Curt Behle & Liberty LLC

2023

Trestles & Wildflower
Level 1 Nutrient-Pathogen Evaluation

Civilize, PLLC

Management and Engineering

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This report documents an Idaho Department of Environmental Quality (IDEQ) Level 1 Nutrient-Pathogen Evaluation for the proposed Trestle Phase 1, Phase 2, and Wildflower development. This Nutrient-Pathogen evaluation includes a comprehensive, scientifically based evaluation of soils, geologic conditions, and water resources in and around the proposed development area. This study is for the approval of the on-site individual wastewater septic systems. This report was developed to cover the Nutrient-Pathogen Evaluation Technical Guide for On-Site Wastewater Treatment Systems in Teton County, Idaho requirements.

- Well driller reports for wells within ½ mile radius of the project site.
- Map showing the project with proposed lot configuration, property lines, on-site wastewater treatment systems, water supply wells, surface water features, and location of surrounding wells within 500 feet of the property boundaries.
- Information on the depth to groundwater and groundwater flow direction
- Information on soil and surface geologic conditions at the site for evaluation of pathogen fate and nutrient migration.
- Soil descriptions from test pits excavated at a minimum depth of ten feet at the site.
- Groundwater quality data and surface water nitrate data in the vicinity of the project.
- Nitrogen mass-balance spreadsheet to estimate impacts from the development.

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1.0 Introduction

Trestles I is a proposed 24-lot subdivision, Trestles II is a proposed 41 lot subdivision with 38 buildable lots, and Wildflower is a proposed 23-lot subdivision with 22 buildable lots. The Teton County Planning & Zoning Commission previously approved the Concept Plan for all three subdivisions. The Preliminary Plat submittal for each development is currently being presented to the Teton County Planning & Zoning Commission for consideration. As part of that effort, the County has indicated that some of the required studies, including the Nutrient-Pathogen Study (N-P Study), evaluate the collective impacts from proposed developments.

Civilize, PLLC has been retained by the developers: 071500 LLC, Darby Development Inc. and Liberty LLC to prepare a Level 1 Nutrient-Pathogen Study for the combined projects in accordance with the requirements of Teton County and consistent with the protocols of the Idaho Department of Environmental Quality and the Eastern Idaho Public Health District.

1.1 Project Information

1.1.1 Project Identification

The following table lists important project identification information and contact information for the project.

Project Name	
Owner	071500 LLC, Darby Development/Liberty LLC
Owner Contact Person	Curt Behle
Owner Address	436 Forest View Dr. Driggs, ID 83422
Owner Telephone Number	(858) 361-0888 / (208) 201-5151
Owner Email	curtbehle@gmail.com tetonrealestate@gmail.com
Engineer	Civilize, PLLC
Engineer Contact Person	Brent E. “Husk” Crowther, P.E.
Engineer Address	3853 W. Mountain View Dr. Rexburg, ID 83440
Engineer Project Number	01-20-0030
Engineer Telephone Number	208-351-2824
Engineer Email	bcrowther@civilize.design

1.1.2 Project Location

Trestles is a proposed 66-lot subdivision located in Teton County. Idaho located approximately one half a mile outside of the impact area of the city of Driggs. More particularly, the development is situated near the northeast corner of the intersection of Hwy33 and W 2000 S. The parent parcels of 40.3 acres (RP04N45E029250; SE ¼, SE ¼, Sec 2, T 04N, R 45E) owned by 071500 LLC and 40.17 acres (RP04N45E027350; NE ¼, SE ¼, Sec 2, T 04N, R 45E) owned by Darby Development LLC, total of 80.47 acres, and are both zoned agriculture/rural residential 2.5 under the 2012 Teton County zoning map.

Trestles II is a proposed 41 lot subdivision with 38 buildable lots located directly north of Trestles I. The parent parcels, both owned by Liberty LLC, are 56.36 acres (RP04N45E021201; S ½, NE ¼, Sec 2, T 04N, R 45E) and 80 acres (RP04N45E013600; S ½, NW ¼, Sec 1, T 04N, R 45E) for a total area of 136.36 acres, are both zoned agriculture/rural residential 2.5 under the 2012 Teton County zoning map.

Wildflower is a proposed 23-lot subdivision with 22 buildable lots located directly to the west of Trestles. The parent parcels, both owned by Liberty LLC, are 30.32 acres (RP04N45E028402; SW ¼, SE ¼, Sec 2, T 04N, R 45E) and 34.53 acres (RP04N45E027950; NW ¼, SE ¼, Sec 2, T 04N, R 45E) for a total area of 64.36 acres, are both zoned agriculture/rural residential 2.5 under the 2012 Teton County zoning map.

Trestles and Wildflower total an area of 281.19 acres.

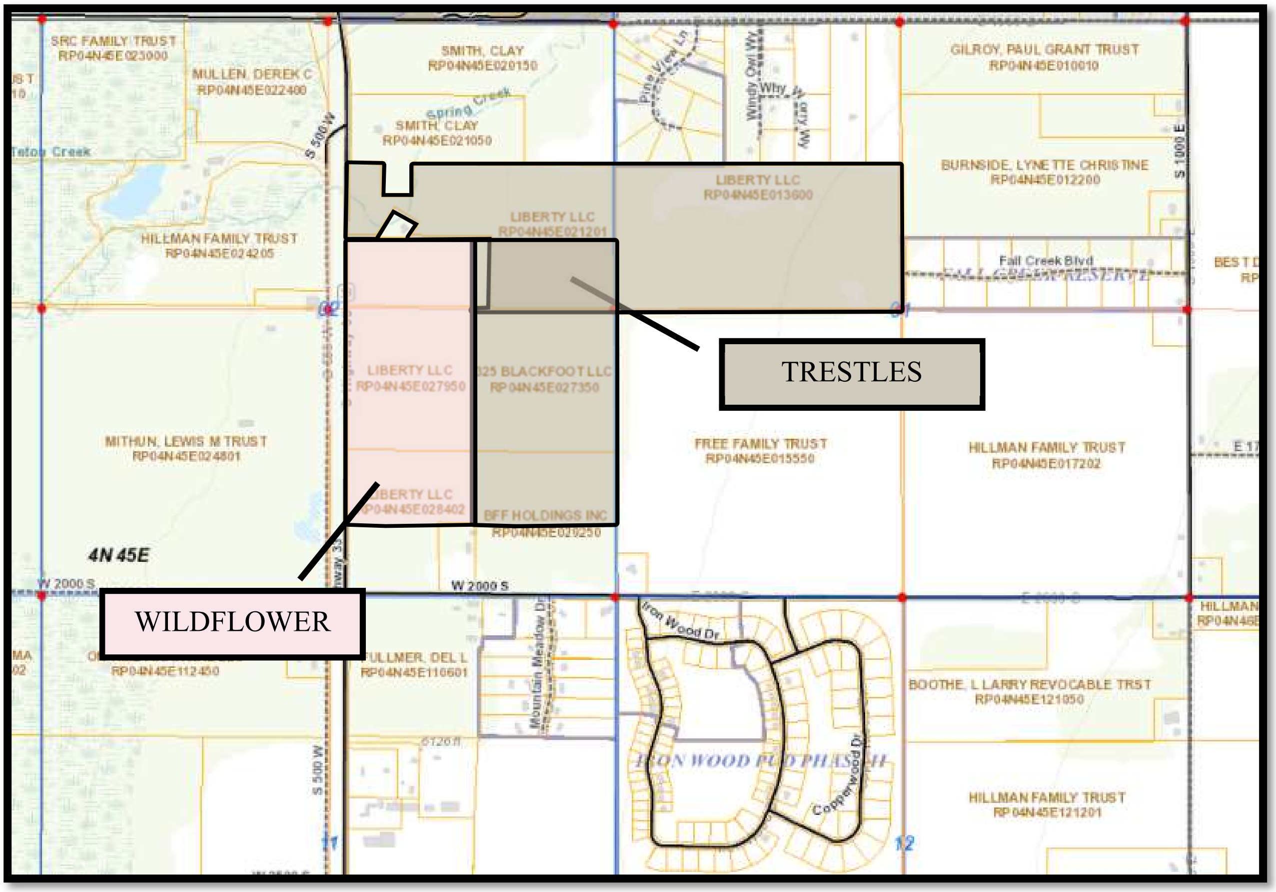

Figure 1-1: Project Location Map

1.1.4 Current Land Uses

The current land use for all six parcels that comprise the three development projects is agricultural featuring a mix of irrigated cropland, dry farm, and pasture. The following figure provides a snapshot in time depicting the land use via aerial image from 2021 as extracted from the Teton County GIS system.

1.3 Study Objectives

The objective of an N-P Study is to evaluate the potential impacts to groundwater from the effluent discharged from the wastewater treatment and dispersal system proposed for a specific development project. The evaluation facilitates the configuration of a proposed development including the number, size, location, and orientation of the lots and assists the engineer in selecting an appropriate wastewater treatment and dispersal system to minimize the impact to the surface and ground water of the State of Idaho.

1.4 Regulatory Authority

Regulations regarding the necessity of conducting a Nutrient-Pathogen (N-P) Study are stipulated in Idaho Administrative Code, IDAPA 58.01.03-Individual/Subsurface Sewage Disposal & Cleaning of Septic Tank Rules as by Teton County Title 9 Subdivision Regulations.

1.4.1 IDAPA Rules

The Idaho Department of Environmental Quality, under IDAPA 58.01.03, Section 013 Large Scale Adsorption System Design and Construction, indicates a site investigation may be required for design and installation of a large soil absorption system to evaluate the impact of the effluent on waters of the State of Idaho.

> *01. Site Investigation. A site investigation for a large soil absorption system by a soil scientist and/or hydrogeologist may be required by the Director for review and approval and shall be coordinated with the Director. Soil and site investigations shall conclude that the effluent will not adversely impact or harm the waters of the State. IDAPA 58.01.03.013.01*

The Idaho Department of Environmental Quality also uses IDAPA 58.01.03, Section 005 Permit and Permit Application, Subsection 04 Contents of Application to require a site investigation under specific circumstances such as with central septic systems, nitrate priority areas, or suspected adverse soil or groundwater conditions. Subparagraph i and o are cited below documenting DEQ's authority to require a site evaluation.

> *i. Soil description and profile, groundwater data, percolation or permeability test results and/or a site evaluation report; IDAPA 58.01.03.005.04.i*
>
> *o. Any other information, document, or condition that may be required by the Director to substantiate that the proposed system will comply with applicable rules and regulations. IDAPA 58.01.03.005.04.o*

Guidance published by DEQ in conjunction with the Central District Health Department explains that the site evaluation must include: " a comprehensive, scientifically based evaluation of soils, geologic conditions,, and water resources in and around the area of the proposed development, CSS, or LSAS."

The N-P evaluation must conclude that the effluent from the wastewater treatment system will not adversely affect the waters of the state.

A large-scale adsorption system (LSAS) is defined as a wastewater dispersal system with a calculated volume of 2,500 gallons per day or more. A central sewer system (CSS) is defined as a wastewater dispersal system with a calculated volume of 2,500 gallons per day or more or any system that receives wastewater from more than two dwellings/buildings under separate ownership.

DEQ typically requires an N-P evaluation if on-site wastewater treatment systems are proposed for the following type of development.

1. Subdivisions exceeding a specified number of lots.
2. Commercial facilities that generate 600 gallons or more of wastewater.
3. Located in an area of concern, which is further defined as:
    a. An area where nutrient and/or pathogen contamination is known to exist and has the potential to create a health risk, or
    b. An area where the soil depth is shallow or there exists a predominance of gravel or other coarse-grained sediment, a shallow depth to the groundwater (10 feet or less), or fractured bedrock (10 feet or less below ground surface).

DEQ may also require an N-P Evaluation on parcels of land where unusual conditions result in concern regarding surface or groundwater quality. In some cases, DEQ will accept the design and construction of suitable alternative treatment and dispersal systems in lieu of completing a Level 2 N-P Evaluation.

1.4.1.1 Approval Criteria

The intent of an N-P Evaluation is to demonstrate that proposed wastewater treatment systems will not degrade ground water or surface water quality beyond the existing background levels. To facilitate practical implementation of this criterion, DEQ considers the fate of nitrate discharged from the treatment system into the subsurface soils. Nitrate was chosen the indicator element because it is often the limiting factor when sizing a wastewater treatment system for the available space on a building lot and it is the most mobile constituent of concern in domestic wastewater. Nitrate also has an appreciable impact on public health when the concentration exceed the maximum contaminant level (MCL) of 10 mg/l as established by the Environmental Protection Agency (EPA).

DEQ allows a simplification of pathogen transport modeling to approximate the fate of nitrate for the project site. The evaluation is accomplished by characterizing soil and geologic conditions at the site and demonstrating sufficient attenuation of nitrate in the subsurface before it impacts the surface or ground water.

An increase of 1.0 mg/l of nitrate or less at the compliance boundary, typically inferred as the property line, is considered the threshold value for demonstrating a negligible increase in background levels of nitrate. The compliance boundary is defined as:

- Individual lot boundaries – Applicable if individual wells are used for each lot in the development.
- Downgradient boundary of the overall subdivision or development – Applied when the development features a centralized or community water system.
- Surface water bodies – Applicable when subsurface conditions result in a hydraulic connection between impacted ground water and a surface water body within the boundary of the

development. Phosphorous is typically the element of most concern when surface water quality is considered.

1.4.1.2 Level 1 N-P Evaluation

If site conditions or design factors warrant, DEQ may allow an abbreviated, or Level 1, N-P pathogen The circumstances whereby a Level 1 N-P Evaluation may be considered include:

- Proposed lot sizes are unusually large,
- Site conditions warrant a review of the "area of concern" designation, or
- A Level 2 N-P Evaluation has been previously performed within ½ mile radius of the proposed development, and the site conditions are sufficiently similar.

DEQ has prepared a mass-balance spreadsheet and made it publicly available for use in Level 1 N-P Evaluations. The spreadsheet is intended as a tool to assess a preliminary potential impact and for use by the design professional and applicant in configuring the development to minimize impacts to the ground water. The spreadsheet tool uses nitrogen as the indicator element to represent other constituents.

A Level 1 N-P Evaluation may be sufficient if 1.) the results of the mass-balance spreadsheet suggest the nitrate impact to the ground water is less than or equal to 1.0 mg/l, or 2.) the data demonstrate that site conditions do not warrant an "area of concern" designation.

The minimum data requirements for a Level 1 N-P Evaluation are listed in the ensuing table.

1.4.1.3 Level 2 N-P Evaluation

A Level 2 N-P Evaluation is required based on the criteria outlined above and if the site conditions don't allow a Level 1 N-P Evaluation. A Level 2 N-P Evaluation includes all of the requirements of a Level 1 N-P Evaluation and further invokes the installation of on-site monitoring wells, analysis of water samples from those wells for several relevant constituents, collection of soil samples and laboratory analysis of those samples for several constituents, and more intensive contaminant fate and transport modeling.

The following table details the minimum data requirements for both Level 1 and Level 2 N-P Evaluations.

Table 1-1: Minimum Requirements for Level 1 and Level 2 N-P Evaluations

Minimum Data Requirements	Level 1 N-P Evaluation	Level 2 N-P Evaluation
Well drillers reports for wells within ½ mile radius of the project	✓	✓
Map showing the project with proposed lot configuration, property lines, on-site wastewater treatment systems, water supply wells, surface water features, and location of surrounding wells represented by well drillers reports	✓	✓
Information on the depth to ground water and ground water flow direction.	✓	✓
Information on soil and surface geologic conditions at the site for evaluation of pathogen fate and nutrient migration	✓	✓
Soil descriptions from test pits excavated at the site.	✓	✓
Ground water quality data in the vicinity of the project	✓	✓
Use nitrogen mass-balance spreadsheet to estimate impacts from development	✓	✓

Install a minimum of three monitoring wells into the uppermost aquifer to, 1.) determine existing site-specific background ground water quality, 2.) establish site-specific ground water flow direction, and 3.) establish site-specific aquifer hydraulic conductivity		✓
At a minimum, analyze water samples collected from on-site wells for pH, conductivity, temperature, chloride, sulfate, sodium, nitrite and nitrate, total Kjeldahl nitrogen (TKN), ammonia, ortho-phosphate, total organic carbon, total dissolved solids, and fecal coliform bacteria.		✓
ONLY for N-P Evaluations with phosphorous considerations or for evaluating nutrient attenuation in the vadose or saturate zone, analyze soil samples (collected from pits or borings) for pH, moisture content, bulk density (calculate porosity), nitrite and nitrate, TKN, ammonia, ortho-phosphate, organic matter, and cation exchange capacity.		✓
ONLY for N-P Evaluations that consider nutrient attenutation in the vadose or saturated zone analyze water samples for dissolved oxygen (or redox potential), dissolved organic carbon, nitrate+nitrite, TKN, and ammonia; describe stratigraphy and moisture content relationships in the soils between the bottom of the drainfield and the top of the water table; document any downgradient changes in aquifer characteristics conducive to denitrification, such as the existence of riparian zones, that are upgradient of proposed points of compliance		✓
Perform contaminant fate and transport modeling		✓

1.4.2 Teton County Ordinances

The Teton County Title 9 Subdivision Regulations, Chapter 3 Procedure for Approval, Section 9-3-2 Subdivision or Planned Unit Development, Subsection C Preliminary Plat Phase, Paragraph 3 Regulations that May Apply, Subparagraph b Nutrient-Pathogen Evaluation, Subparagraph I Requirement states:

> *Requirement: A Level 1 NP evaluation is required by Teton County for any proposed development that is contemplating using on-site wastewater treatment systems or central septic systems when one or more of the five conditions below exist. Said NP evaluation shall be completed following the County NP guidelines found in Appendix A, "Nutrient-Pathogen Technical Guidelines for Wastewater Treatment Systems in Teton County" and DEQ guidelines referenced in Appendix A.*

The five conditions listed applicable to the foregoing paragraph are:

1. (a) The proposed development that lies wholly or partially within the WW Wetland and Waterways Overlay Area (Section 8-5-1-D of Title 8); or
2. (b) There is evidence that ground water, at some time of the year, comes within ten feet of the ground's surface at any location on the proposed development parcel; or
3. (c) There is evidence that soil depth to fractured bedrock is ten feet or less anywhere on the proposed development; or
4. (d) The development application includes a food service, a commercial facility, or an industrial facility generating 600 gallons or more of wastewater per day; or
5. (e) The proposed development is within an area where the concentration of nitrate-nitrogen in ground water is five (5) mg/L or higher.

The condition the County invoked to require the N-P Evaluation is the proposed development lies wholly or partially within the Wetland and Waterways Overlay. The westernmost lot of Trestles II, which is Block 2, Lot 6 with 10.671 acres, is designated as dedicated open space triggered the requirement to evaluate all three of separate proposed developments with combined acreage of 281 acres.

1.5 Theory and Application

The Nutrient-Pathogen Evaluation is intended to predict the nutrient and pathogen movement in the various layers of subsurface materials within the project limits with those contaminants introduced as a result of onsite wastewater treatment and dispersal systems. That movement is affected by the in-situ soils, geologic, and hydrologic conditions of the site. As the most mobile constituent in septic effluent, and one that has a recognized impact on human health, DEQ utilizes nitrate as an indicator for the fate of nutrients in the analysis for the impact of septic system discharge into the subsurface. If phosphorous is deemed a constituent of concern, the N-P Evaluation should consider the fate of phosphorous as well. Because the fate of pathogens and the mechanisms for transport are relatively complex, DEQ allows the characterization of the soil and geologic conditions at the site to suffice in determining the potential for adequate attenuation of pathogens prior to impacting either the ground water or the surface water.

1.5.1 Nitrogen Transport Analysis

The total mass of nitrogen present in the earth and the surrounding atmosphere circulates among four principal banks or sinks; the atmosphere, the hydrosphere, the earth's crust, and the tissues of organisms. While the total quantity in the biosphere is fixed, the proportional distribution in each bank is in constant flux. Because of anthropogenic activities such as mining and manufacturing that release nitrogen from the earth's crust and the cultivation of leguminous crops that are categorized as nitrogen fixing, the natural balance of nitrogen is skewed with the hydrosphere receiving much of this imbalance. The accumulation of nitrogen in the hydrosphere has some deleterious effects on aquatic habitats for some species due to depletion of dissolved oxygen, increased aquatic plant growth, and elevated toxicity for some aquatic life. In response, environmental regulations have been promulgated to mitigate the migration of nitrogen into the hydrosphere (EPA, 1993).

Total nitrogen is comprised of four compounds: nitrate, nitrite, ammonia, and organic nitrogen. Total kjeldahl nitrogen (TKN) is the sum of organic nitrogen and ammonia nitrogen. (MDEQ, 2015) The atmosphere functions as a sink for nitrogen in the form of nitrogen gas. Fixation of nitrogen in the natural environment is defined by incorporation of nitrogen in the gas phase into a chemical compound that is used by plants and animals, typically accomplished by microorganisms adapted for that purpose. Fixation in smaller quantities occurs from lightning and as a product of industrial processes such as fertilizer manufacturing. Ammonification is the process whereby organic nitrogen is converted to ammonium in a hydrolysis reaction. This is often discharged from animals in their urine (EPA, 1993).

$$\underset{Urea}{N_2NCONH_2} + 2H_2O \xrightarrow{enzyme} \underset{ammonium\ carbonate}{(NH_4)_2\ CO_3}$$

Synthesis is a biochemical mechanism that utilizes nitrate compounds and ammonium in the formation of plant proteins (EPA, 1993).

$$NO_3^-\ CO_2 + green\ plants + sunlight \longrightarrow protein$$

$$\frac{NH_3}{NH_4^+} + CO_2 + green\ plants + sunlight \longrightarrow protein$$

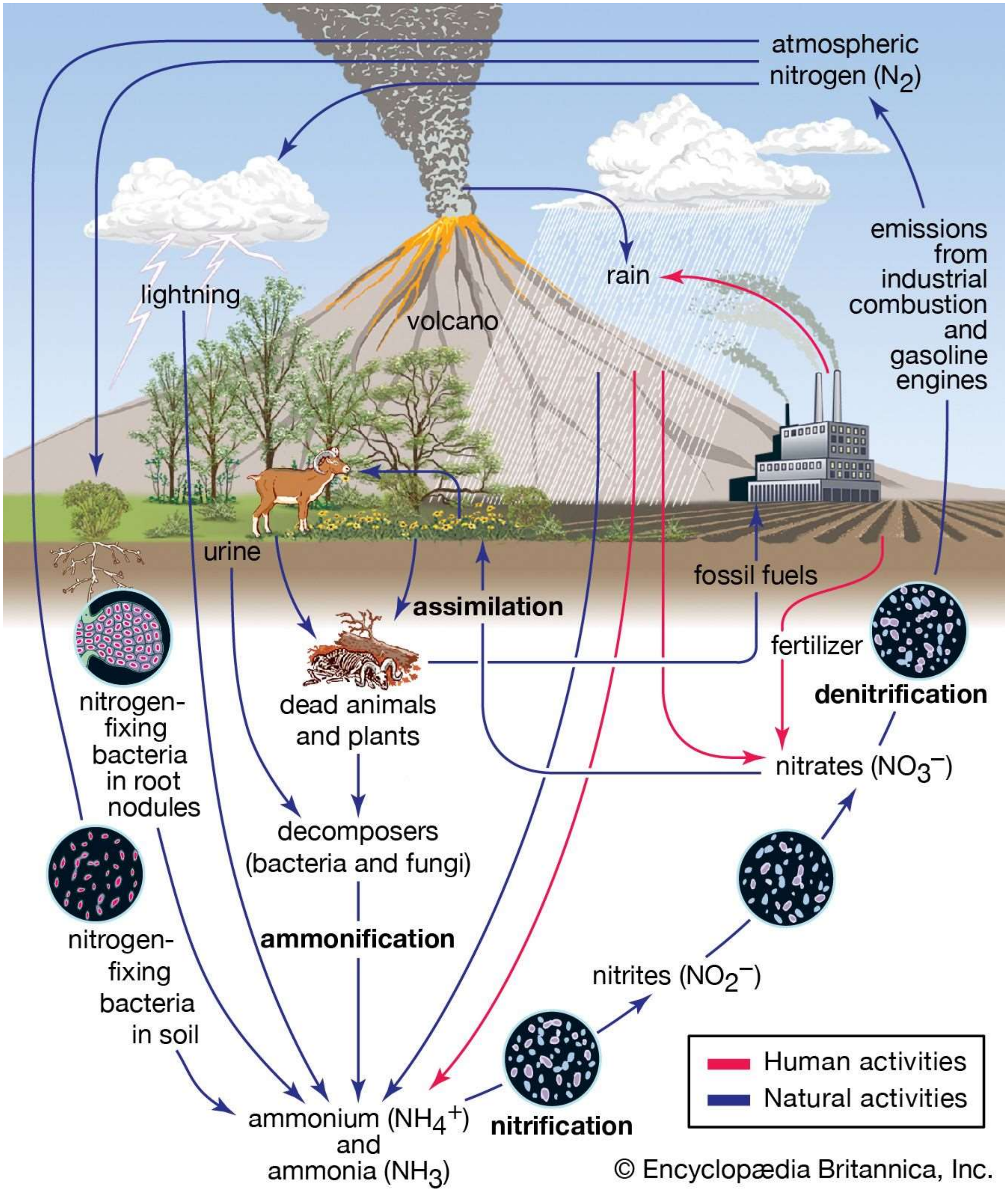

Figure 2: Nitrogen Cycle (https://www.britannica.com/science/nitrogen-cycle)

Nitrification is the biological oxidation of ammonium whereby the hydrogen atoms are stripped from the ammonium molecules and replaced with oxygen atoms (EPA, 1993).

$$NH_4^+ + O_2 \xrightarrow{Nitrosomona} NO_2^- + O_2 \xrightarrow{Nitrobacter} NO_3$$

Finally denitrification is the biological reduction of nitrate molecules to nitrogen gas (EPA, 1993).

$$NO_3^- + organic\ carbon \longrightarrow NO_2^- + organic\ carbon \longrightarrow N_2 + carbon\ dioxide + water$$

The speciation of nitrogen is a dynamic continuum with reactions occurring in both directions depending upon various environmental conditions. Those conditions that affect the rate of nitrogen reactions include temperature, pH, microbiology, oxidation/reduction potential, and the availability of substrate, nutrients, and oxygen (EPA, 1993).

1.5.1.1 Nitrogen in Soils

Nitrogen enters the soil environment via decomposition of plant and animal matter, precipitation, dustfall, urine and fecal matter deposition, application of natural and synthetic fertilizers, and wastewater effluent. Also, nitrogen fixing bacteria living in the soil profile convert nitrogen gas to nitrogen forms available for uptake by plant and animal life. In a natural environment, 90 percent of the nitrogen in the soil profile is organic and originates as a result of decomposition of plant and animal residue. The nitrates are removed from the soil profile by plant uptake or by water leaching through the soil.

1.5.1.2 Nitrogen in Wastewater

Ammonia is the most prevalent form of nitrogen in raw wastewater. Several chemical mechanisms transform nitrogen from one form to another including fixation, ammonification, synthesis, nitrification, and denitrification (EPA, 1993). Wastewater treatment systems, including septic systems or other individual treatment systems, convert ammonia into nitrite and nitrate (nitrification) by supplying oxygen in a carbon rich environment in the presence of a sufficient population of chemoautotrophic bacteria known as Nitrosomonas (ammonia to nitrite) and Nitrobacter (nitrite to nitrate). Subsequent unit processes in wastewater treatment can convert the nitrate to nitrogen gas by restricting oxygen in a carbon rich environment. The bacteria will preferentially use oxygen while oxidizing organic matter in the presence of oxygen and nitrate because it yields more energy.

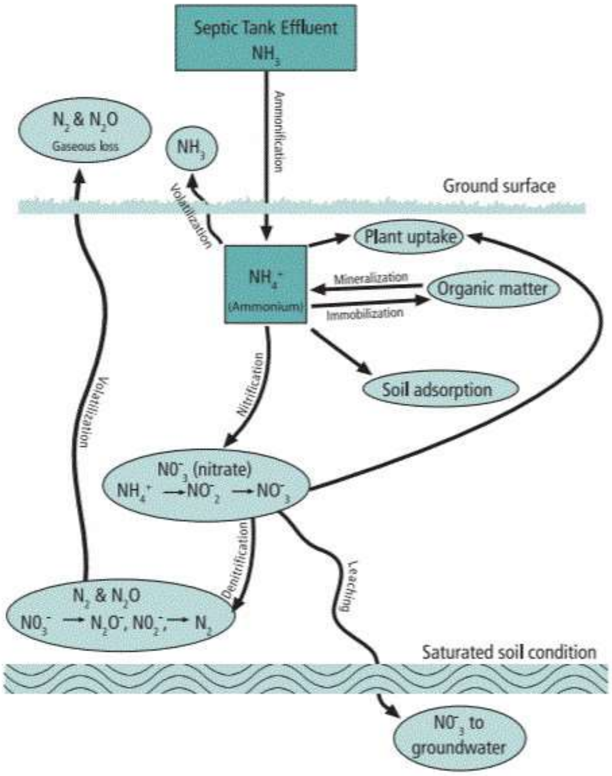

Figure 3: Nitrogen Interactions in Septic Effluent and Groundwater (https://www.onsiteinstaller.com

Applying the nitrogen conversion processes specifically to subsurface wastewater treatment systems configured as standard septic systems, the organic and ammonium form of nitrogen present in urea is converted into nitrate in the presence of oxygen in the leach field. The nitrogen content in a typical domestic wastewater ranges from 20-85 mg/lo total nitrogen comprised of 60% ammonium nitrogen and 40% organic nitrogen (total kjeldal nitrogen, TKN, is ammonium nitrogen plus organic nitrogen) with trace amounts of nitrates (EPA, 1993). The nitrate molecule is highly mobile in the underlying soils and groundwater.

Advanced wastewater treatment processes designed for nutrient removal deliberately create a habitat wherein bacteria can metabolize the carbon in the wastewater stream in the presence of oxygen which results in the conversion of ammonium nitrogen to nitrate nitrogen followed by a habitat wherein oxygen is limited and in the anoxic conditions the bacteria strip the oxygen from nitrate molecules which frees the nitrogen element from the chemical bonds.

1.5.2 Phosphorous Transport Analysis

Phosphorous is an essential element and nutrient for plant growth. However, excess phosphorous, like many compounds, can be detrimental to an ecosystem. In particular, excess phosphorous in an aquatic ecosystem has deleterious effects including decreased water clarity, reduced dissolved oxygen levels, dispersal of toxic compounds as a result of the proliferation of algal growth, and a transition from a macrophyte-dominated ecology to an algae-dominated system with low biodiversity. The process whereby excessive nutrients are prevalent in an aquatic ecosystem is labeled eutrophication. The trophic state is defined by the level of total phosphorous concentration (Newton and Jarrell, 1999)

Table 1-2: Typical Total Phosphorous Concentrations (mg/l) by Trophic State (Newton & Jarrell, 1999)

	Trophic State			
Aquatic System	Oligotrophic	Mesotrophic	Eutrophic	Hypertrophic
Lake	< 0.01	0.01 – 0.03	0.03 – 0.10	>0.10
River	---	< 0.01	0.01 – 0.05	> 0.05

In an aquatic environment, phosphorous content is a dynamic cycle that involves the presence of phosphorous in the soil, water, and biological substrates, as well as phosphorous in various speciation in

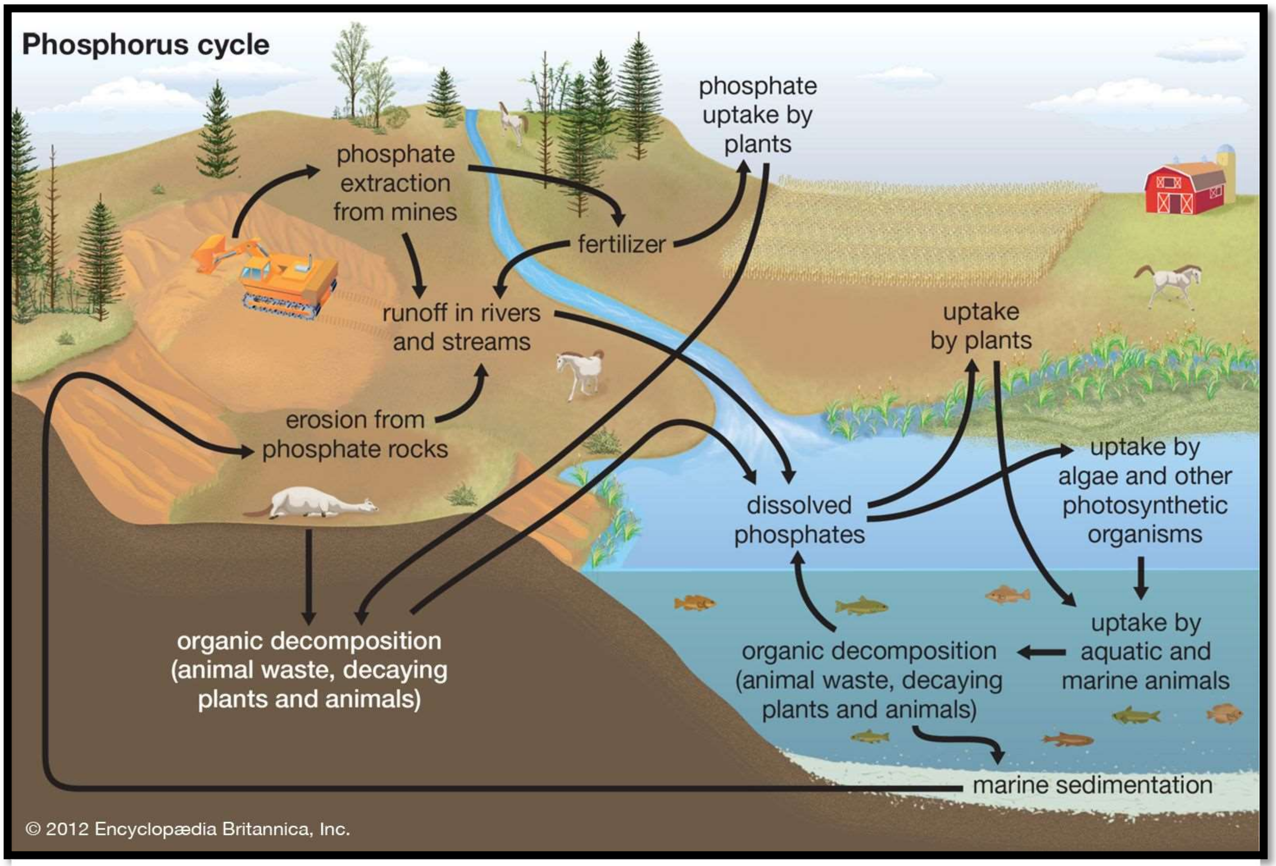

Figure 4: Phosphorous Cycle (https://www.britannica.com/science/phosphorus-cycl)e

adsorbed, soluble, and organic forms. As a consequence, the concentration of phosphorous presented in the foregoing table represents a small fraction of the total phosphorous in a water body (Lombardo, 2006).

1.5.2.1 Forms of Phosphorous

Phosphorous can be classified and described based on its physical characteristics or its chemical forms. The definitions often overlap, i.e., orthophosphate can be dissolved or particulate and organic phosphorous can be dissolved or particulate (Lombardo, 2006)

Physical Characterization

Based on its physical characteristics, phosphorous is divided into two fractions (Jenkins and Hermanowicz, 1991).

1. Dissolved Phosphorous – Dissolved phosphorous is that portion that passes through a filter with a typical pore size of 0.2 or 0.45 µm.
2. Particulate Phosphorous – Particulate phosphorous is that portion which remains on the filter following filtration.

Based on physical classification, total phosphorous is the combined quantity of dissolved phosphorous which is sometimes referred to as soluble phosphorous, and particulate phosphorous, which is sometimes called suspended phosphorous. Particular phosphorous consists of organic phosphorous, phosphates adsorbed onto the surface of other molecules such as iron oxide or aluminum oxide, and various discrete phosphate minerals.

Chemical Classification

With respect to chemical classification, phosphorous can be categorized as follows:

1. Orthophosphate – Orthophosphate includes the phosphate family in the various ionic states; H_3PO_4, $H_2PO_4^-$, HPO_4^{2-}, and PO_4^{3-}. The distribution between the states in an aqueous solution is dependent upon the ionic state (Stumm and Morgan, 1981).
2. Condensed Phosphates – Condensed phosphates include multiple polyphosphate forms including pyrophosphate ($P_2O_7^{4-}$) and $P_3O_{10}^{5-}$ which are principally derived from detergents and cleansers. (Crites and Tchobanoglous, 1998)
3. Organic Phosphorous – Organic phosphorous includes organic compounds such as sugars, phospholipids, and nucleotides that incorporate phosphorous into their chemical structure (Jenkins and Hermanowicz, 1991).
4. Phosphorous-bearing species described above that complex or associate with dissolved cations and organic species present in the wastewater, soil, or groundwater environment.

1.5.2.2 Regulatory Standards

Regulating phosphorous is critical in protecting water quality in natural water bodies. Protecting water quality in ambient water is accomplished through establishment of water quality standards by the EPA on conjunction with each state as mandated in the Water Quality Act of 1977 as well as through dictating discharge limits for phosphorous in the permits for point sources that are compatible with the water quality standards in the respective receiving water body. As such, permit limits are set based on the water quality objective and the background concentration of phosphorous in the receiving body of water. Phosphorous limits in the discharge permits, typically called National Pollutant Discharge Elimination System (NPDES) permits, can range from as low as 0.01 mg-P/l up to 1.5 mg-P/l (Lombardo, 2006).

Septic systems are not subject to NDPES permit requirements as the discharge is to subsurface environment rather than surface water. Although most states don't regulate phosphorous limits in the discharge from individual subsurface wastewater systems, they do restrict the size of the systems based on maximum daily flow. If flows exceed the statutory limits, then groundwater discharge limits are imposed. In Idaho, maximum daily flows above 2,500 gal/day require permitting as a large scale adsorption system (LSAS) and may include phosphorous limits on the effluent discharge (DEQ, 2002).

1.5.2.3 Phosphorous Geochemistry

Phosphorous chemistry in wastewater treatment is governed by physical, chemical, and /or biological processes. Advanced wastewater treatment systems often utilize biological processes for reducing phosphorous levels in the effluent while onsite systems typically rely on precipitation and soil adsorption.

Precipitation

Precipitation removes phosphorous from the solution phase into a solid phase through formation of metal oxides with the phosphorous combining with aluminum, iron, and calcium with speciation depending upon the presence of the necessary metals and the redox conditions in the solution. These phosphate minerals include hydroxyapatite, fluorapatite, strengite, struvite, variscite, vivianite, and wavellite. The chemistry becomes rather complex with predictability based on an understanding of the solubility product for the various phosphate minerals. The controlling mineral phase is typically the least soluble mineral present in the solution. However, the mineral phase controlling phosphate concentrations in the septic tank and the soil adsorption system will vary with the redox potential of the soils as well as with the pH of the solution and the concentration of the elements with which phosphorous will combine (Lombardo, 2006).

The precipitation of phosphorous can occur rapidly, ranging from minutes to hours.

Adsorption

Adsorption is the process of a molecule bonding with the surface of another particle which can occur as a result a difference in the charge of the solute species and the adsorbing solid phase (electrostatic adsorption) or from a chemical interaction between the solute and a solid surface that is stronger than the simple electrostatic attraction between particles (specific adsorption). Phosphorous adsorption is described by specific adsorption wherein phosphate bonds to a specific site on the solid substrate. Since hydrogen phosphate (HPO_4^{2-}) and dihydrogen phosphate ($H_2PO_4^-$) are negatively charged anions, they typically bond with positively charged mineral compounds. due to the competition for adsorption sites with organic acids (Fontes, et. al., (1992)

1.5.2.4 Phosphorous in Wastewater

The phosphorous in wastewater is present in various forms, all of which behave differently in septic tanks, the soil profile, the vadose zone (soil profile between ground surface and the water table), groundwater, and riparian areas. The concentration of phosphorous in raw domestic wastewater ranges from 4-15 mg-P/l in locations where phosphorous containing detergents are regulated. In areas where phosphorous containing detergents are not regulated, the concentration can range as high as 50 mg-P/l. The detergent industry voluntarily limited the manufacture of phosphorous-bearing products for household laundry in 1994, although it remains a component of dishwashing detergent and other commercial and industrial cleaners. The distribution of phosphorous in raw wastewater is approximately 50% orthophosphate, 40% polyphosphates, and 10% organic phosphorous (Tchobanoglous and Schroeder, 1987).

Phosphorous Removal in Septic Tanks

The removal of phosphorous in septic tanks is predominately a physical process although some chemical precipitation may also occur. Approximately 20-30% of the total phosphorous in raw wastewater is removed with the sludge as particulate phosphorous (Wood, 1993). Some orthophosphate may also be removed as a result of mineral precipitation if the conditions in the septic tank favor reducing reactions.

Phosphorous Removal in the Soil Adsorption System

The thickness of the vadose zone influences the amount of phosphorous removal in the soil adsorption system as a function of associated factors such as soil water content, oxygen levels, surface area of media, and hydraulic retention time. In the biomat immediately below the drainfield piping, which is sometimes labeled the rapid attenuation zone, a variety of reactions occur as ortho-rich effluent oxidizes upon contact with the soil. If the percolation zone is large, the wastewater effluent will be initially reduced, followed by oxidation reactions. Precipitation is an important phosphorous removal mechanism in the upper layers of the soil adsorption system. Adsorption reactions, though less dominant, also play a role in phosphorous removal in the vadose zone. Studies show that depending upon site conditions, phosphorous removal in the vadose zone can range from 23% to 99%.

1.5.3 Pathogen Transport Analysis

Three groups of microorganisms, and their fate subsequent to discharge from a septic system, require treatment to protect ground water quality from septic system effluent along with the attendant public health from those pathogens. Those groups are bacteria, protozoa, and viruses. The amount and virulence of the pathogenic organisms discharged depends upon the level of treatment, or the proportion removed or inactivated, in the subsurface wastewater system.

The main source of bacteria, protozoa, and viruses in wastewater is human feces although saliva, vomit, contaminated laundry, and skin flora removed during bathing are minor sources (EPA, 2011). Because the species of bacteria or multifarious, water quality regulations use fecal coliform and fecal streptococci as indicator species that represent the population panopoly of microorganisms present in a sample. In other words, the survival of fecal coliform and fecal streptococci reflect the possible presence of a variety of pathogens in the wastewater. It only takes a few of the pathogenic organisms to cause infection in humans, less than 20 with *E. coli, Salmonellae, and Shegallae* bacteria and less than 1 for some protozoa (Lusk, Gurpal, and Obreza, 2018).

