Water Requirements and Water Supply Sufficiency Analysis for the Proposed Red Ridge Village

Prepared for:

GSBS Consulting
DF Development

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Water Requirements and Water Supply Sufficiency Analysis for Red Ridge Village

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A. Project Description

The proposed Red Ridge Village consists of both residential units and commercial space, all of which will be served by a central water system. The current plan will comprise 722 living units including townhomes, condos, and single-family lots ranging from 3/4-acre to 5 acres in size. Commercial space would include restaurants, meeting space, grocery and retail stores, a lodge, and a small commercial farm. The number and general characteristics of each type of residential and commercial unit are shown on the attached worksheets.

A generalized flow diagram for the project is shown in Figure 1. Water supply will be provided by at least two groundwater wells developed in the local alluvial aquifer system. The wells will be the source for a central water system providing in-house and culinary demands, and supplemental irrigation water as required. The system will be considered a public drinking water system and will be regulated and permitted by the Idaho Department of Environmental Quality (IDEQ).

Wastewater will be collected in a central system and treated to Class A quality in a central wastewater treatment plant. Class A water will be disposed of by two methods: slow-rate recycling (irrigation) of common areas and residential lots during the irrigation season, and rapid infiltration (RI) during the non-irrigation season. Fresh water will be blended with the treated wastewater during the irrigation season in order to match the seasonal crop demand curve. Buffering storage will be provided as required. All aspects of the wastewater collection, treatment, and recycling systems will be reviewed and permitted by DEQ.

The purpose of this report is to estimate the timing and magnitude of the water requirements and consumptive use of the project, determine the extent and hydraulic properties of the groundwater source, and assess the adequacy of the aquifer to support the intended usage.

B. Water Usage Analysis

B.1. In-House (Potable) Water Demands

The average demands, peak demands, and annual water requirements for the project are based on the type of use, estimated occupancy, and estimated per-capita or per-unit daily water usage. For the potable in-house system, variations in demand over a year and within a day are characterized by the average daily demand (ADD), which is the average daily water

requirement over a year; the maximum daily demand (MDD), which is the water requirement for the highest day out of the year (typically occurring in the summertime); and the peak hourly demand (PHD), which is the highest hourly demand within a day, usually expressed in gallons per minute (gpm).

Residential demands were determined based on estimated occupancy for each type of use and an average daily per-capita demand of 84 gpcd. Non-residential demands were based on the type of use, estimated occupant load, and per-unit or per-capita demands outlined in the IDEQ regulations for water system design. Calculations are shown on the attached worksheets, and the results are summarized in Table 1.

Table 1. Potable in-house water demands.

Use Type	ADD	MDD	PHD
Residential	129,700 gpd	311,300 gpd	432 gpm
Non-residential	26,600 gpd	63,700 gpd	89 gpm
TOTAL	**156,300 gpd (109 gpm)**	**375,000 gpd (260 gpm)**	**521 gpm**

B.2. Irrigation Water Demand

Irrigation water demand is a direct function of the irrigated area. Areas to be irrigated include residential lots, commercial areas, and a small commercial farm. The irrigated area for each type of use at full build-out is summarized in Table 2.

Table 2. Irrigated areas by type of use.

Use	No.	Irrigated sf / lot	Total area (ac)
Single-family: 3/4 acre lots	107	6500	16.0
Single-family: 1 acre lots	67	6500	10.0
Single-family: 2+ acre lots	113	8500	22.1
Single-family: 5+ acre lots	15	8500	2.9
Commercial farm & orchard			15
Playgrounds & parks			10
Road buffers (establishment only, no long-term irrigation)			0
Total - lots			50.9
Total - common			25.0
Grand total			75.9

The total project irrigated area at full build-out is estimated to be 50.9 acres in the residential areas based on an estimated per-lot irrigated area for each lot size, and 25 acres in the commercial and common areas including the small farming activity.

Water requirements for irrigation were estimated using standard procedures based on the crop irrigation water requirement (precipitation deficit) developed by the University of Idaho and the Idaho Department of Water Resources (provided on the ET-Idaho web site). Restrictions on irrigation type will be in place for the project. Turfgrass irrigation will be minimized, which will help lower the irrigation demand. For planning purposes a crop of Pasture – High Management was assumed, with an overall irrigation efficiency of 75% which is typical for well-managed residential settings.

Calculations are shown on the attached worksheets, and the results are summarized in Table 3. Peak irrigation demand is estimated to 458 gpm. As the project nears full build-out, an odd-even rotation will be needed to limit the peak demand – this is the usual procedure implemented for small residential central irrigation systems.

Table 3. Irrigation demands – total and supplemental fresh water.

Irrigation season	4/15 – 10/31 (199 days)
Project irrigated area - TOTAL	75.9 acres
Precipitation Deficit - Pasture High Mgmt, McCall (ET-IDWR)	21.53 inches
Design peak monthly ET - July (3-day, 20% exceedance)	0.240 in/day
Irrigation application efficiency	75%
Design peak flow rate (24-hour flow rate)	458 gpm
Average total irrigation demand over 199-day irrigation season	207 gpm
Adjustment to irrigation demand for recycled water availability:	
Average recycled water available at full build-out (potable demand less 10% consumptive use)	98 gpm
Average supplemental fresh water required over the irrigation season (207 gpm – 98 gm = 109 gpm)	109 gpm
Maximum-day supplemental fresh water required (458 gpm – 98 gpm = 360 gpm)	360 gpm

At full build-out, the amount of recycled water available during the 199-day irrigation season will be 85.9 acre-feet, which corresponds to the water requirement on 35.9 acres. Since the project irrigated area exceeds this amount, supplemental fresh water will be needed.[1]

[1] Hydraulic loading governs the irrigated area requirement as nutrient loading will be minimal.

As evident in the flow paths on Figure 1, the amount of supplemental fresh water needed will be reduced to the extent recycled water is available. Practically, however, during the initial build-out period, irrigation may occur using only fresh water until a sufficient number of homes and commercial units are in place to generate a significant volume of recycled water to properly operate the treatment plant.

In terms of daily demands, in Table 3 the amount of recycled water available is conservatively estimated as the potable ADD of 109 gpm less 10% losses due to consumptive use, or 98 gpm. This amount can be subtracted from the average or maximum irrigation demand to estimate the amount of supplemental fresh water needed. However, good engineering practice dictates that the irrigation system be designed to provide the full irrigation demand if necessary, in case the recycled water is not available due to system outages or other reasons.

B.3. Supply Capacity Design Basis

The design capacity of the water supply system must be sufficient to meet standard engineering practice for water systems and for regulatory compliance. Regulations for public water systems require that the supply be sufficient to meet the maximum-day demand with the largest source out of service. Potable water storage will be provided to meet demand fluctuations within the maximum day up to the PHD, and to provide fire flow and volume requirements.

Possible design basis scenarios and the corresponding well water supply capacity are shown in Table 4.

Table 4. Water supply capacity scenarios – full buildout.

Water Supply Design Basis Scenario	Required Capacity
Potable ADD plus average irrigation demand during season, no recycled water available	315 gpm
Potable MDD plus peak irrigation demand, no recycled water available	719 gpm
Potable MDD plus peak irrigation demand, full amount of recycled water available	484 gpm
Potable ADD plus peak irrigation demand, full amount of recycled water available	469 gpm
Potable MDD only (non-irrigation season)	260 gpm

Based on this analysis, it will be appropriate to design each well be designed for at least 484 gpm, which will meet the regulatory requirement. The two wells in combination will also meet the absolute maximum demand of 719 gpm, which assumes no recycled water is available for use.

It is very important to note that the actual amount of water pumped from the wells will be much less than the design capacity, but the capacity must be in place to meet the short-term demands when they occur.

B.3.1 Buildout Period Estimated Demands and Capacity

The buildout period for the project is estimated to be 30 years. Projection of the overall population, potable demands, irrigated area, and irrigation demands for this period is highly dependent on future market conditions. For the residential growth, the commonly-used logistic curve was employed, which models the population growth with an initial slow period, a expansion, and then an asymptotic approach to the final population. The commercial development will likely be built out sooner, as it will service not just the project residents but also the surrounding population in the McCall area. Therefore, for this demand a 15-year linear trend was assumed.

Irrigated area on residential lots was assumed to follow the population curve. The 15-acre farm irrigation will be put in place in the first year as an initial area for slow-rate land application, and the remainder was assume to increase linearly over the next 10 years. The 15-acre farm will be sufficient to receive the recycled water for about 10 years.

The resulting projection of MDD demand is shown in Figure 2, along with the recommended minimum supply capacity that should be in place to meet the demand. Actual supply may follow a different pattern.

Recycled water availability for irrigation will follow the residential and commercial development trends. The balance of irrigation demand will be supplied by supplemental fresh water, and the non-irrigation season volume will be diverted to rapid infiltration. The projected growth pattern of these recycled water elements is shown in Figure 3.

RI basins will be designed and deployed as the project builds out. These basins will be regulated by DEQ in accordance with a wastewater reuse permit, supported by a comprehensive technical analysis of the infiltration basins to be made during the permitting process. At this time, soils information published by the Natural Resources Conservation Service indicate that substantial areas exist on the project having soils suitable for RI basin development, including sandy loam, loamy sand, or sand.

B.4. Consumptive Use

Consumptive use refers to the portion of the water demand that is truly “lost,” in that it does not return to the water resource via infiltration, recharge, or other means. The consumptive use, rather than the short-term water demands, is the best measure of the actual long-term impact on the water resource. For this reason, consumptive use is typically expressed as an annual or seasonal figure.

For potable water usage, about 10% of the amount delivered is lost through activities such as car washing or incidental watering of flower beds. The remainder (90%) will be treated and

recycled either on the irrigated land or in the rapid infiltration basins. For irrigation, the consumptive use is equal to the evapotranspiration of the crop, and will be approximately 75% of the amount pumped. The remainder (25%) returns to the aquifer system via deep percolation. Overall, the project consumptive use is estimated to be 57% of the amount of water supplied.

B.5. Seasonal and Annual Water Balance

All of the above analyses may be summarized by computing the seasonal and annual withdrawals, losses and returns for all of the water usage elements (Table 5).

Table 5. Seasonal and annual water balance at full buildout.

