ABBREVIATIONS AND SYMBOLS**

**N:** Standard Penetration Test
**$U_c$:** Unconfined compressive strength, Pounds/ft$^2$ (PSF)
**Pp:** Pocket Penetrometer values, Ton/ft$^2$ (TSF)
**FILGC:** Fragments indicate gravels and cobbles larger than split spoon diameter.
**w:** Water content, %
**LL:** Liquid limit, %
**PI:** Plasticity index, %
**gd:** In-situ dry density, lbs/ft$^3$ (PCF)
**▽:** Ground water level
**SS:** Split-Spoon Sample
**ST:** Shelby Tube Sampler
**CS:** Cylindrical Brass Lined Sample


Monitoring Well, diagonal hatching indicates screen and sand packed interval

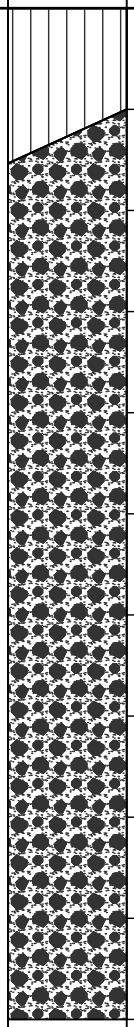
### SOIL RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

| Non-Cohesive Soils | SPT | Cohesive Soils | Pp-(tons/ft$^2$) |
|---|---|---|---|
| Very Loose | 0 - 4 | Very Soft | 0 - 0.25 |
| Loose | 4 - 10 | Soft | 0.25 - 0.50 |
| Slightly Compact | 8 - 15 | Medium Stiff | 0.50 - 1.00 |
| Medium Dense | 10 - 30 | Stiff | 1.00 - 2.00 |
| Dense | 30 - 50 | Very Stiff | 2.00 - 4.00 |
| Very Dense | 50+ | Hard | 4.00+ |

### PARTICLE SIZE

| | | | | |
|---|---|---|---|---|
| **Boulders:** | 12 in.+ | **Coarse Sand:** | 5 mm(#4)-2 mm(#10) | **Silts and Clays:** **<#200** |
| **Cobbles:** | 12 in.-3in. | **Medium Sand:** | 2 mm(#10)-0.4mm(#40) | |
| **Gravel:** | 3in.-5mm(#4) | **Fine Sand:** | 0.4mm(#40)-0.075mm(#200) | |

| | | | |
|---|---|---|---|
| PROJECT NAME: **BLACKHORSE RANCH SUBDIVISION, NP STUDY** | **TEST PIT No. 1** | PAGE: | **1** |
| DATE STARTED / FINISHED: **6/9/2022** | OPERATOR: **GRANITE BASIN EARTHWORKS** | | |
| LOGGED BY: **ANDY PRUETT/KATHLEEN PRICE** | EXCAVATOR TYPE: **CASE 580 SUPER N BACKHOE** | | |
| BOREHOLE LOCATION/ELEVATION: **SEE TP LOCATION MAP** | | | |



| WELL LOG | GRAPHICS LOG | DEPTH (FT) | SAMPLES: UNDISTURBED | SAMPLES: BULK | SAMPLE ID | MATERIAL DESCRIPTION | LIQUID LIMIT | PLASTIC LIMIT | DRY DENSITY (PCF) | MOISTURE (%) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | | | *0'–1.25' DRY, DARK BROWN GRAVELLY SILT LOAM TOPSOIL WITH ABUNDANT ROOTS* | | | | | *PROPOSED LOT 1, FLAT GRASS AND ALFALFA FIELD* |
| | | 2 | | | | *1.25'–BOP MOIST, BROWN EXTREMELY GRAVELLY LOAMY COARSE SAND WITH COBBLES UP TO 12–INCH MAXIMUM DIMENSION, VERY DENSE, POORLY–GRADED, ~80% SUB–ROUND TO SUB–ANGULAR GRAVELS AND COBBLES, ~20% SAND, NO OXIDATION STAINING, ALLUVIAL FAN DEPOSITS, SOIL DESIGN SUB–GROUP – B–1* | | | | | *MODERATE DIGGING THROUGH ALLUVIAL FAN DEPOSITS BELOW 1.25'* |
| | | 3 | | | | | | | | | |
| | | 4 | | | | | | | | | |
| | | 5 | | | | | | | | | |
| | | 6 | | | | | | | | | |
| | | 7 | | | | | | | | | |
| | | 8 | | | | | | | | | |
| | | 9 | | | | | | | | | |
| | | 10 | | | | *BOP=10.0'* | | | | | |
| | | 11 | | | | *NO GROUNDWATER ENCOUNTERED* *NO CAVING* | | | | | |
| | | 12 | | | | | | | | | |
| | | 13 | | | | | | | | | |
| | | 14 | | | | | | | | | |
| | | 15 | | | | | | | | | |

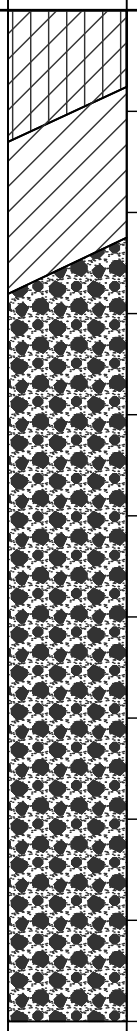
This log is part of a report prepared by Nelson Engineering for this project and should be read with the report. This summary applies only at the location of the test pit and at the time of the excavation. Subsurface conditions may differ at other locations and may change at this location with passage of time. The data presented is a simplification of actual conditions encountered.


NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733–2087


CLIENT: **BELICE RANCH HOLDINGS, LLC**
**TETON COUNTY, IDAHO**

JOB NO. 21–563–03

| | | | |
|---|---|---|---|
| PROJECT NAME: **BLACKHORSE RANCH SUBDIVISION, NP STUDY** | **TEST PIT No. 2** | PAGE: | **1** |
| DATE STARTED / FINISHED: **6/9/2022** | OPERATOR: **GRANITE BASIN EARTHWORKS** | | |
| LOGGED BY: **ANDY PRUETT/KATHLEEN PRICE** | EXCAVATOR TYPE: **CASE 580 SUPER N BACKHOE** | | |
| BOREHOLE LOCATION/ELEVATION: **SEE TP LOCATION MAP** | | | |