1.5 .3.1 Bacteria

Bacteria are single-celled organisms that lack a membrane-enclosed nucleus or other organelles. They typically range in size from 0.2 to 2.0 µm in diameter. While bacteria are not harmful and are essential to the proper functioning of wastewater treatment in that they are instrumental in converting organic matter in the wastewater stream into simpler compounds in both the septic tank and the drainfield, some bacteria do cause disease in other life forms such as humans. Some examples include cholera, dystenery, shigellosis, and typhoid fever.

Bacteria are removed from wastewater in septic systems through physical straining (filtration) and by adsorption to soil surfaces. This occurs when the soil pores are smaller than the bacteria and protozoa microorganisms. Adsorption is the primary removal mechanism when soil pores are larger than the microorganisms. Bacteria typically carry a net negative charge at their surface that can be trapped by positively charged soil particles. In addition, bacteria typically have a short life span and the population attenuates naturally outside the host organism if environmental conditions such as temperature, pH, moisture, nutrients, etc. aren't conducive to reproduction (Lusk, Gurpal, and Obreza, 2018).

1.5.3.2 Protozoa

In contrast to bacteria, protozoa are single-celled organisms that have a membrane enclosed nucleus and organelles. They are also about 10 times larger than bacteria. Protozoa can also be beneficial or detrimental to human health. Protozoa in the wastewater stream are beneficial because they feed on bacteria including the pathogenic bacteria. However, some protozoa are the culprit in intestinal tract diseases and reproduce when cysts or oocysts are excreted from the host back into the wastewater. Protozoa are resilient and can survive in the wastewater for extended periods of time. Examples of disease-causing protozoa are *Cryptosporidium parvum, Entameoba histolytica, Giardia lamblia*. Conseuqently, removal in excess of 99% is necessary to protect public health (Lusk, Gurpal, and Obreza, 2018).

Protozoa typically survive their tenure in the septic tank. Outside the septic tank in the soil below the drainfield, protozoa are primarily removed via straining with fine grained soils providing significantly higher removal rates for protozoa (Damault, 2003).

2.0 Existing Conditions

2.1 Geologic Conditions

2.1.1 Physiography

As shown in the accompanying figure extracted from the USDA-NRCS website, with respect to physical geography, or physiography, the contiguous United States features eight distinct physiographic provinces characterized by their geomorphology which describes the physical features and the process of landform formation and the relationship to geologic structure. Each of the eight major physiographic provinces is further subdivided into one or more minor physiographic provinces. The physical features such as mountain, plain, plateau, valley, and canyon; along with the underlying geologic history affect the topography and climate of the region.

Figure 0-1: Physiographic Map of the United States (USDA - NRCS).

2.1.1.1 Rocky Mountain Physiographic Province

The Rocky Mountain System consists of a series of discontinuous mountain ranges with origins from 40 million to 170 million years ago. The Rocky Mountain System is divided into several subsystems:

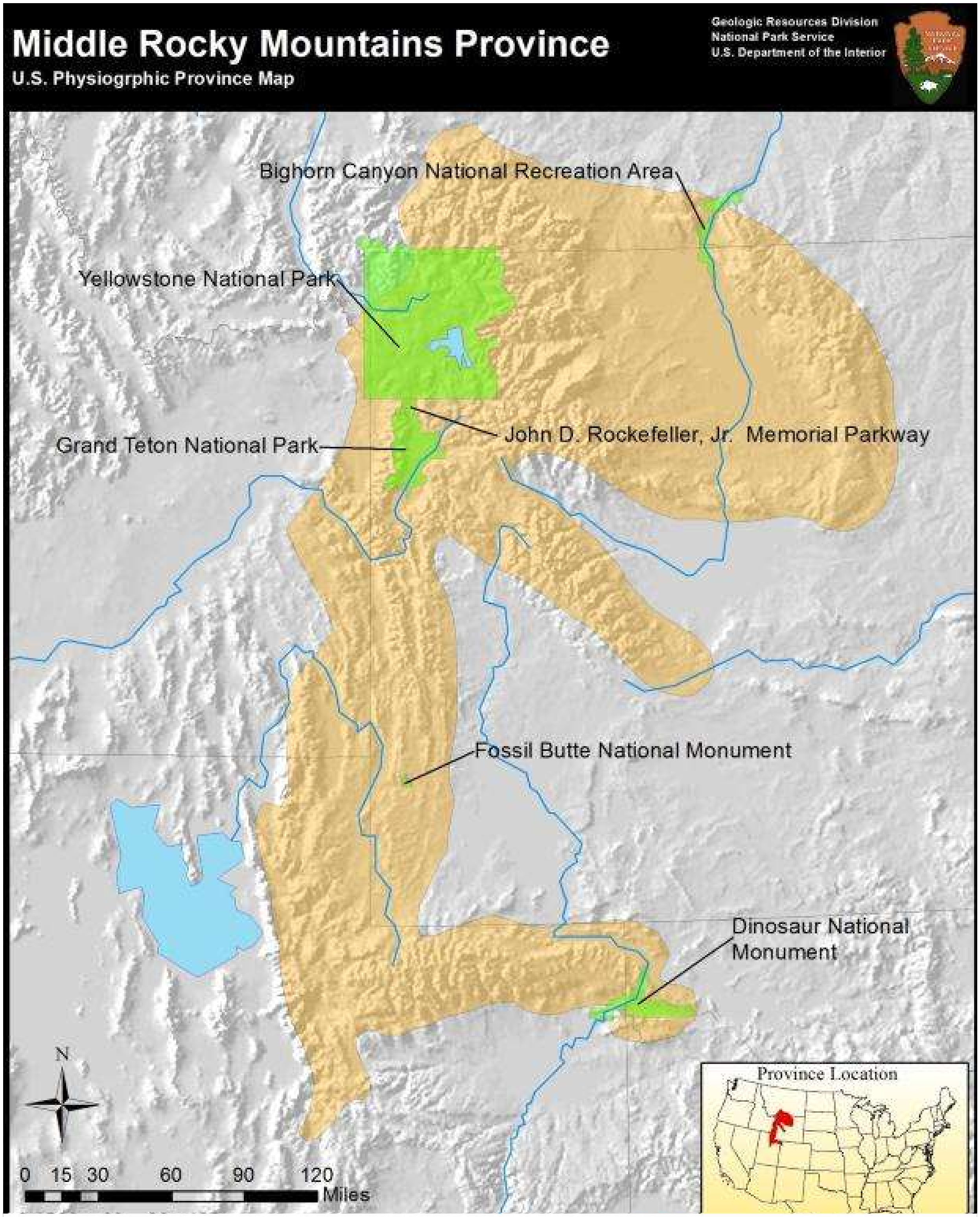

Figure 0-2: Middle Rocky Mountain Physiographic Sub-Province (National Park Service)

Wyoming Basin, Middle Rocky Mountains, Northern Rocky Mountains, and the Southern Rocky Mountains.

2.1.1.1.1 Middle Rocky Mountains Physiographic Sub-province

The Middle Rocky Mountains province is located in the western United States stretching from Northeast Utah and Northwest Colorado through Eastern Idaho and Western Wyoming and into South Central Montana. Several extensions of the Middle Rockies spread into Montana, Colorado, Utah, and Idaho. Folded mountains, which are anticlinal folds, are the dominant type of mountain in this province. Other types of mountains include volcanic mountains and uplifted fault blocks.

The Teton Basin sits on the eastern edge of the Middle Rocky Mountains province and borders the Columbia Plateau System which stretches into Eastern Idaho along the Snake River and is characterized by volcanic flows.

The proposed project sits within the Teton Basin and thus falls within the Middle Rocky Mountain physiographic province. The Teton Mountain range forms the eastern edge of the basin and the Big Hole Mountains form the western boundary of the valley.

2.1.2 Topography

The topography of Eastern Idaho varies in accordance with the physiography and geology of the landforms ranging from volcanic formations to uplift mountain ranges with attendant river canyons, plains, and valleys; all of which reflect a complex geologic history. River systems form as precipitation and snowmelt flow from the mountains seeking efficient hydraulic energy gradients and routes across the landforms. In Eastern Idaho, the stream courses are often superimposed across older geologic structures or disrupted by lava flows which act as dams rather than more strictly conforming to geologic structure as is typical in more mature geologic landscapes. This affects the topography of the landscape. In Eastern Idaho

The floor of the Teton Valley ranges from an elevation of 5,800 feet to 7,000 feet above sea level (ASL). The Big Hole Mountain in the southwest portion of the valley have peaks that reach 9,000 feet while the Teton Mountains to the east rise to 12,605 feet at the highest (Mount Moran).

The proposed project is situated on the valley floor near the foot of the Teton Mountains at an elevation ranging from 6137 feet ASL at the southwest corner of Trestles II to 6095 feet ASL at the northwest corner of Trestles II. (See Master Plan in the Appendix)

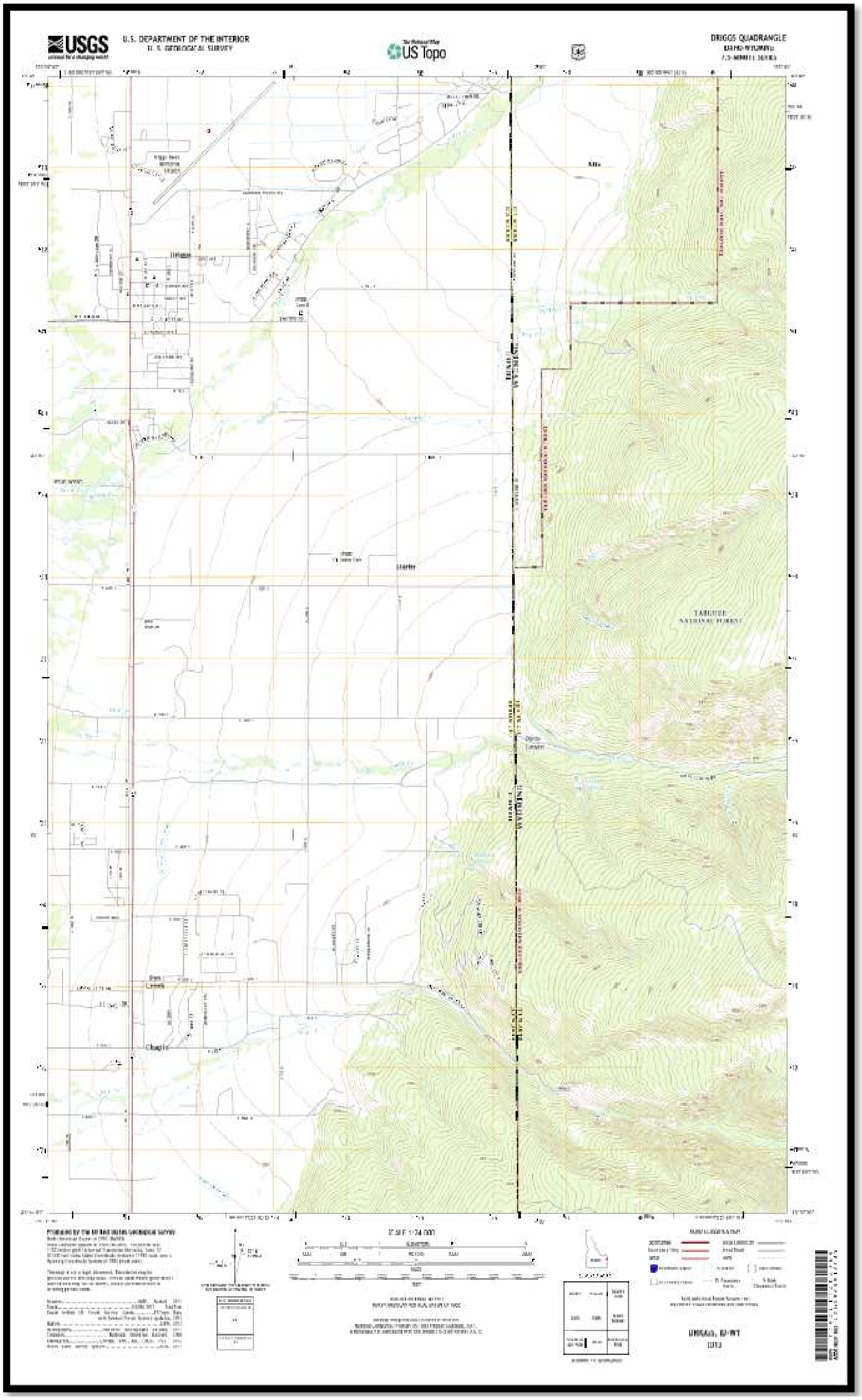

Figure 0-3: US Department of the Interior, US Geological Survey, Driggs Quadrangle (Dept. of Interior, USGS)

2.1.3 Existing Geologic Conditions

As stated previously, the Teton Mountains are situated on the east side of the valley and the Big Hole Mountains form the western boundary of the valley, at least on the southern portion. The bulk of the county is underlain by Quaternary sediment. The Teton Mountains formed from west dipping Paleozoic carbonate strata. The rock near the top of the mountains is either Mississippian (Targhee Ski Area), Cambrian-Archean unconformity (Table Rock), or Archean gneiss (Grand Teton). The Big Hole Mountains contain folded and thrust faulted sedimentary rocks that are from the Mesozoic age. (Idaho Geologic Society)

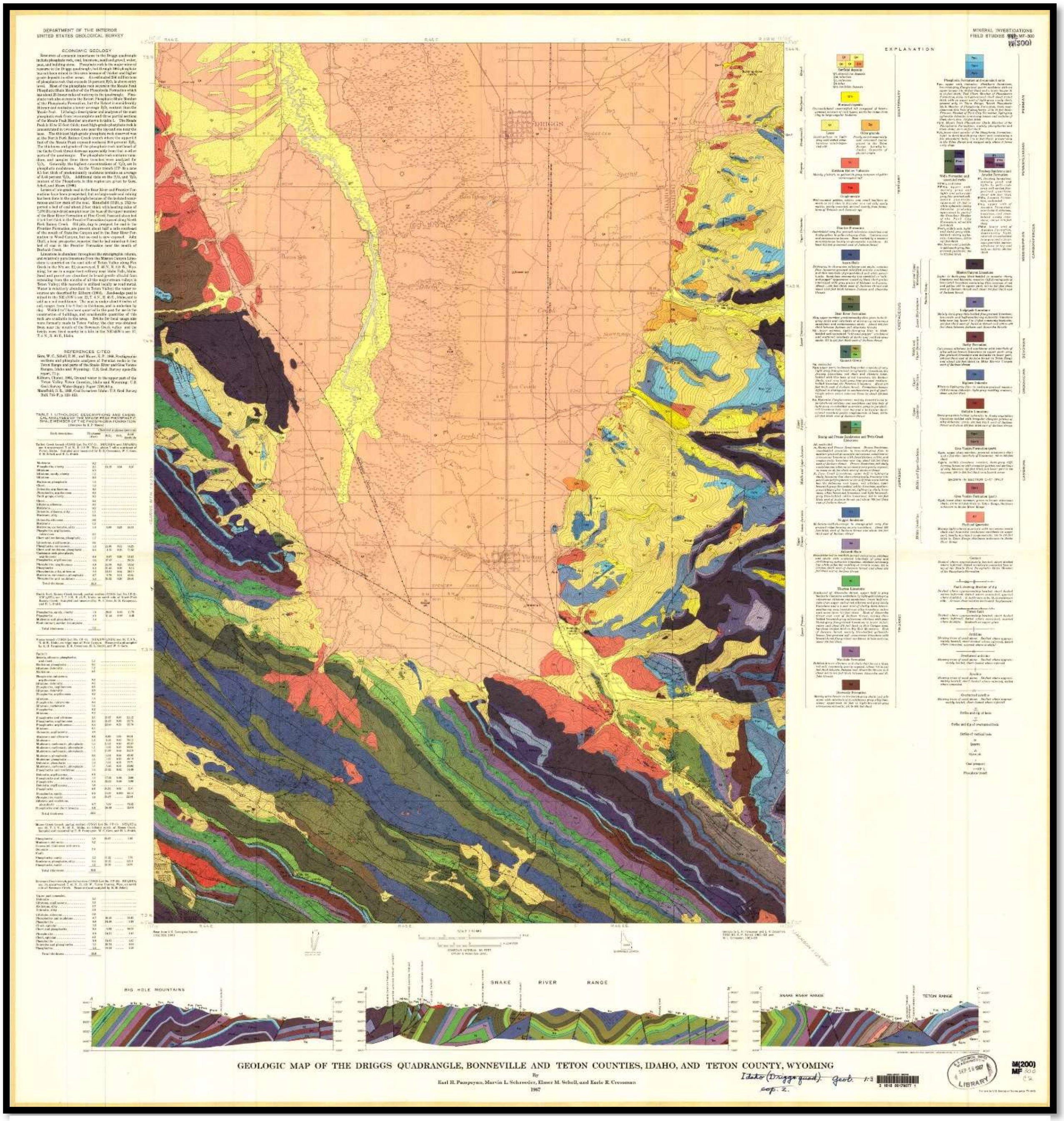

Figure 0-4: Geologic Map of the Driggs Quadrangle, Bonneville and Teton Counties, Idaho, and Teton County, Wyoming (Dept. of Interior, USGS)

2.1.3.1 Teton Mountains

The Teton Mountains are relatively young geologically and were formed about 6-9 million years ago as a result of movement along the Teton fault. The pressure forced the western block upwards and the eastern block dropped. A more detailed explanation is found on the website for Geology of Wyoming.

> *The Archean age rocks in the northern Tetons consist of deformed gneisses that were metamorphosed from both sedimentary and igneous source rocks. They are intruded by light colored (high silica) gneisses and by the younger Mt. Owens quartz monzonite (granites that form the central high Tetons). The southern Tetons lack the intrusions and did not reach as high a grade of metamorphism as the northern domain. The northern rocks consist of four units, the Moose Canyon gneiss, the Layered Gneiss, the Webb Canyon Gneiss and the Bitch Creek Gneiss. The story of these rocks moves the age of known active continental plate convergence about 1.6 billion years further back in time.*
>
> *The Moose Basin gneiss originated as basinal sediments shed from a 3.1 billion year old island arc (possibly a segment of the Idaho Block). The sediments were buried to a depth of about 28 miles and crystallized about 2.74 billion years ago. They underwent high-pressure, high-temperature granulite facies metamorphism 2.69 billion years ago. Ten million years later they collided with the amphibolite-grade Layered Gneisses of the southern Teton block. Both domains were intruded by the Webb Canyon Gneiss over the next ten million years. The intrusion consisted of partial melts from both blocks. The Wind River Range was the magmatic arc generated by this tectonism.*
>
> *The Layered Gneiss originated as layered sediments with some interbedded igneous layers deposited in an ocean basin adjacent to the Wyoming craton. Crystallization occurred around 2.7 billion years ago at a depth of about 12.5 miles. The rocks reached amphibolite-grade metamorphism before being attached to the Moose Basin gneiss during the Neoarchean continental collision. Both the Moose Basin gneiss and Layered gneisses had partial melts that generated silica-rich gneiss of the Webb Canyon.*
>
> *Based on geochemistry, two distinct types of leucogranites (granites with almost no dark minerals) where formed due to their differing manner of melting. The more voluminous Webb Canyon Gneiss occurs as large, tabular exposures and the Bitch Creek Gneiss occurs as small sills, dikes and plutons. They were emplaced in multiple phases shortly after the collision. (Geology of Wyoming 2023)*

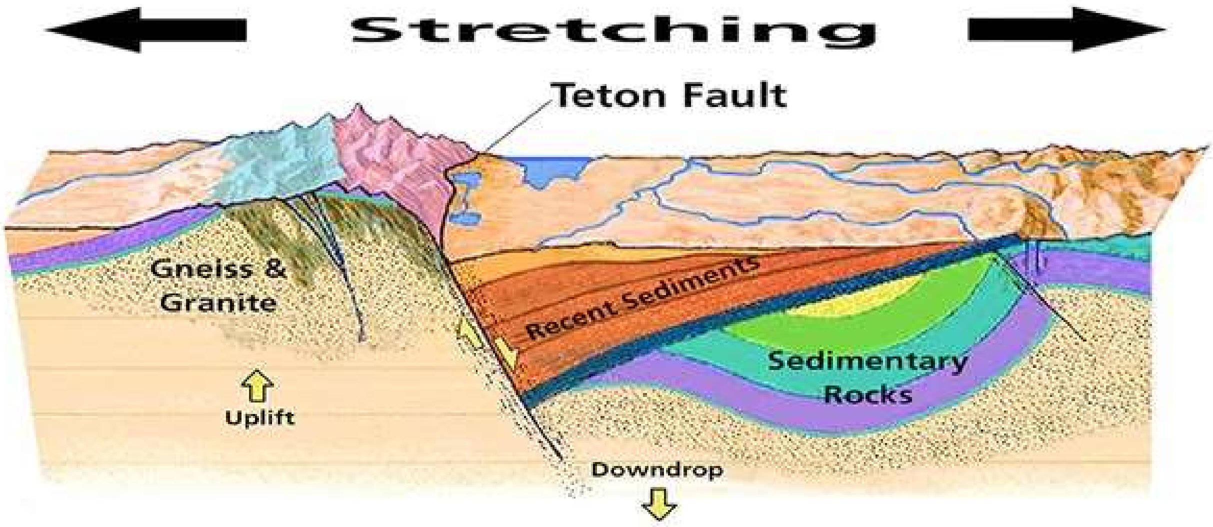

Figure 0-5: Geology of Teton Fault (National Park Service, 2023)

2.1.3.2 Big Hole Mountains

The Big Hole Mountains are geologically complex and feature continual thrust faulting and deformation of sedimentary rock. The range is part of the Overthrust Belt of the Rocky Mountains. The Big Hole Mountains were created by a thrust fault. A thrust fault is when the Earth's crust folds over on itself, creating mountains like the Big Holes. Thrust faults typically have older rock on top of younger rock because of the way it is formed.

Additional information on the geology of the Big Hole Mountains is found in the following excerpt from Ground Water in the Upper Part of the Teton Valley, Teton Counties, Idaho and Wyoming by Chabot Kilburn.

> *The Big Hole Mountains and Snake River Range consist largely of resistant rocks which have been steeply tilted by faulting. The mountainous terrain adjacent to the southwestern part of the valley is characterized by southeast-trending strike ridges. A large topographic basin has formed at the headwaters of Horseshoe Creek in the northwestern part of the Big Hole Mountains. This basin is bounded on its west side by a high northwest-trending escarpment which rises abruptly to an altitude of 8,879 feet at its highest point. The escarpment forms part of the western edge of the upper Teton drainage basin. (Kilburn, 1964)*

2.1.3.3 Valley Floor

Chabot Kilburn also describes the geology of the valley floor in the paper, Ground Water in the Upper Part of the Teton Valley, Teton Counties, Idaho and Wyoming as described in the following excerpt.

> *Teton Valley is floored largely by alluvial fans that radiate from the mouths of the canyons of tributary streams. The gradient of the land surface east of the Teton River increases from about 30 feet per mile near the river to an average of slightly more than 100 feet per mile near the base of the Teton Range. The surface west of the river rises at an average slope of about 75 feet per mile at the base to the Big Hole Mountains. Along its axis the valley descends at a gradient of about 6 feet per mile, from about 6,025 feet, west of Victor, to about 5,900 feet in The Narrows northwest of Tetonia. (Kilburn, 1964)*

2.2 Existing Hydrologic Conditions

2.2.1 Surface Water

The Teton Basin is drained by the Teton River and its multiple tributaries that originate in the Teton Mountains on the east side of the valley and the Big Hole Mountains on the west side of the valley. Once again, quoting from Ground Water in the Upper Part of the Teton Valley, Teton Counties, Idaho and Wyoming.

> *The Teton River rises in the southern part of the Teton Range near the Snake River Range and flows northwestward into the valley. Northwest of Victor it is joined by Little Pine Creek which drains the northern end of the Snake River Range. Northward, the river collects drainage from tributaries which head in the Teton and Big Hole Mountains. The major tributaries from the Teton Range are, from south to north, Fox, Darby, Teton, and Badger Creek. The major tributaries from the Big Hole Mountains are Mahogany, Twin, Horseshoe, and Packsaddle Creeks, and in the Snake River Range, Little Pine and Pole Creeks. (Kilburn, 1964)*

The basin upstream from The Narrows was delineated using the EPA Waters GeoViewer 2.0 and is presented in the following figure. According to GeoViewer, the total area of the watershed upstream of The Narrows is 1,195 square kilometers. The mean annual flow volume in the Teton River at The Narrows is estimated at 551 cfs with a mean velocity of 2.28 fps.

More specific to the proposed project, Spring Creek crosses the northwest corner of Trestles II. The basin upstream from the bridge at Hwy 33 was delineated using the EPA Waters GeoViewer 2.0 and is presented in the following figure. According to GeoViewer, the total area displayed in the figure is 55 square kilometers. The mean annual flow volume is estimated at 24 cfs with a mean velocity of 1.16 fps.

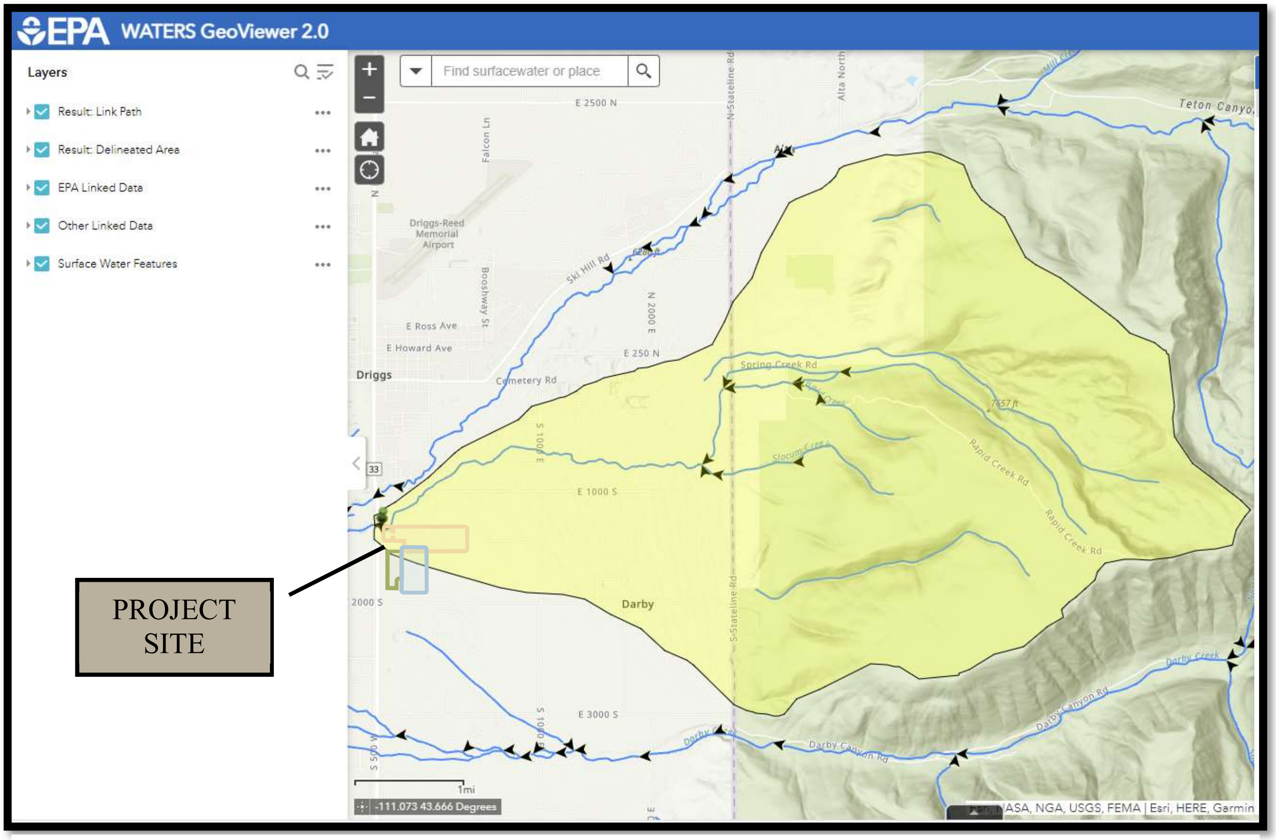

Figure 0-6: Spring Creek Drainage Basin Upstream of Hwy. 33 (EPA Waters Geoviewer 2.0)

2.2.2 Groundwater

The aquifer is supplied by precipitation and snowmelt from the immediate area as well as the mountains surrounding the valley, i.e., the Teton Mountains, the Snake River Range, and the Big Hole Mountains. Citing information regarding the water table from Geology and Water Resources of the Mud Lake Region, Idaho Including the Island Park Area:

> *Water in the alluvial deposits occupies the pore spaces between rock particles. Where the sand and gravel are clean and well sorted, water can be transmitted through them quite readily. Poorly sorted material transmits less water.*
>
> *The alluvial deposits beneath the valley floor compose the best aquifer in the Teton Valley. A single aquifer test was made, on well 4N-45E-13adl, to determine the coefficients of transmissibility and storage, which indicate respectively the ability of the aquifer to transmit water and to release water from storage. The coefficient of transmissibility may be expressed as the number of gallons of water a day that will flow through*

> *a strip of the aquifer one foot wide under a hydraulic gradient of one foot per foot…The coefficient of storage is defines as the volume of water the aquifer releases, or takes into, storage per unit surface area of the aquifer per unit change in the component of head normal to the surface. or through a strip of the aquifer one mile wide under a hydraulic gradient (Kilburn, 1964)*

2.2.2.1 Water Well Inventory

Utilizing the Idaho Department of Water Resources (IDWR) find a well map, all wells within a ½ mile radius surrounding the property were evaluated. In total 35 well reports were pulled dating from 1984-2021. Those well reports were used to determine water table thickness, static water level, discharge, and drawdown to estimate the soil hydraulic conductivity by comparison. The well reports and the corresponding key plan are presented in Appendix B. Calculation details of the hydraulic conductivity are located in section 3.1 and Appendix H.

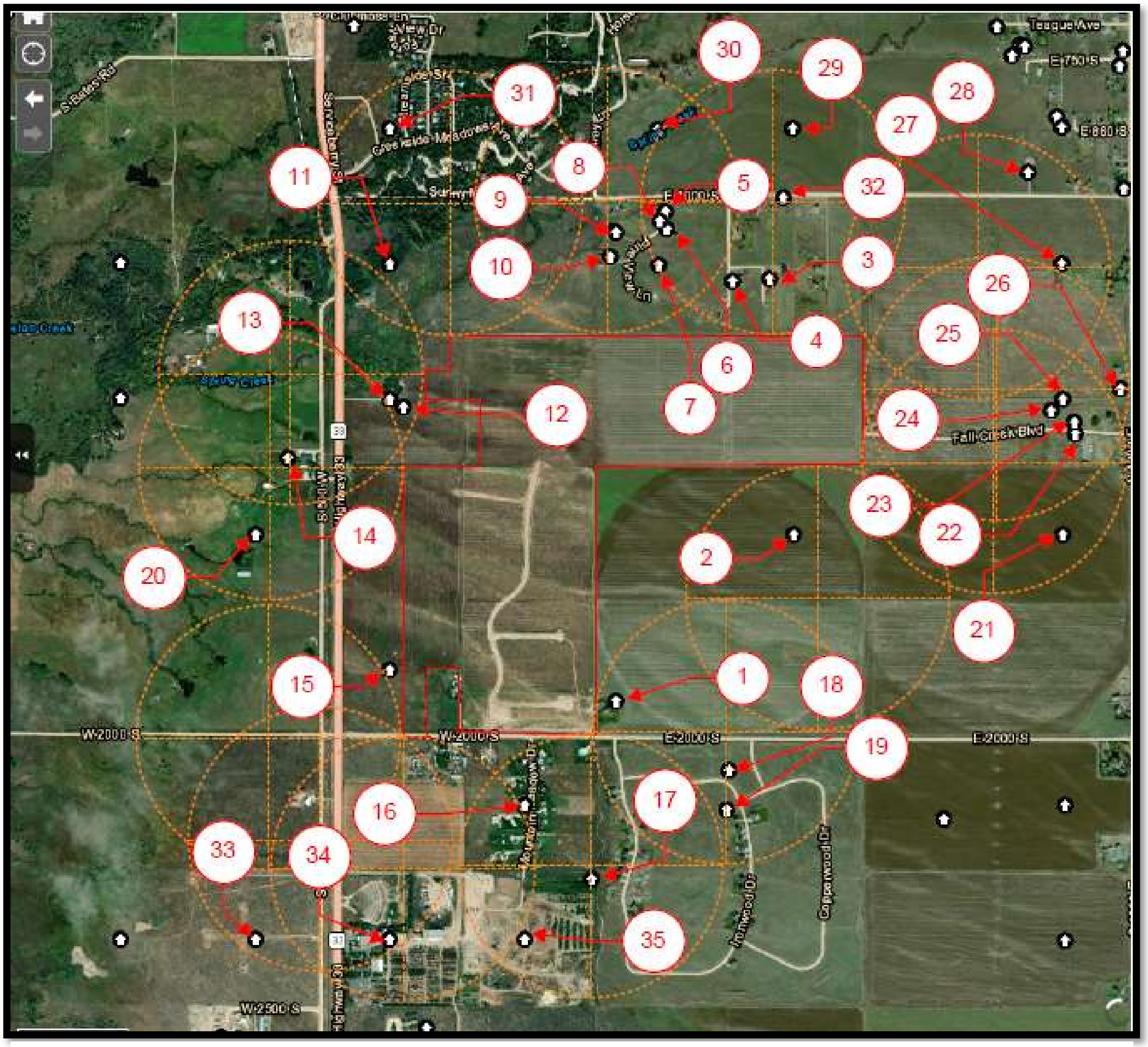

Figure 0-7: Wells within 1/2 Mile of Project Site (IDWR Well Locator

3.0 Proposed Development

3.1 Intended Use and Development

The current proposed development of Trestles 1, Trestles 2 and Wildflower total an area of 281.68 acres of agricultural land. The development preliminary design and layout are located in Appendix A. The proposed development would consist of individual wells and septic systems on each lot.

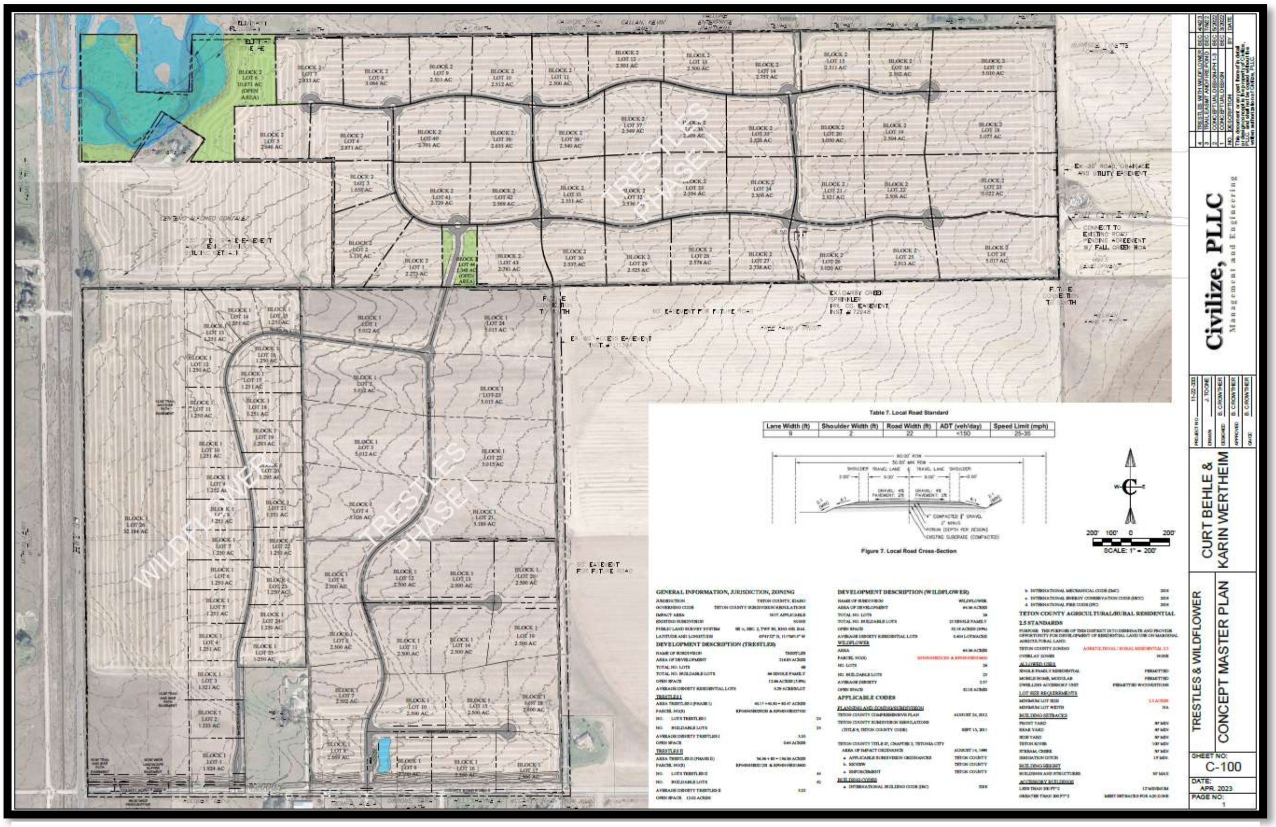

Figure 0-1: Master Plan for Trestles I, Trestles II, and Wildflower

4.0 Field Investigation

4.1 Soil Test Pits and Boring Holes

4.1.1 NRCS Soil Mapping

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Service website was used to determine the local soil type along with test pit excavations. The detailed soil types, from the soil survey are included in Appendix C, those include:

- **Altaby-Alpine complex –** Altaby-Alpine is a mixed alluvium with loess influences. The soil is a silty loam changing to very gravelly sandy loam at depth. The soil is well-drained with the capacity of the most limiting layer to transmit water moderately high to high.
- **Alpine-St. Anthony complex –** Alpine-St. Anthony is a mixed alluvium. The soil is a gravelly loam changing to an extremely gravelly loamy sand at depth. The soil is well-drained with the capacity of the most limiting layer to transmit water moderately high to high.
- **Zohner-Zohner –** Zohner-Zohner is a mixed alluvium. The soil is a silty loam changing to extremely gravelly sand at depth. The soil is poorly drained with the capacity of the most limiting layer to transmit water moderately low to moderately high.

4.1.2 EIPH Test Pits

The Eastern Idaho Public Health Department evaluated test pits advanced by the Applicant on all three developments and classified the soils in those pits. The test pits totaled 22 over the project area. Locations of the test pits along with a detailed soil profile of all 22 test pits is included in Appendix E. All test pits were dug to a minimum depth of 10 feet and none of the test pits discovered groundwater or bedrock. The test pits validate the USDA soil survey. The average test pit consisted of silty sandy loam transitioning to a gravely sand between 30 inches to 84 inches.

4.2 Monitoring Wells

4.2.1 Hydraulic Gradient

4.2.1.1 Kilburn Study

Chibot Kilburn, under the authority of the U.S. Geological Survey, in cooperation with the U.S Bureau of Reclamation, published a study on the ground water in the upper part of the Teton Valley in 1964. The Kilburn study is the seminal work on groundwater in the Teton Valley and has been cited earlier in this document in reference to the geological setting for the Teton Valley. In 2007, D. M. Cosgrove and J. Taylor of the Idaho Water Resources Institute at the University of Idaho published a study prepared for the Idaho Department of Environmental Quality entitled, Preliminary Assessment of Hydrogeology and Water Quality in Ground Water in Teton County, Idaho. This work expanded upon the earlier work by Kilburn with a specific focus on the hydrogeology of the Teton Valley and its connection to groundwater quality with respect to nutrients and pathogens introduced via wastewater dispersal systems. It also provided an assessment of the sensitivity of the mass-balance spreadsheet to various inputs and created a spreadsheet based tool to analyze the nitrate loading to various build-out scenarios.

One of the parameters developed in the Cosgrove/Taylor study was the hydraulic gradient for various portions of the valley.

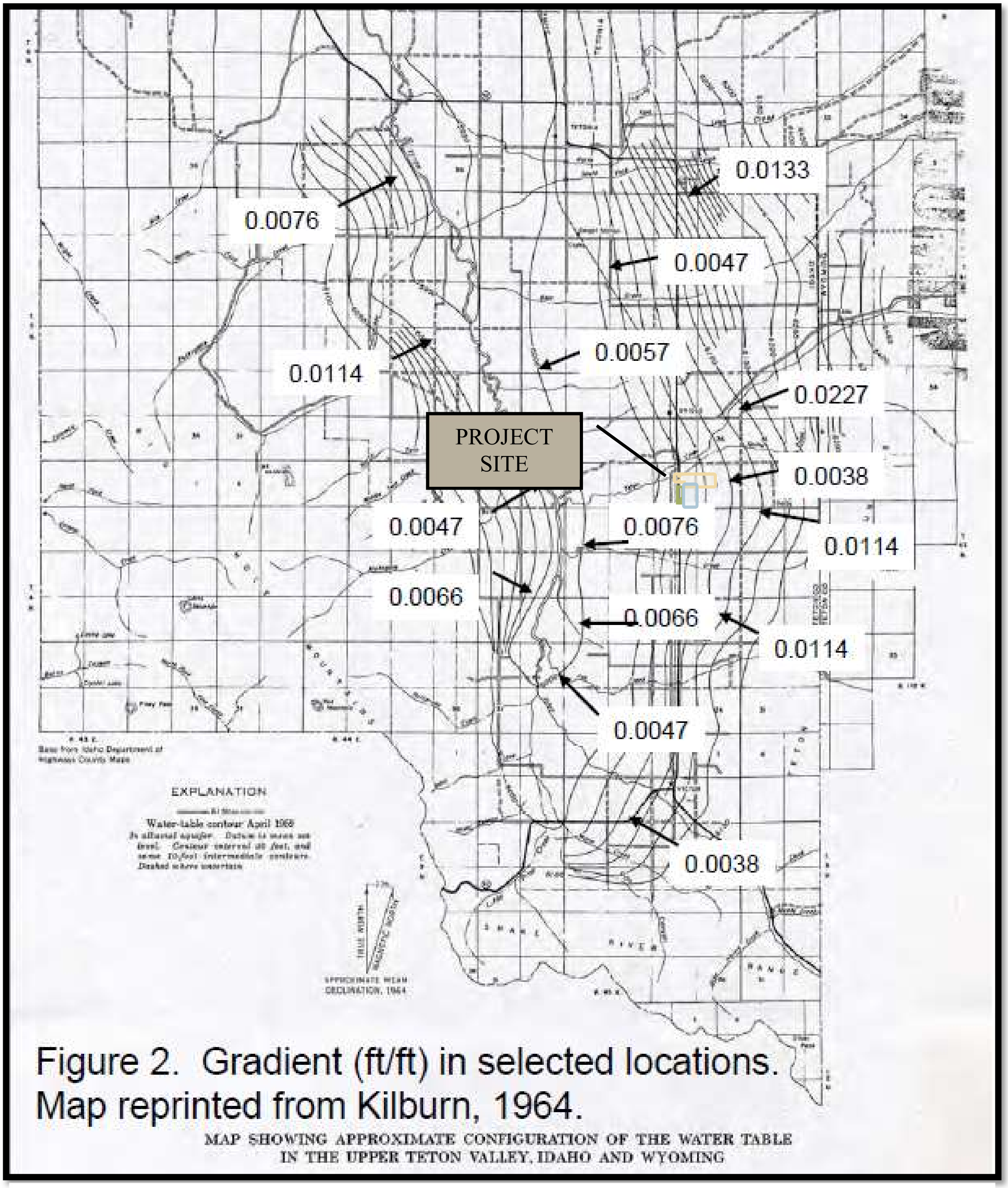

Figure 0-1: Hydraulic Gradient in Select Locations (Cosgrove/Taylor 2007 reprinted and annotated from Kilburn 1964)

Based on the Kilburn Study from 1964 as annotated in the Cosgrove/Taylor study in 2007, the hydraulic gradient for the project site is estimated at .0033 ft/ft.