	Acre-Feet		
	Irrigation Season	Non-irrigation Season	Annual
Potable water diversion	95.4	79.6	175.0
Recycled water available	85.9	71.6	157.5
Irrigation water requirement	181.7	0.0	181.7
Supplemental fresh water diversion	95.8	0.0	95.8
Total groundwater diversion	191.2	79.6	270.8
Recharge in RI basins	0.0	71.6	71.6
Return to upper water table aquifer	45.4	71.6	117.1
Overall consumptive use	145.8	8.0	153.8
Overall consumptive use percentage	76%	10%	57%

C. Groundwater Supply

C.1. Hydrogeologic Setting

The aquifer to be utilized for water supply is the alluvial aquifer of the North Fork Payette River basin between Payette Lake and Cascade Reservoir. The aquifer consists of a highly stratified system of alluvial valley fill sediments, primarily sand, gravel, and clay. Water-bearing strata consist of sand and gravel deposits, which are separated by low-permeability clay strata with thicknesses typically ranging from a few feet to more than 20 feet. As with most valley-fill aquifer systems, the system is bounded on either side and on the bottom. In this case, the boundaries consist of either massive clay deposits or granitic bedrock, with permeabilities that are likely several orders of magnitude lower than the sand and gravel, so that these formations may be considered to be imperemable hydraulic boundaries.

Figure 4 shows the study area for the aquifer analysis, wells completed in the aquifer from the IDWR database, and the approximate aquifer boundaries on the west and east sides based on inspection of the drilling records and topographic considerations. The wells on Figure 4

are color-coded by total depth. Nearly all of them are relatively shallow domestic wells. Very few deep wells or large production wells have been drilled, primarily because large-scale irrigation from groundwater has not been extensively developed from this aquifer due to the general reliability of the surface water supply including natural flow and rentals available from Payette River storage.

Two large production wells were developed for the Blackhawk project, south of the proposed Red Ridge Village. These wells were engineered and subjected to extensive testing, and provide by far the best available data on the aquifer in the vicinity of Red Ridge Village. It is assumed that the Red Ridge production wells will likely encounter similar lithology and be completed in a similar fashion to these wells.

C.2. Geologic Cross-Section

Selected wells with sufficient depth and having detailed lithologic information on the drilling record were used to develop a transverse geologic cross-section A-A' at the location shown on Figure 5. This section (Figure 6) illustrates the aquifer boundaries, the stratification of the system, and the sand and gravel production zones that are available for development on the west side of the valley. The Lake Fork drainage to the east appears to support a much less prolific aquifer, with much thinner strata of sand and gravel production zones. Massive clay lies between the Lake Fork side of the valley and the aquifer under consideration, and it appears the two sides have little hydraulic connection.

At the project site there are three relatively distinct aquifer zones, based on the lithologic separations and on the fact that differing piezometric heads exist. These zones were confirmed, characterized, and tested in substantial detail in the development of the Blackhawk wells:

- Upper zone: This is a water-table aquifer, likely fed by surface recharge as well as Payette Lake seepage. It is hydraulically connected to the North Fork Payette River, which is a gaining reach as evidenced by the numerous springs and subwater areas feeding the river. Nearly all domestic wells are developed in this zone. Depth to the water table ranges from 10 feet to 100 feet or more, depending on the land surface elevation of the well. The upper zone will not be targeted for development for the Red Ridge project.

- Intermediate zone: This zone is semi-confined and under mild artesian pressure. A test well completed for the Blackhawk development indicated an artesian pressure of 5 feet above ground level.

- Deep zone: This zone is confined and under considerable artesian pressure due to the presence of clay layers above as indicated in the lithologic record. The Blackhawk production wells were developed in this zone and pressures at the surface were 12 feet and 22 feet above ground level.

The substantial difference in piezometric head between the upper zone and the two deeper zones confirms that a hydraulic separation exists between the deep production zones and the water table zone in which domestic wells are completed.

The intermediate and deep zones are both under artesian pressure, and the available lithology is inconclusive as to the degree of clay separation between the two zones. The most likely conclusion is that these two zones are only partly separated and it would be reasonable treat them as a combined resource for analysis purposes, distinct from the upper system. These artesian zones will be the zones targeted for the Red Ridge production wells. If possible, only the deepest strata will be targeted to provide the best possible water quality and the lowest possible influence due to pumping on any other zone.

C.3. Connection to Surface Water

In the immediate vicinity of the project site, it is evident that the upper zone is hydraulically connected to the North Fork Payette River, while this connection is absent or at least minimal for the lower artesian zones. However, based on the topographic constraints of the valley it is highly likely that all aquifer zones are ultimately tributary to Cascade Reservoir and contribute to reservoir gain and downstream natural flow.

C.4. Aquifer Hydraulic Characteristics

Transmissivity and hydraulic conductivity were estimated using well drilling data and pumping test information for the Blackhawk well and three other large wells developed in the aquifer for which reliable pumping data were reported on the well drilling record. This estimate was made using the Theis specific capacity method with a correction for partial penetration of the well. The estimated average hydraulic conductivity is 23.2 ft/day and the average transmissivity is 28,000 gpd/ft. These values are in line with expectations for sand and gravel aquifers and are suitable for production well development. The hydraulic conductivities for the Blackhawk wells are the highest of the four, with values of 30 ft/day and 35 ft/day. Storativity was assumed to be 0.001, representative of confined aquifer systems.

C.5. Aquifer Flow Area, Gradient, and Discharge

The cross-sectional flow area of the aquifer for the intermediate and deep zones was estimated to be 3.54×10^6 ft^2 based on the geologic cross-section in Figure 6. The direction of flow is generally southward, down the valley, but the gradient is difficult to quantify as there is no data from wells completed in the deep zones from which a gradient can be computed. For the purposes of this study, it was assumed that Payette Lake acts as an upgradient hydraulic control on the piezometric head, which appears to be a reasonable assumption based on topographic considerations and inspection of wells in the area of the lake. This assumption, and the piezometric head data from the Blackhawk wells, leads to an estimated gradient of 0.00313 ft/f (16.5 ft/mile).

Applying Darcy's Law with the above calculated values, the estimated groundwater discharge in the artesian zones is 250,800 ft^3/d or 2,102 ac-ft/year. This figure is also a reasonable estimate of the average rate of annual recharge to the aquifer in question, as the aquifer is likely to be in long-term equilibrium given the minimal development of the resource.

C.6. Adequacy of Well Yield

As noted above, the target yield for each well will be 484 gpm. A Theis analysis was conducted to determine whether this rate is obtainable from each well with a reasonable drawdown in the well bore. It was conservatively assumed that the pumping well operates continuously for a period of 14 days. As shown in the attached worksheet, the drawdown in the well is predicted to be 34.4 feet after this period, for a specific capacity of 14.3 gpm/ft. This is a reasonable drawdown and will result in a pumping water level of approximately 154 feet.

In addition to individual well drawdown, the potential interference between the two pumping wells operating simultaneously was analyzed. The wells must be located with sufficient separation so that one pumping well does not impose an undue water level drawdown on the other. For this analysis, it would be unreasonable to assume both wells were pumping at 484 gpm. Instead, each well was assumed to be pumping at one-half that rate continuously for 14 days. Separation distances of 50 to 800 feet were investigated, resulting in drawdown effect from each well on the other well ranging from 9.6 to 4.7 feet. A distance of 200 feet is reasonable, resulting in an interference effect of 7.1 feet. This will not unduly hinder the ability of each well to deliver the required yield.

C.7. Groundwater Sustainability

The ability of the Red Ridge production wells to safely supply the projected water demands for the long term must be evaluated based on two general criteria: the effect of the well pumping on local aquifer water levels, and the long-term aquifer water supply availability in relation to the consumptive use of the project.

C.7.1 Local Drawdown

The assumed scenario to estimate local drawdown from well pumping was the overall irrigation season withdrawal rate if no recycled water were available, or 315 gpm. Drawdown in the aquifer for this continuous flow rate was simulated using the Winflow 3 model, including the effect of the nearby west aquifer boundary which will tend to increase the drawdown for a given pumping rate.[2] The predicted drawdown contours are shown on Figure 5. Shorter-duration higher-demand scenarios were also evaluated but were not found to result in higher drawdowns, e.g. pumping at the absolute maximum capacity of 719 gpm during the highest-demand two-week period results in about the same drawdown.

[2] This model is essentially an enhanced implementation of the Theis method, and allows for multiple wells, recharge areas, sources and sinks, aquifer boundaries, etc.

It is important to note that the drawdown on Figure 5 represents the effect on the artesian production zones, not the upper water table zone in which domestic wells are completed. There is a separation between the two zones and the drawdown in the upper zone is expected to be minimal.

To further evaluate the potential influence on domestic wells, all wells within 0.5 miles of the project boundary (Figure 4) were evaluated in detail by calculating a land surface elevation and a completed elevation to determine whether they were in fact be completed in the upper water table zone or whether they were deeper and cased through to a lower zone. Of the 73 wells within this area, 70 were determined to be completed in the upper zone, one was determined to be conclusively completed in the lower zone, and two were inconclusive and could possibly be completed in or influenced by the lower zone.

C.7.2 Long-Term Aquifer Supply

The total annual withdrawal at full build-out is estimated to be 271 ac-ft, and the consumptive use is estimated to be 154 ac-ft (Table 5). These values are 12.9% and 7.3%, respectively, of the total annual discharge of 2,102 ac-ft in the aquifer. While these amounts are not negligible, the aquifer is able to sustain them without long-term depletion, which would occur if the withdrawal exceeded the average rate of annual recharge (assumed to be equal to the groundwater discharge as calculated above).

One significant effect of the project is that about 25% of the applied irrigation water, and all of the rapid infiltration recharge will return to the upper system, amounting to 117.1 ac-ft/year. This will enhance the water supply in the upper aquifer, and will tend to augment the flow in the North Fork Payette River.

C.1. Ambient Groundwater Quality

Groundwater quality must meet all primary water quality standards in order for the source to be acceptable. At the time of drilling, the two Blackhawk wells were tested for all parameters required for new public water system sources, including inorganic constituents, volatile organic compounds, synthetic organic compounds, radiological parameters, and bacteriological parameters. No deficiencies were noted that would preclude the use of the aquifer as a public water supply source. Iron and manganese were elevated in one well, but these are secondary standards and of no health concern. Based on this data, and the fact that the lower production zones are structurally protected from surface influences by the clay interbeds, no water quality problems are expected.