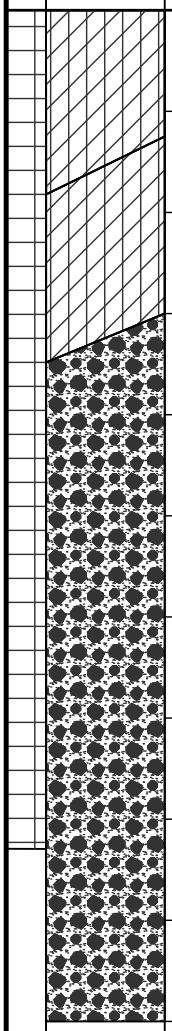
| WELL LOG | GRAPHICS LOG | DEPTH (FT) | SAMPLES: UNDISTURBED | SAMPLES: BULK | SAMPLE ID | MATERIAL DESCRIPTION | LIQUID LIMIT | PLASTIC LIMIT | DRY DENSITY (PCF) | MOISTURE (%) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | | | | This log is part of a report prepared by Nelson Engineering for this project and should be read with the report. This summary applies only at the location of the test pit and at the time of the excavation. Subsurface conditions may differ at other locations and may change at this location with passage of time. The data presented is a simplification of actual conditions encountered. | | | | | |
| | | | | | | *0'–1.0' SLIGHTLY MOIST, DARK BROWN/BLACK SILTY CLAY LOAM TOPSOIL WITH MINOR ROOTS* | | | | | *PROPOSED LOT 5, FLAT GRASS AND ALFALFA FIELD* |
| | | 1 | | | | *1.0'–2.5' MOIST, GRAY/BROWN GRAVELLY CLAY LOAM, ORANGE OXIDATION STAINING THROUGHOUT, SOIL DESIGN SUB–GROUP – C–2* | | | | | |
| | | 2 | | | | | | | | | |
| | | | | | | *2.5'–BOP MOIST, BROWN EXTREMELY GRAVELLY LOAMY COARSE SAND WITH COBBLES UP TO 12–INCH MAXIMUM DIMENSION, VERY DENSE, POORLY–GRADED, ~80% SUB–ROUND TO SUB–ANGULAR GRAVELS AND COBBLES, ~20% SAND, OXIDATION STAINING THROUGHOUT, ALLUVIAL FAN DEPOSITS, SOIL DESIGN SUB–GROUP – B–2* | | | | | *MODERATE DIGGING THROUGH ALLUVIAL FAN DEPOSITS BELOW 2.5'* |
| | | 3 | | | | | | | | | |
| | | 4 | | | | | | | | | |
| | | 5 | | | | | | | | | |
| | | 6 | | | | | | | | | |
| | | 7 | | | | | | | | | |
| | | 8 | | | | | | | | | |
| | | 9 | | | | | | | | | |
| | | 10 | | | | *BOP=10.0'* | | | | | |
| | | | | | | *NO GROUNDWATER ENCOUNTERED* | | | | | |
| | | | | | | *NO CAVING* | | | | | |
| | | 11 | | | | | | | | | |
| | | 12 | | | | | | | | | |
| | | 13 | | | | | | | | | |
| | | 14 | | | | | | | | | |
| | | 15 | | | | | | | | | |


NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733–2087


CLIENT: **BELICE RANCH HOLDINGS, LLC**
**TETON COUNTY, IDAHO**

JOB NO. 21–563–03

| | | | |
|---|---|---|---|
| PROJECT NAME: **BLACKHORSE RANCH SUBDIVISION, NP STUDY** | **TEST PIT No. 3** | PAGE: | **1** |
| DATE STARTED / FINISHED: **6/9/2022** | OPERATOR: **GRANITE BASIN EARTHWORKS** | | |
| LOGGED BY: **ANDY PRUETT/KATHLEEN PRICE** | EXCAVATOR TYPE: **CASE 580 SUPER N BACKHOE** | | |
| BOREHOLE LOCATION/ELEVATION: **SEE TP LOCATION MAP** | | | |



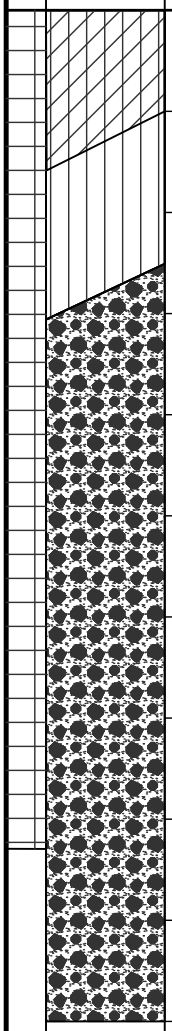
| DEPTH (FT) | SAMPLES: UNDISTURBED | SAMPLES: BULK | SAMPLE ID | MATERIAL DESCRIPTION | LIQUID LIMIT | PLASTIC LIMIT | DRY DENSITY (PCF) | MOISTURE (%) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | This log is part of a report prepared by Nelson Engineering for this project and should be read with the report. This summary applies only at the location of the test pit and at the time of the excavation. Subsurface conditions may differ at other locations and may change at this location with passage of time. The data presented is a simplification of actual conditions encountered. | | | | | |
| 0 | | | | *0'–1.5' SLIGHTLY MOIST, DARK BROWN/BLACK SILTY CLAY LOAM TOPSOIL WITH MINOR ROOTS* | | | | | *PROPOSED LOT 3, FLAT GRASS AND ALFALFA FIELD, NORTH OF WARM CREEK* |
| 1 | | | | *1.5'–3.25' MOIST, DARK BROWN/BROWN GRAVELLY CLAY SILT LOAM, ~65% CLAY SILT LOAM, ~35% GRAVELS, ORANGE OXIDATION STAINING THROUGHOUT, SOIL DESIGN SUB-GROUP – B-2* | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | *3.25'–BOP MOIST, BROWN EXTREMELY GRAVELLY LOAMY COARSE SAND WITH COBBLES UP TO 12-INCH MAXIMUM DIMENSION, VERY DENSE, POORLY-GRADED, ~80% SUB-ROUND TO SUB-ANGULAR GRAVELS AND COBBLES, ~20% SAND, OXIDATION STAINING THROUGHOUT, ALLUVIAL FAN DEPOSITS, SOIL DESIGN SUB-GROUP – B-2* | | | | | *MODERATE DIGGING THROUGH ALLUVIAL FAN DEPOSITS BELOW 3.25'* |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | *BOP=10.0'* | | | | | |
| | | | | *NO GROUNDWATER ENCOUNTERED* | | | | | |
| | | | | *NO CAVING* | | | | | |
| 11 | | | | *MONITORING WELL INSTALLED: 10' OF 3"ø SCHEDULE 40 PVC SOLID PIPE, NO SLOTS STICK UP = 1.7'* | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |


**NELSON ENGINEERING**
P.O. BOX 1599, JACKSON WYOMING (307) 733-2087


CLIENT: **BELICE RANCH HOLDINGS, LLC**
**TETON COUNTY, IDAHO**

JOB NO. 21-563-03

| | |
|---|---|
| PROJECT NAME: **BLACKHORSE RANCH SUBDIVISION, NP STUDY** | **TEST PIT No. 4** PAGE: **1** |
| DATE STARTED / FINISHED: **6/9/2022** | OPERATOR: **GRANITE BASIN EARTHWORKS** |
| LOGGED BY: **ANDY PRUETT/KATHLEEN PRICE** | EXCAVATOR TYPE: **CASE 580 SUPER N BACKHOE** |
| BOREHOLE LOCATION/ELEVATION: **SEE TP LOCATION MAP** | |



| DEPTH (FT) | SAMPLES: UNDISTURBED | SAMPLES: BULK | SAMPLE ID | MATERIAL DESCRIPTION | LIQUID LIMIT | PLASTIC LIMIT | DRY DENSITY (PCF) | MOISTURE (%) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | This log is part of a report prepared by Nelson Engineering for this project and should be read with the report. This summary applies only at the location of the test pit and at the time of the excavation. Subsurface conditions may differ at other locations and may change at this location with passage of time. The data presented is a simplification of actual conditions encountered. | | | | | |
| 0 | | | | *0'–1.25' SLIGHTLY MOIST, DARK BROWN/BLACK SILTY CLAY LOAM TOPSOIL WITH MINOR TO MODERATE ROOTS* | | | | | *PROPOSED LOT 4, FLAT GRASS AND ALFALFA FIELD, SOUTH OF WARM CREEK* |
| 1 | | | | *1.25'–2.75' SLIGHTLY MOIST, DARK BROWN/BROWN GRAVELLY SILT LOAM, ~65% SILT LOAM, ~35% GRAVELS, SOIL DESIGN SUB–GROUP – B–2* | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | *2.75'–BOP MOIST, BROWN EXTREMELY GRAVELLY LOAMY COARSE SAND WITH COBBLES UP TO 12–INCH MAXIMUM DIMENSION, VERY DENSE, POORLY–GRADED, ~80% SUB–ROUND TO SUB–ANGULAR GRAVELS AND COBBLES, ~20% SAND, OXIDATION STAINING THROUGHOUT, ALLUVIAL FAN DEPOSITS, SOIL DESIGN SUB–GROUP – B–2* | | | | | *MODERATE DIGGING THROUGH ALLUVIAL FAN DEPOSITS BELOW 2.75'* |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | *BOP=10.0'* | | | | | |
| 11 | | | | *NO GROUNDWATER ENCOUNTERED*<br>*NO CAVING*<br>*MONITORING WELL INSTALLED:*<br>*10' OF 3"ø SCHEDULE 40 PVC SOLID PIPE, NO SLOTS*<br>*STICK UP = 1.7'* | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |


**NELSON ENGINEERING**
P.O. BOX 1599, JACKSON WYOMING (307) 733–2087


CLIENT: **BELICE RANCH HOLDINGS, LLC**
**TETON COUNTY, IDAHO**

JOB NO. 21–563–03

# Vicinity Well Data

Form 238-7
3/82

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

# 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.

USE TYPEWRITER OR BALLPOINT PEN

√Permit ID 701681

## 1. WELL OWNER

Name William Swope

Address 198 West 950 South Victor, Idaho 83455

Owner's Permit No. 22-(23)-88-E-059
23-88-E-10 Task Number issued on 10-3-88

## 2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log)

## 3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

## 4. METHOD DRILLED

☒ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

## 5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

| Thickness | Diameter | From | To |
|---|---|---|---|
| .250 inches | 6 inches + | 1 feet | 95 feet |
| _____ inches | _____ inches | _____ feet | _____ feet |
| _____ inches | _____ inches | _____ feet | _____ feet |
| _____ inches | _____ inches | _____ feet | _____ feet |

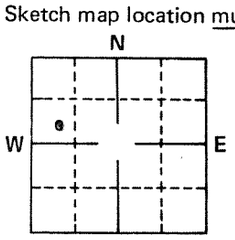
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

| Number | From | To |
|---|---|---|
| _____ perforations | _____ feet | _____ feet |
| _____ perforations | _____ feet | _____ feet |
| _____ perforations | _____ feet | _____ feet |

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
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 18' 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 _____
Lot No. _____ Block No. _____
County Teton
SW ¼ NW ¼ Sec. 15, T. 3 (N/S), R. 45 (E/W).

## 7. WATER LEVEL

Static water level 32' 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

| Bore Diam. | Depth From | Depth To | Material | Water Yes | Water No |
|---|---|---|---|---|---|
| | 0 | 95 | Sand Silt Clay Seams | | |
| | 95 | 100 | Rock w/ Crevices | | |

RECEIVED
NOV 20 1989
Department of Water Resources
Eastern District Office

## 10.

Work started 8/30/88 finished 8/30/88

## 11. DRILLERS 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. 10
Address Box 460 Ucon, Ida. 83454 Date 9/1/88
Signed by (Firm Official) Duane Denning
and
(Operator) Duane Denning

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

rm 238-7
782

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER C
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 Rodger Canaan c/o Craig Stewart

Address 172 W 950 S Victor Id

0005-000 D.S.

Owner's Permit No. 22-90-E-004

## 2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log)

## 3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

## 4. METHOD DRILLED

☒ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

## 5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

| Thickness | Diameter | From | To |
|---|---|---|---|
| .250" inches | 6" inches | + 1 feet | 120' feet |
| _____ inches | _____ inches | _____ feet | _____ feet |
| _____ inches | _____ inches | _____ feet | _____ feet |
| _____ inches | _____ inches | _____ feet | _____ feet |

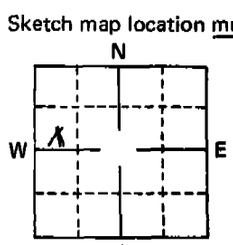
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

| Number | From | To |
|---|---|---|
| _____ perforations | _____ feet | _____ feet |
| _____ perforations | _____ feet | _____ feet |
| _____ perforations | _____ feet | _____ feet |

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
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 18' 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 _____

Lot No. _____ Block No. _____

County Teton

SW ¼ NW ¼ Sec. 15, T. 3 (N) S, R. 45 (E) W.