4.2.2 Groundwater Flow Direction

The direction of groundwater flow was determined using the Idaho Department of Environmental Quality (IDEQ) ground water quality monitoring and protection website. The detailed analysis is located in section 3.5 and Appendix E.

Figure 0-2: Groundwater Flow Direction (Idaho DEQ Ground Water Quality Monitoring and Protection)

4.3 Climate Data

The U. S. Climate Data was retrieved for the project location so a natural recharge rate could be calculated. The natural recharge rate was calculated in section 3.8 along with the climate data located in Appendix D.

5.0 Results

5.1 Hydraulic Conductivity

The 35 Well Driller's Reports within a half mile of the proposed development were analyzed for completeness (Appendix D). Of the 35 Reports, 12 were found to have sufficient data to calculate the hydraulic conductivity. From the 12 wells the discharge rate varied from 5 to 100 gallons per minute and the draw down was reported from 0 to 160 feet with the average draw down of 70 ft. The calculation for hydraulic conductivity (K) required first finding the transmissivity (T). Using the following equation from Razack and Huntly (Fetter 1994) the transmissivity (T) was calculated (Appendix H). Inputting the pumping rate (Q) along with the drawdown $(h\_0 - h)$ for each of the 12 wells resulted in an average transmissivity of 18,300 ft^2/day.

$$T = 33.6(Q/(h\_0 - h))\text{^}0.67$$

With the transmissivity (T) calculated for each of the selected wells, the hydraulic conductivity (K) could now be found using the following relationship with aquifer thickness (b). The resulting hydraulic conductivity (K) for the selected wells average 277 $feet/day$ (Appendix K). The well drillers logs show a variety of silty sands to well-sorted gravels, indicating possible hydraulic conductivities ranging from 0.003 $feet/day$ to 3000 $feet/day$. Using the well drillers' logs for soil types, and calculations along with accepted hydraulic conductivity values previously used in recent nutrient pathogen studies in the project vicinity 277 $feet/day$ was deemed conservative and acceptable to be applied in the mass-balance spreadsheet.

$$K = T/b$$

5.2 Hydraulic Gradient

The hydraulic gradient of the area was found using Kilburn (1964) water-table contours of the upper Teton Valley. The Kilburn map shows elevation changes in 10 $ft.$ and 50 $ft.$ changes. The project was located between two 10 $ft.$ contour lines (6,060 $ft.$ (h_1) and 6,070 $ft.$ (h_2)). The distance between the contours was found to be 3000 $ft.$ (L). Using the following formula, the hydraulic gradient was determined to be 0.0033. This value was inputted in the mass-balance spreadsheet.

$$H\_G = ((h\_1 - h\_2))/L$$

5.3 Mixing Zone Thickness

The mixing zone thickness is determined by the anticipated distance to the property boundary. The mixing zone refers to the anticipated induction zone for the effluent wastewater from the septic system. IDEQ recommends using the following mixing zone thickness per distance from the property boundary.

- 15 feet – If the distance between the induction zone and property boundary falls under 500 ft.
- 30 feet – If the distance between the induction zone and property boundary falls under 1,000 ft. but over 500 ft.
- 45 feet – If the distance between the induction zone and property boundary are greater than 1,000 ft.

5.3.1 Original N-P Evaluation

A 15-foot mixing zone was selected for use with the mass-balance spreadsheet for individual lots, due to lot sizing not allowing over 500 ft between the induction zone and property boundary.

5.3.2 Revised N-P Evaluation

To accommodate comments from the County review of the original N-P Evaluation, a separate mixing zone thickness was assessed for the subdivision as a whole and subdivision phases. This unique mixing zone is discussed in depth in section 7.

5.4 Aquifer Width Perpendicular to Flow

In order to calculate the aquifer width perpendicular to flow the direction of groundwater flow was determined. Locating the proposed project on the Kilburn (1964) contour map determined the flow of the aquifer to be in a westerly direction (approximately 275° Azimuth). This was also validated by the IDEQ ground water quality monitoring and protection data. Both the Kilburn and IDEQ maps representing ground water flow are presented in Appendix H.

5.4.1 Original N-P Evaluation

The groundwater flow direction of 275° azimuth was applied over a sampling of six worse case individual lots. (Appendix L) The lot width perpendicular to flow varied between 154' to 302'. Those values were used in the mass-balance spreadsheet.

5.4.2 Revised N-P Evaluation

To accommodate comments from the County review of the original N-P Evaluation, the revised N-P Evaluation includes the stated aquifer width for the individual lot scenario, as well as a wider aquifer width commensurate with the width of the development for the composite evaluation of each subdivision. This is a reasonable approach given the bias of the Level 1 model published by DEQ for orientation of the subdivision relative to the direction of groundwater flow and the overall width of a proposed development in combination with the number of lots, or subsurface wastewater dispersal systems, anticipated with the proposed development.

5.5 Parcel Area

5.5.1 Original N-P Evaluation

The proposed development was divided into lots and analyzed individual lots for compliance. The development totaled 281.19 acres, with the individual lots used in the mass balance spreadsheet between 1.25 acres to 2.65 acres.

5.5.2 Revised N-P Evaluation

To accommodate comments from the County review of the original N-P Evaluation, each subdivision was evaluated based on the composite area of the individual lots including the common area.

Trestles I	80.47 acres
Trestles II	131.79 acres
Wildflower	64.36 acres

5.6 Septic Tank Effluent

5.6.1 Original N-P Evaluation

In the original N-P Evaluation, the proposed single-family residential lots were described as having individual septic systems. The default for single-family homes per IDEQ guidance is 300 $gallons/day$. This guidance was used in the mass-balance spreadsheet. in the original N-P Evaluation which was accepted and approved by DEQ.

The lots being approved for accessory dwelling unit's (ADU's) were also checked with higher than IDEQ guidance effluent flows. Lots that met or exceeded 2.5 acres were also evaluated with a 500 $gallons/day$ flow to account for possible ADU's. Lots smaller than 2.5 acres were evaluated with a 400 $gallons/day$ to account for the addition of ADU's.

5.6.2 Revised N-P Evaluation

To accommodate comments from the County review of the original N-P Evaluation, in the final revision of the NP study, a fundamental change was implemented in the evaluation of septic tank effluent. The conventional pass/fail criteria, coupled with subsequent effluent increases due to Accessory Dwelling Units (ADUs), gave way to a more nuanced approach. This strategy involved determining a maximum effluent allowance per lot, taking into account factors such as effluent concentration and lot width perpendicular to groundwater flow. The motivation behind this shift was to offer a more detailed and flexible understanding of the limitations and capacities associated with each lot, each phase, and the entire subdivision. With lots varying by up to 70% in size, a the former 'one size fits all' model for total effluent flow was replaced with a more robust approach to account for variation in lot size and subdivision orientation relative to the groundwater flow. This adoption of a tailored methodology provides more granular insights into each lot's unique capabilities. Section 7.2 of the study provides a comprehensive explanation of this refined approach, shedding light on how it enhances the assessment of constraints and potential within the development.

5.7 Natural Recharge

To determine the natural recharge rate (NRR) the average annual precipitation (AAP) was needed for the project site. The climate data (Appendix F) gave an average annual precipitation (AAP) for the project area of 17.14 inches. Using the IDEQ estimation for natural recharge rate (NRR) the average annual precipitation (AAP) was inputted into the following equation. The natural recharge rate (NRR) was determined to be 1.351 $in/year$. This value was used in the mass-balance spreadsheet.

$$NRR = 0.0046\,(AAP)\text{^}2$$

5.8 Upgradient Ground Water Nitrate Concentration

Utilizing the IDEQ groundwater monitoring wells website no monitoring wells were found to be upgradient to the project. The only monitoring well (Site ID 691) within 4 miles of the proposed site was 1,400 feet downgradient. (Appendix G) The Nitrate + Nitrite concentration at Site ID 691, on 11-02-2021, was recorded as 4.90 mg/L rate. Due to the lack of upgradient rate concentrations, well sampling was undertaken to determine an accurate upgradient Nitrate + Nitrite concentration.

To ascertain an upgradient Nitrate + Nitrite concentration four samples were taken from various locations in close proximity to the project location. (Appendix G) The Nitrate + Nitrite levels at the four locations varied between 0.00 mg/L to 4.75 mg/L. To determine a value to use in the mass-balance spreadsheet an average was taken from the samples and DEQ. (Appendix G) The average between the five locations was 2.42 mg/L, that value was utilized in the mass balance spreadsheet.

5.9 Septic Tank Effluent Concentration

5.9.1 Original N-P Evaluation

In the original N-P Evaluation, the septic tank effluent concentration used was commensurate with the amount of nitrate that is anticipated to be released into the groundwater from the septic tank effluent of an individual system. The IDEQ guidance for non-nitrate reducing systems is 45 mg/L.. This value was used in the mass-balance spreadsheet.

5.9.2 Revised N-P Evaluation

In adherence to IDEQ guidance, the default concentration for subsurface septic systems was set at 45 mg/l in the following analysis. However, to accommodate comments from the County review of the original N-P Evaluation, the revised approach implemented a more comprehensive approach to enhance the understanding of lot potential. Although more analysis was performed to model the three effluent concentrations, a greater understanding of the models limitations and the absorption capacity of each lot was gleaned. To achieve this, two additional concentrations representative of nitrate-reducing systems were meticulously modeled. These concentrations, set at 38 mg/l and 27 mg/l, were strategically chosen to provide a nuanced perspective on lot performance. The rationale behind the selection of these specific concentrations is thoroughly elucidated in section 7.3, offering a detailed insight into the considerations guiding this refined modeling approach.

5.10 Nitrate Concentration Goal

The nitrate concentration goal with guidance from the IDEQ Nutrient-Pathogen Evaluation Program for On-Site Wastewater Treatment Systems May 2002 is 1.0 mg/L nitrate or less predicted at the down-gradient boundary as demonstrating a negligible impact. Nitrate levels above 10.00 mg/L are determined to have an impact on public health. With the upgradient ground water concentration selected as 2.42 mg/L the nitrate concentration goal for the mass-balance spreadsheet was determined to be 3.42 mg/L as to have negligible impact on public health.

6.0 Overall Site Phosphoros Evaluation

6.1 Methodology

The developments of Trestles, Trestles II, and Wildflower, situated adjacent to Spring Creek, necessitate a thorough examination of the potential hydraulic connections between the groundwater of the subdivisions and the surface water of the creek. The evaluation of such connections is crucial, not only for regulatory compliance but also for ensuring the ecological integrity of the area. A multitude of methodologies are available to ascertain these connections, each with its level of complexity and precision. However, Level 1 studies, characterized by their reliance on existing data and less invasive techniques, pose inherent limitations in conclusively establishing the absence of hydraulic connectivity. In light of these constraints, adopting a phosphorus mass balance approach emerges as a strategic alternative to demonstrate compliance, given phosphorus's significant impact on water quality and ecological balance. Recognizing the limitations of Level 1 studies is essential, and often, a more comprehensive, stepwise approach is warranted to safeguard the water quality in both the development areas and Spring Creek.

6.2 Compliance Boundary

Nestled in the northwestern quadrant of the proposed development, Spring Creek runs in close proximity to the eastern boundary of the Trestles II portion of the development, marking a critical interface between the natural and built environments. Given the creek's geographical significance, a multifaceted approach to assessing potential environmental impacts was adopted.

In order to ascertain the potential impact on Spring Creek, the 35-degree water delineation, as recommended by the Idaho Department of Environmental Quality, was overlaid on the subdivision drawings. This methodical approach helps identify which lots in the Trestles, Trestles II, and Wildflower developments are situated within this delineation and are thereby likely to have a direct influence on the creek, especially concerning phosphorus and nitrogen levels.

The overlap of the water delineation on the subdivision maps allowed for a more detailed analysis of each individual lot’s potential contribution to pollutant levels in the creek. This targeted approach may prove helpful in developing a tailored strategy for each identified lot, ensuring that the ecological balance of Spring Creek is maintained, and any adverse effects from the development are mitigated.

By focusing on the lots that fall within the 35-degree water delineation, more efficient and effective measures can be employed, ensuring both the sustainable development of the subdivision and the preservation of the natural environment surrounding Spring Creek. This approach underlines the commitment to responsible development, balancing community growth with environmental stewardship.

6.3 Spring Creek Data

In the context of the proposed development near Spring Creek, a key consideration is the creek’s annual flow volume, which is 24 cubic feet per second (cfs). A noteworthy aspect of this analysis is the absence of direct monitoring data for nitrogen and phosphorus levels in Spring Creek. However, Spring Creek feeds into Teton Creek shortly after traversing the property in question, providing an opportunity to analyze the water quality downstream.

Available data for Teton Creek and the Teton River, where Teton Creek merges with the river, offers insight into the background concentrations of phosphorus and nitrogen. The phosphorus loads for Teton

Creek and the Teton River were recorded as 0.04 mg/l and 0.05 mg/l respectively, while total nitrogen levels were measured at 0.44 mg/l for Teton Creek and 1.33 mg/l for the Teton River. (IDEQ, 2016)

To err on the side of caution in the environmental assessment, the higher concentrations recorded at the junction of Teton Creek and the Teton River were adopted as background values in the mass-balance spreadsheet developed by Civilize. This conservative approach aims to ensure a thorough evaluation of potential impacts, thereby aiding in the formulation of strategies to safeguard the water quality of Spring Creek as the development progresses.

6.4 Effluent Concentrations for Phosphorus and Nitrogen

The phosphorus concentration in septic tank effluent can exhibit significant variability, with typical values ranging between 5 to 15 mg/L total P. These concentrations substantially exceed the levels known to promote algal growth and eutrophication in aquatic ecosystems (Dillon and Rigler, 1974). Total phosphorus in the effluent encompasses dissolved phosphate (PO43–), commonly known as soluble reactive phosphorus (SRP), phosphorus incorporated within organic compounds in the wastewater, and phosphorus adhered to particulate matter. Typically, SRP constitutes 70-85% of the total phosphorus in septic tank effluent (McCray et al., 2005). As the effluent infiltrates through the drainfield sediments, filtration removes particulate matter and organic compounds degrade, rendering the majority of total P in septic system plumes as SRP (Harman et al., 1996). By considering 85% of 15 mg/L, an effective concentration of 12.75 mg/L is derived. This value was utilized in the mass-balance spreadsheet modeling to maintain a conservative approach. According to the Environmental Protection Agency (EPA) guidelines, phosphorus concentrations in streams should ideally be below 0.1 mg/L, particularly for streams not discharging into reservoirs.

In aligning with the IDEQ guidelines, our modeling of nitrogen effluent concentration was meticulously applied. The baseline was established at 45mg/l, accompanied by the exploration of two alternative concentrations, 38mg/l and 27mg/l, to facilitate a comprehensive analysis. These alternate concentrations were systematically incorporated into the model, influencing the associated effluent flows derived from the maximum permissible flows outlined in the IDEQ Level 1 mass-balance spreadsheet.

A pivotal aspect of the IDEQ guidance is the stipulation that nitrogen concentration increases should not exceed 1.0 mg/l, a critical threshold underscoring the balance between environmental sustainability and developmental aspirations. This guidance served as a foundational parameter in our modeling, ensuring adherence to established environmental standards.

Our methodological approach enabled a detailed scrutiny of the subdivision, evaluating it as a holistic entity as well as dissecting it into its individual phases – Trestles, Trestles II, and Wildflower. The integration of varied nitrogen concentrations infused the analysis with nuanced insights, facilitating an in-depth assessment of the potential repercussions of differing nitrogen levels across each development phase. The subsequent sections of this document will delve deeper into the findings and implications arising from this phase-wise analysis.

Modeling diverse concentrations was instrumental in exploring a range of scenarios. This ranged from adhering to the stringent IDEQ guidelines to examining the implications of more lenient concentration levels. This multifaceted approach was pivotal in assessing the environmental footprint and the sustainability of the proposed development under an array of conditions. It provided valuable insights into the responsiveness of each subdivision phase to variations in nitrogen effluent concentrations, thereby contributing to the formulation of a balanced approach harmonizing developmental objectives with environmental conservation.

6.5 Intermediate Results

The findings from the mass-balance spreadsheet demonstrate a reassuring environmental prognosis for the proposed development area. Even under scenarios where all effluent from the earlier designated zones reaches the stream at elevated flow levels, the data suggests that the resulting increase in nitrogen would still be contained below 1 mg/l. Moreover, the downstream phosphorous concentration is projected to remain under 0.100 mg/l, aligning with established environmental guidelines. The comprehensive analysis conducted on all six mass balance scenarios is thoroughly documented and can be referenced in Appendix M. This meticulous evaluation underscores the development's commitment to maintaining ecological balance and adhering to environmental safety standards.

7.0 Overall Site Nitrogen Evaluation

7.1 Methodology

Establishing compliance boundaries within a subdivision equipped with individual wells and septic systems is a critical step in safeguarding public health and environmental quality. One approach is to consider the entire subdivision as the compliance boundary, which can offer several advantages. This method facilitates unified management, ensuring uniform adherence to environmental regulations and streamlined monitoring across the entire subdivision. It allows for a more holistic risk assessment, addressing cumulative impacts and interdependencies among individual lots. Furthermore, this approach fosters a comprehensive understanding of the subdivision's ecological footprint and can realize economies of scale in monitoring and compliance activities.

However, a comprehensive analysis indicates that defining compliance boundaries at the level of individual lots emerges as a method of greater precision and adaptability. This strategy aligns more closely with regulatory standards and adeptly accommodates the variability in site-specific conditions inherent across different subdivisions.

1. To gain deeper insights into the development, three distinct compliance boundary models were explored. The first model expanded the initial individual compliance boundaries, previously discussed in depth, to include an additional six "best case" lots, resulting in a total of twelve lots analyzed within individual lot compliance boundaries.
2. The second model encompassed the entire subdivisions of Trestles, Trestles II, and Wildflower, a method hereafter referred to as the Teton County approach.
3. The final model, termed the Revised Teton County approach, applied compliance boundaries to each phase of the development separately. Evaluating these three diverse approaches provided a more nuanced understanding of both the development as a whole and its individual lots, thereby facilitating informed decision-making and effective environmental risk management.

7.2 Modeling Strategy

The standard practice for modeling a property in the IDEQ Level 1 mass-balance spreadsheet involves calculating several parameters including hydraulic conductivity, hydraulic gradient, mixing zone thickness, aquifer width perpendicular to flow, parcel area, natural recharge rate, and upgradient groundwater concentration. Subsequent assumptions are then made based on either code requirements or experiential knowledge regarding septic tank effluent volume and concentrations. While this methodology offers insight into whether a specific set of parameters passes or fails the evaluation, it falls short of providing a detailed understanding of the potentialities of each individual lot.

In response to this limitation, a more nuanced approach has been proposed. Instead of modeling each lot based on assumptions related to septic tank effluent volume and concentration, the strategy is to model each lot, subdivision, and phase at three different concentrations and determine the maximum effluent for these concentrations. This refined methodology allows for a detailed analysis of the max effluent for each lot, phase, and subdivision, thereby offering more comprehensive insight into the limitations and capabilities of each section of the development. By adopting this approach, developers and planners can gain a deeper understanding of the unique characteristics of each lot and make informed decisions that cater to the specific needs and constraints of the entire development.

7.3 Effluent Concentrations Modeled

In the detailed modeling of each facet of the subdivision, employing three distinct concentrations serves as a cornerstone to understanding the nuanced dynamics at play. These concentrations, reflective of various treatment efficiencies, offer a spectrum of scenarios to scrutinize the environmental impact across individual lots, phases, and the entire subdivision.

The first concentration, mirroring the established DEQ standards, represents a scenario where the effluent retains a higher level of total nitrogen, close to 45 mg/L. This scenario provides a baseline, helping to assess how each lot and phase would fare under less stringent treatment conditions, offering insight into the inherent resilience and vulnerability of different sections of the development.

The second concentration exemplifies a moderate level of treatment efficiency, similar to what is achieved by technologies akin to Intermittent Sand Filters. This middle ground, characterized by nitrogen levels reduced to approximately 38 mg/L, presents a more balanced view. It allows for the evaluation of the development under improved, yet not optimal, treatment conditions, highlighting areas that might necessitate further intervention or modified strategies.

The final concentration depicts an advanced treatment scenario, where nitrogen levels are significantly curtailed to around 27 mg/L, emulating the performance of more sophisticated systems comparable to Recirculating Gravel Filters. This scenario unveils the potential of each lot, phase, and the subdivision as a whole when subjected to optimal treatment conditions, thereby illuminating the realms of possibility for sustainable development and environmental stewardship.

By modeling each aspect of the subdivision with these three varied concentrations, a comprehensive and multifaceted understanding of the development is achieved. This approach not only elucidates the limitations and capabilities of each section but also aids in making informed decisions tailored to the specific needs and constraints of the entire development.

7.3.1 Individual Lots Modeling

The twelve individual lots adhere to the identical modeling criteria meticulously outlined in Chapter Five, with the sole variation being that the lot size and aquifer width perpendicular to flow are updated for each individual lot. These lots, which are comprehensively depicted in the appendix, are subsequently modeled employing the three distinctive effluent concentrations previously enumerated. Rather than yielding a binary pass or fail outcome for each lot, the result manifests as a total effluent volume. This nuanced approach grants enhanced flexibility, proving invaluable when deliberating on the dimensions of homes and the incorporation of additional dwelling units. The results for each lot are given in the following table along with the supporting IDEQ spreadsheets added to the appendix.

7.3.2 Subdivision Modeling

In a manner akin to the individual lots, the subdivision modeling aligns with the methodology detailed in Chapter Five, incorporating necessary adjustments for total size, aquifer width perpendicular to flow, and the number of homes on the parcel. A significant modification in the subdivision model involves the adjustment of the mixing zone thickness. As delineated in Section 5.3, the mixing zone thickness is determined by the distance to the property boundary, which, in this case, ranges from 600 feet to 4500 feet, with the majority—over 80 percent—exceeding the 1000 ft distance. Given that the induction zone and property boundary are established as greater than 1000 ft, a value of 45 feet for the mixing zone can subsequently be applied in the modeling of the entire subdivision for determining the Teton County Allowable Effluent Flows. This adjustment is pivotal in ensuring accurate and relevant modeling outcomes for comprehensive environmental management of the subdivision. The result for the subdivision is presented in the following table along with the supporting IDEQ spreadsheets added to the appendix.

7.3.3 Subdivision Phases Modeling

Similarly, the distinct phases of the subdivision – Wildflower, Trestles I, and Trestles II – adhere to the comprehensive modeling approach outlined in Chapter Five, with appropriate modifications tailored to each phase's unique characteristics. For Trestles I, the average distance to the property boundary is approximately 705 feet, falling within the 500-1000 feet range for the mixing zone, thereby establishing a 30-foot mixing zone for this phase. In contrast, Trestles II exhibits a more varied range, with distances stretching between 800 and 4500 feet to the property boundary, necessitating 45-foot mixing zone to accommodate this diversity. Lastly, Wildflower, characterized by a distance range of 600-1000 feet to the boundary and falling within the 500-1000 feet delineation, also adopts a 30-foot mixing zone. These variations in mixing zone thickness are pivotal, ensuring that each phase's modeling is both precise and reflective of its specific environmental context. This nuanced approach is integral to facilitating effective environmental management across the different phases of the subdivision and is referred to as the Revised Teton County Allowable Effluent Flows. The results for each phase are given in the following table along with the supporting IDEQ spreadsheets added to the appendix.

7.7 Intermediate Results

In conclusion, the detailed and multifaceted modeling approach applied to the subdivision, individual lots, and distinct phases—Wildflower, Trestles I, and Trestles II—yields an intricate understanding of the environmental dynamics and the ability of each phase to balance nitrogen levels. The broader stroke of the Subdivision model reveals allowable flows ranging from 350 to 650 gallons/day/parcel, contingent on the concentration levels utilized. In contrast, the Revised Teton County results demonstrate a discernible difference between the phases. Wildflower exhibits flows between 500-1000 gallons/day/parcel, Trestles I shows a range of 600-1050, while Trestles II has the most constrained allowable flows at 250-500 gallons/day/parcel. This variance in results underscores the utility of a nuanced approach in revealing the distinctive capabilities and limitations of each phase, thereby guiding sustainable development and effective environmental management through informed decision-making.

Table 1 - Allowable Effluent Flows

Allowable Effluent Flow per lot following DEQ and Teton County Requirements				
Lot Evaluated	**Setic Tank Effluent Concentration (mg/l)**	**DEQ Allowable Effluent calculated per lot (gallons/d/parcel)**	**Teton County Allowable Effluent calculated per subdivison (gallons/d/parcel)**	**Revised Teton County Allowable Effluent calculated per phase (gallons/d/parcel)**
WF Block 1 Lot 25	45	400	350	550
	38	450	450	650
	27	700	650	1000
WF Block 1 Lot 13	45	500	350	550
	38	600	450	650
	27	900	650	1000
WF Block 1 Lot 11	45	600	350	550
	38	700	450	650
	27	1050	650	1000
WF Block 1 Lot 1	45	700	350	550
	38	850	450	650
	27	1250	650	1000
T1 Block 1 Lot 10	45	800	350	600
	38	950	450	700
	27	1400	650	1050
T1 Block 1 Lot 4	45	1000	350	600
	38	1200	450	700
	27	1800	650	1050
T1 Block 1 Lot 24	45	950	350	600
	38	1150	450	700
	27	1750	650	1050
T2 Block 2 Lot 3	45	550	350	250
	38	650	450	300
	27	1000	650	500
T2 Block 2 Lot 5	45	700	350	250
	38	850	450	300
	27	1300	650	500
T2 Block 2 Lot 12	45	650	350	250
	38	750	450	300
	27	1150	650	500
T2 Block 2 Lot 32	45	950	350	250
	38	1150	450	300
	27	1700	650	500
T2 Block 2 Lot 18	45	850	350	250
	38	1050	450	300
	27	1550	650	500

8.0 Conclusions and Recommendations

In conclusion, the nuanced, multifaceted modeling approach employed in this analysis has yielded significant insights into the environmental dynamics of the proposed development. Incorporating evaluations of individual lots and diverse subdivision phases—Wildflower, Trestles I, and Trestles II—as well as the entire subdivision, this method has elucidated the distinct nitrogen-balancing capacities inherent to each segment. The individual lots model indicates adsorption capacities ranging from 400 gpd to 1,800 gpd while the more restrictive, while the broader, but perhaps skewed, subdivision model indicates variable allowable flows ranging from 350 to 650 gallons/day/parcel, contingent upon specific nitrogen concentration levels, thereby highlighting the unique environmental capacities and considerations for each phase.

Moreover, our comprehensive analysis demonstrates a reassuring environmental outlook for the area adjacent to Spring Creek. Even in scenarios positing that all effluent from the initially designated areas infiltrates the stream at heightened flow levels, the nitrogen increase is projected to remain under 1 mg/l, and the downstream phosphorous concentration below 0.100 mg/l. These findings, available in Appendix M, signify the project's adherence to stringent environmental standards and its commitment to preserving the ecological balance of the surrounding areas.

Each modeling approach, whether focusing on the entirety of the combined projects, each subdivision, or dissecting it to individual lot levels, yield invaluable insights and do not forewarn any detrimental impact on groundwater nitrate levels. These findings coalesce to strongly support the proposition of permitting individual septic systems within the proposed subdivision, without jeopardizing groundwater quality. The amalgamation of insights derived from the three differing models lay a robust foundation for informed decision-making, underpinning sustainable development and effective environmental stewardship across the distinct phases of the subdivision.

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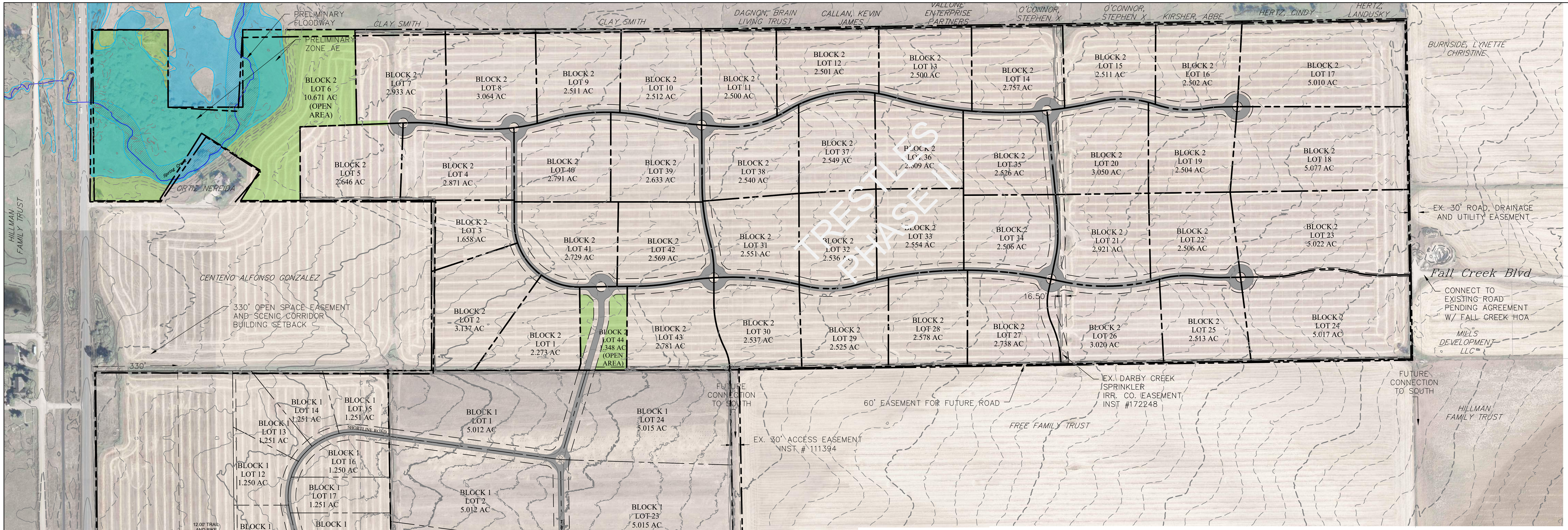
Appendix A

Site Map



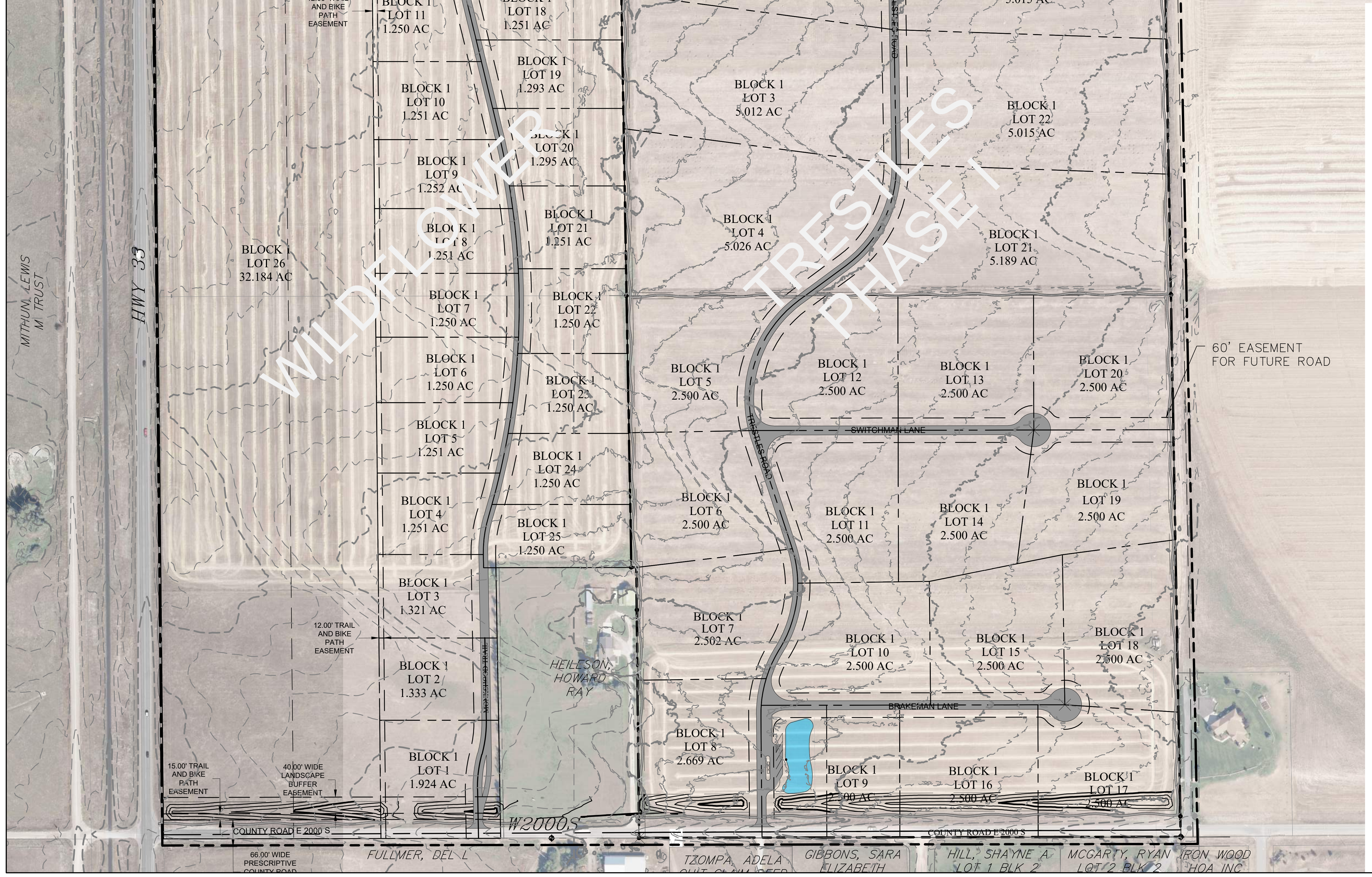


Table 7. Local Road Standard

Lane Width (ft)	Shoulder Width (ft)	Road Width (ft)	ADT (veh/day)	Speed Limit (mph)
9	2	22	<150	25-35

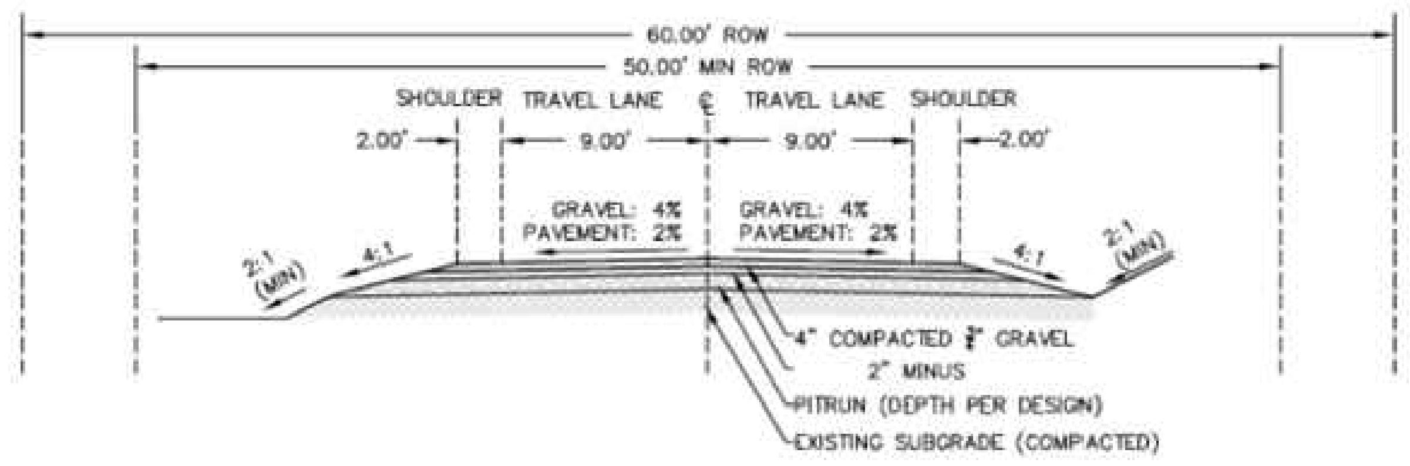
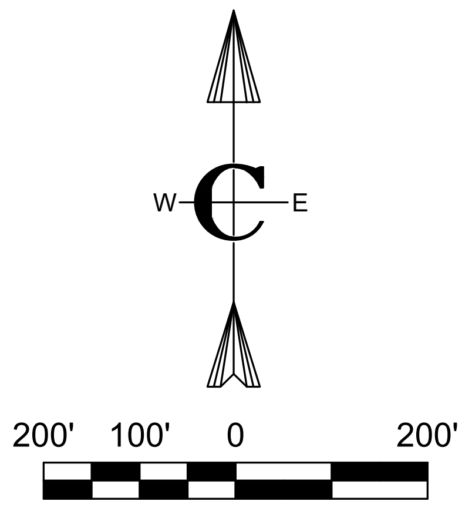


Figure 7. Local Road Cross-Section



SCALE: 1" = 200'

GENERAL INFORMATION, JURISDICTION, ZONING

JURISDICTION	TETON COUNTY, IDAHO
GOVERNING CODE	TETON COUNTY SUBDIVISION REGULATIONS
IMPACT AREA	NOT APPLICABLE
EXISTING SUBDIVISION	NONE
PUBLIC LAND SURVEY SYSTEM	SE ¼, SEC. 2, TWP 5N, RNG 45E. B.M.
LATITUDE AND LONGITUDE	43º41'52” N, 111º06'14” W

DEVELOPMENT DESCRIPTION (TRESTLES)

NAME OF SUBDIVSION	TRESTLES
AREA OF DEVELOPMENT	216.83 ACRES
TOTAL NO. LOTS	68
TOTAL NO. BUILDABLE LOTS	66 SINGLE FAMILY
OPEN SPACE	12.66 ACRES (5.8%)
AVERAGE DENSITY RESIDENTIAL LOTS	3.29 ACRES/LOT

TRESTLES I

AREA TRESTLES I (PHASE I)	40.17 +40.30 = 80.47 ACRES	
PARCEL NO(S)	RP04N45E029250 & RP04N45E027350	
NO. LOTS TRESTLES I		24
NO. BUILDABLE LOTS		24
AVERAGE DENSITY TRESTLES I	3.35	
OPEN SPACE	0.64 ACRES	

TRESTLES II

AREA TRESTLES II (PHASE II)	56.36 + 80 = 136.36 ACRES	
PARCEL NO(S)	RP04N45E021201 & RP04N45E013600	
NO. LOTS TRESTLES II		44
NO. BUILDABLE LOTS		42
AVERAGE DENSITY TRESTLES II	3.25	

OPEN SPACE 12.02 ACRES

DEVELOPMENT DESCRIPTION (WILDFLOWER)

NAME OF SUBDIVSION	WILDFLOWER
AREA OF DEVELOPMENT	64.36 ACRES
TOTAL NO. LOTS	26
TOTAL NO. BUILDABLE LOTS	25 SINGLE FAMILY
OPEN SPACE	32.18 ACRES (50%)
AVERAGE DENSITY RESIDENTIAL LOTS	0.404 LOTS/ACRE

WILDFLOWER

AREA	64.36 ACRES
PARCEL NO(S)	RP04N45E021201 & RP04N45E013600
NO. LOTS	26
NO. BUILDABLE LOTS	25
AVERAGE DENSITY	2.57
OPEN SPACE	32.18 ACRES

APPLICABLE CODES

PLANNING AND ZONING/SUBDIVISION

TETON COUNTY COMPREHENSIVE PLAN	AUGUST 24, 2012
TETON COUNTY SUBDIVISION REGULATIONS (TITLE 9, TETON COUNTY CODE)	SEPT 15, 2011
TETON COUNTY TITLE 07, CHAPTER 2, TETONIA CITY AREA OF IMPACT ORDINANCE	AUGUST 14, 1995
a. APPLICABLE SUBDIVISION ORDINANCES	TETON COUNTY
b. REVIEW	TETON COUNTY
c. ENFORCEMENT	TETON COUNTY

BUILDING CODES

a. INTERNATIONAL BUILDING CODE (IBC)	2018
b. INTERNATIONAL MECHANICAL CODE (IMC)	2018
c. INTERNATIONAL ENERGY CONSERVATION CODE (IECC)	2018
d. INTERNATIONAL FIRE CODE (IFC)	2018

TETON COUNTY AGRICULTURAL/RURAL RESIDENTIAL 2.5 STANDARDS

PURPOSE: THE PURPOSE OF THIS DISTRICT IS TO DESIGNATE AND PROVIDE OPPORTUNITY FOR DEVELOPMENT OF RESIDENTIAL LAND USE ON MARGINAL AGRICULTURAL LAND.

TETON COUNTY ZONING	AGRICULTRUAL / RURAL RESIDENTIAL 2.5
OVERLAY ZONES	NONE

ALLOWED USES

SINGLE FAMILY RESIDENTIAL	PERMITTED
MOBILE HOME, MODULAR	PERMITTED
DWELLING ACCESSORY UNIT	PERMITTED W/CONDITIONS

LOT SIZE REQUIREMENTS

MINIMUM LOT SIZE	2.5 ACRES
MINIMUM LOT WIDTH	NA

BUILDING SETBACKS

FRONT YARD	30' MIN
REAR YARD	40' MIN
SIDE YARD	30' MIN
TETON RIVER	100' MIN
STREAM, CREEK	50' MIN
IRRIGATION DITCH	15' MIN.