D. Well Construction and Testing

The likely location of production wells is shown on Figure 4. The location was selected to maximize the distance from any known existing well, while also being as far away from the west aquifer boundary as possible.

For planning purposes it is assumed that the two Blackhawk wells reasonably represent the aquifer conditions at the project wells. As a precursor to the production well drilling, a small-diameter exploratory boring will be made to confirm the aquifer lithology and provide design data for the production wells.

The static water elevation is expected to be approximately 4955 feet, or 120 feet below ground surface at the proposed well location.

The expected construction of the well will include a fully-cased and fully-sealed well to a depth of approximately 430 feet in order to reach the lower zones described above. The production zone will be developed by placement of at least 100 feet of screen and filter pack within the production zone.

Each of the two wells must undergo 24-hour pump testing, followed by a detailed analysis of the data and determination of aquifer properties, to comply with public water system regulations. As part of this testing program, a shallow monitoring well will be completed approximately 200 feet from the pumping wells to allow the water level to be monitored during the pumping tests. In addition, efforts will be made to obtain access to monitor water levels in the domestic wells determined to possibly be completed beyond the upper water table zone (Section C.7.1). The purpose of this monitoring will be to confirm the separation between the production zone and the water table aquifer and/or verify the magnitude of the influence, if any.

Both production wells are required to undergo comprehensive testing for water quality parameters required for new public water system sources.

E. Water Right Considerations

Use of groundwater for the Red Ridge project must be authorized either by a water right or by an exemption for in-house usage under Idaho Code 42-111. Since the usage will involve irrigation, an exemption will not apply and a new appropriation will be required. The basin is open for appropriation, with no moratorium in place, and a new permit application will be filed with IDWR based on the water usage estimates described herein. The IDWR Western Region manager has confirmed that IDWR will process the application.

If necessary, mitigation for the water usage will be provided by one of two sources: securing water from the Payette River rental pool, entering into a long-term agreement with a contract spaceholder, or acquisition of a vested natural flow right. The watermaster of Water District 65 and the manager of the Payette Rental Pool have confirmed that to date, there has always been a surplus of water in the pool and all rental requests for in-basin uses have been able to be filled. Therefore, at this time this approach is considered a reliable supply of mitigation water if needed during the IDWR appropriation process.

F. Summary

A water requirements analysis and aquifer evaluation was completed for the proposed Red Ridge Village project. Water supply for the project will be derived from groundwater wells, and water demands consist of residential in-houses uses, commercial culinary uses, irrigation on the residential lots, irrigation on the commercial areas, and irrigation on the commercial farm. Wastewater will be collected and treated to Class A levels and distributed in a separate irrigation system to slow-rate land application during the irrigation season and rapid infiltration in the wintertime. All of these systems will be regulated and permitted by IDEQ and IDWR.

The following findings were made:

1. The average day demand (potable water) for the project is estimated to be 156,300 gpd (109 gpm). The maximum-day demand (potable water) is estimated to be 375,000 gpd (260 gpm). The maximum-day demand with irrigation is estimated to be 719 gpm if recycled water is not available, and 484 gpm if recycled water is available.

2. The total pumping at full buildout is estimated to be 271 ac-ft and the annual consumptive use at full buildout is estimated to be 154 ac-ft.

3. Irrigated area at full buildout is estimated to be 75.9 acres.

4. Approximately 36 acres are required to receive the recycled water via slow-rate application (irrigation). The project irrigated area is more than sufficient to receive the recycled water and supplemental fresh water will be required.

5. Irrigated area will initially consist of at least a 15-acre farm, which is sufficient to receive the recycled water for about 10 years.

6. The balance of the recycled water at Class A levels will be recharged via rapid infiltration (RI) basins in the non-irrigation season. Available soils information indicates that RI basin development is likely feasible.

7. The groundwater source is the valley-fill alluvial aquifer of the North Fork Payette system between McCall and Cascade.

8. The aquifer system is highly stratified, consisting of sand and gravel separated by low-permeability clay layers, with an upper water-table zone and two lower artesian zones. The artesian zones will be the target production zone for the water supply wells.

9. Based on nearby well testing and lithologic analysis, the upper water table zone appears to be hydraulically separated from the lower artesian zones, and nearly all domestic wells are completed in the upper water-table zone.

10. The upper water-table zone is tributary to the North Fork Payette River in the project area and downstream to Cascade Reservoir. The lower zones are likely not tributary to the river in the immediate project area, but are highly likely to contribute to Cascade Reservoir and natural flow downstream.

11. The hydraulic conductivity of the aquifer production zones is typical of sand and gravel systems, and is likely adequate to support wells with the required design capacity. An exploratory test well will be drilled to confirm that the aquifer at the proposed well location is consistent with the findings of this report.

12. The local drawdown due to pumping the proposed wells was conservatively estimated by assuming a full irrigation season of pumping with no recycled water available. Projected drawdown is shown on Figure 5.

13. The annual total pumping at full buildout (271 ac-ft) and the annual consumptive use at full buildout (154 ac-ft) are 12.9% and 7.3% of the estimated groundwater discharge in the production zones to be developed. This indicates that the withdrawal is a small fraction of the average rate of annual recharge, and the aquifer will sustain the withdrawal.

14. Groundwater quality is expected to be excellent, and suitable for a public water supply.

15. A water right will be necessary to allow groundwater diversion for the project, and a new appropriation application will be submitted to IDWR. The basin is not subject to a moratorium, and IDWR has indicated that the application will be processed. Ample options for mitigation, if required, are available in the basin.

Figures

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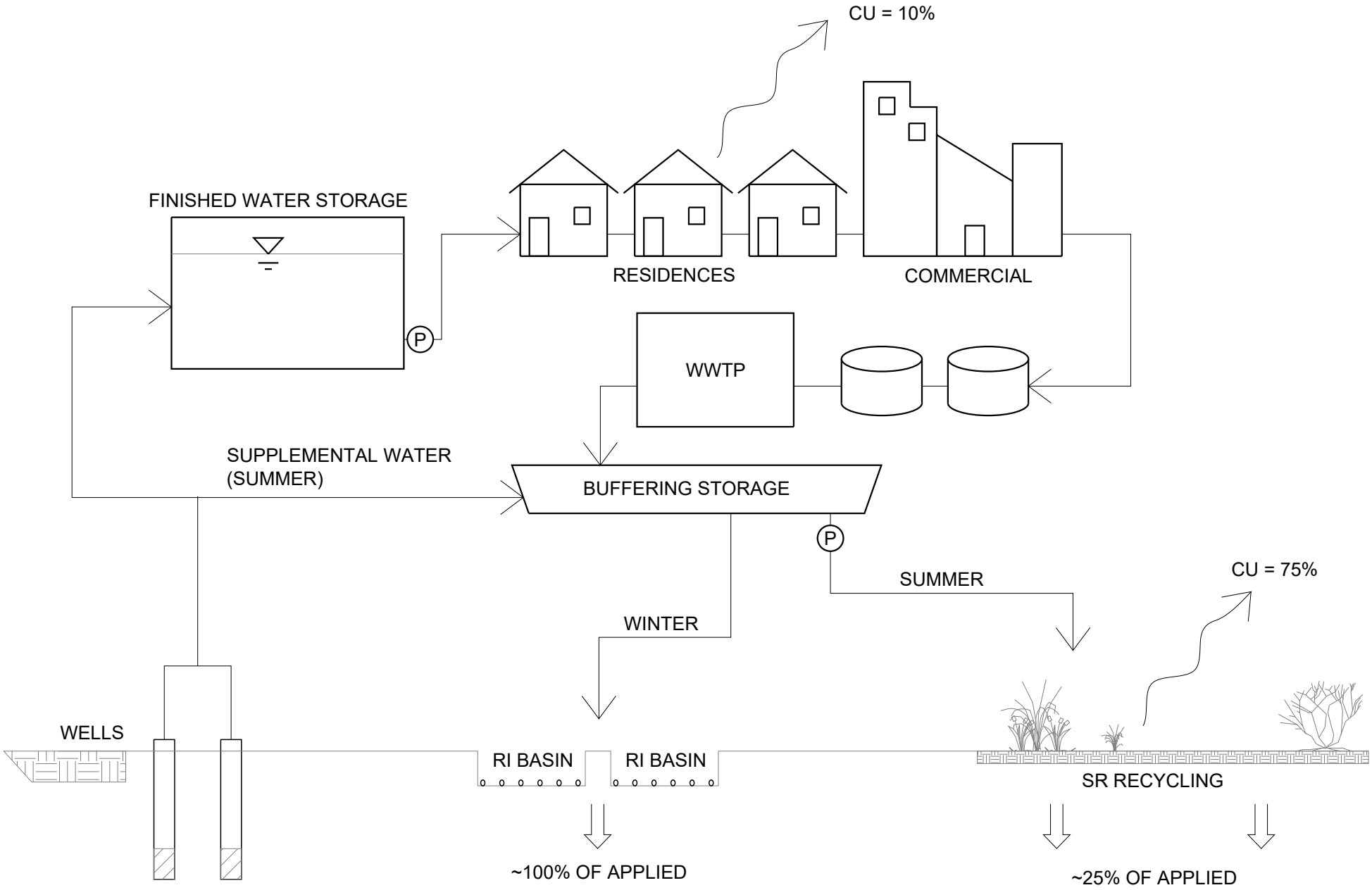

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A	ISSUED FOR REVIEW	08/13/26	

SCALE: NTS
(8.5 X 11 DWG ONLY)

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BROCKWAY ENGINEERING PLLC
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RED RIDGE VILLAGE