## 7. WATER LEVEL

Static water level 95' 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

| Bore Diam. | Depth From | Depth To | Material | Water Yes | Water No |
|---|---|---|---|---|---|
| 6" | 0 | 7' | Sand & Gravel | | |
| | 7 | 12' | Clay | | |
| | 12' | 95' | Clay Sand Gravel | | |
| | 95' | 120' | Clay Sand Gravel | X | |

RECEIVED
MAR 12 1990
Department of Water Resources
Eastern District Office

## 10.

Work started 2-7-90 finished 2-14-90

## 11. DRILLERS CERTIFICATION

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

Firm Name Denning Well Drilling Firm No. 10

Address Box 460 Ucon Idaho Date 2-14-90

Signed by (Firm Official) Denning

and

(Operator) Daniel Denning

AUG 28 1991

**USE ADDITIONAL SHEETS IF NECESSARY – FORWARD THE WHITE COPY TO THE DEPARTMENT**

Form 238-7
11/97 JC OMD

# 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 0024406
DRILLING PERMIT NO. 77-6998
Other IDWR No. _____

**2. OWNER:**
Name Steve Bagley
Address 9745 200 W
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. 45 East ☒ or West ☐
Sec. 16, ____ 1/4 (10 acres) SE 1/4 (40 acres) SE 1/4 (160 acres)
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 ~~Pounds~~ | METHOD |
|---|---|---|---|---|
| bentonite | 0 | 20 | 3 | 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 | +2 | 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:**
45 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 |
|---|---|---|---|
| 30 | 0 | 45 | 1 hr. |
| | | | |
| | | | |

Water Temp. 50° Bottom hole temp. _____
Water Quality test or comments: excell.
Depth first Water Encounter 45

**12. LITHOLOGIC LOG:** (Describe repairs or abandonment)

| Bore Dia. | From | To | Remarks: Lithology, Water Quality & Temperature | Water Y | Water N |
|---|---|---|---|---|---|
| 8 | 0 | 20 | gravel | | ☒ |
| 8 | 20 | 60 | gravel | ☒ | |
| 6 | 60 | 90 | gravel | ☒ | |
| 6 | 90 | 95 | clay | | ☒ |
| 6 | 95 | 100 | gravel | ☒ | |

Completed Depth 100 (Measurable)
Date: Started 5-16-02 Completed 5-16-02

**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 Franke Date 5-30-02
and
Driller or Operator Travis Date _____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
4/82

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

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MAR 14 1994
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 Shane Anderson
Address 1039 South 200 West Victor ID
Drilling Permit No. 22-94-E-004-000
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 | + 1' feet | 120' 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 |

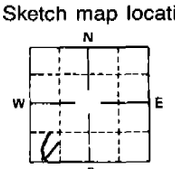
Well screen installed? ☐ Yes ☒ No
Manufacturer _____ Type _____
Top Packer or Headpipe _____
Bottom of Tailpipe _____

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**
Sketch map location **must** agree with written location.




Subdivision Name _____
Lot No. _____ Block No. _____
County Teton
Address of Well Site _____ (give at least name of road)
SW ¼ SW ¼ Sec. 15, T. 3 N ☒ or S ☐, R. 45 E ☒ or W ☐

**7. WATER LEVEL**
Static water level 80' 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** 107887

| Bore Diam. | Depth From | Depth To | Material | Water Yes | Water No |
|---|---|---|---|---|---|
| 8" | 0 | 6' | Clay | | X |
| 8" | 6' | 20' | Clay and Gravel | | X |
| 6" | 20' | 58' | Clay and Gravel | | X |
| 6" | 58' | 60' | Clay | | X |
| 6" | 60' | 79' | Clay with Light Gravel | | X |
| 6" | 79' | 95' | Gravel | X | |
| 6" | 95 | 120' | Clay + Gravel | X | |

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Eastern District Office

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**10.**
Work started 1-20-94 finished 1-21-94

**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 Denning Drilling Firm No. 518
Address PO. Box 460 Ucon Id Date 1-21-94
Signed by Drilling Supervisor Daniel Denning
and
(Operator) _____ *(If different than the Drilling Supervisor)*

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

Form 238-7
5-07

# IDAHO DEPARTMENT OF WATER RESOURCES
## WELL DRILLER'S REPORT

WELL TAG NO. D 0065564
Illing Permit No
ter right or injection well #
OWNER:
Name Kristia Godtz
ddress PO Box
State Zip
ELL LOCATION:
3 North or South Rge 45 East or West
16 1/4 NE 1/4 SE 1/4
Lot County Teton
Lat 43 35.010 (Deg and Decimal minutes)
Long 111 8.562 (Deg and Decimal minutes)
ddress of Well Site 9620 S. 2000 W.
City Victor
Blk Sub. Name
USE:
Domestic Municipal Monitor Irrigation Thermal Injection
Other
TYPE OF WORK:
New well Replacement well Modify existing well
Abandonment Other
DRILL METHOD:
Air Rotary Mud Rotary Cable Other
SEALING PROCEDURES:

| Seal material | From (ft) | To (ft) | Quantity (lbs or ft³) | Placement method/procedure |
|---|---|---|---|---|
| bentonite | 0' | 38' | 1100 lb | temp. casing |

CASING/LINER:

| Diameter (inch) | From (ft) | To (ft) | Gauge/ Schedule | Material | Casing | Liner | Threaded | Welded |
|---|---|---|---|---|---|---|---|---|
| 6" | +2' | 98' | .250 | steel | ☒ | ☐ | ☐ | ☒ |
| | | | | | ☐ | ☐ | ☐ | ☐ |
| | | | | | ☐ | ☐ | ☐ | ☐ |
| | | | | | ☐ | ☐ | ☐ | ☐ |

Drive shoe used? ☒ Y ☐ N Shoe Depth(s) 98'
PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method
Manufactured screen ☐ Y ☒ N Type
Depths 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
GRAVEL PACK:

| Size of Material | From (ft) | To (ft) | Quantity (lbs or ft³) | Placement method |
|---|---|---|---|---|
| | | | | |
| | | | | |

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

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft) 50' Static water level (ft) 50'
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 |
|---|---|---|---|---|---|---|
| 90' | 20-25 | 30 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 + gravels | | ✓ |
| 6" | 38' | 50' | clay + gravels | | ✓ |
| | 50' | 98' | sediment + gravels | ✓ | |

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OCT 15 2014
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 98'
Date Started: 9-23-14 Date Completed: 9-24-14

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 10-1-14
*Driller Jack Downing Date 9-28-14
*Operator II Date
Operator I Date
* Signature of Principal Driller and rig operator are required