BUILDING HEIGHT

BUILDINGS AND STRUCTURES	30' MAX

ACCESSORY BUILDINGS

LESS THAN 200 FT^2	12' MINIMUM
GREATER THAN 200 FT^2	MEET SETBACKS FOR A20 ZONE

NO.	DESCRIPTION	BY	DATE
4	TRESTLES WITH WILDFLOWER	BEC	4/4/23
3	TRAIL EASMT AND FIRE POND	BEC	7/9/22
2	CONCEPTUAL DESIGN-PH 1-3	BEC	5/2022
1	CONCEPTUAL DESIGN	BEC	3/2022

Civilize, PLLC
Management and Engineering

PROJECT NO.	11-22-333
DRAWN	J. TOONE
DESIGNED	B. CROWTHER
APPROVED	B. CROWTHER
QA/QC	B. CROWTHER

CURT BEHLE &
KARIN WERTHEIM

TRESTLES & WILDFLOWER
CONCEPT MASTER PLAN

SHEET NO:
C-100

DATE:
APR. 2023

PAGE NO:
1

Appendix B

USGS Geologic Map

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MINERAL INVESTIGATIONS
FIELD STUDIES ~~MAP~~ MF-300

ECONOMIC GEOLOGY

Resources of economic importance in the Driggs quadrangle include phosphate rock, coal, limestone, sand and gravel, water, peat, and building stone. Phosphate rock is the major mineral resource in the Driggs quadrangle, but through 1965 phosphate has not been mined in this area because of thicker and higher grade deposits in other areas. An estimated 260 million tons of phosphate rock that exceeds 18 percent P_2O_5 is above entry level. Most of the phosphate rock occurs in the Meade Peak Phosphatic Shale Member of the Phosphoria Formation which has about 25 linear miles of outcrop in the quadrangle. Phosphate rock also occurs in the Retort Phosphatic Shale Member of the Phosphoria Formation, but the Retort is considerably thinner and contains a lower average P_2O_5 content than the Meade Peak. Lithologic descriptions and analyses of the most phosphatic rock from two complete and three partial sections of the Meade Peak Member are shown in table 1. The Meade Peak is 35 to 55 feet thick; most high-grade phosphate rock is concentrated in two zones, one near the top and one near the base. The thickest high-grade phosphate rock observed was at the North Fork Rainey Creek trench where the upper 5.8 feet of the Meade Peak exposed contains 30.6 percent P_2O_5. The thickness and grade of the phosphate rock northeast of the Cache Creek thrust decrease appreciably from that in other parts of the quadrangle. The phosphate rock contains vanadium, and samples from three trenches were analyzed for V_2O_5. Generally, the highest concentrations of V_2O_5 are in phosphatic mudstones. At the Victor trench (CP-3) a zone 9.5 feet thick of predominantly mudstone contains an average of 0.44 percent V_2O_5. Additional data on the P_2O_5 and V_2O_5 content of the Phosphoria in this region are given by Gere, Schell, and Moore (1966).

Lenses of low-grade coal in the Bear River and Frontier Formations have been prospected, but no large-scale coal mining has been done in the quadrangle because of the isolated occurrences and low rank of the coal. Mansfield (1920, p. 152) reported a bed of coal about 2 feet thick with heating value of 7,376 Btu (air-dried sample) near the base of the upper member of the Bear River Formation at Pine Creek Pass and also a bed 4 to 6 feet thick in the Frontier Formation exposed along North Fork Rainey Creek. Old pits, dug to prospect for coal in the Frontier Formation, are present about half a mile southeast of the mouth of Stateline Canyon and in the Bear River Formation in Wood Canyon, but no coal is now exposed. John Cluff, a local prospector, reported that he had mined an 8-foot bed of coal in the Frontier Formation near the mouth of Burbank Creek.

Limestone is abundant throughout the stratigraphic column, and relatively pure limestone from the Mission Canyon Limestone is quarried on the east side of Teton Valley along Fox Creek in the N½ sec. 32, unsurveyed, T. 43 N., R. 118 W., Wyoming, for use in a sugar-beet refinery near Idaho Falls, Idaho. Sand and gravel are abundant in broad gentle alluvial fans extending from the mouths of all the major stream valleys in Teton Valley; this material is utilized locally as road metal. Water is relatively abundant in Teton Valley; the water resources are described by Kilburn (1964). Reed-sedge peat is mined in the NE¼NW¼ sec. 22, T. 4 N., R. 45 E., Idaho, and is sold as a soil conditioner. The peat is under about 6 inches of soil, ranges from 1 to 9 feet in thickness, and is underlain by clay. Welded tuff has been quarried in the past for use in the construction of buildings, and considerable quantities of this rock are available in the area. Bricks for local usage also were formerly made in Teton Valley; the clay was obtained from near the mouth of the Sorensen Creek valley and the bricks were fired nearby in a kiln in the NE¼SW¼ sec. 17, T. 4 N., R. 46 E., Idaho.

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Gere, W. C., Schell, E. M., and Moore, K. P., 1966, Stratigraphic sections and phosphate analyses of Permian rocks in the Teton Range and parts of the Snake River and Gros Ventre Ranges, Idaho and Wyoming: U.S. Geol. Survey open-file report, 71 p.

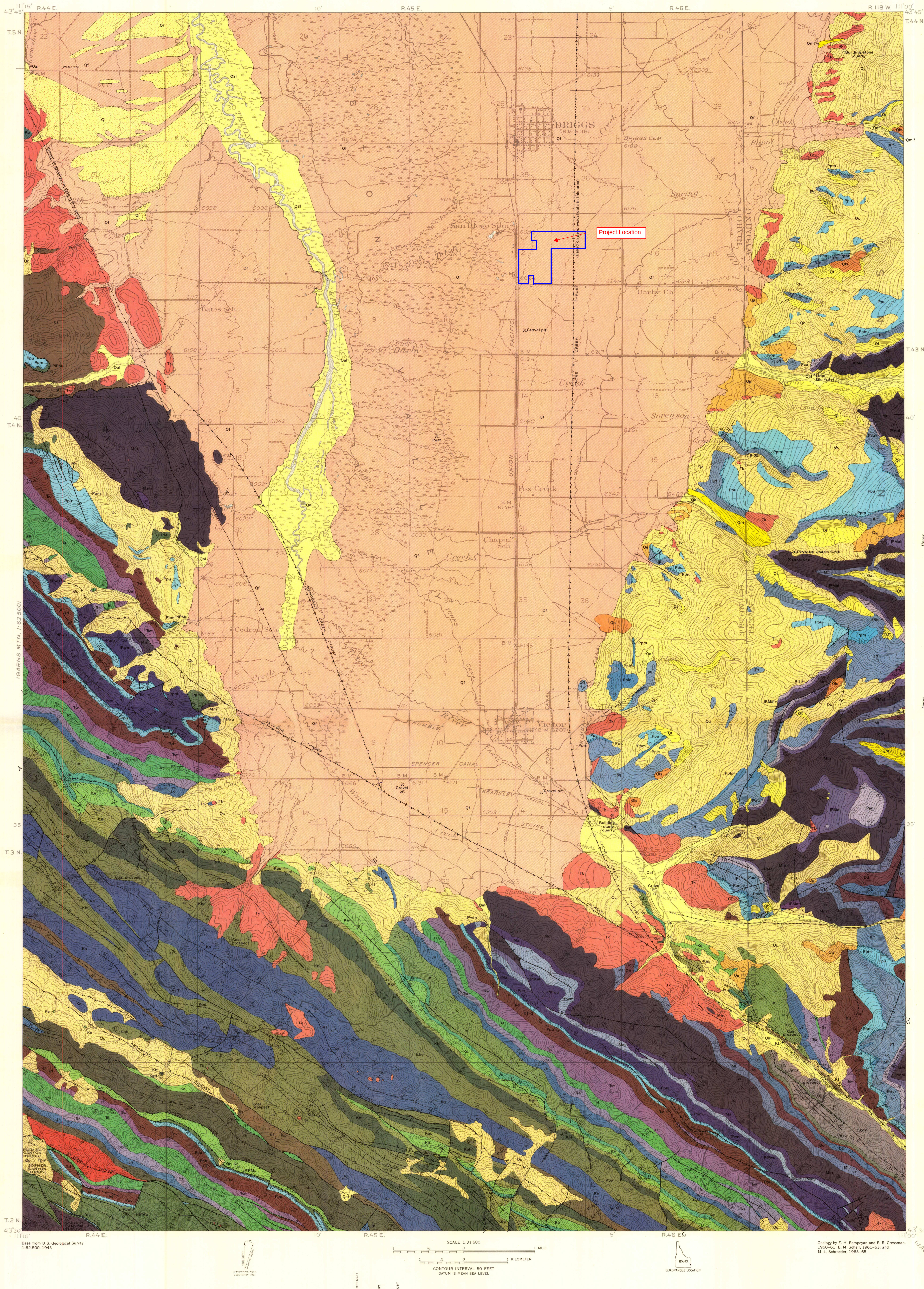
Kilburn, Chabot, 1964, Ground water in the upper part of the Teton Valley, Teton Counties, Idaho and Wyoming: U.S. Geol. Survey Water-Supply Paper 1789, 60 p.

Mansfield, G. R., 1920, Coal in eastern Idaho: U.S. Geol. Survey Bull. 716-F, p. 123-153.

TABLE 1. LITHOLOGIC DESCRIPTIONS AND CHEMICAL ANALYSES OF THE MEADE PEAK PHOSPHATIC SHALE MEMBER OF THE PHOSPHORIA FORMATION

[Analyses by K. P. Moore]

Rock description	Thickness (feet)	Chemical analyses (percent)		
		P_2O_5	V_2O_5	Acid insoluble
Talbot Creek trench (USGS Lot No. CP-1). SE¼NE¼ and NE¼SE¼ sec. 9, unsurveyed, T. 41 N., R. 118 W., Wyo., about 7 miles southeast of Victor, Idaho. Sampled and measured by E. R. Cressman, W. C. Gere, E. M. Schell, and H. L. Smith.				
Mudstone	0.2			
Phosphorite, cherty	2.5	31.19	0.04	8.97
Siltstone	0.9			
Siltstone, sandy, cherty	1.1			
Siltstone	0.9			
Mudstone, phosphatic	1.0			
Chert	1.0			
Dolomite, argillaceous	0.3			
Phosphorite, argillaceous	0.5			
Fault gouge, cherty	0.3			
Chert	0.4			
Siltstone, siliceous	0.7			
Mudstone	0.3			
Dolomite, siliceous, silty	1.7			
Mudstone, silty	0.4			
Dolomite, siliceous	0.6			
Mudstone	1.3			
Mudstone, carbonatic, silty	1.6	0.00	0.24	51.41
Phosphorite, argillaceous, calcareous	0.2			
Chert and mudstone, phosphatic	1.7			
Limestone, argillaceous	0.9			
Phosphorite, calcareous	1.3	22.46	0.12	14.25
Chert and mudstone, phosphatic	6.4	4.15	0.26	71.62
Carbonate rock, phosphatic, argillaceous	0.8	8.97	0.20	15.11
Phosphorite, argillaceous	0.5	27.47	----	20.36
Phosphorite, argillaceous	0.9	26.99	0.25	13.52
Phosphorite	0.3	30.45	0.08	8.16
Phosphorite, silty, siliceous	2.2	21.81	0.04	28.19
Mudstone, carbonatic, phosphatic	2.7	9.78	0.11	43.64
Phosphorite and mudstone	1.4	19.32	0.26	29.91
Total thickness	35.0			
North Fork Rainey Creek trench, partial section (USGS Lot No. CP-2). NW¼SE¼ sec. 7, T. 2 N., R. 45 E., Idaho, on north side of North Fork Rainey Creek. Sampled and measured by W. C. Gere, E. H. Pampeyan, and H. L. Smith.				
Phosphorite, sandy, cherty	1.8	28.67	0.03	11.78
Phosphorite	4.0	31.44	0.02	4.46
Mudstone and phosphorite	1.4			
Fault contact, section incomplete				
Total thickness	7.2			
Victor trench (USGS Lot No. CP-3). NE¼SW¼NE¼ sec. 35, T. 3 N., R. 45 E., Idaho, on ridge east of Pole Canyon. Measured and sampled by E. H. Pampeyan, E. R. Cressman, H. L. Smith, and W. C. Gere.				
Fault(?).				
Breccia, siltstone, phosphorite, and chert	1.5			
Mudstone, phosphatic	0.5			
Siltstone, dolomitic	1.2			
Mudstone	0.5			
Phosphorite, calcareous, argillaceous	0.2			
Siltstone, dolomitic	0.3			
Phosphorite, argillaceous	0.3			
Siltstone, dolomitic	2.9			
Phosphorite, argillaceous	0.2			
Siltstone	1.0			
Phosphorite, calcareous	0.4			
Siltstone, carbonatic	1.1			
Phosphorite	0.2			
Siltstone	0.3			
Phosphorite and siltstone	3.1	25.17	0.07	21.12
Phosphorite, argillaceous	2.5	24.27	0.08	22.75
Phosphorite, argillaceous	0.4	22.66	0.21	22.76
Siltstone	6.1			
Dolomite, argillaceous	4.0			
Mudstone and siltstone	6.6	0.09	0.08	86.94
Mudstone	1.3	4.58	0.40	70.12
Mudstone, carbonatic, phosphatic	1.5	10.62	0.60	42.30
Mudstone, carbonatic, phosphatic	1.1	8.23	0.25	50.84
Mudstone, carbonatic, phosphatic	1.3	13.36	0.44	34.19
Mudstone, phosphatic	0.8	8.24	0.64	49.32
Mudstone, phosphatic	1.1	9.17	0.50	40.19
Dolomite, phosphatic	1.3	9.11	0.21	17.71
Mudstone, carbonatic, phosphatic	1.1	5.46	0.51	53.92
Phosphorite and mudstone	1.4	25.12	0.02	14.49
Dolomite, argillaceous	0.8			
Phosphorite and dolomite	1.2	17.02	0.06	3.68
Phosphorite	0.5	35.12	0.06	3.90
Dolomite, argillaceous	1.8			
Phosphorite	0.8	36.31	0.02	2.95
Phosphorite, sandy	0.9	19.50	0.009	45.14
Phosphorite, sandy	1.0	29.57	----	22.64
Siltstone and sandstone, phosphatic	0.7	5.54	----	72.52
Phosphorite and chert breccia	0.6	26.49	----	22.04
Total thickness	52.5			
Moose Creek trench, partial section (USGS Lot No. CP-6). NE¼SE¼ sec. 20, T. 3 N., R. 46 E., Idaho, on hillside north of Moose Creek. Sampled and measured by E. H. Pampeyan, W. C. Gere, and H. L. Smith.				
Phosphorite	1.8	35.47	----	5.45
Mudstone, dolomitic	3.2			
Concealed, thickness unknown.				
Dolomite	2.0			
Fault.				
Phosphorite, sandy	1.3	35.12	----	7.78
Sandstone, phosphatic, silty	0.5	14.72	----	52.01
Phosphorite, sandy	1.2	28.18	----	14.99
Total thickness	10.0			
Sorensen Creek trench, partial section (USGS Lot No. CP-23). SE¼NE¼ sec. 30, unsurveyed, T. 43 N., R. 118 W., Teton County, Wyo., on north side of Sorensen Creek. Measured and sampled by E. M. Schell.				
Upper part concealed.				
Dolomite	2.5			
Siltstone, argillaceous	1.3			
Mudstone, silty	1.7			
Dolomite, silty	2.4			
Siltstone, siliceous	0.9			
Phosphorite and mudstone	0.7	19.50	----	35.43
Phosphorite	0.9	34.49	----	3.44
Chert, spicular	1.3			
Chert and phosphorite	0.5	6.99	----	64.68
Phosphorite	0.9	34.51	----	1.49
Chert, spicular	4.3			
Phosphorite	0.9	34.61	----	4.35
Dolomite and phosphorite	1.1	13.74	----	6.69
Phosphorite	1.4	36.14	----	1.64
Total thickness	20.8			



Base from U.S. Geological Survey 1:62,500, 1943

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

Geology by E. H. Pampeyan and E. R. Cressman, 1960–61; E. M. Schell, 1961–63; and M. L. Schroeder, 1963–65

EXPLANATION

QUATERNARY

Recent

Qf Qal Qc Qt Qls

Surficial deposits

Qf, *alluvial fan deposits*
Qal, *alluvium*
Qc, *colluvium*
Qt, *talus*
Qls, *landslide deposits*

Pleistocene

Qm

Morainal deposits

Unconsolidated unstratified till composed of heterogeneous mixture of rock types; particles range from clay to large angular boulders

Pleistocene(?)

Ql

Loess

Light-yellow to light-gray well-sorted structureless wind-deposited silt

Qg

Older gravels

Poorly sorted moderately well cemented coarse gravel in the Teton Range. Locally includes deposits of glacial origin

TERTIARY

Pliocene

Tk

Kirkham Hollow Volcanics

Mainly pinkish- to yellowish-gray compact rhyolitic vitric-crystal tuff

Tco

Conglomerate

Well-rounded pebbles, cobbles, and small boulders as much as 18 inches in diameter in a red silty sandy matrix, poorly cemented; derived mainly from formations of Triassic and Jurassic age

CRETACEOUS

Upper Cretaceous

Kf

Frontier Formation

Interbedded very fine grained calcareous sandstone and dusky-yellow to yellowish-gray shale. Contains coal and carbonaceous lenses. Base marked by a massive noncalcareous locally conglomeratic sandstone. At least 645 feet preserved west of Jackson thrust

Lower Cretaceous

Ka

Aspen Shale

Dark-gray to olive-green siltstone and shale; contains fine- to coarse-grained silicified arkosic sandstone and thin interbeds of grayish-black and white porcellanite. Sandstone commonly has speckled or "salt-and-pepper" appearance caused by black chert grains intermixed with gray grains of feldspar and quartz. About 1,400 feet thick west of Jackson thrust and about 2,500 feet thick between Jackson and Absaroka thrusts

Kbu Kbl

Bear River Formation

Kbu, *upper member; predominantly olive-green to dark-gray shale and interbeds of olive-gray calcareous sandstone and carbonaceous shale. About 690 feet thick between Jackson and Absaroka thrusts*
Kbl, *lower member; light-olive-gray thin- to thick-bedded well-cemented "salt-and-pepper" sandstone and scattered interbeds of dark- and reddish-gray shale; 375 to 425 feet thick west of Jackson thrust*

Kg Kgu Ke

Gannett Group

Kg, *undivided*
Kgu, *upper part; in descending order consists of very light gray fine-grained to aphanitic limestone, the Draney Limestone; red shale and siltstone interbedded with thin beds of red limestone, the Bechler Shale; and very light gray fine-grained medium-bedded limestone, the Peterson Limestone. About 400 feet thick west of Jackson thrust. Formations become difficult to distinguish in southeastern part of quadrangle where entire interval thins to about 220 feet thick*
Ke, *Ephraim Conglomerate; mainly hematitic-red to purplish-red siltstone and sandstone and thin beds of light-gray crossbedded quartzite; gray to purplish-red limestone beds near top and a lenticular dark-colored resistant pebble conglomerate at base; 350 to 430 feet thick west of Jackson thrust*

JURASSIC

Upper Jurassic

Jst Js Jt

Stump and Preuss Sandstones and Twin Creek Limestone

Middle and Upper Jurassic

Jst, *undivided*
Js, *Stump and Preuss Sandstones. Stump Sandstone, crossbedded greenish- to brownish-gray fine- to medium-grained glauconitic calcareous sandstone or arenaceous limestone with fossiliferous, oolitic, and conglomeratic limestone near top; about 135 feet thick west of Jackson thrust. Preuss Sandstone, red shaly sandstone and siltstone commonly very poorly exposed; as much as 80 feet thick west of Jackson thrust*
Jt, *Twin Creek Limestone; upper half is light-gray shaly limestone that characteristically fractures into pencil-shaped fragments; lower half from top to bottom has the following rock types: red siltstone, light-brownish-gray thin-bedded oolitic limestone, medium-gray lithographic limestone, light-gray shaly limestone, white brecciated limestone, and light-brownish-gray thin-bedded oolitic limestone; 900 to 960 feet thick west of Jackson thrust and about 760 feet thick east of Jackson thrust*

Lower Jurassic

Jn

Nugget Sandstone

Moderate-reddish-orange to orange-pink very fine grained ridge-forming quartz sandstone. About 350 feet thick west of Jackson thrust and about 100 feet thick east of Jackson thrust

TRIASSIC

Upper Triassic

Ŧa

Ankareh Shale

Hematitic-red to reddish-purple calcareous siltstone and shale with scattered interbeds of gray and pinkish-gray aphanitic limestone; siltstone commonly has white polka-dot mottling at certain zones; 325 to 550 feet thick west of Jackson thrust and about 510 feet thick east of Jackson thrust

Lower Triassic

Ŧt

Thaynes Limestone

Southwest of Absaroka thrust, upper half is gray bioclastic limestone underlain by light-yellowish-gray calcareous siltstone and sandstone; lower half consists of an upper unit of red siltstone and gray sandy limestone and a lower unit of slabby dark-brown-weathering very fossiliferous silty limestone; entire unit more than 700 feet thick. East of Absaroka thrust and west of Jackson thrust, mainly thin-bedded brownish-gray calcareous siltstone with some bluish-gray fine-grained limestone in lower 18 feet; entire unit about 270 feet thick in Pole Canyon area, but about 500 feet thick in Big Hole Mountains. East of Jackson thrust, mainly thin-bedded yellowish-brown fine-grained soft arenaceous limestone with brownish-red fine-grained sandstone at base and top; about 110 feet thick

Ŧw

Woodside Formation

Reddish-brown siltstone and shale that forms a thick red soil; commonly poorly exposed; about 700 to 920 feet thick between Jackson and Absaroka thrusts and about 300 to 500 feet thick between Absaroka and St. John thrusts

Ŧd

Dinwoody Formation

Mainly olive-brown to brownish-gray shale and siltstone with interbeds of fossiliferous gray silty limestone; uppermost 20 feet is light-brownish-gray arenaceous dolomite; 400 to 600 feet thick

PERMIAN

Ppu Ppm Pplc

Phosphoria Formation and equivalent units

Ppu, *upper unit, includes: Shedhorn Sandstone, brownish-gray fine-grained quartz sandstone with an upper tongue 0 to 60 feet thick and a lower tongue 10 to 48 feet thick; Tosi Chert Member of Phosphoria Formation, dark- to light-colored chert about 10 feet thick with an upper unit of light-gray sandy chert, present only in Teton Range; Retort Phosphatic Shale Member of Phosphoria Formation, black mudstone and thin beds of phosphorite, 15 to 38 feet thick; Franson Member of Park City Formation, light-gray aphanitic dolomite containing lenses and nodules of black chert, 60 to 150 feet thick*
Ppm, *Meade Peak Phosphatic Shale Member of the Phosphoria Formation; mainly phosphorite and black shale; 35 to 50 feet thick*
Pplc, *lower chert member of the Phosphoria Formation; light- to dark-bluish-gray chert unit containing a few phosphatic beds; 2 to 10 feet thick; present only in the Team Range and mapped only where it forms a dip slope*

PENNSYLVANIAN

CARBONIFEROUS

PIPMu PIPwu IPwm Mal

Wells Formation and associated rocks

PIPMu, *undivided*
PIPwu, *upper unit; mainly pink and light- and yellowish-gray fine-grained well-sorted quartzite; uppermost 10 feet is white aphanitic cherty dolomite probably equivalent to part of the Grandeur Member of the Park City Formation; about 970 feet thick*
IPwm, *middle unit; light- and dark-gray thin-bedded cherty aphanitic limestone; 210 to 240 feet thick*
Mal, *lower unit; pinkish- to yellowish-gray fine-grained quartzite; 105 to 275 feet thick*

IPt IPMa IPau IPMal

Tensleep Sandstone and Amsden Formation

IPt, *Tensleep Sandstone; mainly pink and light- to yellowish-gray well-sorted fine-grained quartzite; about 400 feet thick*
IPMa, *Amsden Formation, undivided*
IPau, *upper unit of Amsden Formation; interbedded siltstone, limestone, and crossbedded sandy limestone; about 250 feet thick*
IPMal, *lower unit of Amsden Formation; dominantly light-colored crossbedded fine-grained calcareous quartzite; maroon siltstone at top and bottom; 115 to 160 feet thick*

MISSISSIPPIAN

Madison Group

Lower and Upper Mississippian

Mm

Mission Canyon Limestone

Light- to dark-gray thick-bedded to massive cherty limestone and dolomite; massive cliff-forming beds of brecciated limestone containing thin laminae of red and yellow silt in upper part; 900 to 950 feet thick west of Jackson thrust and about 670 feet thick east of Jackson thrust

Lower Mississippian

Ml

Lodgepole Limestone

Mainly dark-gray thin-bedded fine-grained limestone; brownish- and buff-weathering dolomitic limestone beds near top; lower 5 to 10 feet commonly bioclastic; 400 feet thick east of Jackson thrust and 400 to 420 feet thick between Jackson and Absaroka thrusts

DEVONIAN

Middle and Upper Devonian

Dd

Darby Formation

Calcareous siltstone and sandstone with interbeds of silty yellow-brown limestone in upper part; gray fine-grained limestone and dolomite in lower part; 400 feet thick east of Jackson thrust in Teton Range and about 455 feet thick in Mike Harris Canyon west of Jackson thrust

ORDOVICIAN

Upper Ordovician

Ob

Bighorn Dolomite

White to light-gray fine- to medium-grained massive cliff-forming dolomite; light-gray mottling common; about 440 feet thick

CAMBRIAN

Upper Cambrian

Ꞓg

Gallatin Limestone

Dark-gray thin-bedded aphanitic to finely crystalline limestone mottled with irregular elongate patches of silty dolomite; 120 to 200 feet thick west of Jackson thrust and about 200 feet thick east of Jackson thrust

Middle and Upper Cambrian

Ꞓgvu Ꞓgvm

Gros Ventre Formation (part)

Ꞓgvu, *upper shale member; greenish micaceous shale and a few thin interbeds of limestone; 100 to 200 feet thick*
Ꞓgvm, *middle limestone member; dark-gray cliff-forming limestone with irregular patches and partings of silty dolomite; 340 feet thick, but lower part is not exposed; 300 to 500 feet thick in adjacent areas*

SHOWN IN SECTION C–C' ONLY

Ꞓgvl

Gros Ventre Formation (part)

Ꞓgvl, *lower shale member; green to brown micaceous shale; 100 to 150 feet thick in Teton Range, thickness unknown in Snake River Range*

Middle Cambrian

Ꞓf

Flathead Quartzite

Mainly light-colored quartzite with micaceous sandy shale and hematitic sandstone interbeds in upper part; locally has basal conglomerate; 150 to 200 feet thick in Teton Range, thickness unknown in Snake River Range

Contact

Dashed where approximately located; short dashed where inferred; dotted to indicate concealed base or top of the Meade Peak Phosphatic Shale Member of the Phosphoria Formation

Fault, showing direction of dip

Dashed where approximately located; short dashed where inferred; dotted where concealed; queried where doubtful. U, *upthrown side;* D, *downthrown side. Arrows show relative horizontal displacement*

Thrust fault

Dashed where approximately located; short dashed where inferred; dotted where concealed; queried where doubtful. Sawteeth on upper plate

Anticline

Showing trace of axial plane. Dashed where approximately located; short dashed where inferred; dotted where concealed; queried where doubtful

Overturned anticline

Showing trace of axial plane. Dashed where approximately located; short dashed where inferred

Syncline

Showing trace of axial plane. Dashed where approximately located; short dashed where inferred; dotted where concealed

Overturned syncline

Showing trace of axial plane. Dashed where approximately located; short dashed where inferred

40 Strike and dip of beds

45 Strike and dip of overturned beds

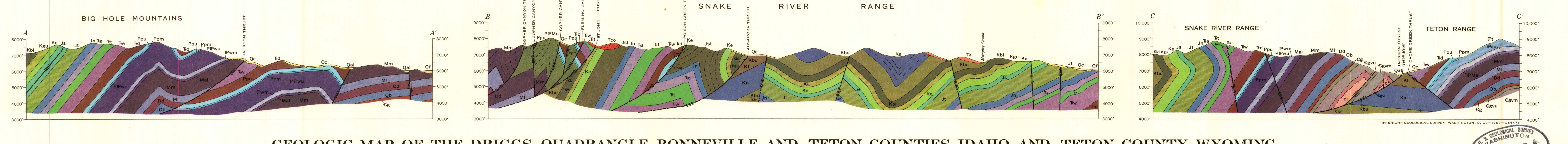
Strike of vertical beds

⚒ Quarry

Open pit

x Coal prospect

CP-1 Phosphate trench



INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1967—C66473

GEOLOGIC MAP OF THE DRIGGS QUADRANGLE, BONNEVILLE AND TETON COUNTIES, IDAHO, AND TETON COUNTY, WYOMING

By

Earl H. Pampeyan, Marvin L. Schroeder, Elmer M. Schell, and Earle R. Cressman

1967

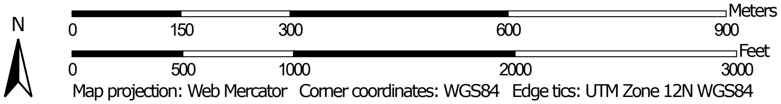
For sale by U.S. Geological Survey, price 75 cents

Appendix C

NRCS Soil Map

Soil Map—Teton Area, Idaho and Wyoming

Map Scale: 1:10,400 if printed on A landscape (11" x 8.5") sheet.



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

MAP LEGEND

Area of Interest (AOI)

- 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 11, Sep 2, 2022

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

Date(s) aerial images were photographed: Jul 20, 2022—Jul 25, 2022

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
13105	Zohner-Zohner, frequently flooded complex, 0 to 2 percent slopes	0.3	0.1%
13430	Alpine-St. Anthony complex, 0 to 2 percent slopes	0.0	0.0%
13438	Altaby-Alpine complex, 0 to 4 percent slopes	241.3	99.9%
Totals for Area of Interest		**241.6**	**100.0%**

Teton Area, Idaho and Wyoming

13105—Zohner-Zohner, frequently flooded complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1qmkm
Elevation: 5,930 to 6,110 feet
Mean annual precipitation: 16 to 18 inches
Mean annual air temperature: 38 to 44 degrees F
Frost-free period: 20 to 50 days
Farmland classification: Not prime farmland

Map Unit Composition

Zohner, occasionally flooded, and similar soils: 60 percent
Zohner, frequently flooded, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zohner, Occasionally Flooded

Setting

Landform: Flats, terraces
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 2 inches: silt loam
Ak - 2 to 10 inches: silty clay loam
Bkg1 - 10 to 13 inches: silty clay loam
Bkg2 - 13 to 18 inches: silty clay loam
Bkg3 - 18 to 27 inches: clay loam
2Bkg4 - 27 to 39 inches: gravelly coarse sandy loam
3Bg - 39 to 45 inches: very gravelly loamy coarse sand
3Cg - 45 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 0 to 10 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Calcium carbonate, maximum content: 81 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: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): 6c
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: C/D
Ecological site: R013XY039MT - Dry Meadow PONE-PHAL2
Hydric soil rating: Yes

Description of Zohner, Frequently Flooded

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Mixed alluvium

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
Ak - 2 to 10 inches: silty clay loam
Bkg1 - 10 to 13 inches: silty clay loam
Bkg2 - 13 to 18 inches: silty clay loam
Bkg3 - 18 to 27 inches: clay loam
2Bkg4 - 27 to 39 inches: gravelly coarse sandy loam
3Bg - 39 to 45 inches: very gravelly loamy coarse sand
3Cg - 45 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 0 to 10 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: None
Calcium carbonate, maximum content: 81 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: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 6c
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: C/D
Ecological site: R013XY038ID - Meadow DECA18-CANE2
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Teton Area, Idaho and Wyoming
Survey Area Data: Version 11, Sep 2, 2022

Teton Area, Idaho and Wyoming

13430—Alpine-St. Anthony complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vghp
Elevation: 5,910 to 6,480 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 and similar soils: 50 percent
St. anthony and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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: 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 2.2 inches)

Interpretive groups

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

Description of St. Anthony

Setting

Landform: Swales on fan remnants
Down-slope shape: Concave, linear, convex
Across-slope shape: Concave, linear
Parent material: Gravelly mixed alluvium

Typical profile

A1 - 0 to 7 inches: gravelly loam
A2 - 7 to 12 inches: gravelly loam
Bw - 12 to 23 inches: very gravelly sandy loam
BC - 23 to 47 inches: extremely gravelly coarse sandy loam
2C - 47 to 60 inches: extremely gravelly loamy sand

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
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 3.5 inches)

Interpretive groups

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

Data Source Information

Soil Survey Area: Teton Area, Idaho and Wyoming
Survey Area Data: Version 11, Sep 2, 2022

Teton Area, Idaho and Wyoming

13438—Altaby-Alpine complex, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 20fv3
Elevation: 5,950 to 6,550 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

Altaby and similar soils: 70 percent
Alpine, gravelly silt loam, and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altaby

Setting

Landform: Stream terraces, fan remnants
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Mixed alluvium with loess influence

Typical profile

Ap1 - 0 to 7 inches: silt loam
Ap2 - 7 to 16 inches: silt loam
AB - 16 to 19 inches: silt loam
Bk1 - 19 to 24 inches: gravelly silt loam
Bk2 - 24 to 28 inches: very gravelly sandy loam
2Bkq - 28 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 4 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 (0.20 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: 65 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 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4c

Hydrologic Soil Group: C
Ecological site: R013XY001ID - Loamy 12-16 PZ
Hydric soil rating: No

Description of Alpine, Gravelly Silt Loam

Setting

Landform: Swales on fan remnants
Down-slope shape: Linear, convex
Across-slope shape: Concave, 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: 2 to 4 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 PZ ARTRV/PSSPS
Hydric soil rating: No

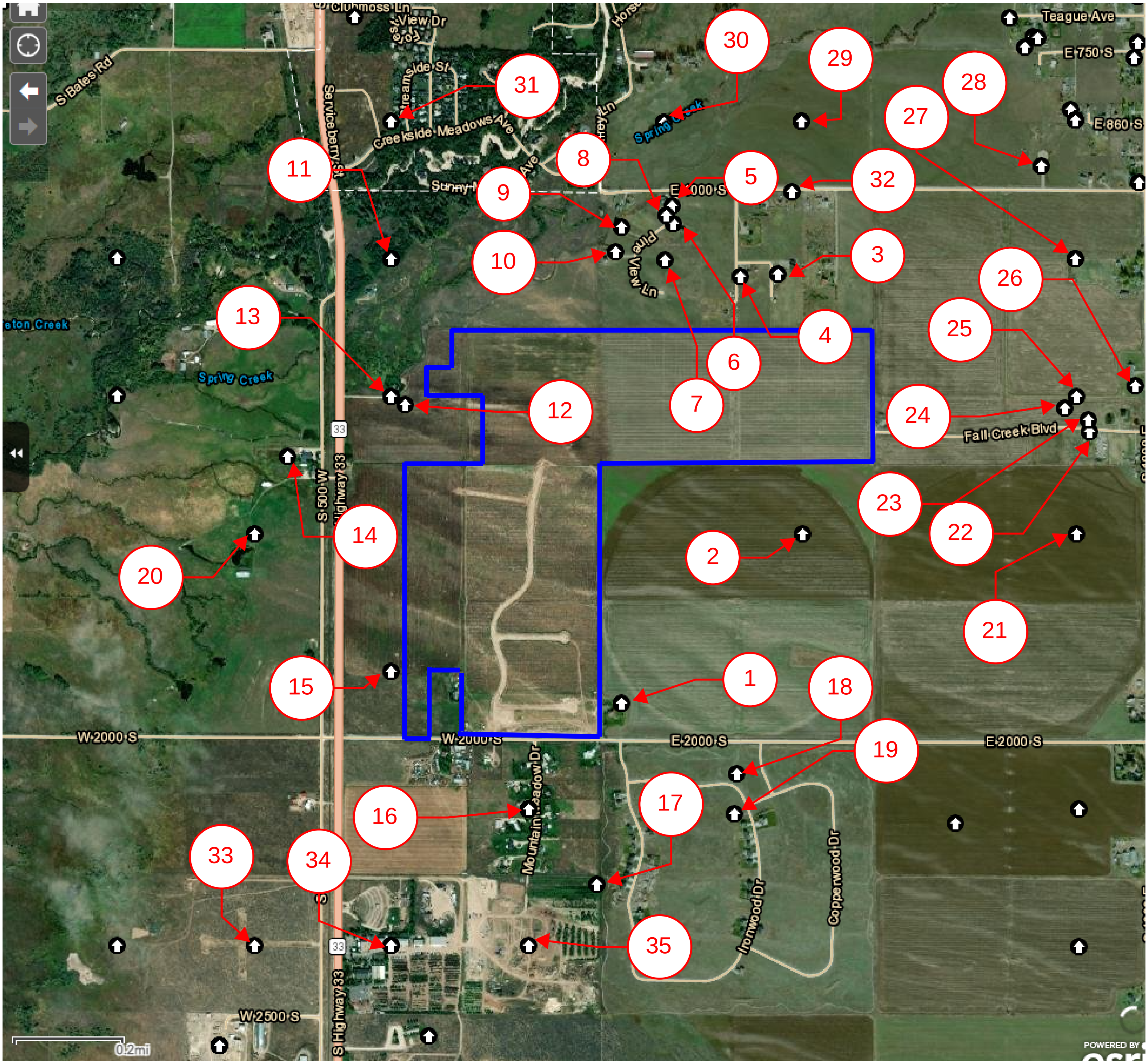
Data Source Information

Soil Survey Area: Teton Area, Idaho and Wyoming
Survey Area Data: Version 11, Sep 2, 2022

Appendix D

IDWR Well Logs

Well Driller Report Key



Project Boundry

1

Form 238-7
6/02

OMD

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 0027014
DRILLING PERMIT NO. 802337
Water Right or Injection Well No. ________

2. OWNER:
Name Ken c/o Harold Harris Cons.
Address P.O. Box 30
City Sugar City State ID Zip 83448

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 4 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 1, ____ 1/4 SW 1/4 SE 1/4
10 acres 40 acres 160 acres
Gov't Lot ____ County Teton
Lat: : : **Long:** : :
Address of Well Site 200S 25E City Driggs
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ________

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

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

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

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0'	20'	400#	over bore

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1'	120'	.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:
75' ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: ________

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

Yield gal./min.	Drawdown	Pumping Level	Time

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

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0'	7'	Dirt - top soil		X
	7'	20'	Clay, gravel		|
6"	20'	50'	Clay, gravel		|
	50	55	Clay		X
	55	125	Clay gravel Sand	X	

RECEIVED
JUN 10 2003
Department of Water Resources
Eastern Region

Completed Depth 120' (Measurable)
Date: Started 5/21/03 Completed 5-21-03

14. DRILLER'S CERTIFICATION 5/21/03
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Denning Well Drilling Firm No. 518
Principal Driller Daniel P. Denning Date 5-26-03
and
Driller or Operator II ________ Date 5/21/03
Operator I ________ Date ________

Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
11/97

DMD

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: : :

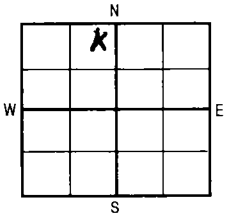
1. WELL TAG NO. D 2021009
DRILLING PERMIT NO. 769135
Other IDWR No. ______

2. OWNER:

Name Steve OConner
Address P.O. Box 720
City Driggs State Id Zip 83422

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.



Twp. 4 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 1, ______ 1/4 (10 acres) NE 1/4 (40 acres) NW 1/4 (160 acres)
Gov't Lot ______ County Teton
Lat: : : Long: : :
Address of Well Site 75E 150S
City Driggs
(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			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	20'	350LBS	over Bore

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	104'	.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:

60' ft. below ground Artesian pressure ______ lb.
Depth flow encountered ______ ft. Describe access port or control devices: ______

11. WELL TESTS:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

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

12. 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'	60'	Clay + Gravel		^
6"	60'	104'	Clay Gravel	X	

RECEIVED
JUN 27 2001
Department of Water Resources

RECEIVED
JUN 18 2001
Department of Water Resources
Eastern Region

Completed Depth 104' (Measurable)
Date: Started 5-24-01 Completed 5-24-01

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 Denning Drilling Firm No. 518
Firm Official Dennis Denning Date 5-24-01
and
Driller or Operator ______ Date ______
(Sign once if Firm Official & Operator)

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1 D

3

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0071293

Drilling Permit No.

Water right or Injection well #

2. OWNER:

Name Abbe Kirscher

Address 294 why worry way

City Driggs State ID Zip 83433

3.WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 1 ___ 1/4 NE 1/4 NW 1/4
(10 acres) (40 acres) (160 acres)

Gov't Lot County Teton

Lat. 43 ° 42.375 (Deg. and Decimal minutes)

Long. 111 ° 05.663 (Deg. and Decimal minutes)

Address of Well Site 1000 S. 1000 E

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

Lot. Blk. Sub. Name

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection
☐ Other

5. TYPE OF WORK:

☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other

6. DRILL METHOD:

☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
bentonite	0'	40'	1200#	overbore

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+1'	99'	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 99

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method

Manufactured screen ☐ Y ☒ N Type

Method of installation

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

Length of Headpipe Length of Tailpipe

Packer ☐ Y ☒ N Type

10.FILTER PACK:

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

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG)

Describe control device

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 50' Static water level (ft) 50'

Water temp. (°F) 58° Bottom hole temp. (°F) 58°

Describe access port

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
80'	20	

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'	40'	clay light brown		x
6"	40'	100'	clay gravel dark Brown	x	

RECEIVED
NOV 2 3 2016
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 99'

Date Started: 10-21-16 Date Completed: 10-24-16

14. DRILLER'S CERTIFICATION:

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

Company Name Denning Well Drilling Co. No. 518

*Principal Driller Denning Date 10-25-16

*Driller Date

*Operator II Date 10-24-16

Operator I Date

* Signature of Principal Driller and rig operator are required.

Form 238-7
6/07

4

22

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0059708

Drilling Permit No.

Water right or injection well #

2. OWNER: Raymond Patrick % Jay Southern HJS

Name Raymond + Frances Patrick

Address PO Box 1107

City Victor State ID Zip 83455

3.WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 1 ____ 1/4 (10 acres) ____ 1/4 (40 acres) ____ 1/4 (160 acres)

Gov't Lot ____ County Teton

Lat. 43 ° 42 372 (Deg. and Decimal minutes)

Long. 111 ° 05 746 (Deg. and Decimal minutes)

Address of Well Site 1165 Windy Owl Way

City Driggs

(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 ft^3)	Placement method/procedure
Bentonite	0	38	1000 #	10" Temp. Casing

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+2	98	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 98'

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method

Manufactured screen ☐ Y ☒ N Type

Method of installation

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

Length of Headpipe ____ Length of Tailpipe ____

Packer ☐ Y ☒ N Type

10.FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft^3)	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) 34 Static water level (ft) 34

Water temp. (°F) ____ Bottom hole temp. (°F) ____

Describe access port

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
78'	5+	

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	3	overburden		
	3	25	Clay + Gravel		
	25	38	Gravel + Sediment	/	
6	38	54	Gravel + Sediment	/	
	54	61	Clay		/
	61	75	Gravel + Sediment	/	
	75	84	Clay		/
	84	98	Gravel + Sediment	/	

RECEIVED
SEP 22 2011
Department of Water Resources
Eastern Region

Completed Depth (Measurable):

Date Started: 9-8-11 Date Completed: 9-9-11

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 David Denning Date 9-9-11

*Driller David Denning Date 9-9-11

*Operator II Tyler Hill Date 9-12-11

Operator ____ Date ____

*** Signature of Principal Driller and rig operator are required.**

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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 0027212

DRILLING PERMIT NO.