PROJECT # 1840-01-2025

FIGURE 1.
GENERALIZED FLOW DIAGRAM

DWG # 1

REV A

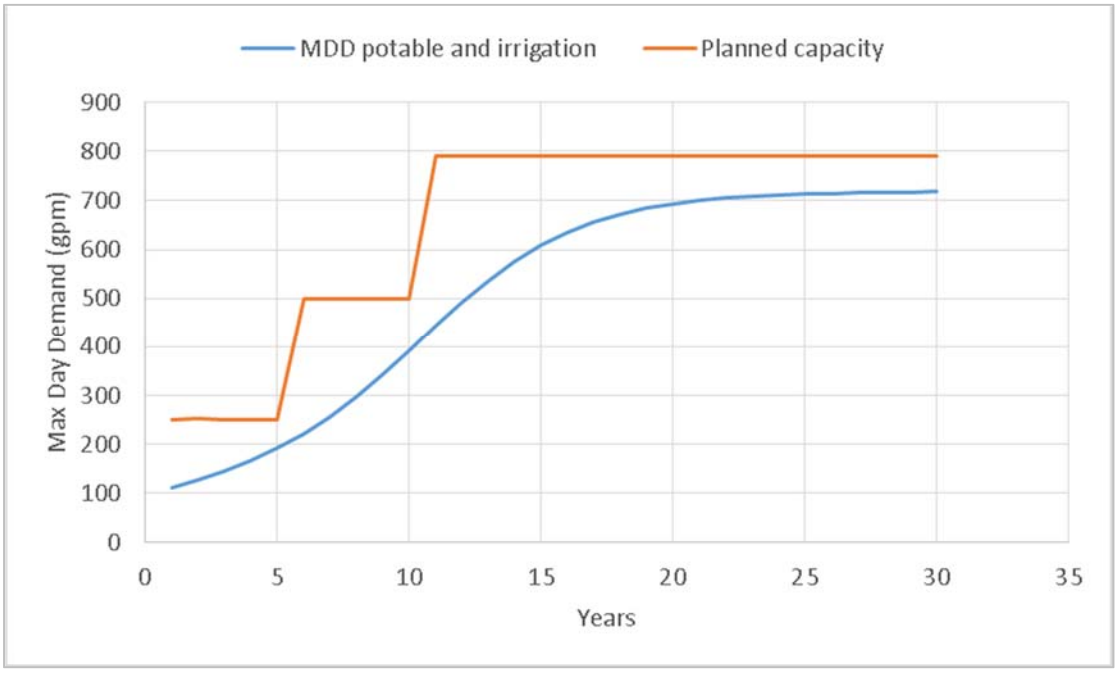

Figure 2. Demand and supply capacity projection over project buildout period.

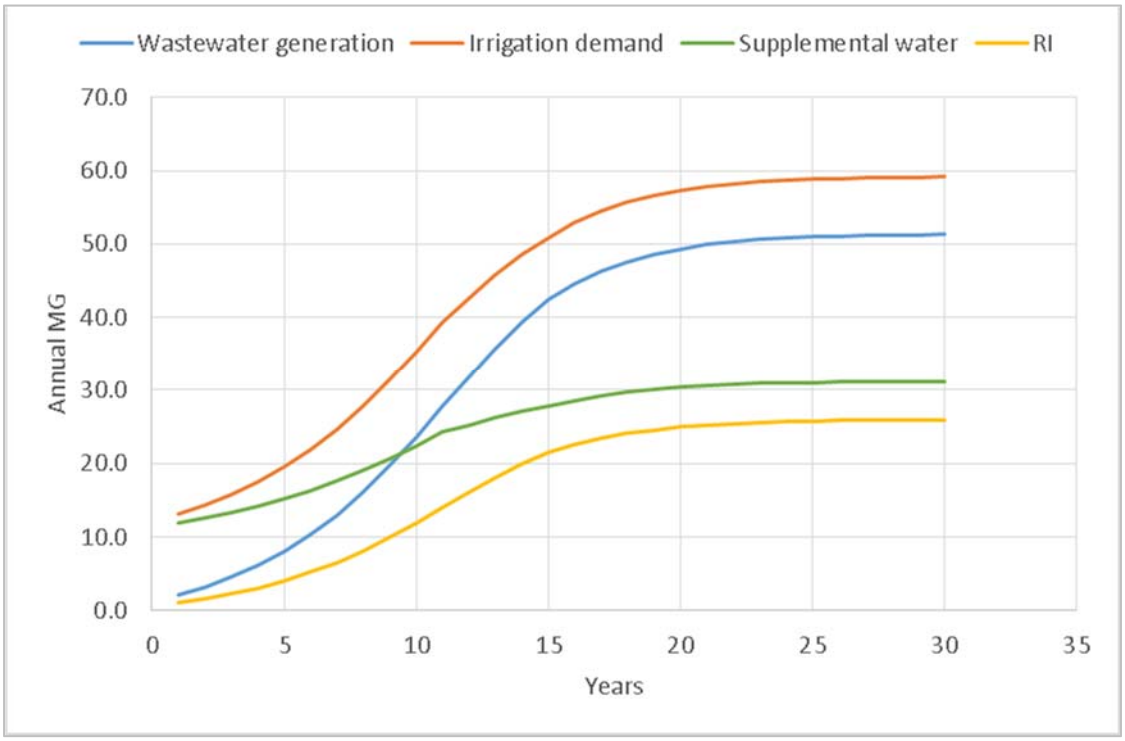

Figure 3. Recycled and supplemental water projections.

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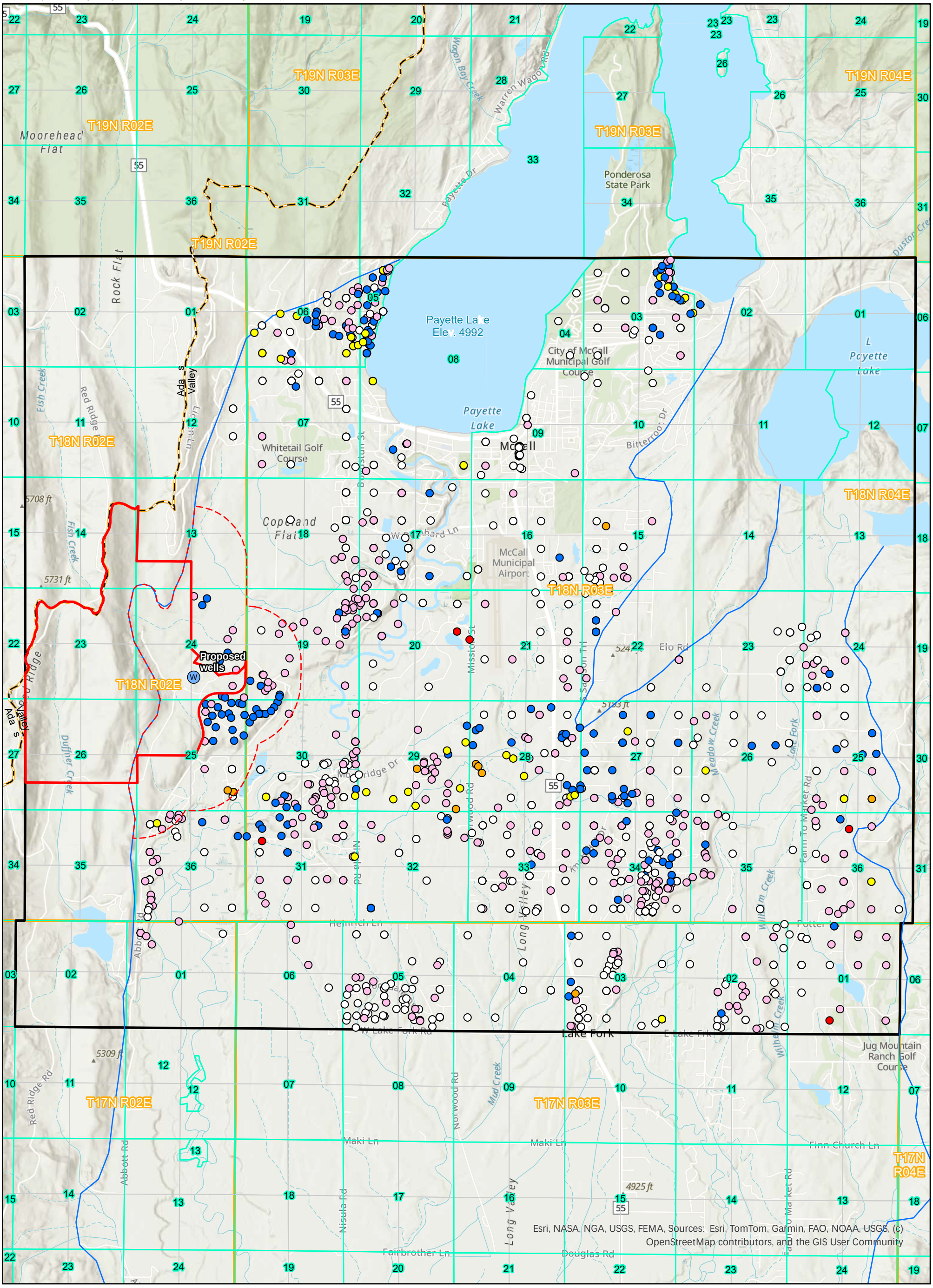

Esri, NASA, NGA, USGS, FEMA, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community

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N

0 0.5 1 Miles

FIGURE 4. WELLS IN STUDY AREA WITH TOTAL DEPTH INDICATED

Legend

- Proposed Wells
- Study Area
- Red Ridge Project Area
- Ida o Counties
- 0.5- ile u er
- Allu ial A ui er Boundary

Total Dept (t)

- 0-100
- 100-200
- 200-300
- 300-400
- 400-500
- 500-560

Well #: 1651
Flow rate(gp): 1200
Drawdown(t): 350
Esti ated Hydraulic Conducti ity(t/d): 20.4

Well #: 989
Flow rate(gp): 400
Drawdown(t): 118
Esti ated Hydraulic Conducti ity(t/d): 7.5

Blac aw Well #: 1029
Flow rate(gp): 1990
Drawdown(t): 114
Esti ated Hydraulic Conducti ity(t/d): 30.0

Blac aw Well #: 1023
Flow rate(gp): 1690
Drawdown(t): 83
Esti ated Hydraulic Conducti ity(t/d): 34.8

Proposed wells

A Cran Ridge 1470 1029 1023 1510 1491 724 842 Carter A'

T19N R02E T19N R03E T19N R04E T18N R02E T18N R03E T18N R04E T17N R02E T17N R03E T17N R04E

Moorehead Flat Rock Flat Ada s Valley Payette La e Ele . 4992 Payette Lake Ponderosa State Park City of McCall Municipal Golf Course Whitetail Golf Course McCall Copeland Flat Lake Fork Jug Mountain Ranch Golf Course

Esri, NASA, NGA, USGS, FEMA, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community

BROCKWAY ENGINEERING P.L.L.C.