Form 238-7
6/07

# IDAHO DEPARTMENT OF WATER RESOURCES
# WELL DRILLER'S REPORT

**1. WELL TAG NO. D** 0083605
Drilling Permit No. _____
Water right or injection well # _____

**2. OWNER:**
Name Eric Tucker / mike Tener
Address PO Box 181
City Wilson State Wy Zip 83014

**3.WELL LOCATION:**
Twp. 03 North ☒ or South ☐ Rge. 45 East ☒ or West ☐
Sec. 15 ____ 1/4 (10 acres) SW 1/4 (40 acres) NW 1/4 (160 acres)
Gov't Lot _____ County Teton
Lat. 43 ° 35.125 (Deg. and Decimal minutes)
Long. 111 ° 08.275 (Deg. and Decimal minutes)
Address of Well Site 1750 W 9500 S
City Victor
(Give at least name 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 |
|---|---|---|---|---|
| Bebnite | 0 | 40' | 1100lbs | Temp Casing Overburden |
| | | | | |

**8. CASING/LINER:**

| Diameter (nominal) | From (ft) | To (ft) | Gauge/ Schedule | Material | Casing | Liner | Threaded | Welded |
|---|---|---|---|---|---|---|---|---|
| 6" | +2' | 140' | .250 | Steel | ☒ | ☐ | ☐ | ☒ |
| | | | | | ☐ | ☐ | ☐ | ☐ |
| | | | | | ☐ | ☐ | ☐ | ☐ |
| | | | | | ☐ | ☐ | ☐ | ☐ |

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 140'

**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:**

| Filler 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) 85' Static water level (ft) 75'
Water temp. (°F) _____ Bottom hole temp. (°F) _____
Describe access port _____

**Well test:**

| Drawdown (feet) | Discharge or yield (gpm) | Test duration (minutes) |
|---|---|---|
| 120' | 15+gpm | 30min |
| | | |

**Test method:**

| Pump | Bailer | Air | Flowing artesian |
|---|---|---|---|
| ☐ | ☐ | ☒ | ☐ |
| ☐ | ☐ | ☐ | ☐ |

**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 | 20' | topsoil, rocks | | N |
| | 20' | 40' | rocks, gravel | | N |
| 6" | 40' | 60' | gravel | | N |
| | 60' | 80' | gravel | Y | |
| | 80' | 100' | gravel | Y | |
| | 100' | 120' | gravel | Y | |
| | 120' | 140' | gravel | Y | |

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AUG 26 2020
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 140'
Date Started: 8/6/20 Date Completed: 8/7/20

**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 Co. No. 518
*Principal Driller Daniel Denning Date 8-13-20
*Driller Ryan Cook Date 8/10/20
*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 48506
DRILLING PERMIT NO.
Water Right or Injection Well No

**2. OWNER:**
Name Water treatment Solution - Christensen
Address PO Box 7261
City Jackson State ~~ID~~ WY Zip 83002

**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 45 East ☒ or West ☐
Sec 16 ____ 1/4 (10 acres) NE 1/4 (40 acres) SE 1/4 (160 acres)
Gov't Lot ____ County Teton
Lat: : : Long: : :
Address of Well Site 952 S 200 W
(Give at least name of road + Distance to Road or Landmark) City Victor
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 | 160 | 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 | +2 | 115 | 250 | 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:**
30 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 |
|---|---|---|---|
| 30 | | | |
| | | | |
| | | | |

Water Temp. 51° Bottom hole temp
Water Quality test or comments:
Depth first Water Encounter 30

**13. LITHOLOGIC LOG:** (Describe repairs or abandonment)

| Bore Dia. | From | To | Remarks: Lithology Water Quality & Temperature | Water Y | Water N |
|---|---|---|---|---|---|
| 8 | 0 | 20 | clay gravel | | X |
| 6 | 20 | 57 | clay | | X |
| 6 | 57 | 117 | gravel & clay | X | |
| 6 | 117 | 120 | clay | | X |

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AUG 13 2007
Department of Water Resources
Eastern Region

Completed Depth 115' (Measurable)
Date: Started 7-26-07 Completed 7-27-07

**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 High Plains Firm No. 299
Principal Driller Marcus Frandsen Date 8-10-07
and
Driller or Operator II ____ Date
Operator I Greg Howe Date 8-10-07
Principal Driller and Rig Operator *Required*.
Operator I must have signature of Driller/Operator II

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# Wells within Half Mile Radius of Canyon Wren Subdivision