Water Right or Injection Well No. 303089

2. OWNER:

Name Rex Nelson

Address 245 E. Alta Rd.

City Alta State Wy Zip 302

3. LOCATION OF WELL by legal description:

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

Twp. 4 North ☒ or South ☐

Rge. 45 East ☒ or West ☐

Sec. 1, ____ 1/4 (10 acres) NW 1/4 (40 acres) NW 1/4 (160 acres)

Gov't Lot ____ County Teton

Lat: : : Long: : :

Address of Well Site 101 S. Dacha

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

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	18	400 LBS	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 98'

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6	+2	98	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:

50' ft. below ground Artesian pressure ____ lb.

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

12. WELL TESTS:

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
30		80'	1 HR.

Water Temp. ____ Bottom hole temp. ____

Water Quality test or comments: ____

Depth first Water Encounter ____

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
10	0	18	gravel and clay		X
6	18	60	gravel and clay		X
6	60	100'	gravel and clay	[✓ X]	

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JUN 0 5 2003

Department of Water Resources

Completed Depth 100' (Measurable)

Date: Started 5-31-03 Completed 5-31-03

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 State Line Drilling & Pump Firm No. 625

Principal Driller Dana Nicholls Date 5-31-03

and

Driller or Operator II ____ Date ____

Operator I ____ Date ____

Principal Driller and Rig Operator *Required.*

Operator I must have signature of Driller/Operator II.

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6

Form 238-7
6/07

22

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 56889

Drilling Permit No.

Water right or injection well #

2. OWNER: Rodger S Shea

Name

Address 75 table Rock East Rd.

City Alta State Wy Zip 83414

3.WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 1 ___ 1/4 (10 acres) NW 1/4 (40 acres) NW 1/4 (160 acres)

Gov't Lot ___ County teton

Lat. ___ ° ___ (Deg. and Decimal minutes)

Long. ___ ° ___ (Deg. and Decimal minutes)

Address of Well Site 1079 Pine View Ln. City Driggs

(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
chips	0	40	23 lbs	overbore

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6	+2	100	.250	steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method

Manufactured screen ☐ Y ☒ N Type

Method of installation

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

Length of Headpipe ___ Length of Tailpipe

Packer ☐ Y ☒ N Type

10.FILTER PACK:

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

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG)

Describe control device

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 35 Static water level (ft) 35

Water temp. (°F) 50° Bottom hole temp. (°F) 50°

Describe access port well cap

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
	40	

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	40	sand & gravel clay	X	
6	40	80	gravel & clay	X	
6	80	100	gravel	X	

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OCT 26 2009
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 100'

Date Started: 9-16-09 Date Completed: 9-17-09

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 Co. No. 298

*Principal Driller ___ Date 10-24-09

*Driller ___ Date

*Operator II Tyler Ricks Date 10-24-09

Operator I ___ Date

*** Signature of Principal Driller and rig operator are required.**

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Form 238-7
11/97 (DWR)

IDAHO DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

065331

Office Use Only
~~Inspected by~~
Twp 4N Rge 45E Sec 1
____ 1/4 NW 1/4 NW 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 000 - 4817
DRILLING PERMIT NO. 22-98-E-0076-000
Other IDWR No. ____

2. OWNER:
Name LAW HERTZ / Cindy Kesler
Address P.O. BOX 592
City Victor State ID Zip 83422

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.

Twp. 4 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 1, ____ 1/4 NW 1/4 NW 1/4
(10 acres) (40 acres) (160 acres)
Gov't Lot ____ County ____
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			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	20	200	Overbore

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6	+1	140	.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:
55 ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: ____

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

Yield gal./min.	Drawdown	Pumping Level	Time
25+			1 hr.

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

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
6	0	6	Topsoil		✓
	6	83	Sand & Gravel		✓
	83	91	Clay		✓
	91	115	Sand & Gravel	✓	
	115	140	Gravel & Sand	✓	

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AUG 13 1998
Department of Water Resources
Eastern Region

RECEIVED
MICROFILMED AUG 17 1998

SEP 23 1998 Department of Water Resources

Completed Depth 140' (Measurable)
Date: Started 7/18/98 Completed 7/18/98

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 TETON WATER WORKS LLC
P.O. BOX 502
SHELLEY, ID 83274
Firm No. 506
Firm Official ____ Date 7/18/98
and
Driller or Operator Greg ____ Date 7/18/98
(Sign once if Firm Official & Operator)

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8

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D D0096704

Drilling Permit No. ______

Water right or injection well # ______

2. OWNER: Chris & Sue Champlin

Name ______

Address 1066 Pine view Ln

City Driggs State ID Zip 83422

3.WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 1 ______ 1/4 (10 acres) nw 1/4 (40 acres) nw 1/4 (160 acres)

Gov't Lot ______ County Teton

Lat. 43 ° 42.469 (Deg. and Decimal minutes)

Long. 111 ° 05.908 (Deg. and Decimal minutes)

Address of Well Site 1066 Pine view Ln City Driggs

(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
Bentonite	0	38	1150 lbs	10' temp casing

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6	+2	100	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 100

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method ______

Manufactured screen ☐ Y ☒ N Type ______

Method of installation ______

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

Length of Headpipe ______ Length of Tailpipe ______

Packer ☐ Y ☒ N Type ______

10.FILTER PACK:

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

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) ______

Describe control device ______

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 40 Static water level (ft) 40

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
☐	☐	☐	☐
☐	☐	☐	☐

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 + gravel		✓
6	38	100	clay + gravel	✓	

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NOV 16 2022

Department of Water Resources
Eastern Region

Completed Depth (Measurable): 100

Date Started: 10/24/22 Date Completed: 10/26/22

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 Daniel Denney Drilling Co. No. 518

*Principal Driller ______ Date ______

*Driller ______ Date 10/27/22

*Operator II ______ Date 10-29-22

Operator I Dillon Ferguson Date 10/27/22

*** Signature of Principal Driller and rig operator are required.**

9

816271

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 NW 1/4 NW 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0032774
DRILLING PERMIT NO. ______
Water Right or Injection Well No. ______

2. OWNER:
Name Chris Nelson
Address 1015 E beverley way
City Bountiful State Ut Zip 84010

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 4 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 1, ____ 1/4 ~~NE~~ 1/4 ~~SE~~ 1/4
10 acres 40 acres 160 acres
Gov't Lot ____ County Teton
Lat: : : Long: : :
Address of Well Site 111 Dacha Ln
(Give at least name of road + Distance to Road or Landmark) City Driggs
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'	350 #	Over bore

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	99	.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: ____

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

Yield gal./min.	Drawdown	Pumping Level	Time

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

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	**Remarks:** Lithology, Water Quality & Temperature	Water Y	Water N
8"	0'	20'	Sand Clay gravel		X
6"	20'	100'	Sand Clay gravel	X	

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JUL 1 5 2004
Department of Water Resources
Eastern Region

SCANNED
AUG 0 6 2004

Completed Depth 100' (Measurable)
Date: Started 6-7-04 Completed 6-7-04

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name Denning Well Drilling Firm No. 518
Principal Driller ____ Date 6-10-04
and
Driller or Operator II ____ Date 6-7-04
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

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Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D D0083643

Drilling Permit No.

Water right or injection well #

2. OWNER: David Artntz

Name

Address 1136 pine View Dr

City Driggs State ID Zip 83422

3.WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 1 ___ 1/4 (10 acres) nw 1/4 (40 acres) nw 1/4 (160 acres)

Gov't Lot ___ County Teton

Lat. 43 ° 42.411 (Deg. and Decimal minutes)

Long. 111 ° 06.017 (Deg. and Decimal minutes)

Address of Well Site 1136 pine view Drive

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

Lot. ___ Blk. ___ Sub. Name

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection
☐ Other

5. TYPE OF WORK:

☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other

6. DRILL METHOD:

☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
Bentonite	0	38	1150	10' over bore

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6	1	100	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 100

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method

Manufactured screen ☐ Y ☒ N Type

Method of installation

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

Length of Headpipe ___ Length of Tailpipe

Packer ☐ Y ☒ N Type

10.FILTER PACK:

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

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG)

Describe control device

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 40 Static water level (ft) 25

Water temp. (°F) ___ Bottom hole temp. (°F)

Describe access port

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
	30	20

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	38	clay & gravel		x
6	38	40	clay & gravel		x
6	40	100	clay & gravel	Y	

RECEIVED
OCT 13 2020
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 100

Date Started: 9/22/20 Date Completed: 9/23/20

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 Daniel Denning Drilling Co. No. 518

*Principal Driller ___ Date 10-5-20

*Driller ___ Date 9/24/20

*Operator II ___ Date

Operator I Brand Paquet Date 9/24/20

*** Signature of Principal Driller and rig operator are required.**

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Form 238-7
6/02

DMD

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

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

1. WELL TAG NO. D 0026002

DRILLING PERMIT NO. 787797

Water Right or Injection Well No. ____________

2. OWNER:

Name Cade Jacobs c/o Grant Thompson

Address P.O. Box 221

City Victor State Id Zip 83455

3. LOCATION OF WELL by legal description:

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

Twp. 4 N North ☒ or South ☐

Rge. 45 E East ☒ or West ☐

Sec. 2, ______ 1/4 (10 acres) NW 1/4 (40 acres) NE 1/4 (160 acres)

Gov't Lot ______ County Teton

Lat: : : Long: : :

Address of Well Site 386 So. 100 W City Driggs

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

Lt. 3 Blk. 1 Sub. Name Briarwood

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'	200LBS	over Bore

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

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	79'	.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:

29' ft. below ground Artesian pressure ______ lb.

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

12. WELL TESTS:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ______ Bottom hole temp. ______

Water Quality test or comments: ______

______ Depth first Water Encounter ______

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0	20'	Clay Gravel		X
6"	20'	35'	Clay Gravel	X	
6"	35'	40'	Clay	X	
6"	40'	48'	Clay Gravel	X	
6"	48'	65'	Clay		X
6"	65'	75'	Clay Gravel	X	
6"	75'	79'	Clay		X
6"	79'	83'	Gravel	X	

Completed Depth 80' (Measurable)

Date: Started 9-17-02 Completed 9-17-02

14. DRILLER'S CERTIFICATION

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

Company Name Denning Drilling Firm No. 518

Principal Driller Daniel Denning Date 9-17-02

and

Driller or Operator II Daniel Denning Date 9-17-02

Operator I ______ Date ______

Principal Driller and Rig Operator *Required.*

Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

USE TYPEWRITER OR BALL POINT PEN

no card

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

RECEIVED
JAN 25 1971
Department of Water Administration

1. WELL OWNER

Name Eugene Toome

Address Driggs, Idaho

Owner's Permit No. none

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotory ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 16 inches Total depth 108 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness		Diameter		From		To	
.250	inches	16	inches	x1	feet	108	feet
	inches		inches		feet		feet
	inches		inches		feet		feet
	inches		inches		feet		feet
	inches		inches		feet		feet

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☒ Yes ☐ No

How perforated? ☐ Factory ☒ Knife ☐ Torch

Size of perforation 1/2 inches by 4 inches

Number		From		To	
10 per ft holes	perforations	40	feet	56	feet
✓	perforations	61	feet	65	feet
✓	perforations	94	feet	104	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

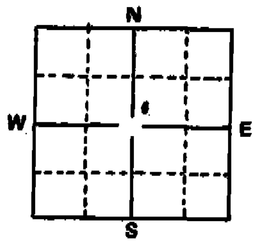
Surface seal? ☒ Yes ☐ No To what depth 18 feet

Material used in seal ☐ Cement grout ☒ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location.

2 ✓



County Teton

S.W. ¼ N.E ¼ Sec. 2, T. 4 [✓ N] S, R. 45 [✓ E] /W

7. WATER LEVEL

Static water level 30 feet below land surface

Flowing? ☐ Yes ☒ No G.P.M. flow

Temperature 50 ° F. Quality good

Artesian closed-in pressure p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth		Material	Water	
	From	To		Yes	No
16	0	1	soil		
	1	3	tan clay		
	3	16	clay & boulders		
	16	23	sand & gravel		
	23	29	brown clay		
	29	56	gravel	X	
	56	61	tan clay		
	61	65	gravel	X	
	65	70	clay		
	70	75	gravel	x	
	75	81	clay		
	81	91	gravel	x	
	91	94	clay		
	94	97	gravel	x	
	97	101	sand		
	101	108	gravel	x	

006620

10.

Work started Dec.15,1970 finished Jan.7,1971

11. DRILLER'S CERTIFICATION

4471 V. H.

This well was drilled under my supervision and this report is true to the best of my knowledge.

Hopkins Brothers 32
Driller's or Firm's Name Number

Thornton, Idaho
Address

Signed By Date

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

13

Form 238-7
6/93

✓ C

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter
or
Ball Point Pen

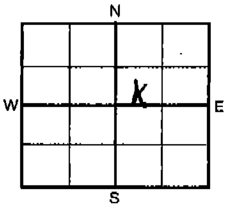
108968

1. DRILLING PERMIT NO. 22 - 93 - E - 170 - 00
Other IDWR No.

2. OWNER:
Name Mike Taylor
Address Box 11
City Wilson State Wyo Zip 83014

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.



T. 4 North ☒ or South ☐
R. 45 East ☒ or West ☐
Sec. 2, ____ 1/4 (10 acres) SW 1/4 (40 acres) NE 1/4 (160 acres)
Gov't Lot ____ County Teton

Address of Well Site

(Give at least Direction + Distance to Road or Landmark)

Lot No. ____ Block No. ____ Subd. Name ____

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

5. TYPE OF WORK
☒ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

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

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	20'	300LB	overbore 8"

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

8. CASING/LINER:

Diameter	From	To	Guage	Casting	Liner	Steel	Plastic	Welded	Threaded
6"	+1	55'	.250"			☒	☐	☐	☐
						☐	☐	☐	☐
						☐	☐	☐	☐
						☐	☐	☐	☐

Final location of shoes 55'
Top Packer or Headpipe ____ Bottom Tailpipe ____

9. PERFORATIONS/SCREENS
☐ Perforations Method
☐ Screens Type ____ Material

From	To	Slot Size	Number	Diameter	Tele/Pipe Size	Casting	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

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

Yield gal./min.	Drawdown	Pumping Depth	Time

Temperature of water ____ Was a water analysis done? Yes ☐ No ☐
By whom?
Water Quality (odor, etc.)
Bottom Hole Temperature

11. STATIC WATER LEVEL:
9' ft. below surface Depth artesian flow found
Artesian pressure ____ lb. Describe access port
Describe Controlling Devices:

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	GPM	SWL
8"	0	2'	Clay		
8"	2'	20'	Clay & Gravel		K
6"	20'	35'	Clay & Gravel		K
6"	35	37'	Clay		
6"	37	46'	Clay & Gravel		K
6"	46'	48'	Clay		
6"	48	55'	Clay & Gravel	20	K

RECEIVED
NOV 04 1993
Department of Water Resources
Eastern District Office

MICROFILMED
FEB 28 1994

RECEIVED
DEC 08 1993
Department of Water Resources

Date: Started 10-28-93 Completed 10-28-93

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

Firm Name Daniel Denning Drilling Firm No. 518
Firm Official Daniel Denning Date 10-28-93
and
Supervisor or Operator ____ Date ____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
3/95

BMD

IDAHO DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

22

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

1. DRILLING PERMIT NO. D-0-0-119-33
Other IDWR No. ____

2. OWNER:
Name Hillman Child Care Facility
Address 145 50 W
City Driggs State ID Zip 83455

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.

N / S / E / W

Twp. 4N North ☐ or South ☐
Rge. 45E East ☐ or West ☐
Sec. 2, 1/4 SE 1/4 NW 1/4
10 acres 40 acres 160 acres
Gov't Lot ____ County Teton
Lat: : : Long: : :
Address of Well Site 145 50 W
City Driggs
(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			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Cement	0	60	30	Pumped

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 137
Was drive shoe seal tested? ☐ Y ☒ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6 5/8	2	130	.250	Steel	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS
☐ Perforations Method ____
☒ Screens Screen Type Stainless Steel

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
130	137	.25		5 1/2	SS	☐	☒
						☐	☐
						☐	☐

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

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

Yield gal./min.	Drawdown	Pumping Level	Time
15	40		30 Min
60	95		30 Min
100	120		20 Min

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encountered 17

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
6"	0	5	TopSoil		X
	5	17	Limestone gravel up4" Sand		X
	17	45	Limestone gravel 2" Sand	X	
	45	64	Silty Sand limestone gravel	X	
	64	69	Brown Clay Chips Limestone		X
	69	73	Limestone gravel 1"	X	
	73	75	Brown Clay		X
	75	82	Limestone grarel	X	
	82	89	Brown Clay limestone grarel		X
	89	97	Limestone gravel Silty Sand	X	
	97	102	Limestone grarel Silty Sand	X	
	102	104	Brown Silty Clay		X
	104	107	Limestone gravel	X	
	107	113	Limestone grey Clay		X
	113	117	Brown Silty Clay limestone	X	
	117	125	Limestone Silty Sand	X	
	125	135	Limestone Sand	X	
	135	137	Limestone Sand grey Clay	X	

RECEIVED
JUN 03 2004
Department of Water Resources
Eastern Region

Completed Depth 137 (Measurable)
Date: Started 4/21/04 Completed 4/28/04

13. DRILLER'S CERTIFICATION

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

Firm Name Weber Drilling Firm No. 599

Firm Official Jack Weber Date 5/28/04
and
Supervisor or Operator Jim Weber Date 5/28/04
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

15

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AUG 24 1990
Department of Water Resources

Form 238-7
9/8

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

RECEIVED
SEP 5
Department of Water Resources
Eastern District Office

1. WELL OWNER

Name Donald H Hooper

Address P.O. Box 245 Driggs ID 83422

Owner's Permit No. 22-89-~~X~~C-003-000

Water Permit No. 22-7651

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	100	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

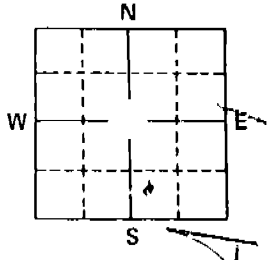
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata

Describe access port ______

6. LOCATION OF WELL

Sketch map location must agree with written location.

RECEIVED
AUG 29



Subdivision Name ______

Lot No. ______ Block No. ______

County Teton

SW ¼ SE ¼ Sec. 2, T. 4 [✓ N]/S, R. 45 [✓ E]/W.

7. WATER LEVEL

Static water level 40 feet below land surface.

Flowing? ☐ Yes ☒ No G.P.M. flow ______

Artesian closed-in pressure ______ p.s.i.

Controlled by: ☐ Valve ☐ Cap ☐ Plug

Temperature ______ °F. Quality ______

Describe artesian or temperature zones below.

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other ______

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
6	0	10	Over-burden		✓
	10	101	Gravel & Dirt	✓	

10.

Work started 6/15/89 finished 6/19/89

11. DRILLERS CERTIFICATION

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

Firm Name Jenning Drilling Firm No. 10

Address Box 460 Ucon Date 6/19/89

Signed by (Firm Official) ______

and

(Operator) Jay Jenning

Form 238-7
6/07

✓

DMD

22

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IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0049717

Drilling Permit No. ______

Water right or injection well # ______

2. OWNER: Mike Brown

Name Michael Brown

Address Box 408

City Driggs State Id Zip 83422

3.WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 11 ______ 1/4 (10 acres) NE 1/4 (40 acres) NE 1/4 (160 acres)

Gov't Lot ______ County Teton

Lat. ______ ° ______ (Deg. and Decimal minutes)

Long. ______ ° ______ (Deg. and Decimal minutes)

Address of Well Site 222 Mtn Meadows Drive

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

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 ft^3)	Placement method/procedure
Bentonite	0'	80'	350LBS	Over Bore

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+1	120'	.250"	Steel	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method ______

Manufactured screen ☐ Y ☒ N Type ______

Method of installation ______

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

Length of Headpipe ______ Length of Tailpipe ______

Packer ☐ Y ☒ N Type ______

10.FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft^3)	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) 70' Static water level (ft) 70'

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 ☐

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
8"	0	80'	Clay Gravel		X
6"	80'	70'	Clay Gravel		X
6"	70'	120	Clay Gravel	X	

RECEIVED
JUL 21 2008
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 120'

Date Started: 6-19-08 Date Completed: 6-19-08

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 Daniel Denning Drilling Co. No. 518

*Principal Driller Daniel Denning Date 6-19-08

*Driller Daniel Denning Date 6-19-08

*Operator II ______ Date ______

Operator I ______ Date ______

*** Signature of Principal Driller and rig operator are required.**

C ✓

OMD

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0065562

Drilling Permit No.

Water right or injection well #

2. OWNER: Casey Moss ℅ Kartchner Homes

Name

Address 601 W. 1200 S. Ste A.

City Logan State UT Zip 84321

3.WELL LOCATION:

Twp 4 North ☒ or South ☐ Rge 45 East ☒ or West ☐

Sec 11 ____ 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)

Gov't Lot ____ County Teton

Lat 43 ° 41.41 (Deg. and Decimal minutes)

Long 111 ° 06.060 (Deg. and Decimal minutes)

Address of Well Site 2171 Mountain Meadows

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

Lot ____ Blk. ____ Sub. Name Mountain Meadows Ranches

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection

☐ Other

5. TYPE OF WORK:

☒ New well ☐ Replacement well ☐ Modify existing well

☐ Abandonment ☐ Other

6. DRILL METHOD:

☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
bentonite	0'	38'	1000lbs.	temp. casing

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+2	138'	.250	steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 138

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method

Manufactured screen ☐ Y ☒ N Type

Method of installation

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

Length of Headpipe ____ Length of Tailpipe ____

Packer ☐ Y ☒ N Type

10.FILTER PACK:

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

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG)

Describe control device

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 76' Static water level (ft) 76'

Water temp. (°F) ____ Bottom hole temp. (°F) ____

Describe access port

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
135'	40gpm	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 w/ some cobbles		X
6"	38'	100'	clay + gravels	X	
	100'	138'	sediment + gravels	X	

RECEIVED
OCT 15 2014
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 138'

Date Started: 9-18-14 Date Completed: 9-22-14

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 Denning Drilling Co. No. 518

*Principal Driller Dennis Denning Date 10-1-14

*Driller Joel Denning Date 9-22-14

*Operator II ____ Date ____

Operator I ____ Date ____

* Signature of Principal Driller and rig operator are required.

18

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 0048803
DRILLING PERMIT NO. ______
Water Right or Injection Well No. 22-13478

2. OWNER:
Name Fron Wood c/o John Fullmer Const.
Address PO Box 145
City Victor State Id. Zip 83455

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 4 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 12, ______ 1/4 (10 acres) ______ 1/4 (40 acres) ______ 1/4 (160 acres)
Gov't Lot ______ County ______
Lat: : : Long: : :
Address of Well Site 50 East 200 South
(Give at least name of road + Distance to Road or Landmark) City Driggs
Lt. ______ Blk. ______ Sub. Name IRON Wood

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
Neat Cement	0	62'	4 Yds	OVER Bore Temp Casing

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
8"	+1	186'	.322	Steel	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 2' Length of Tailpipe 2'
Packer ☒ Y ☐ N Type Triple K Packer

9. PERFORATIONS/SCREENS PACKER TYPE
~~Perforation Method~~ Lowered with drill Steel to Bottom
Screen Type & Method of Installation Johnson Stainless Steel wire Wrap (Alloy)

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
184'	206'	.030"		8" Tele	Stainless	☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

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

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

Yield gal./min.	Drawdown	Pumping Level	Time

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

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	**Remarks:** Lithology, Water Quality & Temperature	Water Y	Water N
12"	0	62'	Clay Gravel Sand		X
8"	62'	100'	Sand Gravel	X	
8"	100'	150'	Sand Gravel	X	
8"	150'	200'	Sand Gravel	X	
8"	200'	206'	Sand Gravel (Lots of Water)	X	

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NOV 2 9 2007
Department of Water Resources
Eastern Region

Completed Depth 206' (Measurable)
Date: Started 9-20-07 Completed 10-5-07

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 Denning Drilling Firm No. 518
Principal Driller and Daniel Denning Date 10-10-07
Driller or Operator II Daniel Denning Date 10-10-07
Operator I ______ Date ______

Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/07

pmn

IDAHO DEPARTMENT OF WATER RESOURCES 22
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0048996

Drilling Permit No.

Water right or injection well # 22-13478

2. OWNER:

Name John Fullmer Const. c/o Iron Wood Sub

Address P.O. Box 145

City Victor State Idaho Zip 83455

3. WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 12 ___ 1/4 (10 acres) NW 1/4 (40 acres) NW 1/4 (160 acres)

Gov't Lot ___ County Teton

Lat. ___ ° ___ (Deg. and Decimal minutes)

Long. ___ ° ___ (Deg. and Decimal minutes)

Address of Well Site 50 East 200 South

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

Lot. ___ Blk. ___ Sub. Name Iron Wood

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
Neat Cement	0'	65'	2½ yds	over Bore. Temp Casing

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
8"	+1	201'	.322"	Steel	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 201'

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method

Manufactured screen ☒ Y ☐ N Type Stainless Steel wire wrap (Alloy)

Method of installation Lowered with Drill Steel Thread in Bottom of Screen

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
197'	201'	.030"	20'	8" Tele	Stainless	Steel

Length of Headpipe 2' Length of Tailpipe 2'

Packer ☒ Y ☐ N Type Triple K Packer

10. FILTER PACK:

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

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG)

Describe control device

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 85' Static water level (ft) 85'

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 ☐

Water quality test or comments:

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
12"	0	65'	Clay Sand Gravel		X
8"	65'	85'	Sand + Gravel		X
8"	85'	200'	Sand + Gravel	X	
8"	200'	220'	Sand Gravel Clay Seams	X	
8"	220	230'	Clay Gravel	X	

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NOV 2 9 2007
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 201'

Date Started: 10-17-07 Date Completed: 10-26-07

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 Denning Drilling Co. No. 518

*Principal Driller Dennis Denning Date 10-26-07

*Driller Dennis Denning Date 10-26-07

*Operator II ___ Date ___

Operator I ___ Date ___

*** Signature of Principal Driller and rig operator are required.**

20

VC DMD

Form 238-7
3/95

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

062093

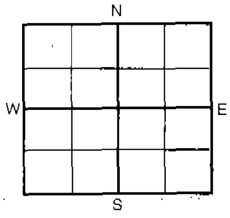
Office Use Only
Inspected by ______
Twp ____ Rge ____ Sec ____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 22-97-E-0124-001
Other IDWR No. D0004358

2. OWNER:
Name Reeve & Associates c/o Jerry Reeve
Address 147 S Arthur
City Pocatello State ID Zip 83204

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.



Twp. 4 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 2, ____ 1/4 NE 1/4 SW 1/4
10 acres 40 acres 160 acres
Gov't Lot ____ County Teton
Lat: : : Long: : :
Address of Well Site 1.5 mi. S of Driggs 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			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Med Bentonite chips	0	25'	14 sacks	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
2"	+1	25		PVC	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ______ Length of Tailpipe ______

9. PERFORATIONS/SCREENS
☐ Perforations Method ______
☒ Screens Screen Type .020 Flush joint PVC

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
25'	35'	.020		2"	PVC	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
8' 6" ft. below ground Artesian pressure ______ lb.
Depth flow encountered ______ ft. Describe access port or control devices: ______

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

Yield gal./min.	Drawdown	Pumping Level	Time

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

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
11	0	5	Clay/gravel		
	5	10	Clay/gravel		
	10	15	Bigger Gravel/clay		
	15	25	Gravel/Clay (yellow & brown)		
	25	30	Clay/gravel		
	33	35	Clay		
	35		Gravel/clay		

RECEIVED
DEC 16 1997
Department of Water Resources
Eastern Region

RECEIVED
DEC 22 1997
Department of Water Resources

Completed Depth 35' (Measurable)
Date: Started November 10, 1997 Completed November 11, 1997

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

Firm Name Daniel Denning well Drilling Inc. Firm No. 518

Firm Official Daniel Denning Date 11/11/97
and
Supervisor or Operator ______ Date ______
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

21

Form 238-7
3/95

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

63070

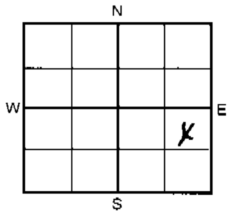
Office Use Only
Inspected by ________
Twp____ Rge____ Sec____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 22 - 95 - E - 0183 - 000
Other IDWR No. ________

2. OWNER:
Name Julian Winder
Address 158 S 100 E
City Driggs State Id Zip 83422

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.



Twp. 4 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 1, ____ 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 100 E 200 So
City Driggs
(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			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	20'	6 Sacks	over Bore

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	179'	.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:
130' ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: ____

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

Yield gal./min.	Drawdown	Pumping Level	Time

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

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0'	6'	Clay		X
8"	6'	85'	Clay Gravel		X
8"	85'	90'	Clay		X
8"	90'	100'	Clay Gravel		X
8"	100'	140'	Clay Gravel Cobble Rocks	X	
8"	140	143'	Clay		X
8"	143	175'	Clay Gravel	X	
8"	175	177	Clay		X
6"	177	180'	Clay Gravel	X	

RECEIVED
JAN 19 1996
Department of Water Resources

RECEIVED
NOV 06 1995
Department of Water Resources
Eastern District Office

Completed Depth 180' (Measurable)
Date: Started 10-18-95 Completed 10-21-95

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

Firm Name Denning Drilling Inc Firm No. 518

Firm Official Dennis Denning Date 10-21-95
and
Supervisor or Operator ____ Date ____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0071017

Drilling Permit No.

Water right or injection well #

2. OWNER:

Name Wind Mills

Address P.O. Box 6407

City Jackson Hole State WY Zip 83002

3.WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 1 ____ 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)

Gov't Lot ____ County Teton

Lat. 43 ° 42.125 (Deg and Decimal minutes)

Long. 111 ° 4.980 (Deg. and Decimal minutes)

Address of Well Site 924 Fall Creek blvd

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

Lot. ____ Blk. ____ Sub. Name ____

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection
☐ Other ____

5. TYPE OF WORK:

☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other ____

6. DRILL METHOD:

☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other ____

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
Bentonite	0'	40'	1500#	overbore/temp casin

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+1	159'	.250	steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 159'

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method ____

Manufactured screen ☐ Y ☒ N Type ____

Method of installation ____

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

Length of Headpipe ____ Length of Tailpipe ____

Packer ☐ Y ☒ N Type ____

10.FILTER PACK:

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

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) ____

Describe control device ____

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 125 Static water level (ft) 125

Water temp. (°F) 58* Bottom hole temp. (°F) 58*

Describe access port ____

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
140	20+	30

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'	40'	clay, cobbles, soil		X
6"	40'	165'	clay, cobbles	X	

RECEIVED
AUG 11 2016
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 159'

Date Started: Jun 30, 2016 Date Completed: Jul 5, 2016

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 Dan Denning well drilling Co. No. 518

*Principal Driller ____ Date 7-20-16

*Driller ____ Date ____

*Operator II ____ Date Jul 5, 2016

Operator I ____ Date ____

* **Signature of Principal Driller and rig operator are required**

DND

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0071013

Drilling Permit No. ______

Water right or injection well # ______

2. OWNER:

Name Wind Mills

Address P.O. Box 6407

City Jackson Hole State WY Zip 83002

3.WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 1 ______ 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)

Gov't Lot ______ County Teton

Lat. 43 ° 42.133 (Deg. and Decimal minutes)

Long. 111 ° 4.898 (Deg. and Decimal minutes)

Address of Well Site 926 Fall Creek BLVD

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

Lot. ______ Blk. ______ Sub. Name ______

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection

☐ Other ______

5. TYPE OF WORK:

☒ New well ☐ Replacement well ☐ Modify existing well

☐ Abandonment ☐ Other ______

6. DRILL METHOD:

☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other ______

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
Bentonite	0'	40'	1500#	overbore/temp casin

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+1	159'	.250	steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 159'

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method ______

Manufactured screen ☐ Y ☒ N Type ______

Method of installation ______

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

Length of Headpipe ______ Length of Tailpipe ______

Packer ☐ Y ☒ N Type ______

10.FILTER PACK:

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

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) ______

Describe control device ______

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 105' Static water level (ft) 105'

Water temp. (°F) 58* Bottom hole temp. (°F) 58*

Describe access port ______

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
140	20+	30	☐	☐	☒	☐
			☐	☐	☐	☐

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'	40'	clay, cobbles, soil		X
6"	40'	165'	clay, cobbles	X	

RECEIVED
AUG 11 2016
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 159'

Date Started: Jun 28, 2016 Date Completed: Jun 30, 2016

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 Dan Denning well drilling Co. No. 518

*Principal Driller Daniel Denning Date 7-25-16

*Driller ______ Date ______

*Operator II ______ Date Jun 30, 2016

Operator I ______ Date ______

*** Signature of Principal Driller and rig operator are required.**

Form 238-7
9/82

E

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

RECEIVED
JUL 9 1984
Department of Water Resources
Eastern District Office

Department ...
Eastern District Office

1. WELL OWNER

Name James Hamby

Address Box 491
Hanna, Wyoming 82327

Owner's Permit No. 22-84-C-0003-000

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	180	feet
	inches		inches		feet		feet
	inches		inches		feet		feet
	inches		inches		feet		feet

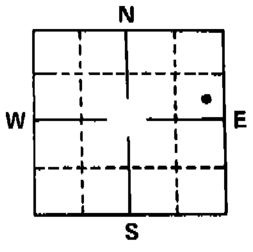
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☒ Yes ☐ No
How perforated? ☐ Factory ☒ Knife ☐ Torch
Size of perforation 2 inches by 3/16 inches

Number		From		To	
320	perforations	160	feet	180	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 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 Well Cap

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name ______

Lot No. ______ Block No. ______

County Teton

SE ¼ NE ¼ Sec. 1, T. 4 N R. 45 E

7. WATER LEVEL

Static water level 90 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 Good
Describe artesian or temperature zones below.

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other ______

Discharge G.P.M.	Pumping Level	Hours Pumped

78967

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
6	0	20	Gummy black clay.		X
6	20	30	Gummy brown clay & gravel.		X
6	30	50	Gravel & sand & clay.		X
6	50	60	Gummy blue clay.		X
6	60	80	Gummy blue clay & gravel.		X
6	80	100	Pee gravel & clay.		X
6	100	125	Gummy brwon clay.		X
6	125	130	Pee gravel & clay.	X	
6	130	135	Gummy brown clay.		X
6	135	160	Gummy brown clay & gravel.	X	
6	160	180	Large gravel & clay.	X	

RECEIVED
OCT 5 1984

MICROFILMED
Department of Water Resources

10.

Work started 4/14/84 finished 4/25/84

11. DRILLERS CERTIFICATION

dl

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

Firm Name Andrew Well Drilling Firm No. 5

Address 1268 E. 17th Street Date 5/2/84
Idaho Falls, Idaho 83401

Signed by (Firm Official) Neil J Andrew

and

(Operator) Kevin Brown

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

Form 238-7
3/95

DMD

IDAHO DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

63926

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

1. DRILLING PERMIT NO. 22-95-E-0125-000

Other IDWR No. ______

2. OWNER:

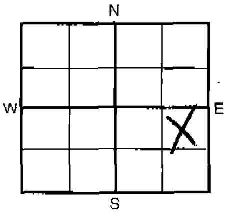
Name Mike Monahan

Address 29 E. Wallace Ave

City Driggs State Id Zip 83422

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.



Twp. 4 North ☒ or South ☐

Rge. 45 East ☒ or West ☐

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

Gov't Lot ______ County Teton

Lat: : : Long: : :

Address of Well Site 100 E. 14050

Driggs 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			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	20	4	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	160	250	Steel	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ______ Length of Tailpipe ______

9. PERFORATIONS/SCREENS None

☐ Perforations Method ______

☐ Screens Screen Type ______

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

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

110 ft. below ground Artesian pressure ______ lb.

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

11. WELL TESTS:

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
30	160	160	2 hrs

Water Temp. ______ Bottom hole temp. ______

Water Quality test or comments: excellent

______ Depth first Water Encountered ______

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
6	0	4	top soil		X
	4	38	sand + silty clay		X
	38	43	fine sand		X
	43	110	clay + gravel		X
	110	125	clay & Dayn Rock		X
6	125	160	clay + gravel	X	

RECEIVED
NOV 27 1995
Department of Water Resources

OCT 23 1995
Department of Water Resources
Eastern District Office

MAR 07 1996

Completed Depth 160 (Measurable)

Date: Started 10-11-95 Completed 10-11-95

13. DRILLER'S CERTIFICATION

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

Firm Name Teton Water Works Firm No. 506

Firm Official Richard Steel Date 10-12-95

and

Supervisor or Operator ______ Date ______

(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

26

✓ C

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 49056
DRILLING PERMIT NO. ____
Water Right or Injection Well No. ____

2. OWNER:
Name Brad Burnside
Address 120 S 100
City Driggs State Id Zip 83422

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 4 North ☒ or South ☐
Rge. 45 East ☐ or West ☐
Sec. 1, ____ 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)
Gov't Lot ____ County ~~Driggs~~ Teton
Lat: : : **Long:** : :
Address of Well Site 136 S 100E City Driggs
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

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

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

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

7. SEALING PROCEDURES

Seal Material	From	To	Weight ~~Volume~~	Seal Placement Method
bentonite	0	20	150	overbore

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6	+2	160	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:
100 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	0		

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

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	**Remarks:** Lithology, Water Quality & Temperature	Water Y	Water N
8	0	4	clay		X
6	4	50	gravel		X
6	50	110	clay gravel	X	
6	110	155	gravel	X	
6	155	160	gravel & clay	X	

Completed Depth 160' (Measurable)
Date: Started 10-12-07 Completed 10-12-07

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 1-15-08
and
Driller or Operator II ____ Date ____
Operator I Greg Howe Date 1-15-08

Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
11/97

JC DMD

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

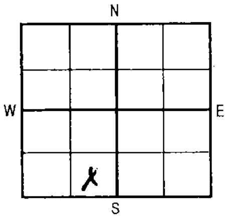
Office Use Only
Inspected by ________
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0024679
DRILLING PERMIT NO. 7-80116
Other IDWR No. ____

28

2. OWNER:
Name Charise Cook
Address 17 East 100 South
City Driggs State Id Zip 83422

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



Twp. 4 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 1, ____ 1/4 (10 acres) SE 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot ____ County Teton
Lat: : : Long: : :
Address of Well Site 17 East 100 South
(Give at least name of road + Distance to Road or Landmark) City Driggs
Lt. 1 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			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	18'	250LBS	over Bore

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	99'	.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:
50' ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: ____

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

Yield gal./min.	Drawdown	Pumping Level	Time

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

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

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
8"	0	20'	Clay Gravel		X
6"	20'	50'	Clay & Gravel		X
6"	50'	100'	Clay & Gravel	X	

AUG 0 7 2002
Department of Water Resources
Eastern District Office

Completed Depth 100' (Measurable)
Date: Started 7-8-02 Completed 7-8-02

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 Denning Drilling Firm No. 518
Firm Official Daniel Denning Date 7-8-02
and
Driller or Operator ____ Date ____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D D0089694

Drilling Permit No.

Water right or injection well #

2. OWNER:

Name Susan Strayer

Address 850 E 1000 S

City Driggs State ID Zip 83422

3. WELL LOCATION:

Twp. 05 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 36 ___ 1/4 (10 acres) ___ 1/4 (40 acres) ___ 1/4 (160 acres)

Gov't Lot ___ County Teton

Lat. 43 ° 42.547 (Deg. and Decimal minutes)

Long. 111 ° 05.086 (Deg. and Decimal minutes)

Address of Well Site 850 E 1000 S City Driggs

(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 ft^3)	Placement method/procedure
Bentonite	0	38	700	overbore

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6	+2	120	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 120

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method

Manufactured screen ☐ Y ☐ N Type

Method of installation

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

Length of Headpipe ___ Length of Tailpipe

Packer ☐ Y ☐ N Type

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft^3)	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) 62 Static water level (ft) 58

Water temp. (°F) ___ Bottom hole temp. (°F)

Describe access port

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
	20 +	60

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	6	dirt		✓
10	6	38	Gravel & Clay		✓
8	38	120	Gravel & clay	✓	

RECEIVED
DEC 06 2021
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 120

Date Started: 8/7/21 Date Completed: 8/9/21

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 Howe Deep LLC Co. No. 714

*Principal Driller Greg Howe Date 8/9/21

*Driller ___ Date

*Operator II ___ Date

Operator I ___ Date

*** Signature of Principal Driller and rig operator are required.**

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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 37368
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Allan Twitchell
Address 98 S 100 E
City Driggs State Id Zip 83422

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 36, ____ 1/4 SE 1/4 SW 1/4
10 acres 40 acres 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 Material	From	To	Weight ~~Volume~~	Seal Placement Method
bentonite	0	40	420	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 100
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 ____
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:
65 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	0	65	1 hr.

Water Temp. 52° Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encounter 65

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
8	20	60	clay		X
6	60	80	clay & gravel	X	
6	80	100	gravel	X	

RECEIVED
SEP - 7 2005
Department of Water Resources
Eastern Region

Completed Depth 100' (Measurable)
Date: Started 8-25-05 Completed 8-26-05

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name High Plains Firm No. 299
Principal Driller Marcus Frandsen Date 9-5-05
and
Driller or Operator II ____ Date ____
Operator I Travis Frandsen Date 9-5-05
Principal Driller and Rig Operator *Required*.
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

30

Form 238-7
11/97

DMD

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

22

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

1. WELL TAG NO. D 0021209

DRILLING PERMIT NO. -770534

Other IDWR No.

2. OWNER:

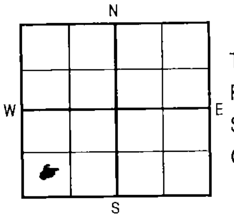
Name Paul Gilroy

Address 77 So. Baseline Rd

City Driggs State ID Zip 83422

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.



Twp. 5 North ☒ or South ☐

Rge. 45 East ☒ or West ☐

Sec. 36, ____ 1/4 SW 1/4 SW 1/4
10 acres 40 acres 160 acres

Gov't Lot ____ County teton

Lat: : : Long: : :

Address of Well Site 77 So. Baseline Rd

City Driggs

(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			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	18'	250#	air bore

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

Was drive shoe seal tested? ☐ Y ☒ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	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:

20' ft. below ground Artesian pressure ____ lb.