N

0 0.5 1 Miles

FIGURE 5. GEOLOGIC SECTION LOCATION AND PREDICTED DRAWDOWN

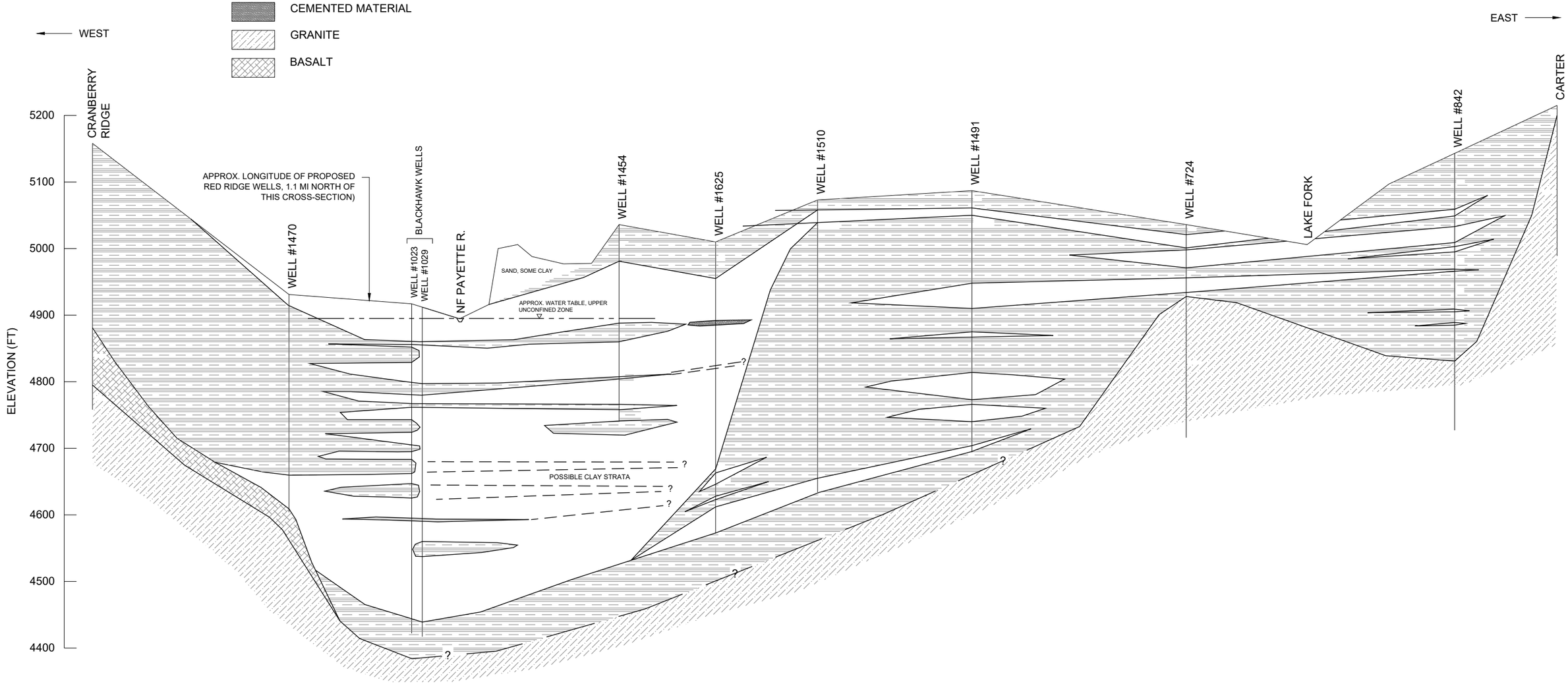
Legend

- Wells
- Proposed Wells
- Allu ial A ui er Boundary
- Geologic Section
- Ida o Counties
- Red Ridge Project Area
- Study Area
- Drawdown Contours (t)

F:\Projects\Red Ridge Village\Water Supply Study\Geologic section - trial3.dwg

LEGEND

- CLAY
- SAND, OR SAND & GRAVEL
- CEMENTED MATERIAL
- GRANITE
- BASALT



VERTICAL SCALE EXAGGERATED 20 TIMES
V. SCALE: 1" = 150'
H. SCALE: 1" = 3000'

NOT FOR CONSTRUCTION

REV.	DESCRIPTION	DATE	APPD.	REFERENCE DRAWINGS
A	ISSUE FOR REVIEW	8/10/2026		

DESIGNED BY CGB | DRAFTED BY LMB

SCALE AS SHOWN (11 x 17 DWG ONLY)

BROCKWAY ENGINEERING PLLC
HYDRAULICS ♦ HYDROLOGY ♦ WATER RESOURCES
2016 WASHINGTON ST NORTH, STE 4
TWIN FALLS, ID 83301
(208) 736-8543

NORTH FORK PAYETTE AQUIFER STUDY

PROJECT # 1863-01-2026

FIGURE 6. TRANSVERSE GEOLOGIC SECTION

DWG # 1 | REV A

Appendix A

Worksheets and Calculations

WATER REQUIREMENTS: POTABLE IN-HOUSE DEMAND AT FULL BUILDOUT

Brockway Engineering 7/17/2026
PROJECT: Red Ridge Village
See worksheets for detailed calculations

RESIDENTIAL IN-HOUSE DEMAND

Total number of units (see worksheet)	722	
Average per-capita demand	84.0	gpcd
Average persons per unit (see worksheet)	2.14	
Average per-unit demand (see worksheet)	180	
Total average daily demand	129708	gpd

NON-RESIDENTAL IN-HOUSE DEMAND

Use Type 1: Farm-To-Table Center	498	gpd
Use Type 2: Circulation & Core	108	gpd
Use Type 3: Restaurants	11375	gpd
Use Type 4: Meeting and Event Space	500	gpd
Use Type 5: Grocery store	50	gpd
Use Type 6: Boutique retail stores	18	gpd
Use Type 7: Service retail	24	gpd
Use Type 8: Lodge with Restaurant	12319	gpd
Use Type 9: Commercial Farm 5 acres	1660	gpd
Total average daily demand (see worksheet)	26551	gpd

Max day : average factor	2.4		
Peak hour : average factor	4.8		
Consumptive use fraction	0.10		
Total ADD	156259	gpd	
Total MDD	375020	gpd or	260 gpm
Total PHD	521	gpm	

	MG	Ac-ft
Annual water requirement	57.0	175.0
Annual in-house consumptive use - 10%	5.7	17.5
Annual wastewater generation	51.3	157.5

WATER REQUIREMENTS: IRRIGATION / SLOW RATE REUSE AT FULL BUILDOUT

Brockway Engineering 8/14/2026
PROJECT: Red Ridge Village
See worksheets for detailed calculations

IRRIGATION / SLOW-RATE REUSE

Project irrigated area - lots (see worksheet)	50.9	acres		
Project irrigated area - common areas	25.0	acres		
Project irrigated area - TOTAL	75.9	acres		
Seasonal Pdef - Pasture High Mgmt, McCall (ET-IDWR)	21.53	inches		
Design peak monthly ET - July (3-day, 20% exceedance)	0.240	in/day		
Irrigation application efficiency	0.75			
Irrigation annual application depth	28.71	inches		
Irrigation annual consumptive use	136.3	ac-ft =	44.4	MGY
Irrigation annual water requirement volume	181.7	ac-ft =	59.2	MGY
Design peak application rate	0.320	in/day		
Design peak flow rate (24-hour flow)	1.02	cfs =	458	gpm
	0.0134	cfs/acre	6.03	gpm/acre
Average demand over 199-day irrigation season	207	gpm		
Assume residential lot rotation will be in place to limit peak demand				

SUMMARY - IN HOUSE PLUS IRRIGATION

ADD (non-irrigation season)	**156259**	**gpd =**	**109**	**gpm**
ADD (irrigation season)	**315**	**gpm**		
Total MDD (well design capacity)	**719**	**gpm**		
Annual volume (no recycled water available)				
Irrigation season	**277.1**	**ac-ft**	**90.3**	**MGY**
Non-irrigation season	**79.6**	**ac-ft**	**25.9**	**MGY**
TOTAL	**356.7**	**ac-ft**	**116.2**	**MGY**
Annual volume (all recycled water available)				
Irrigation season	**191.2**	**ac-ft**		
Non-irrigation season	**79.6**	**ac-ft**		
TOTAL	**270.8**	**ac-ft**		
Consumptive Use				
Irrigation season	**145.8**	**ac-ft =**	**47.5**	**MGY**
Non-irrigation season	**8.0**	**ac-ft =**	**2.6**	**MGY**
TOTAL	**153.8**	**ac-ft =**	**50.1**	**MGY**

OVERALL SUMMARY

	Irrig Season	Non-irrig Season	Total	
Potable diversion	95.4	79.6	175.0	ac-ft
Recycled water available	85.9	71.6	157.5	ac-ft
Irrigation water requirement	181.7	0	181.7	ac-ft
Supplemental fresh water	95.8	0.0	95.8	ac-ft
Total well diversion	191.2	79.6	270.8	ac-ft
Recharge in RI basins	0.0	71.6	71.6	ac-ft
Return to upper water table aquifer	45.4	71.6	117.1	ac-ft
Overall consumptive use	145.8	8.0	153.8	ac-ft
Overall consumptive use percentage	76%	10%	57%	ac-ft

Residential Use Worksheet

Average per-capita in-house demand 84 gpcd
AWWA Residential End Uses of Water Study (1999) for indoor water use
Mean is 69 gpcd, 84 gpcd is a conservative figure to account for incidental outdoor use from hose bibbs

Persons per household (Valley County 2020 Census) 2.82

Residential Type	No. Units	Avg persons per unit	Total Occupancy	Total demand
Townhomes & duplexes	170	2.00	340	28560
Single-family: 3/4 acre lots	107	2.82	302	25346
Single-family: 1 acre lots	67	2.82	189	15871
Single-family: 2+ acre lots	113	2.82	319	26767
Single-family: 5+ acre lots	15	2.82	42	3553
Village center condos / rentals	250	1.41	352.5	29610
TOTAL	722 units		1544 persons	129708 gpd
Average persons/unit	2.14			
Average per-unit demand (gpd)	180			

Non-Residential Uses Worksheet

Use type characteristics based on information from GSBS Consulting.
Per-capita demands based on State of Idaho IDAPA guidelines and other literature values.