| Well ID | Permit ID | Owner | Well Address | Township | Range | Section | QQ | Quarter | Well Use | Production (GPM) | Static Water Level (ft) | Total Depth (ft) | Construction Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SW 1/4 of Section 15** | | | | | | | | | | | | | |
| 327333 | 702401 | SHANE ANDERSON | | 03N | 45E | 15 | SW | SW | | 0 | 80 | | 1/20/1994 |
| 327359 | 702427 | POLE CANYON DEVELOPMENT | | 03N | 45E | 15 | NE | SW | | 30 | 120 | | 4/7/1994 |
| 327495 | 702554 | RICK BAYER | POLE CANYON RD, WEST OF | 03N | 45E | 15 | NE | SW | | 15 | 125 | | 9/26/1994 |
| 418837 | 848941 | TRAVIS KARNS | 200 W | 03N | 45E | 15 | NW | SW | Domestic-Single Residence | | 78 | 120 | 9/6/2007 |
| 418856 | 848960 | DARREN ENRICO | 151 WARM CREEK DR | 03N | 45E | 15 | SE | SW | Domestic-Single Residence | 30 | 100 | 140 | 8/15/2007 |
| **NW 1/4 of Section 15** | | | | | | | | | | | | | |
| 328145 | 701681 | WILLIAM SWOPE | 9455 S 2000 W | 03N | 45E | 15 | SW | NW | Domestic-Single Residence | 0 | 32 | 100 | 8/29/1988 |
| 328266 | 701795 | RODGER CANAAN | | 03N | 45E | 15 | SW | NW | | 0 | 95 | | 2/13/1990 |
| 353994 | 782924 | WILL PILKINGTON | 146 LODGE POLE DR | 03N | 45E | 15 | NW | NW | Domestic-Single Residence | | 120 | 200 | 8/8/2002 |
| 359759 | 788725 | AW ENGINEERING | | 03N | 45E | 15 | NE | NW | | 0 | 90 | 140 | 7/25/1978 |
| 456594 | 891606 | SCOTT WIENTJES | 9973 S 2000 W | 03N | 45E | 15 | SW | NW | Domestic-Single Residence | 30 | 68 | 120 | 9/9/2019 |
| 459947 | 895240 | ERIC TUCKER C/O MIKE TREVOR | 1750 W 9500 S | 03N | 45E | 15 | SW | NW | Domestic-Single Residence | 15 | 75 | 140 | 8/6/2020 |
| **NE 1/4 of Section 15** | | | | | | | | | | | | | |
| 433416 | 864364 | JACK WALKER | DAIRY RD AND POLE LINE | 03N | 45E | 15 | SW | NE | Domestic-Single Residence | | 115 | 180 | 9/11/2012 |
| 445337 | 879713 | DREW KNEELAND | 1348 LODGE POLE DR | 03N | 45E | 15 | SW | NE | Domestic-Single Residence | | 95 | 178 | 8/3/2016 |
| 445388 | 879766 | BRIAN MAW | 9371 FAUTZ | 03N | 45E | 15 | SW | NE | Domestic-Single Residence | | 125 | 200 | 8/9/2016 |
| 445639 | 880024 | TRAVIS MARKEGARD | 1215 LODGE POLE DR | 03N | 45E | 15 | SE | NE | Domestic-Single Residence | | 125 | 200 | 8/28/2016 |
| 447883 | 882490 | AVARD BRANN | 9471 EOUTZ DR | 03N | 45E | 15 | SW | NE | Domestic-Single Residence | | 118 | 200 | 6/1/2017 |
| 452352 | 887159 | BRADY BARKDULL | 9431 FOUTZ DR | 03N | 45E | 15 | SW | NE | Domestic-Single Residence | | 95 | 198 | 8/15/2018 |
| 461738 | 897120 | HENRY FORK HOMES (MARTINEZ) | 1233 W 9000 S | 03N | 45E | 15 | NE | NE | Domestic-Single Residence | 15 | 130 | 200 | 12/21/2020 |
| **SE 1/4 of Section 16** | | | | | | | | | | | | | |
| 348823 | 776998 | STEVE BAGLEY | 974 S 2000 W | 03N | 45E | 16 | SE | SE | Domestic-Single Residence | 30 | 45 | 100 | 5/15/2002 |
| 418101 | 848156 | WATER TREATMENT SOLUTIONS | 952 S 2000 W | 03N | 45E | 16 | NE | SE | Domestic-Single Residence | 30 | 30 | 120 | 7/26/2007 |
| 439482 | 873531 | KRISTINA GOETZ | 9620 S 2000 W | 03N | 45E | 16 | NE | SE | Domestic-Single Residence | | 50 | 98 | 9/23/2014 |
| 460790 | 896112 | STAN MARSHALL | 9620 S 2000 W | 03N | 45E | 16 | NE | SE | Domestic-Single Residence | 45 | 60 | 160 | 10/4/2020 |
| **NE 1/4 of Section 16** | | | | | | | | | | | | | |
| 327686 | 701991 | JIM BUDGE | | 03N | 45E | 16 | NE | NE | | 0 | 0 | | 12/30/9999 |
| 327718 | 702023 | JIM BUDGE | | 03N | 45E | 16 | NE | NE | | 0 | 55 | | 12/4/1991 |
| 337171 | 765175 | CASEY COOK | 225 W STATE HIGHWAY 31 | 03N | 45E | 16 | NE | NE | | | 65 | 100 | 5/19/2000 |
| 410612 | 840314 | DEE WILLIAMS | 200 W | 03N | 45E | 16 | NE | NE | Domestic-Single Residence | | 51 | 100 | 6/20/2006 |
| 412859 | 842657 | GRANT THOMPSON | 200 W 925 S | 03N | 45E | 16 | NE | NE | Domestic-Single Residence | | 67 | 100 | 10/5/2006 |
| 413621 | 843438 | DEE WILLIAMS | 200 W | 03N | 45E | 16 | SE | NE | Domestic | | 53 | 103 | 11/14/2006 |
| 417355 | 847330 | DEE WILLIAMS | 215 TOMAHAWK 200 W | 03N | 45E | 16 | NE | NE | Domestic-Single Residence | | 50 | 80 | 6/19/2007 |
| 417356 | 847331 | BOBBY ALBERTSON | 215 TOMAHAWK OFF 200 W | 03N | 45E | 16 | NE | NE | Domestic-Single Residence | | 50 | 80 | 6/19/2007 |
| 417368 | 847343 | DEE WILLIAMS | 218 TOMAHAWK ON 200 W | 03N | 45E | 16 | NE | NE | Domestic-Single Residence | | 50 | 80 | 6/20/2007 |
| 421588 | 851798 | WARM SPRINGS LLC | SOUTHERN SKIES DRIVE S 3/8 M FROM HWY 31 ON 200 W | 03N | 45E | 16 | SE | NE | Fire Protection | | 55 | 206 | 7/1/2008 |
| 421898 | 852117 | DON L THOMPSON | 906 SOUTH 200 WEST | 03N | 45E | 16 | NE | NE | Domestic-Single Residence | | 55 | 120 | 7/6/2008 |
| 445343 | 879719 | CHARLES TAYLOR | 2197 SOUTHERN SKY DRIVE | 03N | 45E | 16 | SE | NE | Domestic-Single Residence | | 58 | 118 | 8/7/2016 |
| 452740 | 887557 | PACIFIC WEST CONSTRUCTION | 2052 TOMAHAWK TRAIL | 03N | 45E | 16 | NE | NE | Domestic-Single Residence | | 50 | 98 | 9/12/2018 |
| 453486 | 888332 | STERLING ERCANBROCK | 9140 SOUTH 2000 WEST | 03N | 45E | 16 | NE | NE | Domestic-Single Residence | 20 | 50 | 98 | 11/14/2018 |
| 454569 | 889478 | BEN HANNER | 2247 SOUTHERN SKY DR | 03N | 45E | 16 | SW | NE | Domestic-Single Residence | 25 | 42 | 98 | 4/25/2019 |
| 456153 | 891153 | RIVERBEND BUILERS | 9385 CONNER DR | 03N | 45E | 16 | SE | NE | Domestic-Single Residence | 35 | 60 | 100 | 9/3/2019 |
| 456595 | 891607 | WITH THE GRAIN | 2043 SOUTHERN SKY DR | 03N | 45E | 16 | SE | NE | Domestic-Single Residence | 35 | 60 | 100 | 9/5/2019 |