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

11. WELL TESTS:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ____ Bottom hole temp. ____

Water Quality test or comments: ____

Depth first Water Encounter ____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0'	18'	clay, Dirt, cobels		X
6"	18'	40'	clay cobels	X	
	40	80	clay sand	X	
	80	100	sand gravel	X	

RECEIVED
SEP 13 2001
Department of Water Resources

RECEIVED
AUG 15 2001
Department of Water Resources
Eastern Region

Completed Depth 100' (Measurable)

Date: Started 8/6/01 Completed 8/6/01

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 Dennings Well Drilling Firm No. 518

Firm Official Dennis Denning Date 8-6-01

and

Driller or Operator ____ Date 8/6/01

(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

√c 22 **31**

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

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

1. WELL TAG NO. D 0045753
DRILLING PERMIT NO. ______
Water Right or Injection Well No. ______

2. OWNER:
Name Brett Linsenmann
Address 523 N 30 West
City Driggs State ID Zip 83422

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 35, ____ 1/4 (10 acres) SW 1/4 (40 acres) SE 1/4 (160 acres)
Gov't Lot ______ County Teton
Lat: : : **Long:** : :
Address of Well Site 523 N 30 West City Driggs
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ______

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

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

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

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
bentonite	0'	18'	400 lbs.	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 160'
Was drive shoe seal tested? ☐ Y ☒ N How? ______

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	0'	160'	.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: ______

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

Yield gal./min.	Drawdown	Pumping Level	Time

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

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

Bore Dia.	From	To	**Remarks:** Lithology, Water Quality & Temperature	Y	N
8"	0'	18'	clay/gravels		|
6"	18'	40'	clay/gravels		|
6"	40'	60'	clay/gravels		|
6"	60'	80'	clay/gravels		|
6"	80'	100'	clay/gravels	|	
6"	100'	120'	clay/gravels	|	
6"	120'	135'	clay/gravels	|	
6"	135'	140'	clay		X
6"	140'	160'	gravels	X	

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JUL 24 2007
Department of Water Resources
Eastern Region

Completed Depth 160' (Measurable)
Date: Started 6-28-07 Completed 6-28-07

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 Denning Drilling Firm No. 518
Principal Driller Daniel Denning Date 6-29-07
and
Driller or Operator II Daniel Denning Date 6-29-07
Operator I ______ Date 7-5-07
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

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Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D D0071200

Drilling Permit No. ______

Water right or injection well # ______

2. OWNER: Heather McLendon

Name ______

Address PO Box 822

City Driggs State ID Zip 83422

3. WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge. 45 East ☒ or West ☐

Sec. 1 NE 1/4 (10 acres) NW 1/4 (40 acres) ______ 1/4 (160 acres)

Gov't Lot ______ County Teton

Lat. N. 43 ° 42.505 (Deg. and Decimal minutes)

Long. W. 111 ° 05.631 (Deg. and Decimal minutes)

Address of Well Site 350 E. 1000 S.

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

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
Grout	0	38	~~[illegible]~~ 110 gal	overbore

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+2	120	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 120

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method ______

Manufactured screen ☐ Y ☐ N Type ______

Method of installation ______

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

Length of Headpipe ______ Length of Tailpipe ______

Packer ☐ Y ☐ N Type ______

10. FILTER PACK:

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

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☐ N Artesian Pressure (PSIG) ______

Describe control device ______

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 60 Static water level (ft) 55

Water temp. (°F) ______ Bottom hole temp. (°F) ______

Describe access port ______

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
	20+	60

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	6	dirt		✓
10	6	38	clay & gravel		✓
8	38	120	clay & gravel	✓	

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JAN 30 2017
Department of Water Resources
Eastern Region

Completed Depth (Measurable): 120'

Date Started: 7/28/16 Date Completed: 7/28/16

14. DRILLER'S CERTIFICATION:

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

Company Name Teton Water Works Co. No. 506

*Principal Driller ______ Date 7/28/16

*Driller ______ Date 7/28/16

*Operator II ______ Date ______

Operator I ______ Date ______

*** Signature of Principal Driller and rig operator are required.**

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Form 238-7
6/02

DMM

Office Use Only

Well ID No. ____________

Inspected by ____________

Twp ______ Rge ______ Sec ______

______ 1/4 ______ 1/4 ______ 1/4

Lat: : : Long: : :

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0027038

DRILLING PERMIT NO. ____________

Water Right or Injection Well No. ____________

2. OWNER: 22

Name Martin velazques

Address P.O. Box 1075

City Driggs State ID Zip 83422

3. LOCATION OF WELL by legal description:

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

Twp. 4 North ☒ or South ☐

Rge. 45 East ☒ or West ☐

Sec. 11, ____ 1/4 (10 acres) SE 1/4 (40 acres) NW 1/4 (160 acres)

Gov't Lot ______ County Teton

Lat: : : **Long:** : :

Address of Well Site 350 S. 62 W

______ City ______

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

Lt. ______ Blk. ______ Sub. Name ______

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other ______

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

☒ New Well ☐ Modify ☐ Abandonment ☐ Other ______

6. DRILL METHOD:

☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ______

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0	20'	250LBS	Over bore

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

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6	+1	100	.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:

35" ft. below ground Artesian pressure ______ lb.

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

12. WELL TESTS:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ______ Bottom hole temp. ______

Water Quality test or comments: ______

______ Depth first Water Encounter ______

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	**Remarks:** Lithology, Water Quality & Temperature	Water Y	Water N
8	0	60	Clay Cobbels	X	
6	60	100	Gravel	X	

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JUL 29 2003
Department of Water Resources
Eastern Region

Completed Depth 100 (Measurable)

Date: Started 7-15-03 Completed 7-15-03

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 Inc Firm No. 518

Principal Driller Daniel Denning Date 7-15-03

and

Driller or Operator II Daniel Denning Date 7-15-03

Operator I ______ Date ______

Principal Driller and Rig Operator *Required.*

Operator I must have signature of Driller/Operator II.

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34

Form 238-7
6/93

✓ C✓

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

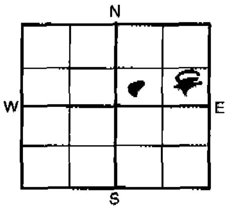
Use Typewriter
or
Ball Point Pen

1. DRILLING PERMIT NO. 22 - 93 - E - 179 - 000
Other IDWR No.

2. OWNER:
Name M + D Landscaping
Address 243 S. Hwy 33
City Driggs State Id. Zip 83440

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.



T. 4 North ☒ or South ☐
R. 45 East ☒ or West ☐
Sec. 11 , ___ 1/4 (10 acres) SW 1/4 (40 acres) NE 1/4 (160 acres)
Gov't Lot ___ County Teton

Address of Well Site same

(Give at least Direction + Distance to Road or Landmark)

Lot No. ___ Block No. ___ Subd. Name ___

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

5. TYPE OF WORK
☒ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

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

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
bentonite	0	30	4	overbore

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

8. CASING/LINER:

Diameter	From	To	Guage	Casting	Liner	Steel	Plastic	Welded	Threaded
6	2	100	250			☒	☐	☒	☐
						☐	☐	☐	☐
						☐	☐	☐	☐
						☐	☐	☐	☐

Final location of shoes 100'
Top Packer or Headpipe ___ Bottom Tailpipe ___

9. PERFORATIONS/SCREENS
☐ Perforations Method
☐ Screens Type ___ Material

From	To	Slot Size	Number	Diameter	Tele/Pipe Size	Casting	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

108969

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

Yield gal./min.	Drawdown	Pumping Depth	Time
50	0	63	1 hr.

Temperature of water 49 Was a water analysis done? Yes ☐ No ☒
By whom?
Water Quality (odor, etc.) etc.
Bottom Hole Temperature 49

11. STATIC WATER LEVEL:
___ ft. below surface Depth artesian flow found
Artesian pressure ___ lb. Describe access port well cap
Describe Controlling Devices:

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	GPM	SWL
8	0	20	gravel + clay		
6	20	47	gravel & sand		
6	47	69	gravel		63
6	69	82	gravel + clay		63
6	82	100	gravel		63

RECEIVED
DEC 0 8 1993
Department of Water Resources

RECEIVED
NOV 26 1993
Department of Water Resources
Eastern District Office

FEB 28 1994

Date: Started 11-14-93 Completed 11-17-93

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

Firm Name High Plains Drilling Firm No. 299
Firm Official Marcus Zrandke Date 11-27-93
and
Supervisor or Operator Mike Zrandke Date 11-27-93
(Sign once if Firm Official & Operator)

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35

Form 238-7
3/95

No DMD
tag 11414

IDAHO DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

59706

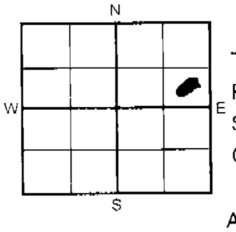
Office Use Only
Inspected by ________
Twp ____ Rge ____ Sec ____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 22-99-E-0120
Other IDWR No. D0011414

2. OWNER:
Name Mike Stears
Address 243 S. Hwy 33
City Driggs State Id Zip 83422

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.



Twp. 4 North ☒ or South ☐
Rge. 45 East ☒ or West ☐
Sec. 11, ____1/4 SE 1/4 NE 1/4
10 acres 40 acres 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			AMOUNT	METHOD
Material	From	To	Sacks or ~~Pounds~~	
bentonite	0	20	3	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 100
Was drive shoe seal tested? ☐ Y ☒ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
8	+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:
30 ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: well cap

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

Yield gal./min.	Drawdown	Pumping Level	Time
100	0	30	1 hr.

Water Temp. 50° Bottom hole temp. ____
Water Quality test or comments: ________
Depth first Water Encountered 30

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
10	0	20	gravel		X
8	20	80	gravel	X	
8	80	100	gravel	X	

RECEIVED
DEC 17 1999
Department of Water Resources

MICROFILMED
2000

Completed Depth 100' (Measurable)
Date: Started 10-14-99 Completed 10-17-99

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Firm Name High Plains Firm No. 299
Firm Official Marcus Franke Date 11-30-99
and
Supervisor or Operator ________ Date ____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Appendix E

Test Pit Reports

Eastern Idaho
Public Health
Prevent. Promote. Protect.

ENVIRONMENTAL HEALTH
1250 Hollipark Drive
Idaho Falls, ID 83401
OFFICE (208) 523-5382
FAX (208) 528-0857

SUBDIVISION ON-SITE

Conducted on: 7-15-21 Time: Travel 30 On-site 90+

I. NAME OF SUBDIVISION: B+W Subdivision

II. LOCATION (COUNTY): Teton

III. GENERAL INFORMATION:

A. Current Land Use: Agriculture

B. Adjoining Property Use: Ag + Residential.

C. Surface Water (on or near development): > 500'

D. Slope: minor, but

E. Drainage Areas Present: No –

F. Rock Outcrop Present: No

G. Wetland Indications: No extremely dry – old irrigation pipe + ditches not in use.

IV. EVALUATION:

A. Individual water and sewer:
Does each lot appear to have sufficient area to install proposed system and to meet minimum separation requirements? Yes X No ____

B. Individual water and central sewer:
Does there appear to be sufficient area for central system and replacement area? Yes ____ No ____

C. Individual sewer and central water system:
Does each lot appear to have sufficient area to install proposed system and to meet minimum separation requirements? Yes ____ No ____

D. Individual sewer and public water system:
Does each lot have sufficient area to install proposed system and to meet minimum separation requirements? Yes ____ No ____

COMMENTS:

There is variable slope due to undulation in topography but no slope ≥ 10% – All lots will have ample space for septic systems, replacement areas and wells. Soil horizons are consistent thru out site –

EHS: K Price #93

TEST HOLE INFORMATION

SUBDIVISION B+W.

DATE 7-15-21

Test Hole # 1

Location: N43°41.883' W111°06.160'

Depth: 120″

Silt loam
T.S. B1

24″

gravelly sand A2A
w/minor fines

>70% rock content
rounded.
2-6″ diameter
increasing w/depth in size
+ content

No bedrock.

No G.W.

Test Hole # 2

Location: 43°42,060
102.

Depth: 120″

Silt loam

Sand gravel
medium to coarse
sand
minor fines

some rock content

layered
zone.

may be some seasonal
gw @

Test Hole #

Location: N43°42,055'
W111°06,285

Depth: 120

12″ Thin topsoil

layered rock
sand minor
silt

Dry
No Bedrock

Test Hole # 4

Location: N43°41.652'
W111°06.061

Depth: 120″.

Same AS others

Test Hole #

Location:

Depth:

Test Hole #

Location:

Depth:

August 10th
Meeting w/ County.

* Approxamate Test Pit Locations.

TEST HOLE INFORMATION

SUBDIVISION Wildflower DATE 5-31-2022

Test Hole # 1

Location:

Depth: 120"

Silty sandy loam. Bi

minor rock content

60" –

gravelly sand A_2b.

40-60% Rock content

clasts 2-8" Diameter

Rockcontent > @ depth.

Dry / No Bedrock.

Test Hole # 2

Location:

Depth: 120"

Silty sandy loam. Bi

No rock content

84" –

gravelly silty sand. A_2b

> 35-40% rock content

1-3" diameter

Dry / No Bedrock

Test Hole # 3

Location:

Depth: 120"

Same as TH 1

Test Hole # 4

Location:

Depth: 120".

Same as TH 1

Test Hole # 5

Location:

Depth: 120"

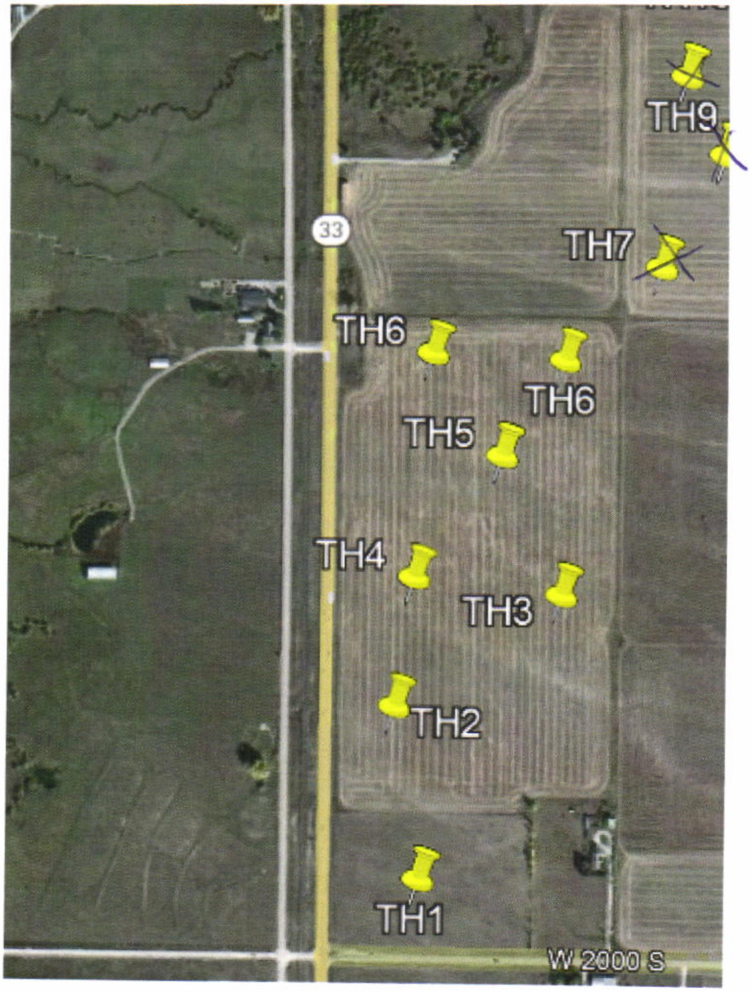
Same as TH 2

Test Hole # 6

Location:

Depth: 120"

Same as T.H. 1



WildFlower Subdivision
TH Locations

TEST HOLE INFORMATION

SUBDIVISION Trestles DATE 5-31-2022

Test Hole # TH 7

Location:

Depth: 120"

Silty sandy Loam B1

60" —

gravelly sandy w/ minor loam

A2b.

35-60% rock content.

1-6" Diameter

Dry / No Bedrock.

Test Hole # TH 8

Location:

Depth: 120"

Same as.

TH 7

Test Hole # TH 9

Location:

Depth: 120"

Same as

TH 7.

Test Hole # 10

Location:

Depth: 120"

Same as.

T.H. 7

Test Hole # 11

Location:

Depth: 120"

silty sandy loam B1

30" —

gravelly sandy loam.

35% rock content. A2b

120" Dry / No bedrock.

Test Hole # 12

Location:

Depth: 120"

Same as

T.H 11

All test holes are dry / No bedrock. Change in B1 layer is Related to topography.

TEST HOLE INFORMATION

SUBDIVISION Trestles -

DATE 5-31-2022

Test Hole # TH 13
Location:
Depth: 120"

Same as
T.H. 11

Test Hole # 14
Location:
Depth: 120"

Same as
TH 11

Test Hole # 15
Location:
Depth: 120"

silty sandy
loam
B1

36"

gravelly sandy
loam.
A2b

35-40% rock
content

Dry / No Bedrock

Test Hole # 16
Location:
Depth: 120"

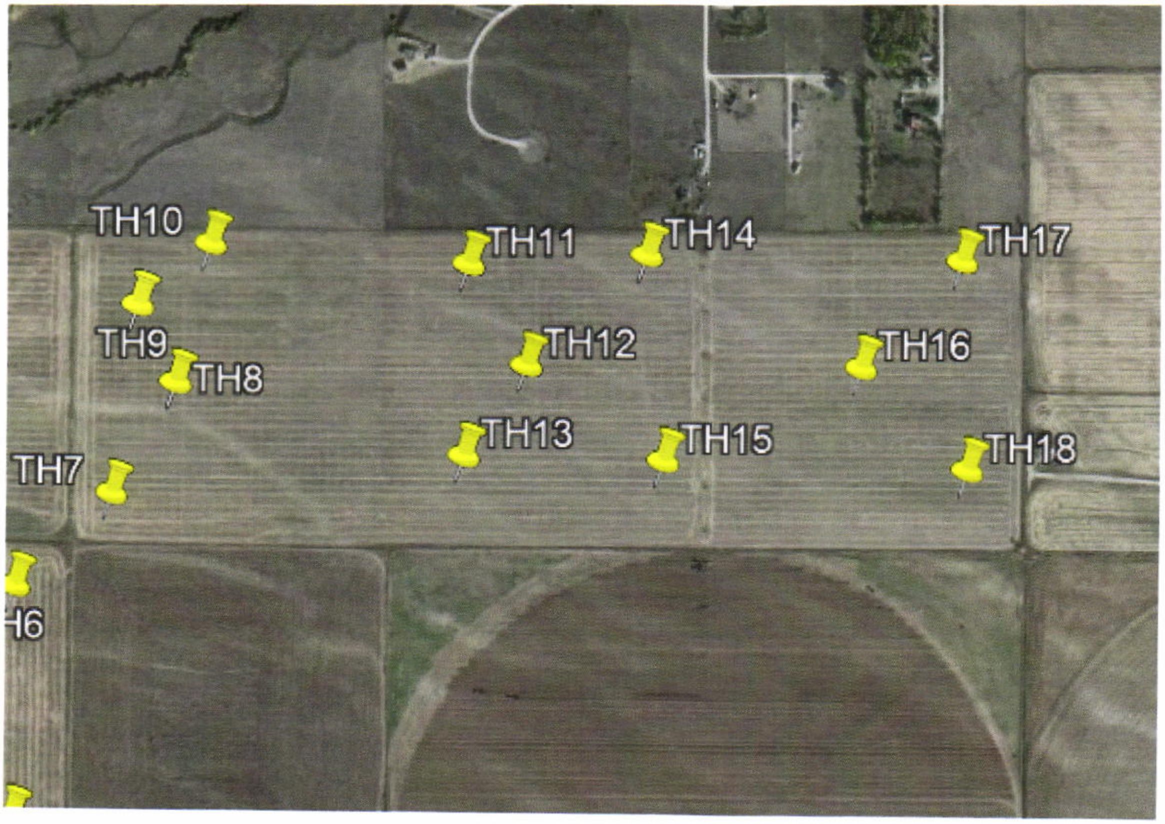
Same as
T.H 15

Test Hole # 17
Location:
Depth: 120"

Same as
TH 15

Test Hole # 18
Location:
Depth: 120"

Same as
TH 15



Trestles Subdivision

Test Hole locations

Appendix F

Climate Data

U.S. Climate Data

Home United States Idaho

Monthly Daily History Geo & Map

Annual high temperature	53ºF
Annual low temperature	27ºF
Average annual precip.	17.14 inch

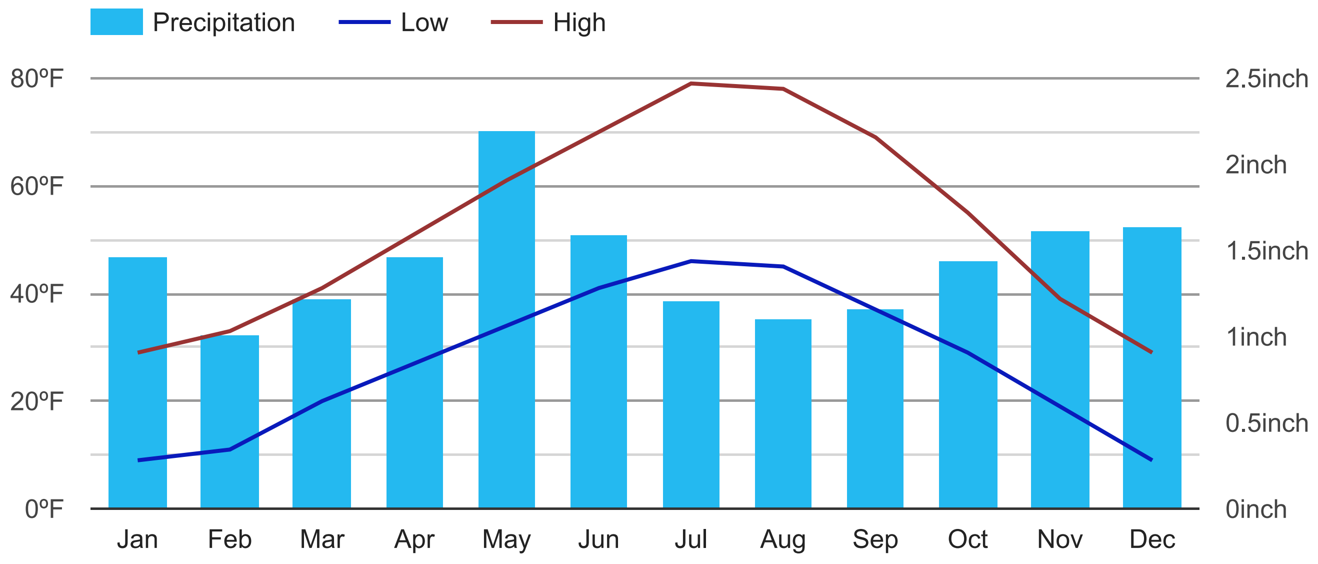
NRR = 0.0046(13.36 in.)^2=1.351

Climate Driggs - Idaho

	Jan (January)	Feb (February)	Mar (March)	Apr (April)	May (May)	Jun (June)
Av. high	29	33	41	51	61	70
Av. low	9	11	20	27	34	41
Av. precip.	1.47	1.01	1.22	1.47	2.20	1.59

	Jul (July)	Aug (August)	Sep (September)	Oct (October)	Nov (November)	Dec (December)
Av. high	79	78	69	55	39	29
Av. low	46	45	37	29	19	9
Av. precip.	1.21	1.11	1.16	1.44	1.62	1.64

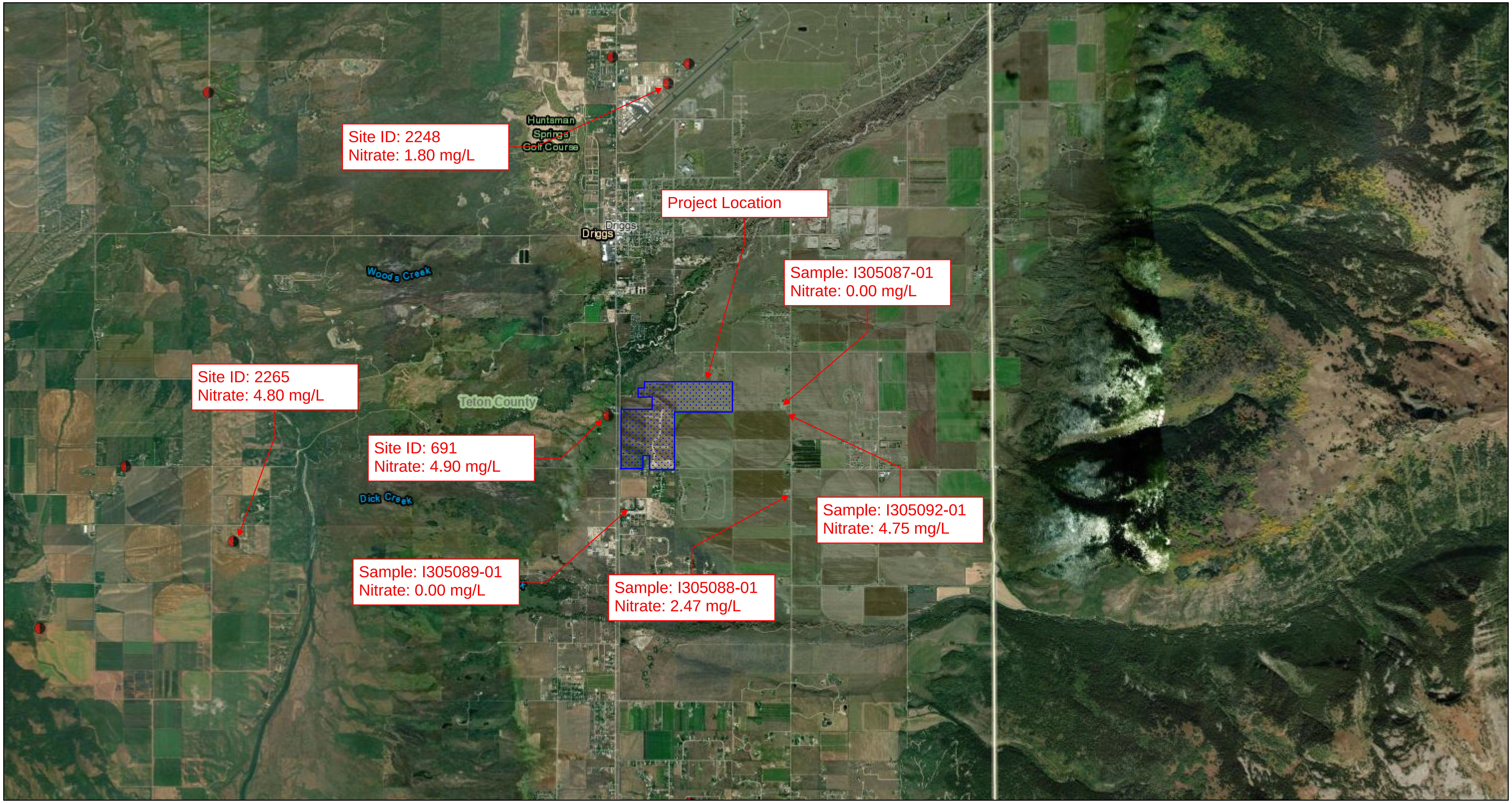
Driggs Climate Graph - Idaho Climate Chart



Appendix G

IDEQ Groundwater Reports & Test Sample Groundwater Reports

Idaho DEQ Ground Water Monitoring Wells



Site ID: 2248
Nitrate: 1.80 mg/L

Project Location

Sample: I305087-01
Nitrate: 0.00 mg/L

Site ID: 2265
Nitrate: 4.80 mg/L

Site ID: 691
Nitrate: 4.90 mg/L

Sample: I305092-01
Nitrate: 4.75 mg/L

Sample: I305089-01
Nitrate: 0.00 mg/L

Sample: I305088-01
Nitrate: 2.47 mg/L

April 17, 2023

● GWQWELLS (DEQ)

☐ County Boundaries

	Nitrate:	Nitrite:	Nitrate + Nitrite:
Site ID: 691	--	--	4.90 mg/L
Sample: I305087-01	0.00	0.00	0.00 mg/L
Sample: I305088-01	2.47	0.00	2.47 mg/L
Sample: I305089-01	0.00	0.00	0.00 mg/L
Sample: I305092-01	4.75	0.00	4.75 mg/L
Average:			2.42 mg/L

1:72,224

0 0.75 1.5 3 mi

0 1.25 2.5 5 km

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Map Courtesy of IDEQ Ground Water Monitoring
Copyright ©2023 DEQ GIS

Department of Environmental Quality

GROUND WATER WELL MONITORING REPORT

PROJECT NAME: TETON COUNTY NITRATE FOLLOW-UP, DRIGGS, TETON COUNTY

PUBLIC LAND SURVEY: ¼, ¼: 04N45E2NESW

43.70055° N, -111.11235° W NAD83

WELL DEPTH(ft): 80'

METAL TAG#: D0006842

IDWR WELL ID: 326750

There Are 44 Well Monitoring Analytes for Site # 691

SITEID	STATIONID	PROJECT	CHEMICAL NAME	VALUE	MEASURE	SAMPLE DATE	QUALIFIER*	COMMENTS
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Alkalinity as (CaCO3)	205	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Ammonia	<0.050	mg/L	11/02/2021	U	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Boron	<5	µg/L	11/02/2021	U	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Bromide	12	µg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Calcium	59	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Chloride	1.64	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Dissolved Oxygen	11.22	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	E. coli	<1	MPN/100 mL	11/02/2021	U	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	H-2 Water	-129.8	‰	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Magnesium	19	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	N-15-Nitrate	3.16	‰	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Nitrate + Nitrite	4.9	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	O-18 Nitrate	-8.11	‰	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	O-18 Water	-17.5	‰	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	pH	7.47	pH	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Phosphorus	0.058	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Potassium	0.68	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Sodium	1.9	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Specific Conductance	422	µS/cm	11/02/2021	NA	

691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Sulfate	11.8	mg/L	11/02/2021	NA	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Total Coliform	<1	MPN/100 mL	11/02/2021	U	
691	04N45E2CAA	TETON COUNTY NITRATE FOLLOW-UP	Water Temperature	7.65	°C	11/02/2021	NA	
691	04N45E2CAA	TETON VALLEY	Chloride	1	mg/L	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	Dissolved Oxygen	12.94	mg/L	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	E. coli	<1	#/100 mL	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	Nitrate	3.46	mg/L	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	pH	8.35	pH	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	Specific Conductance	407	µS/cm	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	Sulfate	6	mg/L	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	Total Coliform	<1.0	#/100 mL	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	Total Dissolved Solids	210	mg/L	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	Water Temperature	8.0	°C	10/20/2008	NA	
691	04N45E2CAA	TETON VALLEY	Chloride	1	mg/L	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	E. coli	<1.0	#/100 mL	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	H-2 Water	-131	‰	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	Nitrate	3.76	mg/L	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	O-18 Water	-18.0	‰	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	pH	7.3	pH	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	Phosphorus	0.09	mg/L	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	Specific Conductance	361	µS/cm	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	Sulfate	7	mg/L	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	Total Dissolved Solids	240	mg/L	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	Turbidity	6	NTU	07/22/2008	NA	
691	04N45E2CAA	TETON VALLEY	Water Temperature	8.3	°C	07/22/2008	NA	

*NA-Not Applicable, *RD-Rejected Data, *NR-No Result, *J-The analyte was detected, but the value of the result is an estimate, *R-Rejected by the data validator. Results are not usable as detects or nondetects for any purpose due to a QA/QC exceedance or equipment malfunction, *U-Not detected. The analyte is not present at or above the detection or reporting limit, *UJ-The analyte was not detected above the lab reporting level (RL). The reported quantitation limit is approximate and may be inaccurate or imprecise.

ExportToCSV

Save or Open with Excel, OpenOffice Calc, ArcGIS, QGIS, Notepad, etc.

Query Executed On: Monday, April 17, 2023

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Department of Environmental Quality

GROUND WATER WELL MONITORING REPORT

PROJECT NAME: TETON BASIN-ASHTON REGIONAL MONITORING, DRIGGS, TETON COUNTY

PUBLIC LAND SURVEY: ¼, ¼: 05N45E23NESE

43.74196° N, -111.10201° W NAD83

WELL DEPTH(ft): 120'

METAL TAG#: D0035683

IDWR WELL ID: 401169

There Are 45 Well Monitoring Analytes for Site # 2249

SITEID	STATIONID	PROJECT	CHEMICAL NAME	VALUE	MEASURE	SAMPLE DATE	QUALIFIER*	COMMENTS
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Alkalinity as (CaCO3)	140	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Ammonia	<0.010	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Arsenic	<2.0	µg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Boron	<5	µg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Bromide	<10	µg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Calcium	44	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Chloride	0.575	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Dissolved Oxygen	9.11	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	E. coli	<1.0	MPN/100 mL	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Fluoride	<0.20	mg/L	10/05/2017	NA	

2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	H-2 Water	-132.2	‰	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Lithium	3.47	µg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Magnesium	11	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	N-15-Nitrate	2.12	‰	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Nitrate + Nitrite	1.8	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	O-18 Nitrate	-4.50	‰	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	O-18 Water	-17.7	‰	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Organic carbon	<0.5	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	pH	7.36	pH	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Potassium	0.71	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Sodium	0.76	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Specific Conductance	291	µS/cm	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Strontium	45.9	µg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Sulfate	5.70	mg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Total Coliform	<1.0	MPN/100 mL	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Uranium	2.23	µg/L	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Water Temperature	10.33	°C	10/05/2017	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Alkalinity as (CaCO3)	136	mg/L	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Calcium	44	mg/L	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Chloride	0.781	mg/L	10/24/2013	NA	

2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Dissolved Oxygen	9.44	mg/L	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	E. coli	<1.0	MPN/100 mL	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	H-2 Water	-133	‰	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Magnesium	11	mg/L	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	N-15-Nitrate	1.23	‰	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Nitrate + Nitrite	2.3	mg/L	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	O-18 Nitrate	-6.31	‰	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	O-18 Water	-18.0	‰	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	pH	7.83	pH	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Potassium	0.71	mg/L	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Sodium	0.78	mg/L	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Specific Conductance	278	µS/cm	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Sulfate	4.31	mg/L	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Total Coliform	<1.0	MPN/100 mL	10/24/2013	NA	
2249	05N45E23DAD	TETON BASIN-ASHTON REGIONAL MONITORING	Water Temperature	8.37	°C	10/24/2013	NA	

*NA-Not Applicable, *RD-Rejected Data, *NR-No Result, *J-The analyte was detected, but the value of the result is an estimate, *R-Rejected by the data validator. Results are not usable as detects or nondetects for any purpose due to a QA/QC exceedance or equipment malfunction, *U-Not detected. The analyte is not present at or above the detection or reporting limit, *UJ-The analyte was not detected above the lab reporting level (RL). The reported quantitation limit is approximate and may be inaccurate or imprecise.

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Query Executed On: Monday, April 17, 2023

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Department of Environmental Quality

GROUND WATER WELL MONITORING REPORT

PROJECT NAME: TETON BASIN-ASHTON REGIONAL MONITORING, DRIGGS, TETON COUNTY

PUBLIC LAND SURVEY: ¼, ¼: 04N45E8NWSW

43.68500° N, -111.17700° W NAD83

WELL DEPTH(ft): 107'

METAL TAG#: D0024365

IDWR WELL ID: 348889

There Are 43 Well Monitoring Analytes for Site # 2265

SITEID	STATIONID	PROJECT	CHEMICAL NAME	VALUE	MEASURE	SAMPLE DATE	QUALIFIER*	COMMENTS
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Alkalinity as (CaCO3)	197	mg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Ammonia	<0.010	mg/L	10/12/2017	U	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Arsenic	<2.0	µg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Boron	10.4	µg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Bromide	22.5	µg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Calcium	62	mg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Chloride	3.50	mg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Dissolved Oxygen	11.83	mg/L	10/12/2017	J	Field meter malfunction.
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	E. coli	<1.0	MPN/100 mL	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Fluoride	<0.20	mg/L	10/12/2017	NA	

2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	H-2 Water	-133.0	‰	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Lithium	2.55	µg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Magnesium	24	mg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Nitrate + Nitrite	4.8	mg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	O-18 Water	-17.8	‰	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Organic carbon	<0.5	mg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	pH	7.21	pH	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Potassium	0.79	mg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Sodium	4.3	mg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Specific Conductance	493	µS/cm	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Strontium	308	µg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Sulfate	41.1	mg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Total Coliform	658.6	MPN/100 mL	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Uranium	0.825	µg/L	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Water Temperature	8.41	°C	10/12/2017	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Alkalinity as (CaCO3)	190	mg/L	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Calcium	61	mg/L	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Chloride	3.07	mg/L	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Dissolved Oxygen	8.48	mg/L	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	E. coli	<1.0	MPN/100 mL	10/28/2013	NA	

2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	H-2 Water	-133	‰	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Magnesium	24	mg/L	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	N-15-Nitrate	5.86	‰	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Nitrate + Nitrite	4.5	mg/L	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	O-18 Nitrate	-5.20	‰	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	O-18 Water	-17.9	‰	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	pH	7.62	pH	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Potassium	0.81	mg/L	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Sodium	4.5	mg/L	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Specific Conductance	460	µS/cm	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Sulfate	39.4	mg/L	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Total Coliform	<1.0	MPN/100 mL	10/28/2013	NA	
2265	04N45E8CBD	TETON BASIN-ASHTON REGIONAL MONITORING	Water Temperature	8.02	°C	10/28/2013	NA	

*NA-Not Applicable, *RD-Rejected Data, *NR-No Result, *J-The analyte was detected, but the value of the result is an estimate, *R-Rejected by the data validator. Results are not usable as detects or nondetects for any purpose due to a QA/QC exceedance or equipment malfunction, *U-Not detected. The analyte is not present at or above the detection or reporting limit, *UJ-The analyte was not detected above the lab reporting level (RL). The reported quantitation limit is approximate and may be inaccurate or imprecise.

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Query Executed On: Monday, April 17, 2023

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LAB FEDERAL ID#: **ID00952**	DATE REPORTED BY LAB: **5/12/2023**
DATE RECEIVED: **5/9/2023**	
COMPLIANCE SAMPLE:	REPLACEMENT SAMPLE:

PWS #:	PWS NAME: **Brent Crowther**
CONTACT NAME: **Brent Crowther**	CONTACT PHONE: **(208) 351-2824**

IAS EnviroChem
3314 Pole Line Rd.
Pocatello, ID 83201
phone: (208) 237-3300
fax: (208) 237-3336
email: iasec3308@iasenvirochem.com
www.iasenvirochem.com

LAB SAMPLE NUMBER: **I305087-01**	COLLECTION DATE/TIME: **05/08/23 11:30**
SAMPLE TYPE:	SAMPLING POINT/LOCATION - TAG#/FACILITY ID: **14685 S 1000 E Driggs**

INORGANIC CHEMICAL ANALYSIS REPORT For Public Water Systems

FRDS	*Compound*	*Result*	*Units*	*MCL*	*MDL*	*Method*	*Analysis Date*	*Analyst*
1040	Nitrate as N	ND	mg/L	10	1.00	300.0	05/09/2023	TP
1041	Nitrite as N	ND	mg/L	1.0	0.10	300.0	05/09/2023	TP

ND = Not Detected MCL = Maximum Contaminant Level MDL = Method Detection Limit

Brent Crowther
Brent Crowther
350 N 2nd E
Rexburg, ID 83440

G. Ryan Pattie
G. Ryan Pattie
Laboratory Director

Login Report

Customer Name: **Brent Crowther**
350 N 2nd E
Rexburg, ID 83440

Work Order #: **I305087**

Contact Name: **Brent Crowther**

Sample Description: **14685 S 1000 E Driggs**
Lab Tracking #: **I305087-01**
Matrix: **Drinking Water**
Sample Notes:

Sampling Date/Time: **05/08/23 11:30**
Date Received: **05/09/23 11:50**

Test	*Method*	*Due*
Nitrate:N (F)	**300.0**	**05/23/23**
Nitrite:N (F)	**300.0**	**05/23/23**

Sample Condition Record

Samples received in a cooler?	Yes
Samples received intact?	Yes
The temperature recorded?	10.8
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all samples properly preserved?	Yes
Labels and chain agree?	Yes

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

I305087
Brent Crowther

Received: 05/09/2023
RAB

1 Sample

IAS EnviroChem

3314 Poleline Rd. • Pocatello, ID 83201
phone (208) 237-3300 • fax (208) 237-3336
email: iasec3308@iasenvirochem.com • www.iasenvirochem.com

Idaho Chain of Custody -.Drinking Water Analysis

Water System Name:		PWS #:	
Contact / Project Manger:	Brent Crowther	County:	
Address:	350 N 2nd E	Phone:	208-351-2824
City, State, Zip:	Rexburg, ID 83440	Email:	bcrowther@civilize.design

Payment Options

Send Bill or Receipt To: ____________________

Payment due with samples unless credit has been established

Amount $ ____________

Received by ____________

Email Invoice to: ____________________

☐ Cash ☐ Bill ☐ Check# ☐ PO # ☐ Other

Sample Information For all samples, Public and Private

Sample Collected By: Quinn

Sample Collection Location: 14685 S 1000 E Driggs

(Name of well or other source for sample collected at the source. A different chain of custody should be used for each location collected from.)