Use Type 1: Farm-To-Table Center

Total square footage	24875	
Area per person	100	sf/person
No. persons (Idaho guidance)	249	
Per-capita average demand	2	gpcd
TOTAL	498	gpd

Use Type 2: Circulation & Core

Total square footage	5375	
Area per person	100	sf/person
No. persons (Idaho guidance)	54	
Per-capita average demand	2	gpcd
TOTAL	108	gpd

Use Type 3: Restaurants

Total square footage	10500	sf
Area per seat	18	sf/seat
Total seats	583	
Average annual occupancy	0.75	
Meals per seat per day	2	
Total meals served	875	
Per-meal average demand	13	gpd/meal
TOTAL	11375	gpd

Use Type 4: Meeting and Event Space

Total square footage	5000	sf
Area per person	20	
Maximum occupancy	250	
Per-capita average demand	2	gpcd
TOTAL	500	gpd

Use Type 5: Grocery store

Total square footage	10000	sf
No. employees	10	
Per-employee average demand	5	gpcd
TOTAL	50	gpd

Use Type 6: Boutique retail stores

Total square footage	4500	sf
No. employees	9	
Per-employee average demand	2	

TOTAL	18	gpd

Use Type 7: Service retail

Total square footage	6000	sf
No. employees	12	
Per-employee average demand	2	
TOTAL	24	gpd

Use Type 8: Lodge with Restaurant

No. rooms	150	
No. bed spaces	225	
Average annual occupancy rate	75%	
Restaurant meals per day	225	
Per-bedspace average demand	60	gpd
Per-meal average demand	13	gpd/meal
TOTAL	12319	gpd

Use Type 9: Commercial Farm 5 acres

No. employees (assume live on premises)	3	
Per-employee average demand	60	gpcd
Large animals at 12 gpd/hd	15	
Small animals at 6 gpd/hd	50	
Cleanup, maintenance	1000	gpd
TOTAL	1660	gpd

TOTAL AVERAGE DAY DEMAND	**26551**	**gpd**

Peaking factors on municipal supply:

MDD : ADD	2.4
PHD : ADD	4.8

MAXIMUM DAY DEMAND PROJECTION	**63722**	**gpd or**	**44 gpm**
PEAK HOUR DEMAND PROJECTION	**89**	**gpm**	

Irrigated Area Worksheet

Use	No.	Irrigated sf / lot	Total area (ac)
Single-family: 3/4 acre lots	107	6500	16.0
Single-family: 1 acre lots	67	6500	10.0
Single-family: 2+ acre lots	113	8500	22.1
Single-family: 5+ acre lots	15	8500	2.9
Commercial farm & orchard			15
Playgrounds & parks			10
Road buffers (establishment only, no long-term irrigation)			0
Total - lots			50.9
Total - common			25
Grand total			75.9

Transmissivity Estimation with Partial Penetration

Bradbury and Rothschild (1985) specific capacity method.
Suitable for situations where a single time and drawdown measurement is available.
Includes effects of partial penetration using Sternberg (1973) approach.
Enter data in blue, pay attention to units. Vary "Trial T" until equal to "Calc T".

Project: Red Ridge Village
Large production wells with good test data within approximately 2 miles of the potential well sites

Well No.	Name	Location*	Pumping Rate [gpm]	Drawdown [ft]	Time [min]	Well radius [in]	Storativity	SWL [ft]	Aquifer bottom [ft]	Avg open interval [ft]	Average aquifer thickness [ft]	Specific capacity	L/b	G	sp	Trial T (vary) [ft2/d]	Calc T [ft2/d]	Calc K [ft/d]	ln K
1023	Sage SGI, LLC	18N02E25SESE	1690	83	480	11	0.001	-9.2	475	110	182	20.4	0.60	1.65	2.39	6337.9	6338.0	34.8	3.55
1029	Sage SGI, LLC	18N02E25SESE	1990	114	315	9	0.001	-12.7	481	110	182	17.5	0.60	1.65	2.52	5458.6	5458.6	30.0	3.40
989	McCall River Ranch	18N03E20SENE	400	118	120	7	0.001	50.2	495	74	150	3.4	0.49	1.54	4.12	1120.1	1120.1	7.5	2.01
1583	Montoya**	17N03E03NWSW	1200	257	300	10	0.001	93	412	60	116	4.7	0.52	1.56	3.16	1437.5	1437.5	12.4	2.52
	City of McCall	18N03E10NWNE	300	55	5	4	0.001	7	150	40	97	5.5	0.41	1.53	5.90	1976.2	1976.2	20.4	3.01

* From drilling records, corrected if needed based on water right records and/or aerial photo evidence.
** Test by blowing with air, drawdown not given but inferred, measurement inaccurate (discount this data point)

Excluding Well 1583 (see note):

Mean	3723.2	23.2	2.7
Median	3717.4	25.2	2.8
Max	6338.0	34.8	3.4
Min	1437.5	12.4	2.0
Std dev	2456.3	10.0	0.6

WELL DRAWDOWN ESTIMATION
RED RIDGE VILLAGE
8/19/2026

Brockway Engineering, PLLC
Drawdown estimated using Theis approach

Hydraulic conductivity	23.2 ft/day	Pumping rate	242 gpm
Saturated thickness	182 feet	Pumping time	336 hrs
Tranmissivity	4222.4 ft2/d		
	31583.6 gpd/ft	Well loss coeff	0.5
Storage coefficient	0.001	Well loss exponent	2.0

Time		R = 0.75 feet			z +	R = 50 feet (closest dom.)			R = 200 feet			R = 800 feet		
(days)	(hrs)	u	W(u)	z (feet)	sw (ft)	u	W(u)	z (feet)	u	W(u)	z (feet)	u	W(u)	z (feet)
0.0	0	--	--	0.00	0.00	--	--	0.00	--	--	0.00	--	--	0.00
0.6	14	5.7E-08	16.101	14.14	14.28	2.5E-04	7.702	6.76	4.1E-03	4.933	4.33	6.5E-02	2.221	1.95
1.2	28	2.9E-08	16.795	14.75	14.89	1.3E-04	8.395	7.37	2.0E-03	5.625	4.94	3.2E-02	2.882	2.53
1.8	42	1.9E-08	17.200	15.10	15.25	8.5E-05	8.801	7.73	1.4E-03	6.029	5.29	2.2E-02	3.277	2.88
2.3	56	1.4E-08	17.488	15.36	15.50	6.3E-05	9.088	7.98	1.0E-03	6.317	5.55	1.6E-02	3.559	3.13
2.9	70	1.1E-08	17.711	15.55	15.70	5.1E-05	9.311	8.18	8.1E-04	6.540	5.74	1.3E-02	3.779	3.32
3.5	84	9.5E-09	17.893	15.71	15.86	4.2E-05	9.494	8.34	6.8E-04	6.722	5.90	1.1E-02	3.959	3.48
4.1	98	8.2E-09	18.047	15.85	15.99	3.6E-05	9.648	8.47	5.8E-04	6.876	6.04	9.3E-03	4.112	3.61
4.7	112	7.1E-09	18.181	15.96	16.11	3.2E-05	9.781	8.59	5.1E-04	7.009	6.15	8.1E-03	4.244	3.73
5.3	126	6.3E-09	18.299	16.07	16.21	2.8E-05	9.899	8.69	4.5E-04	7.127	6.26	7.2E-03	4.361	3.83
5.8	140	5.7E-09	18.404	16.16	16.31	2.5E-05	10.005	8.78	4.1E-04	7.232	6.35	6.5E-03	4.466	3.92
6.4	154	5.2E-09	18.499	16.24	16.39	2.3E-05	10.100	8.87	3.7E-04	7.328	6.43	5.9E-03	4.561	4.00
7.0	168	4.8E-09	18.586	16.32	16.47	2.1E-05	10.187	8.95	3.4E-04	7.415	6.51	5.4E-03	4.647	4.08
7.6	182	4.4E-09	18.666	16.39	16.54	2.0E-05	10.267	9.02	3.1E-04	7.495	6.58	5.0E-03	4.727	4.15
8.2	196	4.1E-09	18.740	16.46	16.60	1.8E-05	10.341	9.08	2.9E-04	7.569	6.65	4.6E-03	4.800	4.22
8.8	210	3.8E-09	18.809	16.52	16.66	1.7E-05	10.410	9.14	2.7E-04	7.638	6.71	4.3E-03	4.869	4.28
9.3	224	3.6E-09	18.874	16.57	16.72	1.6E-05	10.475	9.20	2.5E-04	7.702	6.76	4.1E-03	4.933	4.33
9.9	238	3.4E-09	18.935	16.63	16.77	1.5E-05	10.535	9.25	2.4E-04	7.763	6.82	3.8E-03	4.994	4.39
10.5	252	3.2E-09	18.992	16.68	16.82	1.4E-05	10.592	9.30	2.3E-04	7.820	6.87	3.6E-03	5.051	4.44
11.1	266	3.0E-09	19.046	16.72	16.87	1.3E-05	10.646	9.35	2.1E-04	7.874	6.91	3.4E-03	5.105	4.48
11.7	280	2.9E-09	19.097	16.77	16.91	1.3E-05	10.698	9.39	2.0E-04	7.925	6.96	3.2E-03	5.156	4.53
12.3	294	2.7E-09	19.146	16.81	16.96	1.2E-05	10.747	9.44	1.9E-04	7.974	7.00	3.1E-03	5.204	4.57
12.8	308	2.6E-09	19.192	16.85	17.00	1.2E-05	10.793	9.48	1.8E-04	8.021	7.04	3.0E-03	5.251	4.61
13.4	322	2.5E-09	19.237	16.89	17.04	1.1E-05	10.837	9.52	1.8E-04	8.065	7.08	2.8E-03	5.295	4.65
14.0	336	2.4E-09	19.279	16.93	17.07	1.1E-05	10.880	9.55	1.7E-04	8.108	7.12	2.7E-03	5.338	4.69
14.6	350	2.3E-09	19.320	16.96	17.11	1.0E-05	10.921	9.59	1.6E-04	8.148	7.16	2.6E-03	5.378	4.72

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	31583.6 gpd/ft	Well loss coeff	0.5
Storage coefficient	0.001	Well loss exponent	2.0