# Wells within Half Mile Radius of Canyon Wren Subdivision

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 459308 | 894554 | KATHERINE KNIPE | 2399 SOUTHERN SKY | 03N | 45E | 16 | SW | NE | Domestic-Single Residence | 25 | 42 | 100 | 6/22/2020 |
| 459316 | 894562 | RIVERBEND BUILERS | 2091 TOMAHAWK TRAIL | 03N | 45E | 16 | NE | NE | Domestic-Single Residence | 15 | 50 | 100 | 6/23/2020 |
| **NE 1/4 of Section 21** | | | | | | | | | | | | | |
| 327428 | 702490 | JEAN BENEDICT | | 03N | 45E | 21 | NW | NE | | 0 | | | 6/23/1994 |
| 415685 | 845607 | SHON KUNZ | 200 W 1024 S | 03N | 45E | 21 | NE | NE | Domestic-Single Residence | | 80 | 125 | 3/17/2007 |
| 418868 | 848972 | JASON STREIP | 1035 S 200 W | 03N | 45E | 21 | NE | NE | Domestic-Single Residence | | 80 | 120 | 8/7/2007 |
| **NW 1/4 of Section 22** | | | | | | | | | | | | | |
| 327260 | 702335 | JOHN DELAURENTIS | | 03N | 45E | 22 | NW | NW | | 10 | | | 9/5/1993 |
| 408672 | 838290 | DAVE ROBINSON | 200 WEST | 03N | 45E | 22 | NW | NW | Domestic | | 40 | 180 | 2/4/2006 |
| 409746 | 839411 | DAVE ROBINSON | 156 WARM CREEK DRIVE, 200 WE | 03N | 45E | 22 | NW | NW | Domestic-Single Residence | | 75 | 115 | 4/27/2006 |
| 449653 | 884330 | PACIFIC WEST BUILDERS | 1795 SUMMACEL | 03N | 45E | 22 | NW | NW | Domestic-Single Residence | | 110 | 198 | 11/7/2017 |
| 460174 | 895477 | CAVETT JAMES C/O IRON HORSE CONST | 2000 W 1000 S | 03N | 45E | 22 | NW | NW | Domestic-Single Residence | 50 | 75 | 160 | 8/20/2020 |

# N-P 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) | 325.000 | Site-specific | |
| Hydraulic Gradient | 0.0041 | Site-specific | |
| Mixing Zone Thickness (ft) | 15 | 15 | Default |
| Aquifer Width Perpendicular to Flow (ft) | 1400 | Site-specific | |
| | | | |
| Parcel Area (acres) | 20 | Site-specific | |
| Percent of Parcel That Is Impervious (Percent) | 5 | Site-specific | |
| Current/Acceptable Number of Homes in Parcel | 12.0 | Site-specific | |
| Septic Tank Effluent (gallons/d/home) | 400 | 300 | Provide Justification |
| | | | |
| Natural Recharge rate (inches/yr) | 1.2 | Site-specific | |
| | | | |
| **Nitrogen Budget** (all concentrations represent nitrate nitrogen) | | | |
| | | | |
| Upgradient Ground Water Concentration (mg/l) | 0.0 | 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 | 2.89E+05 | 97.0 |
| Effluent | 6.63E+03 | 2.2 |
| Recharge | 2.34E+03 | 0.8 |
| **Total Water Volume** | **2.98E+05** | |

| | |
|---|---|
| **Point of Compliance Nitrate Concentration Goal** (mg/l) | **1.0** |
| **Avg. Downgradient Nitrate Concentration in GW** (mg/l) | **1.0** |
| **Current/Acceptable Lot Size (Acres)** | **1.7** |

| Yearly Nitrogen Budget | Mass (mg) | % of Total |
|---|---|---|
| Background GW Nitrate Mass | 0.00E+00 | 0.0 |
| Septic Tank Effluent Nitrate Mass | 2.98E+08 | 99.8 |
| Recharge Nitrate Mass | 7.03E+05 | 0.2 |
| **Total Nitrate Mass** | **2.99E+08** | |

## 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

| | |
|---|---|
| Black Horse Subdivision | Site Name |
| | Parcel Identification |
| 9 8 22 | Date |
| Philip Gyr | Prepared By |

Disclaimer: Considerable care was exercised in developing this software. However, the Idaho Department of Environmental Quality makes no warranty regarding its accuracy and shall not be held liable for any damages resulting from its use.

# 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) | 325.000 | Site-specific | |
| Hydraulic Gradient | 0.0041 | Site-specific | |
| Mixing Zone Thickness (ft) | 15 | 15 | Default |
| Aquifer Width Perpendicular to Flow (ft) | 252 | Site-specific | |
| | | | |
| Parcel Area (acres) | 2.5 | Site-specific | |
| Percent of Parcel That Is Impervious (Percent) | 5 | Site-specific | |
| Current/Acceptable Number of Homes in Parcel | 2.0 | Site-specific | |
| Septic Tank Effluent (gallons/d/home) | 400 | 300 | Provide Justification |
| | | | |
| Natural Recharge rate (inches/yr) | 1.2 | Site-specific | |
| | | | |
| **Nitrogen Budget** (all concentrations represent nitrate nitrogen) | | | |
| | | | |
| Upgradient Ground Water Concentration (mg/l) | 0.0 | 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 | 5.21E+04 | 97.4 |
| Effluent | 1.11E+03 | 2.1 |
| Recharge | 2.93E+02 | 0.5 |
| **Total Water Volume** | **5.35E+04** | |

| | |
|---|---|
| **Point of Compliance Nitrate Concentration Goal** (mg/l) | **1.0** |
| **Avg. Downgradient Nitrate Concentration in GW** (mg/l) | **0.9** |
| **Current/Acceptable Lot Size (Acres)** | **1.3** |

| Yearly Nitrogen Budget | Mass (mg) | % of Total |
|---|---|---|
| Background GW Nitrate Mass | 0.00E+00 | 0.0 |
| Septic Tank Effluent Nitrate Mass | 4.97E+07 | 99.8 |
| Recharge Nitrate Mass | 8.79E+04 | 0.2 |
| **Total Nitrate Mass** | **4.98E+07** | |

## 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

| | |
|---|---|
| **Black Horse Subdivision** | **Site Name** |
| **2.5 Acre Lots** | **Parcel Identification** |
| **9 8 22** | **Date** |
| **Philip Gyr** | **Prepared By** |

Disclaimer: Considerable care was exercised in developing this software. However, the Idaho Department of Environmental Quality makes no warranty regarding its accuracy and shall not be held liable for any damages resulting from its use.