Date Sample Taken 05/08/2023

Sample Type

☐ Distribution ☐ Raw Water
☐ Non-Compliance ☐ Plant Tap
☐ Other ____________

Time Sample Taken 11:30 ☒AM ☐PM

For Public Water System Source Samples

Location Tag # ____________

Public Water System Jurisdiction

A copy of report to be sent to:
(Regulator)
estoddard@civilize.design

CHECK DESIRED ANALYSIS

IOCs

☐ Arsenic ☐ Sodium ☒ Nitrate ☒ Nitrite
☐ Copper/Lead ☐ Sulfate
☐ Phase II IOC metals: Ba, Cd, Cr, F, Hg, Se
☐ Phase V IOC: Be, Ni, Sb, Tl
☐ Primary IOC package with Cyanide Waiver:
Ba, Be, Cd, Cr, Hg, Ni, Sb, Se, Tl, Fluoride
☐ Secondary/Optional IOC package:
Ag, Al, Ca, Cu, Fe, K, Mg, Mn, Pb, Zn, Chloride, Ammonia, Hydrogen Sulfide, Silica, Color, Hardness, Odor, pH, Conductivity, Alkalinity, TDS, Langlier Index Corrosivity, Surfactants
☐ Complete IOC package:
Ag, Al, As, Ba, Be, Ca, Cd, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Se, Sb, Tl, Zn, Chloride, Fluoride, Nitrate, Nitrite, Sulfate, Ammonia, Hydrogen Sulfide, Silica, Color, Hardness, Odor, pH, Conductivity, Alkalinity, TDS, Langlier Index Corrosivity, Surfactants
☐ Cyanide

VOCs

☐ VOC 524.2
☐ TTHM
☐ Haloacetic Acids (HAA5)
☐ THMP

RADs

☐ Gross Alpha
☐ Gross Beta
☐ Radium 226
☐ Radium 228
☐ Uranium

SOCs

☐ Full SOC (all 8 below)
☐ Phase II SOC (all 5 below)
  ☐ Semivolatiles (525.2)
  ☐ Herbicides (515.1)
  ☐ Carbamates (531.1)
  ☐ Pesticides (505)
  ☐ EDB/DBCP (504.1)
☐ Phase V SOC (all 3 below)
  ☐ Diquat (549.1)
  ☐ Endothall (548.1)
  ☐ Glyphosate (547)

Other (specify)

☐ Bromate

Sample Submitted By:
Shipping or Delivery Date: 05/08/2023 3:19pm

Received By: Brandon Smith
Received Date/Time: 050923 1150
Temp. °C: 10.8

LAB FEDERAL ID#: **ID00952**	DATE REPORTED BY LAB: **5/12/2023**
DATE RECEIVED: **5/9/2023**	
COMPLIANCE SAMPLE:	REPLACEMENT SAMPLE:
PWS #:	PWS NAME: **Brent Crowther**
CONTACT NAME: **Brent Crowther**	CONTACT PHONE: **(208) 351-2824**

IAS EnviroChem
3314 Pole Line Rd.
Pocatello, ID 83201
phone: (208) 237-3300
fax: (208) 237-3336
email: iasec3308@iasenvirochem.com
www.iasenvirochem.com

LAB SAMPLE NUMBER: **I305088-01**	COLLECTION DATE/TIME: **05/08/23 10:00**
SAMPLE TYPE:	SAMPLING POINT/LOCATION - TAG#/FACILITY ID: **2135 Mountain Medow Driggs**

INORGANIC CHEMICAL ANALYSIS REPORT For Public Water Systems

FRDS	*Compound*	*Result*	*Units*	*MCL*	*MDL*	*Method*	*Analysis Date*	*Analyst*
1040	Nitrate as N	8.29	mg/L	10	1.00	300.0	05/09/2023	TP
1041	Nitrite as N	ND	mg/L	1.0	0.10	300.0	05/09/2023	TP

ND = Not Detected MCL = Maximum Contaminant Level MDL = Method Detection Limit

Brent Crowther
Brent Crowther
350 N 2nd E
Rexburg, ID 83440

G. Ryan Pattie
Laboratory Director

Login Report

Customer Name: **Brent Crowther**
350 N 2nd E
Rexburg, ID 83440

Work Order #: **I305088**

Contact Name: **Brent Crowther**

Sample Description: **2135 Mountain Medow Driggs**
Lab Tracking #: **I305088-01**
Matrix: **Drinking Water**
Sample Notes:

Sampling Date/Time: **05/08/23 10:00**
Date Received: **05/09/23 11:50**

Test	*Method*	*Due*
Nitrate:N (F)	**300.0**	**05/23/23**
Nitrite:N (F)	**300.0**	**05/23/23**

Sample Condition Record

Samples received in a cooler?	Yes
Samples received intact?	Yes
The temperature recorded?	10.8
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all samples properly preserved?	Yes
Labels and chain agree?	Yes

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

I305088
Brent Crowther
Received: 05/09/2023
RAB
1 Sample

IAS EnviroChem

3314 Poleline Rd. • Pocatello, ID 83201
phone (208) 237-3300 • fax (208) 237-3336
email: iasec3308@iasenvirochem.com • www.iasenvirochem.com

Idaho Chain of Custody - Drinking Water Analysis

Water System Name:		PWS #:	
Contact / Project Manger:	Brent Crowther	County:	
Address:	350 N 2nd E	Phone:	208-351-2824
City, State, Zip:	Rexburg, ID 83440	Email:	bcrowther@civilize.design

Payment Options

Send Bill or Receipt To: ____________ Amount $ ____________

Payment due with samples unless credit has been established ____________ Received by ____________ Ⓕ

Email Invoice to: ____________

☐ Cash ☐ Bill ☐ Check# ☐ PO # ☐ Other

Sample Information For all samples, Public and Private	Sample Type
Sample Collected By: Quinn	☐ Distribution ☐ Raw Water
Sample Collection Location: 2135 Mountain Medow Driggs	☐ Non-Compliance ☐ Plant Tap
(Name of well or other source for sample collected at the source. A different chain of custody should be used for each location collected from.)	☐ Other ____________
Date Sample Taken 05/08/2023	Time Sample Taken 10:00 ☒AM ☐PM

For Public Water System Source Samples	Public Water System Jurisdiction
Location Tag # ____________	**A copy of report to be sent to:** (Regulator) estoddard@civilize.design

CHECK DESIRED ANALYSIS

IOCs

- ☐ Arsenic ☐ Sodium ☒ Nitrate ☒ Nitrite
- ☐ Copper/Lead ☐ Sulfate
- ☐ Phase II IOC metals: Ba, Cd, Cr, F, Hg, Se
- ☐ Phase V IOC: Be, Ni, Sb, Tl
- ☐ Primary IOC package with Cyanide Waiver: Ba, Be, Cd, Cr, Hg, Ni, Sb, Se, Tl, Fluoride
- ☐ Secondary/Optional IOC package: Ag, Al, Ca, Cu, Fe, K, Mg, Mn, Pb, Zn, Chloride, Ammonia, Hydrogen Sulfide, Silica, Color, Hardness, Odor, pH, Conductivity, Alkalinity, TDS, Langlier Index Corrosivity, Surfactants
- ☐ Complete IOC package: Ag, Al, As, Ba, Be, Ca, Cd, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Se, Sb, Tl, Zn, Chloride, Fluoride, Nitrate, Nitrite, Sulfate, Ammonia, Hydrogen Sulfide, Silica, Color, Hardness, Odor, pH, Conductivity, Alkalinity, TDS, Langlier Index Corrosivity, Surfactants
- ☐ Cyanide

VOCs

- ☐ VOC 524.2
- ☐ TTHM
- ☐ Haloacetic Acids (HAA5)
- ☐ THMP

RADs

- ☐ Gross Alpha
- ☐ Gross Beta
- ☐ Radium 226
- ☐ Radium 228
- ☐ Uranium

SOCs

- ☐ Full SOC (all 8 below)
- ☐ Phase II SOC (all 5 below)
  - ☐ Semivolatiles (525.2)
  - ☐ Herbicides (515.1)
  - ☐ Carbamates (531.1)
  - ☐ Pesticides (505)
  - ☐ EDB/DBCP (504.1)
- ☐ Phase V SOC (all 3 below)
  - ☐ Diquat (549.1)
  - ☐ Endothall (548.1)
  - ☐ Glyphosate (547)

Other (specify)

- ☐ Bromate

Sample Submitted By: ____________
Shipping or Delivery Date: 05/08/2023 3:15pm

Received By: Brandon Smith
Received Date/Time: 050923 1150
Temp. °C: 10.8

LAB FEDERAL ID#: **ID00952**	DATE REPORTED BY LAB: **5/12/2023**
DATE RECEIVED: **5/9/2023**	
COMPLIANCE SAMPLE:	REPLACEMENT SAMPLE:
PWS #:	PWS NAME: **Brent Crowther**
CONTACT NAME: **Brent Crowther**	CONTACT PHONE: **(208) 351-2824**

IAS EnviroChem
3314 Pole Line Rd.
Pocatello, ID 83201
phone: (208) 237-3300
fax: (208) 237-3336
email: iasec3308@iasenvirochem.com
www.iasenvirochem.com

LAB SAMPLE NUMBER: **I305089-01**	COLLECTION DATE/TIME: **05/08/23 10:15**
SAMPLE TYPE:	SAMPLING POINT/LOCATION - TAG#/FACILITY ID: **2389 S Hwy 33 Driggs**

INORGANIC CHEMICAL ANALYSIS REPORT For Public Water Systems

FRDS	*Compound*	*Result*	*Units*	*MCL*	*MDL*	*Method*	*Analysis Date*	*Analyst*
1040	Nitrate as N	ND	mg/L	10	1.00	300.0	05/09/2023	TP
1041	Nitrite as N	ND	mg/L	1.0	0.10	300.0	05/09/2023	TP

ND = Not Detected MCL = Maximum Contaminant Level MDL = Method Detection Limit

Brent Crowther
Brent Crowther
350 N 2nd E
Rexburg, ID 83440

G. Ryan Pattie
Laboratory Director

IAS EnviroChem
3314 Pole Line Rd. • Pocatello, ID 83201
Phone: (208) 237-3300 • Fax: (208) 237-3336
email: iasec3308@iasenvirochem.com • www.iasenvirochem.com

Login Report

Customer Name: **Brent Crowther**
350 N 2nd E
Rexburg, ID 83440

Work Order #: **I305089**

Contact Name: **Brent Crowther**

Sample Description: **2389 S Hwy 33 Driggs**
Lab Tracking #: **I305089-01**
Matrix: **Drinking Water**
Sample Notes:

Sampling Date/Time: **05/08/23 10:15**
Date Received: **05/09/23 11:50**

Test	*Method*	*Due*
Nitrate:N (F)	**300.0**	**05/23/23**
Nitrite:N (F)	**300.0**	**05/23/23**

Sample Condition Record

Samples received in a cooler?	Yes
Samples received intact?	Yes
The temperature recorded?	10.8
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all samples properly preserved?	Yes
Labels and chain agree?	Yes

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

I305089
Brent Crowther
Received: 05/09/2023
RAB
1 Sample

IAS EnviroChem

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phone (208) 237-3300 • fax (208) 237-3336
email: iasec3308@iasenvirochem.com • www.iasenvirochem.com

Idaho Chain of Custody - Drinking Water Analysis

Water System Name:
Contact / Project Manger: Brent Crowther
Address: 350 N 2nd E
City, State, Zip: Rexburg, ID 83440

PWS #:
County:
Phone: 208-351-2824
Email: bcrowther@civilize.design

Payment Options

Send Bill or Receipt To:
Payment due with samples unless credit has been established
Email Invoice to:

Amount $
Received by
f

☐ Cash ☐ Bill ☐ Check# ☐ PO # ☐ Other

Sample Information
For all samples, Public and Private

Sample Collected By: Quinn
Sample Collection Location: 2389 S Hwy 33 Driggs
(Name of well or other source for sample collected at the source. A different chain of custody should be used for each location collected from.)
Date Sample Taken 05/08/2023

Sample Type

☐ Distribution ☐ Raw Water
☐ Non-Compliance ☐ Plant Tap
☐ Other

Time Sample Taken 10:15 ☒ AM ☐ PM

For Public Water System Source Samples

Location Tag #

Public Water System Jurisdiction

A copy of report to be sent to:
(Regulator)
estoddard@civilize.design

CHECK DESIRED ANALYSIS

IOCs

☐ Arsenic ☐ Sodium ☒ Nitrate ☒ Nitrite
☐ Copper/Lead ☐ Sulfate
☐ Phase II IOC metals: Ba, Cd, Cr, F, Hg, Se
☐ Phase V IOC: Be, Ni, Sb, Tl
☐ Primary IOC package with Cyanide Waiver:
Ba, Be, Cd, Cr, Hg, Ni, Sb, Se, Tl, Fluoride
☐ Secondary/Optional IOC package:
Ag, Al, Ca, Cu, Fe, K, Mg, Mn, Pb, Zn, Chloride, Ammonia, Hydrogen Sulfide, Silica, Color, Hardness, Odor, pH, Conductivity, Alkalinity, TDS, Langlier Index Corrosivity, Surfactants
☐ Complete IOC package:
Ag, Al, As, Ba, Be, Ca, Cd, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Se, Sb, Tl, Zn, Chloride, Fluoride, Nitrate, Nitrite, Sulfate, Ammonia, Hydrogen Sulfide, Silica, Color, Hardness, Odor, pH, Conductivity, Alkalinity, TDS, Langlier Index Corrosivity, Surfactants
☐ Cyanide

VOCs

☐ VOC 524.2
☐ TTHM
☐ Haloacetic Acids (HAA5)
☐ THMP

RADs

☐ Gross Alpha
☐ Gross Beta
☐ Radium 226
☐ Radium 228
☐ Uranium

SOCs

☐ Full SOC (all 8 below)
☐ Phase II SOC (all 5 below)
  ☐ Semivolatiles (525.2)
  ☐ Herbicides (515.1)
  ☐ Carbamates (531.1)
  ☐ Pesticides (505)
  ☐ EDB/DBCP (504.1)
☐ Phase V SOC (all 3 below)
  ☐ Diquat (549.1)
  ☐ Endothall (548.1)
  ☐ Glyphosate (547)

Other (specify)

☐ Bromate

Sample Submitted By:
Shipping or Delivery Date: 05/08/2023 3:16pm

Received By: Brandon Smith
Received Date/Time: 050923 1150
Temp. °C: 10.8

LAB FEDERAL ID#: **ID00952**	DATE REPORTED BY LAB: **5/12/2023**
DATE RECEIVED: **5/9/2023**	
COMPLIANCE SAMPLE:	REPLACEMENT SAMPLE:

PWS #:	PWS NAME: **Brent Crowther**
CONTACT NAME: **Brent Crowther**	CONTACT PHONE: **(208) 351-2824**

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3314 Pole Line Rd.
Pocatello, ID 83201
phone: (208) 237-3300
fax: (208) 237-3336
email: iasec3308@iasenvirochem.com
www.iasenvirochem.com

LAB SAMPLE NUMBER: **I305092-01**	COLLECTION DATE/TIME: **05/08/23 11:00**
SAMPLE TYPE:	SAMPLING POINT/LOCATION - TAG#/FACILITY ID: **1502 S 1000 E**

INORGANIC CHEMICAL ANALYSIS REPORT For Public Water Systems

FRDS	*Compound*	*Result*	*Units*	*MCL*	*MDL*	*Method*	*Analysis Date*	*Analyst*
1040	Nitrate as N	4.75	mg/L	10	1.00	300.0	05/09/2023	TP
1041	Nitrite as N	ND	mg/L	1.0	0.10	300.0	05/09/2023	TP

ND = Not Detected MCL = Maximum Contaminant Level MDL = Method Detection Limit

Brent Crowther
Brent Crowther
350 N 2nd E
Rexburg, ID 83440

G. Ryan Pattie
Laboratory Director

Login Report

Customer Name: **Brent Crowther**
350 N 2nd E
Rexburg, ID 83440

Work Order #: **I305092**

Contact Name: **Brent Crowther**

Sample Description: **1502 S 1000 E**
Lab Tracking #: **I305092-01**
Matrix: **Drinking Water**
Sample Notes:

Sampling Date/Time: **05/08/23 11:00**
Date Received: **05/09/23 11:50**

Test	*Method*	*Due*
Nitrate:N (F)	**300.0**	**05/23/23**
Nitrite:N (F)	**300.0**	**05/23/23**

Sample Condition Record

Samples received in a cooler?	Yes
Samples received intact?	Yes
The temperature recorded?	10.8
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all samples properly preserved?	Yes
Labels and chain agree?	Yes

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

I305092
Brent Crowther
Received: 05/09/2023
RAB
1 Sample

IAS EnviroChem

3314 Poleline Rd. • Pocatello, ID 83201
phone (208) 237-3300 • fax (208) 237-3336
email: iasec3308@iasenvirochem.com • www.iasenvirochem.com

Idaho Chain of Custody - Drinking Water Analysis

Water System Name:		PWS #:	
Contact / Project Manger:	Brent Crowther	County:	
Address:	350 N 2nd E	Phone:	208-351-2824
City, State, Zip:	Rexburg, ID 83440	Email:	bcrowther@civilize.design

Payment Options

Send Bill or Receipt To:
Payment due with samples unless credit has been established

Email Invoice to:

Amount $ ~~0~~

Received by

F

☐ Cash ☐ Bill ☐ Check# ☐ PO # ☐ Other

Sample Information
For all samples, Public and Private

Sample Collected By: Quinn

Sample Collection Location: 1502 S 1000 E
(Name of well or other source for sample collected at the source. A different chain of custody should be used for each location collected from.)

Date Sample Taken 05/08/2023

Sample Type

☐ Distribution ☐ Raw Water
☐ Non-Compliance ☐ Plant Tap
☐ Other

Time Sample Taken ~~[illegible]~~ 11:06 ☒AM ☐PM

For Public Water System Source Samples

Location Tag #

Public Water System Jurisdiction

A copy of report to be sent to:
(Regulator)
estoddard@civilize.design

CHECK DESIRED ANALYSIS

IOCs

☐ Arsenic ☐ Sodium ☒ Nitrate ☒ Nitrite
☐ Copper/Lead ☐ Sulfate
☐ Phase II IOC metals: Ba, Cd, Cr, F, Hg, Se
☐ Phase V IOC: Be, Ni, Sb, Tl
☐ Primary IOC package with Cyanide Waiver:
Ba, Be, Cd, Cr, Hg, Ni, Sb, Se, Tl, Fluoride
☐ Secondary/Optional IOC package:
Ag, Al, Ca, Cu, Fe, K, Mg, Mn, Pb, Zn, Chloride, Ammonia, Hydrogen Sulfide, Silica, Color, Hardness, Odor, pH, Conductivity, Alkalinity, TDS, Langlier Index Corrosivity, Surfactants
☐ Complete IOC package:
Ag, Al, As, Ba, Be, Ca, Cd, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Se, Sb, Tl, Zn, Chloride, Fluoride, Nitrate, Nitrite, Sulfate, Ammonia, Hydrogen Sulfide, Silica, Color, Hardness, Odor, pH, Conductivity, Alkalinity, TDS, Langlier Index Corrosivity, Surfactants
☐ Cyanide

VOCs

☐ VOC 524.2
☐ TTHM
☐ Haloacetic Acids (HAA5)
☐ THMP

RADs

☐ Gross Alpha
☐ Gross Beta
☐ Radium 226
☐ Radium 228
☐ Uranium

SOCs

☐ Full SOC (all 8 below)
☐ Phase II SOC (all 5 below)
  ☐ Semivolatiles (525.2)
  ☐ Herbicides (515.1)
  ☐ Carbamates (531.1)
  ☐ Pesticides (505)
  ☐ EDB/DBCP (504.1)
☐ Phase V SOC (all 3 below)
  ☐ Diquat (549.1)
  ☐ Endothall (548.1)
  ☐ Glyphosate (547)

Other (specify)

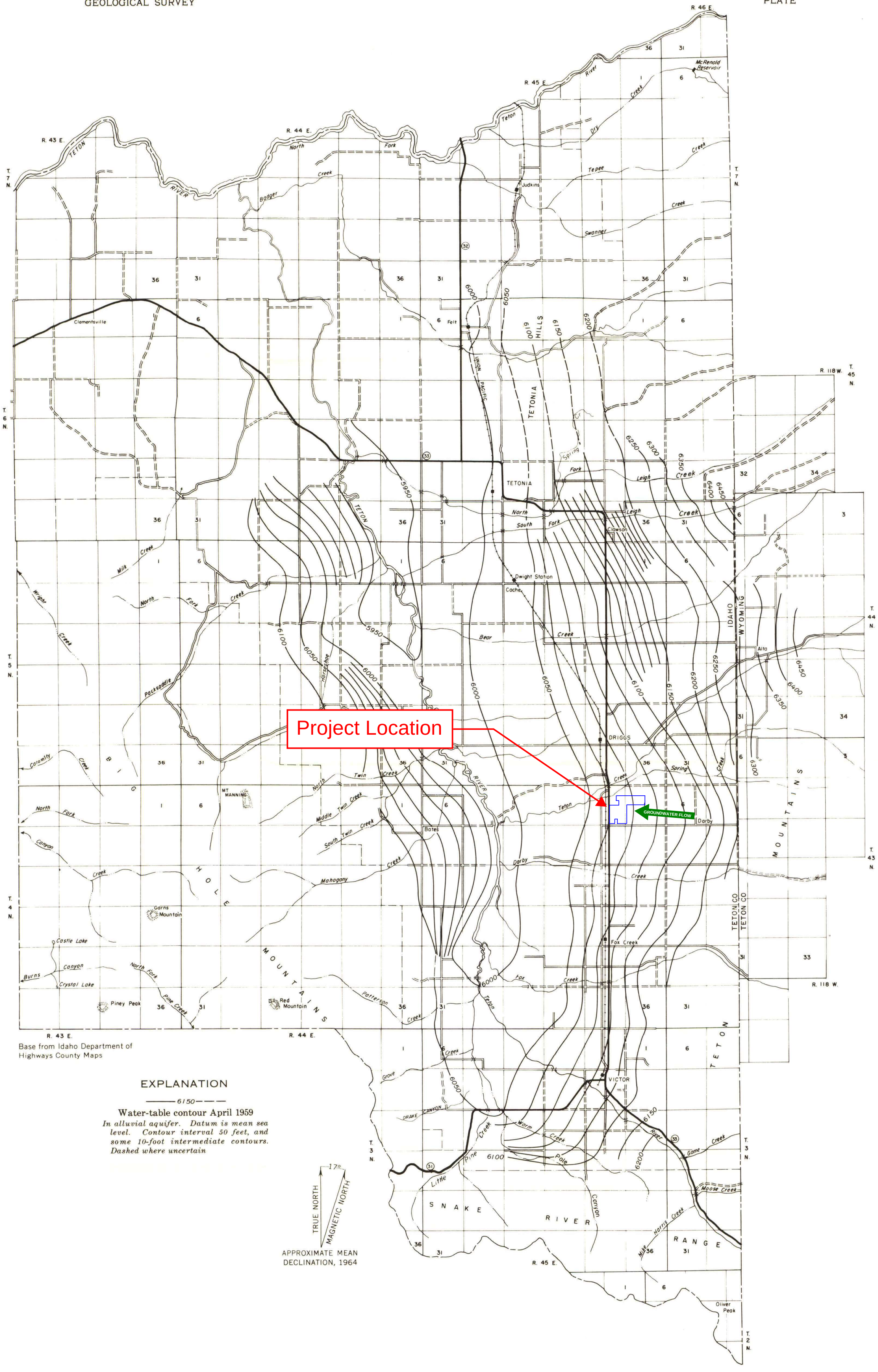
☐ Bromate

Sample Submitted By:
Shipping or Delivery Date: 05/08/2023 3:22pm

Received By: Brandon Smith
Received Date/Time: 050923 1150
Temp. °C: 10.8

Appendix H

Groundwater Flow Direction Map



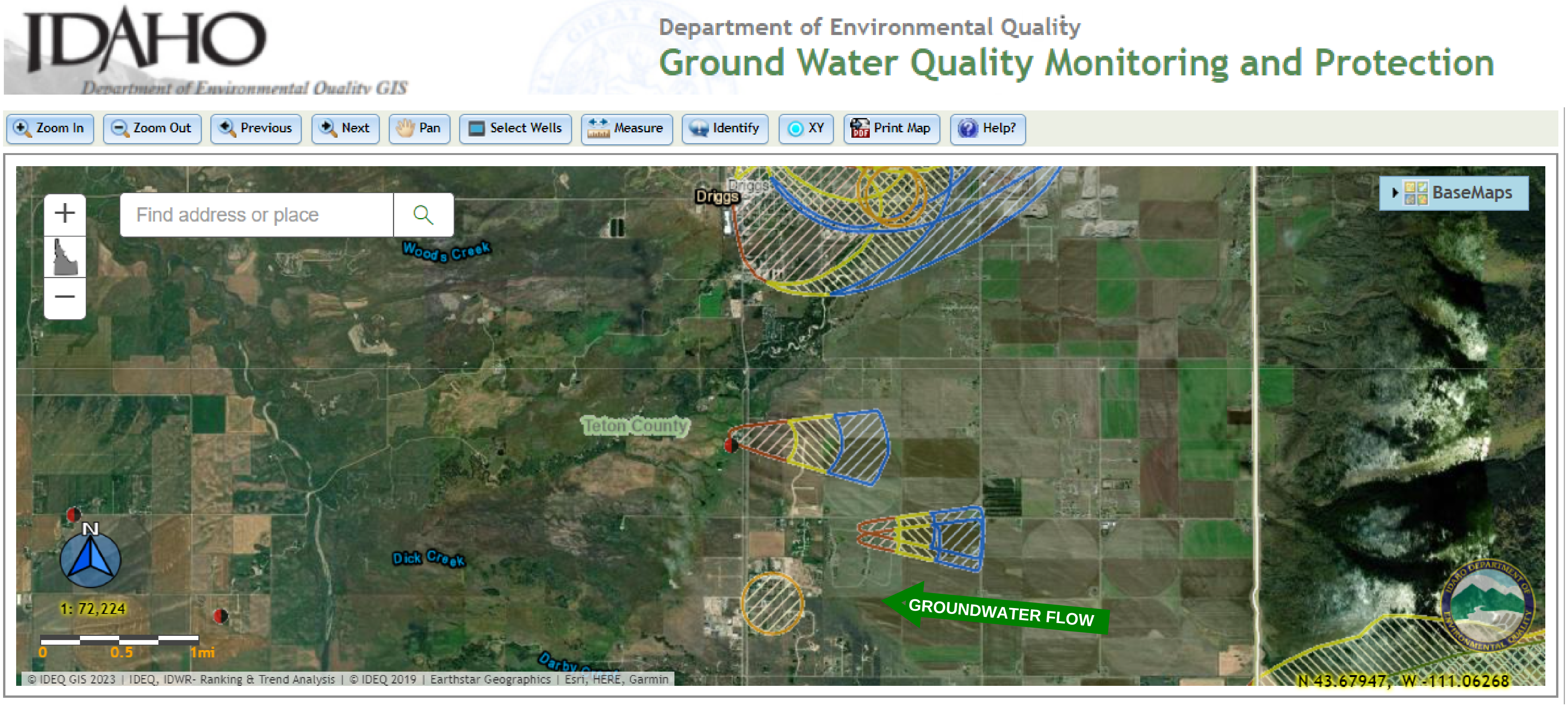
MAP SHOWING APPROXIMATE CONFIGURATION OF THE WATER TABLE IN THE UPPER TETON VALLEY, IDAHO AND WYOMING

SCALE 1:125 000

2 0 2 4 6 MILES

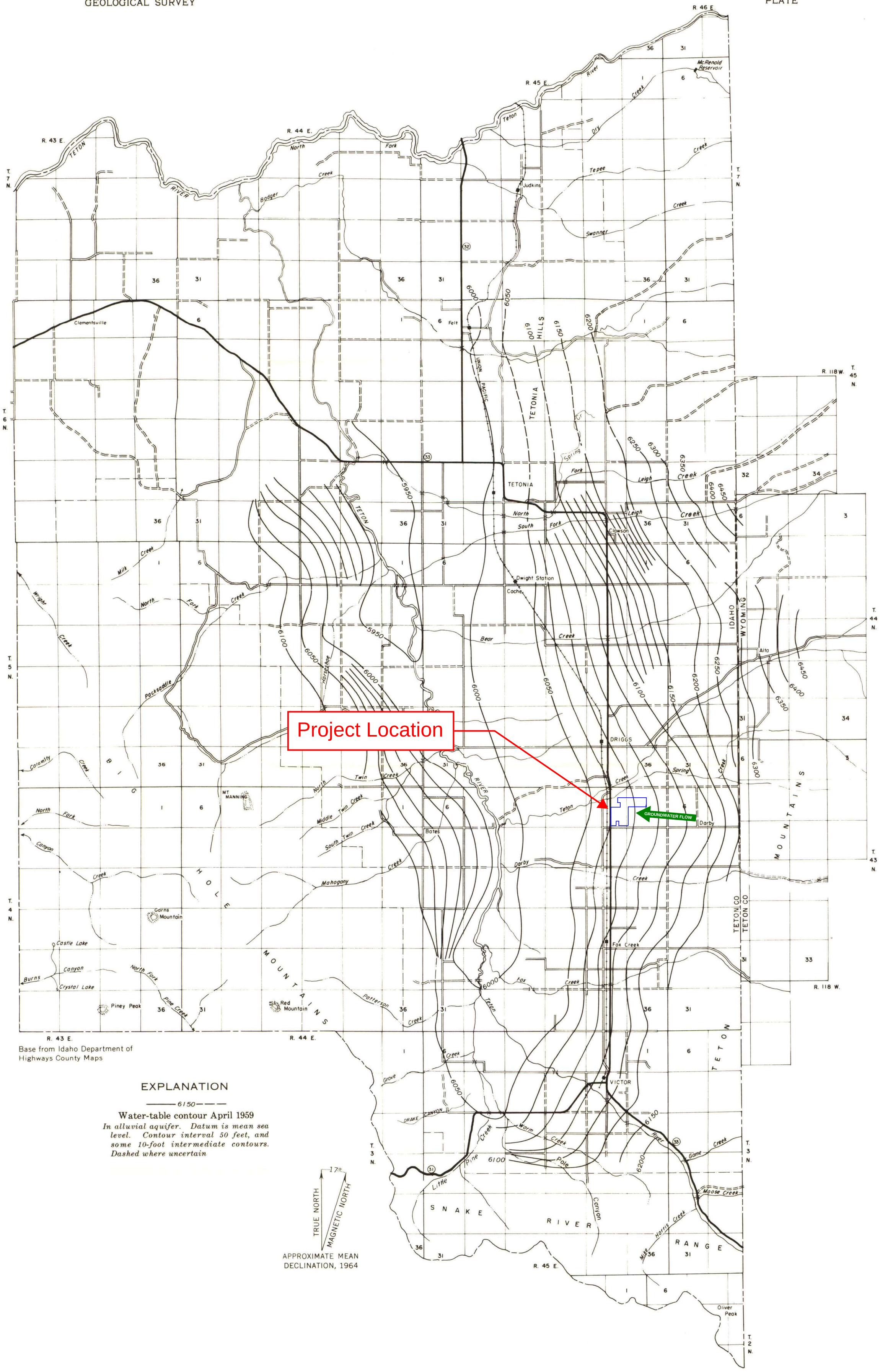
2 0 2 4 6 KILOMETERS

735-911 O - 64 (In pocket)


IDAHO
Department of Environmental Quality GIS
Department of Environmental Quality
Ground Water Quality Monitoring and Protection
Zoom In
Zoom Out
Previous
Next
Pan
Select Wells
Measure
Identify
XY
Print Map
Help?
Find address or place
BaseMaps
Driggs
Woods Creek
Teton County
Dick Creek
Darby Creek
GROUNDWATER FLOW
N
1: 72,224
0
0.5
1mi
© IDEQ GIS 2023 | IDEQ, IDWR- Ranking & Trend Analysis | © IDEQ 2019 | Earthstar Geographics | Esri, HERE, Garmin
N 43.67947, W -111.06268

Appendix I

Groundwater Gradient Map



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)

Appendix J

IDEQ Nitrate Mass-Balance Spreadsheet

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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	302	Site-specific	
Parcel Area (acres)	2.5	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	300	300	**Default**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	4.28E+04	98.3
Effluent	4.14E+02	1.0
Recharge	3.40E+02	0.8
Total Water Volume	**4.36E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**2.8**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	1.03E+08	84.6
Septic Tank Effluent Nitrate Mass	1.87E+07	15.3
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.22E+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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 10	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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

INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	198	Site-specific	
Parcel Area (acres)	1.251	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	300	300	**Default**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	2.81E+04	98.0
Effluent	4.14E+02	1.4
Recharge	1.70E+02	0.6
Total Water Volume	**2.87E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.0**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	6.74E+07	78.3
Septic Tank Effluent Nitrate Mass	1.87E+07	21.7
Recharge Nitrate Mass	5.11E+04	0.1
Total Nitrate Mass	**8.61E+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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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 13	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	154	Site-specific	
Parcel Area (acres)	1.25	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	300	300	**Default**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	2.18E+04	97.4
Effluent	4.14E+02	1.8
Recharge	1.70E+02	0.8
Total Water Volume	**2.24E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.2**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	5.24E+07	73.7
Septic Tank Effluent Nitrate Mass	1.87E+07	26.2
Recharge Nitrate Mass	5.10E+04	0.1
Total Nitrate Mass	**7.11E+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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 25	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	222	Site-specific	
Parcel Area (acres)	1.658	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	300	300	**Default**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	3.15E+04	98.0
Effluent	4.14E+02	1.3
Recharge	2.26E+02	0.7
Total Water Volume	**3.21E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.0**
Current/Acceptable Lot Size (Acres)	**1.7**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	7.62E+07	80.3
Septic Tank Effluent Nitrate Mass	1.87E+07	19.7
Recharge Nitrate Mass	6.77E+04	0.1
Total Nitrate Mass	**9.49E+07**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 3	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	286	Site-specific	
Parcel Area (acres)	2.646	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	300	300	**Default**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	4.06E+04	98.1
Effluent	4.14E+02	1.0
Recharge	3.60E+02	0.9
Total Water Volume	**4.13E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**2.8**
Current/Acceptable Lot Size (Acres)	**2.6**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	9.82E+07	84.0
Septic Tank Effluent Nitrate Mass	1.87E+07	16.0
Recharge Nitrate Mass	1.08E+05	0.1
Total Nitrate Mass	**1.17E+08**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 5	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	251	Site-specific	
Parcel Area (acres)	2.501	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	300	300	**Default**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	3.56E+04	97.9
Effluent	4.14E+02	1.1
Recharge	3.40E+02	0.9
Total Water Volume	**3.64E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**2.9**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	8.61E+07	82.1
Septic Tank Effluent Nitrate Mass	1.87E+07	17.8
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.05E+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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 12	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	302	Site-specific	
Parcel Area (acres)	2.5	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	500	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	4.28E+04	97.6
Effluent	6.91E+02	1.6
Recharge	3.40E+02	0.8
Total Water Volume	**4.39E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.1**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.03E+08	76.7
Septic Tank Effluent Nitrate Mass	3.11E+07	23.2
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.34E+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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 10 (+ADU)	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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

INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	198	Site-specific	
Parcel Area (acres)	1.251	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	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)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	2.81E+04	97.5
Effluent	5.53E+02	1.9
Recharge	1.70E+02	0.6
Total Water Volume	**2.88E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.2**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	6.74E+07	73.0
Septic Tank Effluent Nitrate Mass	2.49E+07	26.9
Recharge Nitrate Mass	5.11E+04	0.1
Total Nitrate Mass	**9.23E+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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 13 (+ADU)	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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

INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	154	Site-specific	
Parcel Area (acres)	1.25	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	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)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	2.18E+04	96.8
Effluent	5.53E+02	2.4
Recharge	1.70E+02	0.8
Total Water Volume	**2.26E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	5.24E+07	67.8
Septic Tank Effluent Nitrate Mass	2.49E+07	32.2
Recharge Nitrate Mass	5.10E+04	0.1
Total Nitrate Mass	**7.73E+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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 25 (+ADU)	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	222	Site-specific	
Parcel Area (acres)	1.658	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	500	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	3.15E+04	97.2
Effluent	6.91E+02	2.1
Recharge	2.26E+02	0.7
Total Water Volume	**3.24E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.3**
Current/Acceptable Lot Size (Acres)	**1.7**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	7.62E+07	71.0
Septic Tank Effluent Nitrate Mass	3.11E+07	29.0
Recharge Nitrate Mass	6.77E+04	0.1
Total Nitrate Mass	**1.07E+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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 3 (+ADU)	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	286	Site-specific	
Parcel Area (acres)	2.646	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	500	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	4.06E+04	97.5
Effluent	6.91E+02	1.7
Recharge	3.60E+02	0.9
Total Water Volume	**4.16E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**	
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.1**	
Current/Acceptable Lot Size (Acres)	**2.6**	

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	9.82E+07	75.9
Septic Tank Effluent Nitrate Mass	3.11E+07	24.0
Recharge Nitrate Mass	1.08E+05	0.1
Total Nitrate Mass	**1.29E+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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 5 (+ADU)	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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IDEQ LEVEL 1 NUTRIENT-PATHOGEN EVALUATION NITROGEN MASS-BALANCE SPREADSHEET V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	251	Site-specific	
Parcel Area (acres)	2.501	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	500	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	3.56E+04	97.2
Effluent	6.91E+02	1.9
Recharge	3.40E+02	0.9
Total Water Volume	**3.66E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.2**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	8.61E+07	73.4
Septic Tank Effluent Nitrate Mass	3.11E+07	26.5
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.17E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 12 (+ADU)	**Parcel Identification**
7/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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IDEQ Nitrate Mass-Balance Spreadsheets
Analysis II

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	45	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	4002	Site-specific	
Parcel Area (acres)	281.19	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	84.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	350	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	1.70E+06	95.6
Effluent	4.06E+04	2.3
Recharge	3.83E+04	2.1
Total Water Volume	**1.78E+06**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.3**
Current/Acceptable Lot Size (Acres)	**3.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	4.09E+09	69.0
Septic Tank Effluent Nitrate Mass	1.83E+09	30.8
Recharge Nitrate Mass	1.15E+07	0.2
Total Nitrate Mass	**5.93E+09**	

Instructions for Use

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

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

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

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

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

SITE INFORMATION

Trestles/Wildflower Development	**Site Name**
Total Development (45 mg/l)	**Parcel Identification**
9/19/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	45	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	4002	Site-specific	
Parcel Area (acres)	281.19	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	84.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	450	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	1.70E+06	95.0
Effluent	5.22E+04	2.9
Recharge	3.83E+04	2.1
Total Water Volume	**1.79E+06**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**3.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	4.09E+09	67.2
Septic Tank Effluent Nitrate Mass	1.98E+09	32.6
Recharge Nitrate Mass	1.15E+07	0.2
Total Nitrate Mass	**6.08E+09**	

Instructions for Use

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

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

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

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

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

TAP is input in inches/yr.

SITE INFORMATION

Trestles/Wildflower Development	**Site Name**
Total Development (38 mg/l)	**Parcel Identification**
9/19/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	45	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	4002	Site-specific	
Parcel Area (acres)	281.19	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	84.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	650	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	1.70E+06	93.7
Effluent	7.54E+04	4.2
Recharge	3.83E+04	2.1
Total Water Volume	**1.82E+06**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**3.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	4.09E+09	66.6
Septic Tank Effluent Nitrate Mass	2.04E+09	33.2
Recharge Nitrate Mass	1.15E+07	0.2
Total Nitrate Mass	**6.13E+09**	

Instructions for Use

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

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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

Trestles/Wildflower Development	**Site Name**
Total Development (27 mg/l)	**Parcel Identification**
9/19/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	30	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	2686	Site-specific	
Parcel Area (acres)	80.47	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	24.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	600	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)

Upgradient Ground Water Concentration (mg/l)	2.4	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	7.62E+05	96.1
Effluent	1.99E+04	2.5
Recharge	1.10E+04	1.4
Total Water Volume	**7.93E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**3.4**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	1.83E+09	67.1
Septic Tank Effluent Nitrate Mass	8.95E+08	32.8
Recharge Nitrate Mass	3.29E+06	0.1
Total Nitrate Mass	**2.73E+09**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Trestles Phase I (45 mg/l)	**Parcel Identification**
9/19/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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IDEQ LEVEL 1 NUTRIENT-PATHOGEN EVALUATION NITROGEN MASS-BALANCE SPREADSHEET V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	30	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	2686	Site-specific	
Parcel Area (acres)	80.47	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	24.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	700	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	7.62E+05	95.7
Effluent	2.32E+04	2.9
Recharge	1.10E+04	1.4
Total Water Volume	**7.96E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**	
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**	
Current/Acceptable Lot Size (Acres)	**3.4**	

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	1.83E+09	67.4
Septic Tank Effluent Nitrate Mass	8.82E+08	32.5
Recharge Nitrate Mass	3.29E+06	0.1
Total Nitrate Mass	**2.71E+09**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Trestles Phase I (38 mg/l)	**Parcel Identification**
9/19/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	30	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	2686	Site-specific	
Parcel Area (acres)	80.47	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	24.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1050	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	7.62E+05	94.3
Effluent	3.48E+04	4.3
Recharge	1.10E+04	1.4
Total Water Volume	**8.08E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**3.4**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.83E+09	66.0
Septic Tank Effluent Nitrate Mass	9.40E+08	33.9
Recharge Nitrate Mass	3.29E+06	0.1
Total Nitrate Mass	**2.77E+09**	

Instructions for Use

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

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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

Trestles/Wildflower Development	**Site Name**
Trestles Phase I (27 mg/l)	**Parcel Identification**
9/19/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	45	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	1333	Site-specific	
Parcel Area (acres)	136.36	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	40.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	250	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	5.67E+05	94.6
Effluent	1.38E+04	2.3
Recharge	1.86E+04	3.1
Total Water Volume	**6.00E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.3**
Current/Acceptable Lot Size (Acres)	**3.4**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.36E+09	68.5
Septic Tank Effluent Nitrate Mass	6.22E+08	31.3
Recharge Nitrate Mass	5.57E+06	0.3
Total Nitrate Mass	**1.99E+09**	

Instructions for Use

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

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

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

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

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

SITE INFORMATION

Trestles/Wildflower Development	**Site Name**
Trestles Phase II (45mg/l)	**Parcel Identification**
9/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	45	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	1333	Site-specific	
Parcel Area (acres)	136.36	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	40.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	300	300	**Default**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	5.67E+05	94.2
Effluent	1.66E+04	2.8
Recharge	1.86E+04	3.1
Total Water Volume	**6.02E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.3**
Current/Acceptable Lot Size (Acres)	**3.4**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.36E+09	68.2
Septic Tank Effluent Nitrate Mass	6.30E+08	31.6
Recharge Nitrate Mass	5.57E+06	0.3
Total Nitrate Mass	**2.00E+09**	

Instructions for Use

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

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

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

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

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

SITE INFORMATION

Trestles/Wildflower Development	**Site Name**
Trestles Phase II (38mg/l)	**Parcel Identification**
9/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	45	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	1333	Site-specific	
Parcel Area (acres)	136.36	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	40.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	500	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	5.67E+05	92.5
Effluent	2.76E+04	4.5
Recharge	1.86E+04	3.0
Total Water Volume	**6.13E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**3.4**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.36E+09	64.4
Septic Tank Effluent Nitrate Mass	7.46E+08	35.3
Recharge Nitrate Mass	5.57E+06	0.3
Total Nitrate Mass	**2.11E+09**	

Instructions for Use

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

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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

Trestles/Wildflower Development	**Site Name**
Trestles Phase II (27 mg/l)	**Parcel Identification**
9/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	30	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	2666	Site-specific	
Parcel Area (acres)	64.76	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	25.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	550	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	7.56E+05	96.5
Effluent	1.90E+04	2.4
Recharge	8.81E+03	1.1
Total Water Volume	**7.84E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.6**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	1.81E+09	67.9
Septic Tank Effluent Nitrate Mass	8.55E+08	32.0
Recharge Nitrate Mass	2.64E+06	0.1
Total Nitrate Mass	**2.67E+09**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Wildflower (45 mg/l)	**Parcel Identification**
9/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	30	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	2666	Site-specific	
Parcel Area (acres)	64.76	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	25.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	650	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	7.56E+05	96.0
Effluent	2.24E+04	2.9
Recharge	8.81E+03	1.1
Total Water Volume	**7.87E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.6**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.81E+09	68.0
Septic Tank Effluent Nitrate Mass	8.53E+08	31.9
Recharge Nitrate Mass	2.64E+06	0.1
Total Nitrate Mass	**2.67E+09**	

Instructions for Use

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

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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

Trestles/Wildflower Development	**Site Name**
Wildflower (38 mg/l)	**Parcel Identification**
9/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	30	15	**Provide Justification**
Aquifer Width Perpendicular to Flow (ft)	2666	Site-specific	
Parcel Area (acres)	64.76	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	25.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1000	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	7.56E+05	94.6
Effluent	3.45E+04	4.3
Recharge	8.81E+03	1.1
Total Water Volume	**8.00E+05**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.6**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	1.81E+09	66.0
Septic Tank Effluent Nitrate Mass	9.33E+08	33.9
Recharge Nitrate Mass	2.64E+06	0.1
Total Nitrate Mass	**2.75E+09**	

Instructions for Use

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

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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

Trestles/Wildflower Development	**Site Name**
Wildflower (27 mg/l)	**Parcel Identification**
9/18/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	379	Site-specific	
Parcel Area (acres)	5.026	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1800	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	5.38E+04	94.4
Effluent	2.49E+03	4.4
Recharge	6.84E+02	1.2
Total Water Volume	**5.69E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**5.0**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.29E+08	65.7
Septic Tank Effluent Nitrate Mass	6.71E+07	34.2
Recharge Nitrate Mass	2.05E+05	0.1
Total Nitrate Mass	**1.96E+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.