Time		R = 0.75 feet			z +	R = 50 feet (closest dom.)			R = 200 feet			R = 800 feet		
(days)	(hrs)	u	W(u)	z (feet)	sw (ft)	u	W(u)	z (feet)	u	W(u)	z (feet)	u	W(u)	z (feet)
0.0	0	--	--	0.00	0.00	--	--	0.00	--	--	0.00	--	--	0.00
0.6	14	5.7E-08	16.101	28.28	28.86	2.5E-04	7.702	13.53	4.1E-03	4.933	8.66	6.5E-02	2.221	3.90
1.2	28	2.9E-08	16.795	29.49	30.08	1.3E-04	8.395	14.74	2.0E-03	5.625	9.88	3.2E-02	2.882	5.06
1.8	42	1.9E-08	17.200	30.21	30.79	8.5E-05	8.801	15.46	1.4E-03	6.029	10.59	2.2E-02	3.277	5.75
2.3	56	1.4E-08	17.488	30.71	31.29	6.3E-05	9.088	15.96	1.0E-03	6.317	11.09	1.6E-02	3.559	6.25
2.9	70	1.1E-08	17.711	31.10	31.68	5.1E-05	9.311	16.35	8.1E-04	6.540	11.48	1.3E-02	3.779	6.64
3.5	84	9.5E-09	17.893	31.42	32.01	4.2E-05	9.494	16.67	6.8E-04	6.722	11.80	1.1E-02	3.959	6.95
4.1	98	8.2E-09	18.047	31.69	32.28	3.6E-05	9.648	16.94	5.8E-04	6.876	12.08	9.3E-03	4.112	7.22
4.7	112	7.1E-09	18.181	31.93	32.51	3.2E-05	9.781	17.18	5.1E-04	7.009	12.31	8.1E-03	4.244	7.45
5.3	126	6.3E-09	18.299	32.14	32.72	2.8E-05	9.899	17.38	4.5E-04	7.127	12.52	7.2E-03	4.361	7.66
5.8	140	5.7E-09	18.404	32.32	32.90	2.5E-05	10.005	17.57	4.1E-04	7.232	12.70	6.5E-03	4.466	7.84
6.4	154	5.2E-09	18.499	32.49	33.07	2.3E-05	10.100	17.74	3.7E-04	7.328	12.87	5.9E-03	4.561	8.01
7.0	168	4.8E-09	18.586	32.64	33.22	2.1E-05	10.187	17.89	3.4E-04	7.415	13.02	5.4E-03	4.647	8.16
7.6	182	4.4E-09	18.666	32.78	33.36	2.0E-05	10.267	18.03	3.1E-04	7.495	13.16	5.0E-03	4.727	8.30
8.2	196	4.1E-09	18.740	32.91	33.49	1.8E-05	10.341	18.16	2.9E-04	7.569	13.29	4.6E-03	4.800	8.43
8.8	210	3.8E-09	18.809	33.03	33.61	1.7E-05	10.410	18.28	2.7E-04	7.638	13.41	4.3E-03	4.869	8.55
9.3	224	3.6E-09	18.874	33.15	33.73	1.6E-05	10.475	18.40	2.5E-04	7.702	13.53	4.1E-03	4.933	8.66
9.9	238	3.4E-09	18.935	33.25	33.83	1.5E-05	10.535	18.50	2.4E-04	7.763	13.63	3.8E-03	4.994	8.77
10.5	252	3.2E-09	18.992	33.35	33.93	1.4E-05	10.592	18.60	2.3E-04	7.820	13.73	3.6E-03	5.051	8.87
11.1	266	3.0E-09	19.046	33.45	34.03	1.3E-05	10.646	18.70	2.1E-04	7.874	13.83	3.4E-03	5.105	8.96
11.7	280	2.9E-09	19.097	33.54	34.12	1.3E-05	10.698	18.79	2.0E-04	7.925	13.92	3.2E-03	5.156	9.05
12.3	294	2.7E-09	19.146	33.62	34.21	1.2E-05	10.747	18.87	1.9E-04	7.974	14.00	3.1E-03	5.204	9.14
12.8	308	2.6E-09	19.192	33.71	34.29	1.2E-05	10.793	18.95	1.8E-04	8.021	14.09	3.0E-03	5.251	9.22
13.4	322	2.5E-09	19.237	33.78	34.36	1.1E-05	10.837	19.03	1.8E-04	8.065	14.16	2.8E-03	5.295	9.30
14.0	336	2.4E-09	19.279	33.86	34.44	1.1E-05	10.880	19.11	1.7E-04	8.108	14.24	2.7E-03	5.338	9.37
14.6	350	2.3E-09	19.320	33.93	34.51	1.0E-05	10.921	19.18	1.6E-04	8.148	14.31	2.6E-03	5.378	9.45

Appendix B

Selected Well Drilling Records
used for Geologic Cross-Section

65 * pg 1 of 2

849589

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 4194619
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0052457
DRILLING PERMIT NO. 902602-849589
Water Right or Injection Well No.

2. OWNER:
Name CRANBERRY RIDGE, LLC
Address 112 NORTH 3RD ST.
City McCall State ID Zip 83638

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 18 North ☒ or South ☐
Rge. 2 East ☒ or West ☐
Sec. 26 ____ 1/4 (10 acres) SW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot ____ County VALLEY
Lat: 44° 57' 891" Long: 116° 11' 118"
Address of Well Site 1.25 MILES WEST OF WEST MOUNTAIN RD. City McCall
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name PROPOSED RED RIDGE

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	100 lbs	OVERBORE

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 198
Was drive shoe seal tested? ☒ Y ☐ N How? AIR

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2	198	250	STEEL	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

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WATER RESOURCES
WESTERN REGION

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:
+1 1/2 ft. below ground Artesian pressure ____ lb.
Depth flow encountered 277 ft. Describe access port or control devices:
WATER TIGHT CAP

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

Yield gal /min.	Drawdown	Pumping Level	Time
20		100	2 HRS.

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments:
Depth first Water Encountered 96'

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
10	0	1	TOP SOIL		X
10	1	4	BROWN CLICHE		
10	4	18	BROWN CLAY		
6	18	42	BROWN CLAY [illegible]		
	42		BROWN CLAY W/		
		53	BASALT FLOATERS		
	53	67	STICKY BROWN CLAY		
	67	69	BASALT BOULDER		
	69	73	STICKY BROWN CLAY		
	73	86	STICKY RED CLAY		
	86	88	STICKY TAN CLAY		
	88	96	TAN SANDSTONE		X
	96	112	FRACTURED BASALT	X	26 GPM
	112	134	BROWN ROCK		X
	134	136	FRACTURED BROWN ROCK	X	30
	136	143	SOLID BASALT		X
	143	152	FRACTURED BASALT	X	10
	152	163	FRACTURED BLUE CLAYSTONE	X	30
	163	176	SOLID BASALT		X
	176	180	CAVY BROWN ROCK	X	50
	180	189	SOLID BASALT		X
6	189	198	BAKED BLUE CLAY		X
5 1/2	198	201	BAKED BLUE CLAY		X
	201	236	STICKY BLUE CLAY		X
	236	239	SOLID BASALT		X
	239	258	STICKY BLUE CLAY		X
	258	277	BAKED BLUE CLAY		X
	277	296	WEATHERED BASALT	X	2
5 1/2	296	305	HARD BASALT		X
			CONT.		

Completed Depth 140' (Measurable)
Date: Started 10-30-07 Completed 11-15-07

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 MENASCO DRILLING Firm No. 391
Principal Driller [signature] Date 11-15-07
and
Driller or Operator II ____ Date ____
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

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 0052457
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name CRANBERRY RIDGE
Address
City State Zip

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. ____ North ☐ or South ☐
Rge. ____ East ☐ or West ☐
Sec. ____ ____1/4 (10 acres) ____1/4 (40 acres) ____1/4 (160 acres)
Gov't Lot ____ County
Lat: : : **Long:** : :
Address of Well Site
(Give at least name of road + Distance to Road or Landmark) City
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

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
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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:
____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
			CONT		
5½	305	317	WEATHERED BASALT		X
	317	332	VERY HARD BASALT		X
	332	334	WEATHERED BASALT		X
	334	341	HARD BASALT		X
	341	348	WEATHERED BASALT		X
	348	360	HARD BASALT		X
	360	363	BROWN ROCK		X
	363	381	DECOMPOSED GRAY GRANITE	X	30
	381	387	HARD GRAY GRANITE		X
	387	394	DECOMPOSED GRAY & BROWN GRANITE	X	70
5½	394	400	HARD GRAY GRANITE		X

400' 4½ Drill steel
3½ Reg Pin up
Stuck in hole 220-400'

Completed Depth (Measurable)
Date: Started Completed

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 Firm No.
Principal Driller Date
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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#842

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

RECEIVED
JUL 27 2004
WATER RESOURCES
WESTERN REGION

Office Use Only
Well ID No. 878310
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D D 00 316 21
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Pat Morell
Address 270 Heikkila Ln
City McCall State ID Zip 83638

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 18 North ☒ or South ☐
Rge. 3 East ☒ or West ☐
Sec. 25, ____ 1/4 (10 acres) SW 1/4 (40 acres) SE 1/4 (160 acres)
Gov't Lot ____ County Valley
Lat: : : Long: : :
Address of Well Site 270 Heikkila Ln
City McCall
(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
Chip Bentonite	0	18	400 #	10" Temp Casing

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 312'6"
Was drive shoe seal tested? ☒ Y ☐ N How? Air / water

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1'6"	312	.250	Steel	☒	☐	☒	☐
4"	-9'6"	336	160#	PVC	☐	☒	☒	☐
					☐	☐	☐	☐

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

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
307	311	1/8"x8"	24	6"	Steel	☒	☐
336	416	.020		4"	PVC	☐	☒
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
8-12 Colo Sand	336	416	1300#	Top / Down

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
27'6" ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices:
Sanitary Well Seal

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

Yield gal./min.	Drawdown	Pumping Level	Time
22		415	1 Hr

Water Temp. 65° Bottom hole temp. 65°
Water Quality test or comments: Good
Depth first Water Encounter 121