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

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## INPUT

| Water Budget | Input Value | Default Value | |
|---|---|---|---|
| Hydraulic Conductivity (ft/day) | 325.000 | Site-specific | |
| Hydraulic Gradient | 0.0041 | Site-specific | |
| Mixing Zone Thickness (ft) | 15 | 15 | Default |
| Aquifer Width Perpendicular to Flow (ft) | 147 | Site-specific | |
| | | | |
| Parcel Area (acres) | 0.67 | Site-specific | |
| Percent of Parcel That Is Impervious (Percent) | 5 | Site-specific | |
| Current/Acceptable Number of Homes in Parcel | 1.0 | Site-specific | |
| Septic Tank Effluent (gallons/d/home) | 400 | 300 | Provide Justification |
| | | | |
| Natural Recharge rate (inches/yr) | 1.2 | Site-specific | |
| | | | |
| **Nitrogen Budget** (all concentrations represent nitrate nitrogen) | | | |
| | | | |
| Upgradient Ground Water Concentration (mg/l) | 0.0 | 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 | 3.04E+04 | 98.0 |
| Eflluent | 5.53E+02 | 1.8 |
| Recharge | 7.85E+01 | 0.3 |
| **Total Water Volume** | **3.10E+04** | |

| | |
|---|---|
| **Point of Compliance Nitrate Concentration Goal** (mg/l) | **1.0** |
| **Avg. Downgradient Nitrate Concentration in GW** (mg/l) | **0.8** |
| **Current/Acceptable Lot Size (Acres)** | **0.7** |

| Yearly Nitrogen Budget | Mass (mg) | % of Total |
|---|---|---|
| Background GW Nitrate Mass | 0.00E+00 | 0.0 |
| Septic Tank Effluent Nitrate Mass | 2.49E+07 | 99.9 |
| Recharge Nitrate Mass | 2.36E+04 | 0.1 |
| **Total Nitrate Mass** | **2.49E+07** | |

## 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).

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| 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

| | |
|---|---|
| Black Horse Subdivision | **Site Name** |
| Lot 4 Portion North of Warm Creek | **Parcel Identification** |
| 9 8 22 | **Date** |
| Philip Gyr | **Prepared By** |

Disclaimer: Considerable care was exercised in developing this software. However, the Idaho Department of Environmental Quality makes no warranty regarding its accuracy and shall not be held liable for any damages resulting from its use.

# NRCS SOIL REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

# Custom Soil Resource Report for Teton Area, Idaho and Wyoming

**Jason Belice**


December 21, 2021

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


Map Scale: 1:2,320 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

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 10, Sep 9, 2021

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

Date(s) aerial images were photographed: Sep 24, 2011—Oct 25, 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 |
|---|---|---|---|
| 13403 | Alpine gravelly silt loam, 0 to 2 percent slopes | 11.3 | 55.9% |
| 13425 | Badgerton-Alpine complex, 2 to 8 percent slopes | 8.9 | 44.1% |
| **Totals for Area of Interest** | | **20.2** | **100.0%** |

# Map Unit Descriptions

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

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

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

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

onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

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

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

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

# Teton Area, Idaho and Wyoming

## 13403—Alpine gravelly silt loam, 0 to 2 percent slopes

### Map Unit Setting

*National map unit symbol:* 1v281
*Elevation:* 6,050 to 6,320 feet
*Mean annual precipitation:* 16 to 18 inches
*Mean annual air temperature:* 38 to 44 degrees F
*Frost-free period:* 50 to 90 days
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Alpine, gravelly silt loam, and similar soils:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Alpine, Gravelly Silt Loam

#### Setting

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

#### Typical profile

*A1 - 0 to 2 inches:* gravelly silt 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:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*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 content:* 75 percent
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 1.0
*Available water supply, 0 to 60 inches:* Very low (about 2.3 inches)

#### Interpretive groups

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

## 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:* Concave, linear
*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
*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:* NoneRare
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 4 percent
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 1.0
*Available water supply, 0 to 60 inches:* Low (about 3.9 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 6c
*Land capability classification (nonirrigated):* 6c
*Hydrologic Soil Group:* B
*Ecological site:* R013XY049ID - Riverbottom 10-18 POAN3/LECI4
*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
*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 content:* 75 percent
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 1.0
*Available water supply, 0 to 60 inches:* Very low (about 2.2 inches)

### Interpretive groups

*Land capability classification (irrigated):* 4c
*Land capability classification (nonirrigated):* 6s
*Hydrologic Soil Group:* B
*Ecological site:* R013XY004ID - SHALLOW GRAVELLY 12-16 ARTRV/PSSPS
*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:* R013XY049ID - Riverbottom 10-18 POAN3/LECI4
*Hydric soil rating:* Yes

### Foxcreek, wooded

*Percent of map unit:* 5 percent
*Landform:* Flood plains
*Down-slope shape:* Linear
*Across-slope shape:* Concave, linear
*Ecological site:* R013XY049ID - Riverbottom 10-18 POAN3/LECI4

*Hydric soil rating:* Yes

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# Water Quality Data

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# Drinking Water Branch

## Chem/Rad Sample Results

| | | | |
|---|---|---|---|
| **Water System No. :** | ID7410033 | **Federal Type :** | C |
| **Water System Name :** | TETON SPRINGS WATER AND SEWER COMPANY | **State Type :** | C |
| **Principal County Served :** | TETON | **Primary Source :** | GW |
| **Status :** | A | **Activity Date :** | 01-01-2007 |
| **Lab Sample No. :** | NI10714502 | **Collection Date :** | 07-12-2021 |

This list displays sample/results of all non-microbial analytes (TSAANLYT.TYPE_CODE <> MOR) associated to the selected sample. Results for Microbial Analytes are not included.

| Analyte Code | Analyte Name | Method Code | Less than Indicator | Level Type | Reporting Level | Concentration level | Monitoring Period Begin Date | Monitoring Period End Date |
|---|---|---|---|---|---|---|---|---|
| 1040 | NITRATE | null | Y | MDL | 0E-9 | | 01-01-2021 | 12-31-2021 |

**Total Number of Records Fetched = 1**

**Return Links**

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# Drinking Water Branch

## Chem/Rad Sample Results

| | | | |
|---|---|---|---|
| **Water System No. :** | ID7410033 | **Federal Type :** | C |
| **Water System Name :** | TETON SPRINGS WATER AND SEWER COMPANY | **State Type :** | C |
| **Principal County Served :** | TETON | **Primary Source :** | GW |
| **Status :** | A | **Activity Date :** | 01-01-2007 |
| **Lab Sample No. :** | NI10714501 | **Collection Date :** | 07-12-2021 |

This list displays sample/results of all non-microbial analytes (TSAANLYT.TYPE_CODE <> MOR) associated to the selected sample. Results for Microbial Analytes are not included.

| Analyte Code | Analyte Name | Method Code | Less than Indicator | Level Type | Reporting Level | Concentration level | Monitoring Period Begin Date | Monitoring Period End Date |
|---|---|---|---|---|---|---|---|---|
| 1040 | NITRATE | null | Y | MDL | 0E-9 | | 01-01-2021 | 12-31-2021 |

**Total Number of Records Fetched = 1**