SITE INFORMATION

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 4 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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.

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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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	379	Site-specific	
Parcel Area (acres)	5.026	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1200	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	5.38E+04	95.8
Effluent	1.66E+03	3.0
Recharge	6.84E+02	1.2
Total Water Volume	**5.61E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**5.0**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.29E+08	67.1
Septic Tank Effluent Nitrate Mass	6.30E+07	32.8
Recharge Nitrate Mass	2.05E+05	0.1
Total Nitrate Mass	**1.92E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 4 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

IDEQ LEVEL 1 NUTRIENT-PATHOGEN EVALUATION NITROGEN MASS-BALANCE SPREADSHEET V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	379	Site-specific	
Parcel Area (acres)	5.026	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1000	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	5.38E+04	96.3
Effluent	1.38E+03	2.5
Recharge	6.84E+02	1.2
Total Water Volume	**5.58E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**5.0**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	1.29E+08	67.4
Septic Tank Effluent Nitrate Mass	6.22E+07	32.5
Recharge Nitrate Mass	2.05E+05	0.1
Total Nitrate Mass	**1.91E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 4 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

IDEQ LEVEL 1 NUTRIENT-PATHOGEN EVALUATION NITROGEN MASS-BALANCE SPREADSHEET V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	302	Site-specific	
Parcel Area (acres)	2.5	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1400	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	4.28E+04	95.0
Effluent	1.93E+03	4.3
Recharge	3.40E+02	0.8
Total Water Volume	**4.51E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.03E+08	66.3
Septic Tank Effluent Nitrate Mass	5.22E+07	33.7
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.55E+08**	

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 10 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	302	Site-specific	
Parcel Area (acres)	2.5	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	950	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	4.28E+04	96.3
Effluent	1.31E+03	3.0
Recharge	3.40E+02	0.8
Total Water Volume	**4.45E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.03E+08	67.3
Septic Tank Effluent Nitrate Mass	4.99E+07	32.6
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.53E+08**	

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 10 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	302	Site-specific	
Parcel Area (acres)	2.5	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	800	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	4.28E+04	96.7
Effluent	1.11E+03	2.5
Recharge	3.40E+02	0.8
Total Water Volume	**4.43E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.03E+08	67.3
Septic Tank Effluent Nitrate Mass	4.97E+07	32.6
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.53E+08**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 10 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	368	Site-specific	
Parcel Area (acres)	5.015	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1750	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	5.22E+04	94.4
Effluent	2.42E+03	4.4
Recharge	6.83E+02	1.2
Total Water Volume	**5.53E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**5.0**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.25E+08	65.7
Septic Tank Effluent Nitrate Mass	6.53E+07	34.2
Recharge Nitrate Mass	2.05E+05	0.1
Total Nitrate Mass	**1.91E+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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 24 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	368	Site-specific	
Parcel Area (acres)	5.015	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1150	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	5.22E+04	95.8
Effluent	1.59E+03	2.9
Recharge	6.83E+02	1.3
Total Water Volume	**5.45E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**5.0**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.25E+08	67.4
Septic Tank Effluent Nitrate Mass	6.04E+07	32.5
Recharge Nitrate Mass	2.05E+05	0.1
Total Nitrate Mass	**1.86E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 24 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	368	Site-specific	
Parcel Area (acres)	5.015	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	950	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	5.22E+04	96.3
Effluent	1.31E+03	2.4
Recharge	6.83E+02	1.3
Total Water Volume	**5.42E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**5.0**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.25E+08	67.9
Septic Tank Effluent Nitrate Mass	5.91E+07	32.0
Recharge Nitrate Mass	2.05E+05	0.1
Total Nitrate Mass	**1.85E+08**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 24 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	222	Site-specific	
Parcel Area (acres)	1.658	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1000	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	3.15E+04	95.1
Effluent	1.38E+03	4.2
Recharge	2.26E+02	0.7
Total Water Volume	**3.31E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.7**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	7.62E+07	67.1
Septic Tank Effluent Nitrate Mass	3.73E+07	32.8
Recharge Nitrate Mass	6.77E+04	0.1
Total Nitrate Mass	**1.14E+08**	

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 3 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

IDEQ LEVEL 1 NUTRIENT-PATHOGEN EVALUATION NITROGEN MASS-BALANCE SPREADSHEET V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	222	Site-specific	
Parcel Area (acres)	1.658	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	650	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	3.15E+04	96.6
Effluent	8.98E+02	2.8
Recharge	2.26E+02	0.7
Total Water Volume	**3.26E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.7**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	7.62E+07	69.0
Septic Tank Effluent Nitrate Mass	3.41E+07	30.9
Recharge Nitrate Mass	6.77E+04	0.1
Total Nitrate Mass	**1.10E+08**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 3 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	222	Site-specific	
Parcel Area (acres)	1.658	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	550	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	3.15E+04	97.0
Effluent	7.60E+02	2.3
Recharge	2.26E+02	0.7
Total Water Volume	**3.25E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.7**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	7.62E+07	69.0
Septic Tank Effluent Nitrate Mass	3.42E+07	31.0
Recharge Nitrate Mass	6.77E+04	0.1
Total Nitrate Mass	**1.10E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 3 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	286	Site-specific	
Parcel Area (acres)	2.646	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1300	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	4.06E+04	95.0
Effluent	1.80E+03	4.2
Recharge	3.60E+02	0.8
Total Water Volume	**4.27E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.6**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	9.82E+07	66.9
Septic Tank Effluent Nitrate Mass	4.85E+07	33.0
Recharge Nitrate Mass	1.08E+05	0.1
Total Nitrate Mass	**1.47E+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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 5 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	286	Site-specific	
Parcel Area (acres)	2.646	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	850	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	4.06E+04	96.4
Effluent	1.17E+03	2.8
Recharge	3.60E+02	0.9
Total Water Volume	**4.21E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.6**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	9.82E+07	68.7
Septic Tank Effluent Nitrate Mass	4.46E+07	31.2
Recharge Nitrate Mass	1.08E+05	0.1
Total Nitrate Mass	**1.43E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 5 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	286	Site-specific	
Parcel Area (acres)	2.646	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	700	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	4.06E+04	96.8
Effluent	9.67E+02	2.3
Recharge	3.60E+02	0.9
Total Water Volume	**4.19E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.6**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	9.82E+07	69.2
Septic Tank Effluent Nitrate Mass	4.35E+07	30.7
Recharge Nitrate Mass	1.08E+05	0.1
Total Nitrate Mass	**1.42E+08**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 5 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	251	Site-specific	
Parcel Area (acres)	2.501	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1150	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	3.56E+04	94.9
Effluent	1.59E+03	4.2
Recharge	3.40E+02	0.9
Total Water Volume	**3.75E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	8.61E+07	66.7
Septic Tank Effluent Nitrate Mass	4.29E+07	33.2
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.29E+08**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 12 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	251	Site-specific	
Parcel Area (acres)	2.501	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	750	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	3.56E+04	96.3
Effluent	1.04E+03	2.8
Recharge	3.40E+02	0.9
Total Water Volume	**3.70E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	8.61E+07	68.6
Septic Tank Effluent Nitrate Mass	3.94E+07	31.3
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.26E+08**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 12 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	251	Site-specific	
Parcel Area (acres)	2.501	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	650	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	3.56E+04	96.6
Effluent	8.98E+02	2.4
Recharge	3.40E+02	0.9
Total Water Volume	**3.68E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	8.61E+07	68.0
Septic Tank Effluent Nitrate Mass	4.04E+07	31.9
Recharge Nitrate Mass	1.02E+05	0.1
Total Nitrate Mass	**1.27E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 12 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	329	Site-specific	
Parcel Area (acres)	5.077	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1550	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	4.67E+04	94.3
Effluent	2.14E+03	4.3
Recharge	6.91E+02	1.4
Total Water Volume	**4.95E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**5.1**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.12E+08	65.9
Septic Tank Effluent Nitrate Mass	5.78E+07	34.0
Recharge Nitrate Mass	2.07E+05	0.1
Total Nitrate Mass	**1.70E+08**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 18 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	329	Site-specific	
Parcel Area (acres)	5.077	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1050	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	4.67E+04	95.6
Effluent	1.45E+03	3.0
Recharge	6.91E+02	1.4
Total Water Volume	**4.88E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**5.1**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.12E+08	66.9
Septic Tank Effluent Nitrate Mass	5.51E+07	32.9
Recharge Nitrate Mass	2.07E+05	0.1
Total Nitrate Mass	**1.67E+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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 18 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	329	Site-specific	
Parcel Area (acres)	5.077	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	850	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	4.67E+04	96.2
Effluent	1.17E+03	2.4
Recharge	6.91E+02	1.4
Total Water Volume	**4.85E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**5.1**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.12E+08	67.9
Septic Tank Effluent Nitrate Mass	5.28E+07	32.0
Recharge Nitrate Mass	2.07E+05	0.1
Total Nitrate Mass	**1.65E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 18 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	371	Site-specific	
Parcel Area (acres)	2.536	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1700	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	5.26E+04	95.1
Effluent	2.35E+03	4.2
Recharge	3.45E+02	0.6
Total Water Volume	**5.53E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.26E+08	66.5
Septic Tank Effluent Nitrate Mass	6.34E+07	33.4
Recharge Nitrate Mass	1.04E+05	0.1
Total Nitrate Mass	**1.90E+08**	

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 32 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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IDEQ LEVEL 1 NUTRIENT-PATHOGEN EVALUATION NITROGEN MASS-BALANCE SPREADSHEET V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	371	Site-specific	
Parcel Area (acres)	2.536	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1150	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	5.26E+04	96.5
Effluent	1.59E+03	2.9
Recharge	3.45E+02	0.6
Total Water Volume	**5.46E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	1.26E+08	67.6
Septic Tank Effluent Nitrate Mass	6.04E+07	32.3
Recharge Nitrate Mass	1.04E+05	0.1
Total Nitrate Mass	**1.87E+08**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 32 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	371	Site-specific	
Parcel Area (acres)	2.536	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	950	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	5.26E+04	96.9
Effluent	1.31E+03	2.4
Recharge	3.45E+02	0.6
Total Water Volume	**5.43E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**2.5**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	1.26E+08	68.1
Septic Tank Effluent Nitrate Mass	5.91E+07	31.8
Recharge Nitrate Mass	1.04E+05	0.1
Total Nitrate Mass	**1.85E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 2 Lot 32 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	274	Site-specific	
Parcel Area (acres)	1.924	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1250	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	3.89E+04	95.1
Effluent	1.73E+03	4.2
Recharge	2.62E+02	0.6
Total Water Volume	**4.08E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.9**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	9.33E+07	66.6
Septic Tank Effluent Nitrate Mass	4.66E+07	33.3
Recharge Nitrate Mass	7.86E+04	0.1
Total Nitrate Mass	**1.40E+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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 1 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	274	Site-specific	
Parcel Area (acres)	1.924	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	850	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	3.89E+04	96.4
Effluent	1.17E+03	2.9
Recharge	2.62E+02	0.6
Total Water Volume	**4.03E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.9**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	9.33E+07	67.6
Septic Tank Effluent Nitrate Mass	4.46E+07	32.3
Recharge Nitrate Mass	7.86E+04	0.1
Total Nitrate Mass	**1.38E+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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 1 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	274	Site-specific	
Parcel Area (acres)	1.924	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	700	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	3.89E+04	96.9
Effluent	9.67E+02	2.4
Recharge	2.62E+02	0.7
Total Water Volume	**4.01E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.9**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	9.33E+07	68.1
Septic Tank Effluent Nitrate Mass	4.35E+07	31.8
Recharge Nitrate Mass	7.86E+04	0.1
Total Nitrate Mass	**1.37E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 1 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	232	Site-specific	
Parcel Area (acres)	1.25	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	1050	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	3.29E+04	95.3
Effluent	1.45E+03	4.2
Recharge	1.70E+02	0.5
Total Water Volume	**3.45E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	7.90E+07	66.8
Septic Tank Effluent Nitrate Mass	3.92E+07	33.1
Recharge Nitrate Mass	5.10E+04	0.0
Total Nitrate Mass	**1.18E+08**	

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 11 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	232	Site-specific	
Parcel Area (acres)	1.25	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	700	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	3.29E+04	96.7
Effluent	9.67E+02	2.8
Recharge	1.70E+02	0.5
Total Water Volume	**3.40E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	7.90E+07	68.2
Septic Tank Effluent Nitrate Mass	3.67E+07	31.7
Recharge Nitrate Mass	5.10E+04	0.0
Total Nitrate Mass	**1.16E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 11 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 5/2/2002

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	232	Site-specific	
Parcel Area (acres)	1.25	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	600	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	3.29E+04	97.1
Effluent	8.29E+02	2.4
Recharge	1.70E+02	0.5
Total Water Volume	**3.39E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	7.90E+07	67.9
Septic Tank Effluent Nitrate Mass	3.73E+07	32.1
Recharge Nitrate Mass	5.10E+04	0.0
Total Nitrate Mass	**1.16E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 11 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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

V. 1.3 **5/2/2002**

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INPUT

Water Budget	**Input Value**	**Default Value**	
Hydraulic Conductivity (ft/day)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	198	Site-specific	
Parcel Area (acres)	1.251	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	900	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	27.0	45.0	**Provide Justification**
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	2.81E+04	95.2
Effluent	1.24E+03	4.2
Recharge	1.70E+02	0.6
Total Water Volume	**2.95E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	6.74E+07	66.7
Septic Tank Effluent Nitrate Mass	3.36E+07	33.2
Recharge Nitrate Mass	5.11E+04	0.1
Total Nitrate Mass	**1.01E+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).

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 13 (27 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**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)	277.000	Site-specific	
Hydraulic Gradient	0.0033	Site-specific	
Mixing Zone Thickness (ft)	15	15	**Default**
Aquifer Width Perpendicular to Flow (ft)	198	Site-specific	
Parcel Area (acres)	1.251	Site-specific	
Percent of Parcel That Is Impervious (Percent)	2	Site-specific	
Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	600	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	Site-specific	
Septic Tank Effluent Concentration (mg/l)	38.0	45.0	**Provide Justification**
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	2.81E+04	96.6
Effluent	8.29E+02	2.9
Recharge	1.70E+02	0.6
Total Water Volume	**2.91E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget		
	Mass (mg)	**% of Total**
Background GW Nitrate Mass	6.74E+07	68.1
Septic Tank Effluent Nitrate Mass	3.15E+07	31.8
Recharge Nitrate Mass	5.11E+04	0.1
Total Nitrate Mass	**9.89E+07**	

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SITE INFORMATION

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Block 1 Lot 13 (38 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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Current/Acceptable Number of Homes in Parcel	1.0	Site-specific	
Septic Tank Effluent (gallons/d/home)	500	300	**Provide Justification**
Natural Recharge rate (inches/yr)	1.351	Site-specific	

Nitrogen Budget (all concentrations represent nitrate nitrogen)			
Upgradient Ground Water Concentration (mg/l)	2.4	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	2.81E+04	97.0
Effluent	6.91E+02	2.4
Recharge	1.70E+02	0.6
Total Water Volume	**2.89E+04**	

Point of Compliance Nitrate Concentration Goal (mg/l)	**3.4**
Avg. Downgradient Nitrate Concentration in GW (mg/l)	**3.4**
Current/Acceptable Lot Size (Acres)	**1.3**

Yearly Nitrogen Budget	**Mass (mg)**	**% of Total**
Background GW Nitrate Mass	6.74E+07	68.4
Septic Tank Effluent Nitrate Mass	3.11E+07	31.5
Recharge Nitrate Mass	5.11E+04	0.1
Total Nitrate Mass	**9.85E+07**	

Instructions for Use

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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

Trestles/Wildflower Development	**Site Name**
Block 1 Lot 13 (45 mg/l)	**Parcel Identification**
9/21/2023	**Date**
Eric Stoddard, PhD	**Prepared By**

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Appendix K

Hydraulic Conductivity

Civilize, PLLC
Management and Engineering

Project Analysis Worksheet
Hydraulic Condutivity

Client:
Project: **Trestles I, Trestles II, & Wildflower**
Project No.: **01-22-0038**
DESIGNED EAS
CHECKED BEC
DATE: 4/17/2023

Description: Teton County, Idaho

Soil Conditions:

Well Designation:	Pumping Rate (gpm):	Pumping Rate Q (ft^3/day):	Drawdown (ft):	Transmissivity T (ft^2/day):	Aquifer Thickness (feet):	Hydraulic conductivity (feet/day):	
(3)	20	3850.3	80	450.3476308	60	7.505793847	
(4)	5	962.6	78	180.940004	60	3.015666734	
(14)	15	2887.7	40	590.9204582	92	6.423048459	
(14)	60	11550.8	95	837.9432343	92	9.108078634	
(14)	100	19251.3	120	1008.966256	92	10.96702452	
(17)	40	7700.5	130	517.5665789	100	5.175665789	
(22)	20	3850.3	140	309.5368721	125	2.476294977	
(25)	30	5775.4	160	371.3974596	35	10.61135599	
(26)	30	5775.4	0	32727.22785	110	297.5202532	
(29)	30	5775.4	0	32727.22785	40	818.1806963	
(34)	50	9625.7	0	46083.75747	53	869.5048579	
(35)	100	19251.3	0	73322.62075	80	916.5327594	
	42	8021	70	15761	Avg Hydraulic Cond. =	246.418458	feet/day

Well Number	Discharge (gpm)	Drawdown (ft)	Static Water Level (ft)	Watertable thickness (ft)
1			75	70
2			60	44
3	20	80	50	60
4	5	78	34	60
5	30		50	40
6	40		35	100
7	25		85	49
8			40	62
9			30	80
10	30		25	60
11			29	48
12			30	52
13	20		9	
14.1	15	40	9	92
14.2	60	95	9	92
14.3	100	120	9	92
15			40	91
16			70	50
17	40	130	76	100
18			85	144
19			85	145
20			8.5	
21			130	80
22	20	140	125	125
23	20	140	105	125
24			90	50
25	30	160	110	35
26	30	0	100	110
27			50	50
28	20		58	82
29	30	0	65	40
30			20	82
31			30	80
32	20		55	82
33			35	40
34	50	0	63	53
35	100	0	30	80

Avg Static Water Level = 54.31 feet
Avg Watertable thickness = 76 feet

Appendix L

Aquifer Width Perpendicular to Flow

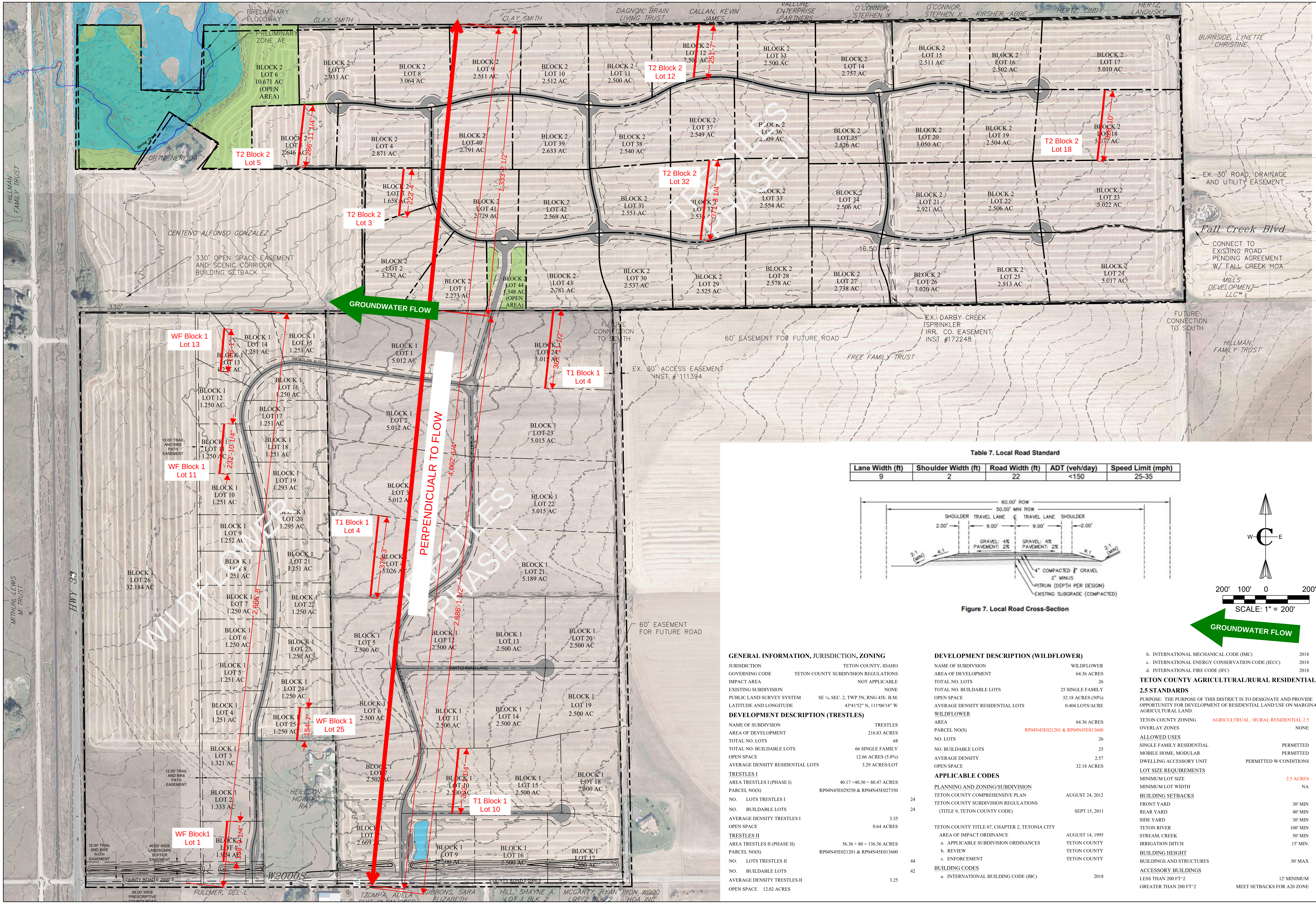

Table 7. Local Road Standard

Lane Width (ft)	Shoulder Width (ft)	Road Width (ft)	ADT (veh/day)	Speed Limit (mph)
9	2	22	<150	25-35

Figure 7. Local Road Cross-Section

SCALE: 1" = 200'

GENERAL INFORMATION, JURISDICTION, ZONING

JURISDICTION	TETON COUNTY, IDAHO
GOVERNING CODE	TETON COUNTY SUBDIVISION REGULATIONS
IMPACT AREA	NOT APPLICABLE
EXISTING SUBDIVISION	NONE
PUBLIC LAND SURVEY SYSTEM	SE ¼, SEC. 2, TWP 5N, RNG 45E. B.M.
LATITUDE AND LONGITUDE	43º41'52" N, 111º06'14" W

DEVELOPMENT DESCRIPTION (TRESTLES)

NAME OF SUBDIVSION	TRESTLES
AREA OF DEVELOPMENT	216.83 ACRES
TOTAL NO. LOTS	68
TOTAL NO. BUILDABLE LOTS	66 SINGLE FAMILY
OPEN SPACE	12.66 ACRES (5.8%)
AVERAGE DENSITY RESIDENTIAL LOTS	3.29 ACRES/LOT

TRESTLES I

AREA TRESTLES I (PHASE I)	40.17 +40.30 = 80.47 ACRES
PARCEL NO(S)	RP04N45E029250 & RP04N45E027350
NO. LOTS TRESTLES I	24
NO. BUILDABLE LOTS	24
AVERAGE DENSITY TRESTLES I	3.35
OPEN SPACE	0.64 ACRES

TRESTLES II

AREA TRESTLES II (PHASE II)	56.36 + 80 = 136.36 ACRES
PARCEL NO(S)	RP04N45E021201 & RP04N45E013600
NO. LOTS TRESTLES II	44
NO. BUILDABLE LOTS	42
AVERAGE DENSITY TRESTLES II	3.25
OPEN SPACE	12.02 ACRES

DEVELOPMENT DESCRIPTION (WILDFLOWER)

NAME OF SUBDIVSION	WILDFLOWER
AREA OF DEVELOPMENT	64.36 ACRES
TOTAL NO. LOTS	26
TOTAL NO. BUILDABLE LOTS	25 SINGLE FAMILY
OPEN SPACE	32.18 ACRES (50%)
AVERAGE DENSITY RESIDENTIAL LOTS	0.404 LOTS/ACRE

WILDFLOWER

AREA	64.36 ACRES
PARCEL NO(S)	RP04N45E021201 & RP04N45E013600
NO. LOTS	26
NO. BUILDABLE LOTS	25
AVERAGE DENSITY	2.57
OPEN SPACE	32.18 ACRES

APPLICABLE CODES

PLANNING AND ZONING/SUBDIVISION

TETON COUNTY COMPREHENSIVE PLAN	AUGUST 24, 2012
TETON COUNTY SUBDIVISION REGULATIONS (TITLE 9, TETON COUNTY CODE)	SEPT 15, 2011
TETON COUNTY TITLE 07, CHAPTER 2, TETONIA CITY AREA OF IMPACT ORDINANCE	AUGUST 14, 1995
a. APPLICABLE SUBDIVISION ORDINANCES	TETON COUNTY
b. REVIEW	TETON COUNTY
c. ENFORCEMENT	TETON COUNTY

BUILDING CODES

a. INTERNATIONAL BUILDING CODE (IBC)	2018
b. INTERNATIONAL MECHANICAL CODE (IMC)	2018
c. INTERNATIONAL ENERGY CONSERVATION CODE (IECC)	2018
d. INTERNATIONAL FIRE CODE (IFC)	2018

TETON COUNTY AGRICULTURAL/RURAL RESIDENTIAL 2.5 STANDARDS

PURPOSE: THE PURPOSE OF THIS DISTRICT IS TO DESIGNATE AND PROVIDE OPPORTUNITY FOR DEVELOPMENT OF RESIDENTIAL LAND USE ON MARGINAL AGRICULTURAL LAND.

TETON COUNTY ZONING	AGRICULTRUAL / RURAL RESIDENTIAL 2.5
OVERLAY ZONES	NONE

ALLOWED USES

SINGLE FAMILY RESIDENTIAL	PERMITTED
MOBILE HOME, MODULAR	PERMITTED
DWELLING ACCESSORY UNIT	PERMITTED W/CONDITIONS

LOT SIZE REQUIREMENTS

MINIMUM LOT SIZE	2.5 ACRES
MINIMUM LOT WIDTH	NA

BUILDING SETBACKS

FRONT YARD	30' MIN
REAR YARD	40' MIN
SIDE YARD	30' MIN
TETON RIVER	100' MIN
STREAM, CREEK	50' MIN
IRRIGATION DITCH	15' MIN.

BUILDING HEIGHT

BUILDINGS AND STRUCTURES	30' MAX

ACCESSORY BUILDINGS

LESS THAN 200 FT^2	12' MINIMUM
GREATER THAN 200 FT^2	MEET SETBACKS FOR A20 ZONE

NO.	DESCRIPTION	BY	DATE
4	TRESTLES WITH WILDFLOWER	BEC	4/4/23
3	TRAIL EASMT AND FIRE POND	BEC	7/9/22
2	CONCEPTUAL DESIGN-PH 1-3	BEC	5/2022
1	CONCEPTUAL DESIGN	BEC	3/2022

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Civilize, PLLC
Management and Engineering

PROJECT NO.	11-22-333
DRAWN	J. TOONE
DESIGNED	B. CROWTHER
APPROVED	B. CROWTHER
QA/QC	B. CROWTHER

CURT BEHLE &
KARIN WERTHEIM

TRESTLES & WILDFLOWER
CONCEPT MASTER PLAN

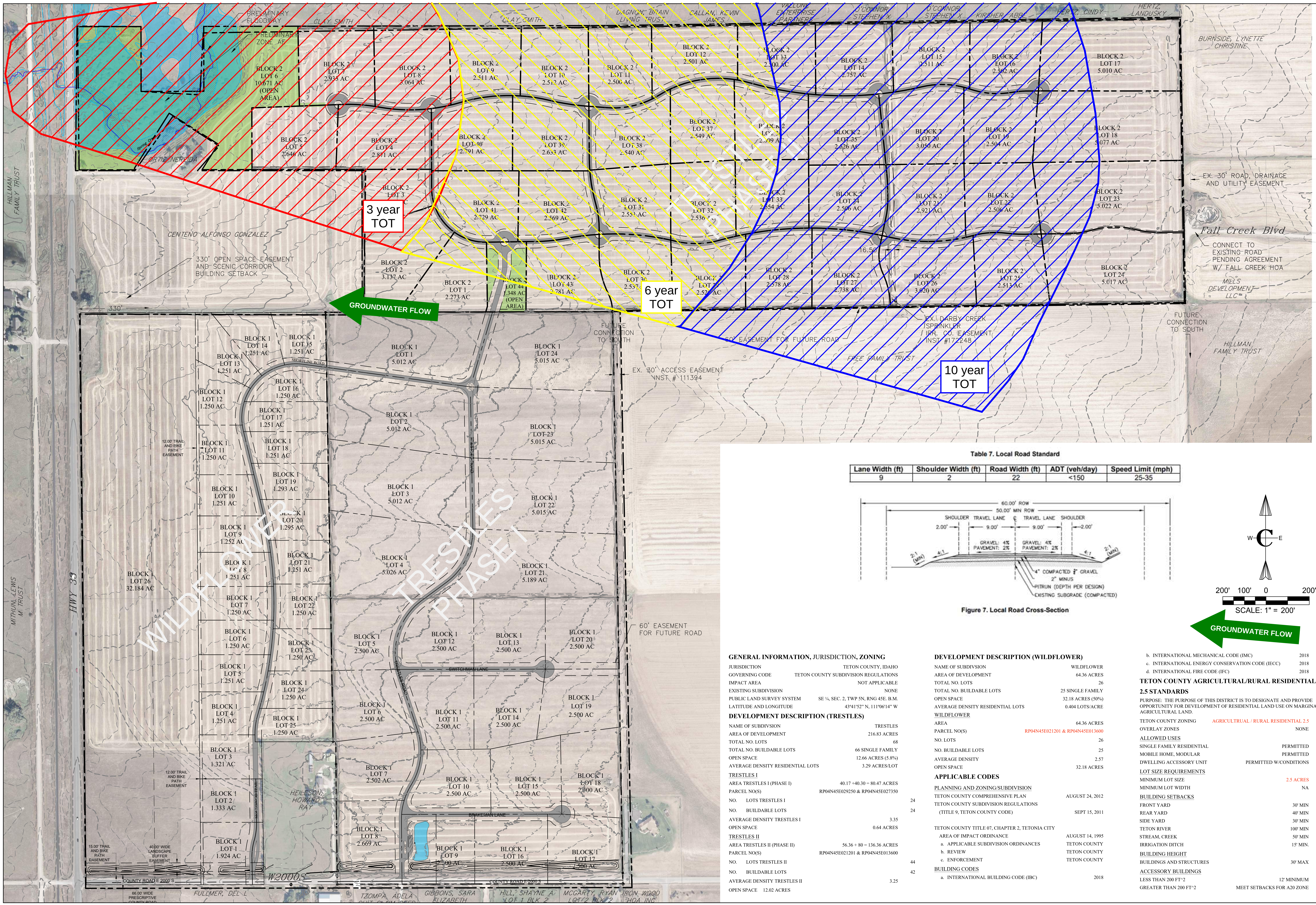
SHEET NO: C-100

DATE: APR. 2023

PAGE NO: 1

Appendix M

Phosphoros Mass-Balance and Delineation



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MINIMUM LOT WIDTH	NA

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SIDE YARD	30' MIN
TETON RIVER	100' MIN
STREAM, CREEK	50' MIN
IRRIGATION DITCH	15' MIN.

BUILDING HEIGHT

BUILDINGS AND STRUCTURES	30' MAX

ACCESSORY BUILDINGS

LESS THAN 200 FT^2	12' MINIMUM
GREATER THAN 200 FT^2	MEET SETBACKS FOR A20 ZONE

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Management and Engineering

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QA/QC	B. CROWTHER

CURT BEHLE &
KARIN WERTHEIM

TRESTLES & WILDFLOWER
CONCEPT MASTER PLAN

SHEET NO:
C-100

DATE:
APR. 2023

PAGE NO:
1

Civilize, PLLC
Management and Engineering

Project Analysis Worksheet
Surface Water Mass-Balance
Nitrite and Phosphorous

Client:	**Curt Behle**	DESIGNED:	EAS
Project:	**Trestles**	CHECKED:	BEC
Project No.:	**01-21-0023**	DATE:	9/22/2023

Description:

Resident Inputs:

Home Flows

Septic Tank Effluent per Home:	350	gallons/d/home
Number of Homes:	42	
Septic Tank Effluent Concentration (Nitrate):	45	mg/l
Septic Tank Effluent Concentration (Phosphorous):	12.75	mg/l

Surface Water Inputs:

Home Flows

Surface Water Description:	Spring Creek		Does the stream enter a lake or reservoir?	No
Mean Annual Flow Volume:	23.91	cfs		
	15453438	gallons per day		
	58497525	liters per day		
Surface Water Background Concentration (Nitrate):	1.33	mg/l		
Surface Water Background Concentration (Phosphorous):	0.05	mg/l		

Mass-Balance Calculation:

Total Effluent Flow per Day (Homes):	14700	*gallons*
	55646	*Liters*
Nitrate from Effluent (Homes):	2504049	mg
Phosphorous from Effluent (Homes):	709480	mg
Total Effluent Flow:	14700	*gallons*
	55646	*Liters*
Nitrate from Stream:	77801708	mg/day
Phosphorous fromStream:	2924876	mg/day
Total Flow:	15468138	*gallons*
	58553171	*Liters*
Total Mass Nitrate:	80305757	mg/day
Percent from Development:	3%	
Total Mass Phosphorous:	3634357	mg/day
Percent from Development:	20%	

Results:

DEQ Negligible Impact Concentration:	2.330	*mg/l*	
Average Downstream Nitrite Concentration:	1.372	*mg/l*	*IDEQ Compliant Concentration*
US EPA Total Mass Daily Load Limits for Phosphorus:	0.100	*mg/l*	
Average Downstream Phosphorous Concentration:	0.062	*mg/l*	*EPA Compliant Concentration*

Civilize, PLLC

Management and Engineering

Project Analysis Worksheet

Surface Water Mass-Balance

Nitrite and Phosphorous

Client:	**Curt Behle**	DESIGNED:	EAS
Project:	**Trestles**	CHECKED:	BEC
Project No.:	**01-21-0023**	DATE:	9/22/2023

Description:

Resident Inputs:

Home Flows

Septic Tank Effluent per Home:	300	gallons/d/home
Number of Homes:	42	
Septic Tank Effluent Concentration (Nitrate):	38	mg/l
Septic Tank Effluent Concentration (Phosphorous):	12.75	mg/l

Surface Water Inputs:

Home Flows

Does the stream enter a lake or reservoir? No

Surface Water Description:	Spring Creek	
Mean Annual Flow Volume:	23.91	cfs
	15453438	gallons per day
	58497525	liters per day
Surface Water Background Concentration (Nitrate):	1.33	mg/l
Surface Water Background Concentration (Phosphorous):	0.05	mg/l

Mass-Balance Calculation:

Total Effluent Flow per Day (Homes):	12600	*gallons*
	47696	*Liters*
Nitrate from Effluent (Homes):	1812454	mg
Phosphorous from Effluent (Homes):	608126	mg
Total Effluent Flow:	12600	*gallons*
	47696	*Liters*
Nitrate from Stream:	77801708	mg/day
Phosphorous fromStream:	2924876	mg/day
Total Flow:	15466038	*gallons*
	58545221	*Liters*
Total Mass Nitrate:	79614163	mg/day
Percent from Development:	2%	
Total Mass Phosphorous:	3533002	mg/day
Percent from Development:	17%	

Results:

DEQ Negligible Impact Concentration:	2.330	*mg/l*	
Average Downstream Nitrite Concentration:	1.360	*mg/l*	*IDEQ Compliant Concentration*
US EPA Total Mass Daily Load Limits for Phosphorus:	0.100	*mg/l*	
Average Downstream Phosphorous Concentration:	0.060	*mg/l*	*EPA Compliant Concentration*

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Description:

Resident Inputs:

Home Flows

Septic Tank Effluent per Home:	450	gallons/d/home
Number of Homes:	42	
Septic Tank Effluent Concentration (Nitrate):	38	mg/l
Septic Tank Effluent Concentration (Phosphorous):	12.75	mg/l

Surface Water Inputs:

Home Flows

Surface Water Description:	Spring Creek		Does the stream enter a lake or reservoir?	No
Mean Annual Flow Volume:	23.91	cfs		
	15453438	gallons per day		
	58497525	liters per day		
Surface Water Background Concentration (Nitrate):	1.33	mg/l		
Surface Water Background Concentration (Phosphorous):	0.05	mg/l		

Mass-Balance Calculation:

Total Effluent Flow per Day (Homes):	18900	*gallons*
	71544	*Liters*
Nitrate from Effluent (Homes):	2718681	mg
Phosphorous from Effluent (Homes):	912189	mg
Total Effluent Flow:	18900	*gallons*
	71544	*Liters*
Nitrate from Stream:	77801708	mg/day
Phosphorous fromStream:	2924876	mg/day
Total Flow:	15472338	*gallons*
	58569069	*Liters*
Total Mass Nitrate:	80520390	mg/day
Percent from Development:	3%	
Total Mass Phosphorous:	3837065	mg/day
Percent from Development:	24%	

Results:

DEQ Negligible Impact Concentration:	2.330	*mg/l*	
Average Downstream Nitrite Concentration:	1.375	*mg/l*	*IDEQ Compliant Concentration*
US EPA Total Mass Daily Load Limits for Phosphorus:	0.100	*mg/l*	
Average Downstream Phosphorous Concentration:	0.066	*mg/l*	*EPA Compliant Concentration*

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Description:

Resident Inputs:

Home Flows

Septic Tank Effluent per Home:	500	gallons/d/home
Number of Homes:	42	
Septic Tank Effluent Concentration (Nitrate):	27	mg/l
Septic Tank Effluent Concentration (Phosphorous):	12.75	mg/l

Surface Water Inputs:

Home Flows

Surface Water Description:	Spring Creek		Does the stream enter a lake or reservoir?	No
Mean Annual Flow Volume:	23.91	cfs		
	15453438	gallons per day		
	58497525	liters per day		
Surface Water Background Concentration (Nitrate):	1.33	mg/l		
Surface Water Background Concentration (Phosphorous):	0.05	mg/l		

Mass-Balance Calculation:

Total Effluent Flow per Day (Homes):	21000	*gallons*
	79494	*Liters*
Nitrate from Effluent (Homes):	2146327	mg
Phosphorous from Effluent (Homes):	1013544	mg
Total Effluent Flow:	21000	*gallons*
	79494	*Liters*
Nitrate from Stream:	77801708	mg/day
Phosphorous fromStream:	2924876	mg/day
Total Flow:	15474438	*gallons*
	58577019	*Liters*
Total Mass Nitrate:	79948036	mg/day
Percent from Development:	3%	
Total Mass Phosphorous:	3938420	mg/day
Percent from Development:	26%	

Results:

DEQ Negligible Impact Concentration:	2.330	*mg/l*	
Average Downstream Nitrite Concentration:	1.365	*mg/l*	*IDEQ Compliant Concentration*
US EPA Total Mass Daily Load Limits for Phosphorus:	0.100	*mg/l*	
Average Downstream Phosphorous Concentration:	0.067	*mg/l*	*EPA Compliant Concentration*

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Description:

Resident Inputs:

Home Flows

Septic Tank Effluent per Home:	650	gallons/d/home
Number of Homes:	42	
Septic Tank Effluent Concentration (Nitrate):	27	mg/l
Septic Tank Effluent Concentration (Phosphorous):	12.75	mg/l

Surface Water Inputs:

Home Flows

Surface Water Description:	Spring Creek		Does the stream enter a lake or reservoir?	No
Mean Annual Flow Volume:	23.91	cfs		
	15453438	gallons per day		
	58497525	liters per day		
Surface Water Background Concentration (Nitrate):	1.33	mg/l		
Surface Water Background Concentration (Phosphorous):	0.05	mg/l		

Mass-Balance Calculation:

Total Effluent Flow per Day (Homes):	27300	*gallons*
	103342	*Liters*
Nitrate from Effluent (Homes):	2790226	mg
Phosphorous from Effluent (Homes):	1317607	mg
Total Effluent Flow:	27300	*gallons*
	103342	*Liters*
Nitrate from Stream:	77801708	mg/day
Phosphorous fromStream:	2924876	mg/day
Total Flow:	15480738	*gallons*
	58600867	*Liters*
Total Mass Nitrate:	80591934	mg/day
Percent from Development:	3%	
Total Mass Phosphorous:	4242483	mg/day
Percent from Development:	31%	

Results:

DEQ Negligible Impact Concentration:	2.330	*mg/l*	
Average Downstream Nitrite Concentration:	1.375	*mg/l*	*IDEQ Compliant Concentration*
US EPA Total Mass Daily Load Limits for Phosphorus:	0.100	*mg/l*	
Average Downstream Phosphorous Concentration:	0.072	*mg/l*	*EPA Compliant Concentration*