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
10	0	1	Top Soil		X
10	1	3	Brown Clay		X
10	3	8	Bro Clay, Gravel, Boulders		X
10	8	18	Brown Clay, Gravel		X
6	18	24	Brown Clay, Gravel		X
6	24	33	Brown Clay		X
6	33	61	Cem Bro Clay, Sand, Gravel		X
6	61	63	Granite Boulder		X
6	63	84	Blue and Brown Clay		X
6	84	94	Cemented Brown Sand		X
6	94	108	Dk Bro Hard Clay, Lt Bro Clay		X
6	108	110	Brown Sandy Clay		X
6	110	120	Bro Cem Sand and Gravel		X
6	120	121	Lt Brown Clay		X
6	121	134	Bro Sand and Gravel Low Static	X	
6	134	140	Dk Brown Clay		X
6	140	148	Gray Brown Sand and Pea Gravel	X	
6	"	"	(Flow dropped off low Static)	X	
6	148	174	Gray / Blue Clay		X
6	174	177	Gray Cemented Sand		X
6	177	234	Bro, Blue, Gray Sandy Clays		X
6	234	238	Brown Sand		X
6	238	254	Blue / Gray Clay w/ Sand Streak		X
6	254	258	Blue / Gray Sand and Gravel 4 GPM	X	
6	258	312	Brown Sandy Clay		X
6	312	336	Med Hard Gray / Brown Granite w/ 4 GPM	X	
6	336	346	Hard Blue / Gray Granite w/ Fractures		X
6	346	356	Med Hard Brown Granite 2¼ GPM	X	
6	356	374	Med Hard Gray Granite 1½ GPM	X	
6	374	391	Hard Blk Granite w/ Fracs 3½ GPM	X	
6	391	408	Med Hard Gray		X
6	408	410	Fractured Granite	X	
6	410	416	Fractured Black Granite	X	

Completed Depth 416 (Measurable)
Date: Started 6-28-04 Completed 7-13-04

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 Gestrin Well Drilling Firm No. 408
Principal Driller Robert W. Gestrin Date 7-20-04
and
Driller or Operator II Frank D. Gestrin Date 7-16-04
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

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#1470

Form 238-7
6/07

65

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 96000
Drilling Permit No. 907772
Water right or injection well #

2. OWNER: Hazen Overdorf
Name
Address Po Box 598
City McCall State ID Zip 83638

3.WELL LOCATION:
Twp. 18 North ☒ or South ☐ Rge. 02 East ☒ or West ☐
Sec. 36 ____ 10 acres ____ 1/4 NW 40 acres 1/4 NW 160 acres 1/4
Gov't Lot ____ County Valley
Lat. 44 ° 51.5847 (Deg. and Decimal minutes)
Long. -116 ° 09.8277 (Deg. and Decimal minutes)
Address of Well Site 12 Cassia Ct
(Give at least name of road + Distance to Road or Landmark) City McCall
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 Dual Rotary

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
Bentonite	0	60	1550	Pullback & Pour

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6	+2	280	.250	Steel	☒	☐	☐	☒
4.5	267	287	sdr-17	PVC	☐	☒	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 280

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method
Manufactured screen ☒ Y ☐ N Type Certa-Lok
Method of installation Set In

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
287	327	20		4.5	PVC	SDR-7

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) 272 Static water level (ft) 6
Water temp. (°F) 61 Bottom hole temp. (°F)
Describe access port Turtle Cap

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
254	60	60

Test method:

Pump	Bailer	Air	Flowing artesian
☐	☐	☒	☐
☐	☐	☐	☐

Water quality test or comments: Ph=7.9, tds=105, Fe=.3mg/l, gpg=10

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	2	Top Soil		X
10	2	16	Gravel		X
10/6	16	272	Clay Alternating Colors		X
6	272	322	Cemented Granite Gravel	X	
6	322	327	Broken & Altered Basalt	X	
	327		Basalt		

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WESTERN REGION

Completed Depth (Measurable): 327
Date Started: 10/7/2022 Date Completed: 10/9/2022

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 Cold Steel Drilling Co. No. 793
*Principal Driller Allan Stineberger Date 11/19/2022
*Driller ____ Date ____
*Operator II ____ Date ____
Operator I Matt McCann Date 11/19/2022

* Signature of Principal Driller and rig operator are required

SCANNED
DEC 02 2022

Form 238-7 6/02

#1023

834514

Office Use Only
Well ID No. 405053
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 0039525
DRILLING PERMIT NO. 889533-
Water Right or Injection Well No.

2. OWNER:
Name SAGE SG, INC.
Address 1220 20th STREET SE
City SALEM State OR Zip 97302

3. LOCATION OF WELL by legal description: WELL #1
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 8 North ☒ or South ☐
Rge. 2 East ☒ or West ☐
Sec. 25, 10 acres 1/4 SE 40 acres 1/4 SE 160 acres
Gov't Lot ____ County VALLEY
Lat: : : Long: : :
Address of Well Site LOOP ROAD
(Give a: least name of road + Distance to Road or Landmark) City McCall
Lt. ____ Blk. ____ Sub. Name BLACKHAWK ON the RIVER

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

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

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

7. SEALING PROCEDURES

Seal Material	From	To	Weight/ Volume	Seal Placement Method
1" BENTONITE CHIP	0	271	18,750	DRY POUR
1" BENTONITE CHIP	371	381	700	DRY POUR

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
12	+2	275	.375	STEEL	☒	☐	☒	☐
10	275	295	.365	STEEL	☒	☐	☒	☐
10	345	355	.365	STEEL	☒	☐	☒	☐
10	365	405	.365	STEEL	☒	☐	☒	☐

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

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
295	345	.030		10	S.S.	☒	☐
355	365	.030		10	S.S.	☒	☐
405	455	.030		10	S.S.	☒	☐

10. FILTER PACK

Filter Material	From	To	Weight/ Volume	Placement Method
CSSI #6-9 SAND	271	495	36,000	DRY POUR

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ ft. below ground Artesian pressure 4 lb.
Depth flow encountered 293 ft. Describe access port or control devices:
BLIND FLANGES

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

Yield gal./min.	Drawdown	Pumping Level	Time
1700	86'	74'	2 hrs

Water Temp. 52° 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
22	0	1	TOP SOIL		
	1	9	GRAVEL		
	9	56	MED-COARSE SAND, GRAVEL		
	56	61	BR + BLUE CLAY		
	61	65	SAND, GRAVEL		
	65	88	GRAY, BROWN CLAY LAYERS		
	88	115	MED SAND, PEA GRAVEL		
	115	120	SANDY BR CLAY		
	120	150	MED SAND, PEA GRAVEL		
	150	153	DARK BR CLAY		
	153	174	SAND, SM GRAVEL		
	174	193	BROWN + GRAY CLAY LAYERS		
	193	212	SAND, SM GRAVEL		
	212	222	TAN + BLACK CLAY		
	222	234	SAND, SM GRAVEL		
	234	255	BR CLAY		
	255	270	MED-COARSE SAND, PEA GRAVEL		
	270	293	BR CLAY & SAND LAYERS		
	293	323	FINE-MED SAND, PEA GRAVEL		
	323	326	BLUE CLAY		
	326	457	FINE-COARSE SAND w/ SM CLAY LAYERS		
	457	472	GRAY CLAY		
	472	476	SAND, CLAY MIX		
	476	495	GRAY CLAY		

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WESTERN REGION

Completed Depth 455' (Measurable)
Date: Started 7-19-05 Completed 8-22-05

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 RIVERSIDE INC Firm No. 333
Principal Driller and Driller or Operator II [signature] Date 8-30-05
Operator I [signature] Date 8-30-05
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

65

Form 238-7
6/02

#1029

835302

Office Use Only
Well ID No. 405812
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 0041733
DRILLING PERMIT NO. 890321-835302
Water Right or Injection Well No. 65-22945

2. OWNER:
Name SAGE SGI, LLC
Address 1220 20th Street SE
City SALEM State OR Zip 97302

3. LOCATION OF WELL by legal description: WELL #2
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 18 North ☒ or South ☐
Rge. 2 East ☒ or West ☐
Sec. 25 ____ 1/4 (10 acres) SE 1/4 (40 acres) SE 1/4 (160 acres)
Gov't Lot ____ County VALLEY
Lat: : : Long: : :
Address of Well Site LOOP ROAD City
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name BLACKHAWK ON the RIVER

4. USE:
☐ Domestic ☐ Municipal ☐ Monitor ☒ Irrigation
☐ Thermal ☐ Injection ☒ Other PWS, FIRE PROTECTION

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

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

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
1" BENTONITE	0	295	27,500	DRY POUR
1" BENTONITE	356	366	800	

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

8. CASING/LINER: 20" X 10" REDUCER @ 286' to 288'

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
20"	+3	285	.375	STEEL	☒	☐	☒	☐
10"	288	321	.365	STEEL	☒	☐	☒	☐
10"	351	376	.365	STEEL	☒	☐	☒	☐

Length of Headpipe N/A Length of Tailpipe N/A
Packer ☐Y ☒N Type

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
321	351	.030		10"	S.S.	☒	☐
376	456	.030		10"	S.S.	☒	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
#6-9 SAND	295	495	21,000	DRY POUR

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ ft. below ground Artesian pressure 5.5 lb.
Depth flow encountered ____ ft. Describe access port or control devices:
8" FLANGE OFF SIDE W/BUTTERFLY VALVE

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

Yield gal./min.	Drawdown	Pumping Level	Time
1990 gpm	114'	92'	5.5 hrs

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
28"	0	2	TOP SOIL		
	2	119	SAND, GRAVEL, SM LAYERS CLAY		
	119	133	BRN CLAY		
	133	145	FINE-COARSE SAND		
	145	152	TAN CLAY		
	152	290	FINE-COARSE SAND, PEA GRAVEL		
18"	290	314	FINE-COARSE SAND, PEA GRAVEL, SM LAYERS CLAY		
	314	320	BLUE CLAY		
	320	352	FINE-MED SAND		
	352	375	GREY CLAY W/FINE SAND LAYERS		
	375	458	FINE-MED SAND, PEA GRAVEL		
	458	463	GREY CLAY		
	463	473	FINE-MED SAND		
	473	477	GREY CLAY		
	477	481	FINE-COARSE SAND		
	481	495	GREY CLAY		

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WATER RESOURCES
WESTERN REGION

Completed Depth 456' (Measurable)
Date: Started 8-19-05 Completed 9-17-05

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 Ryan Drilling Firm No. 333
Principal Driller [signature] Date 10-12-05
and
Driller or Operator II ____ Date
Operator I [signature] Date 10-12-05
Principal Driller and Rig Operator *Required*.
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

#1454

Form 238-7
6/07

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IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 93635
Drilling Permit No. 906069
Water right or injection well #

2. OWNER: Fred Smelser
Name
Address 14055 Nisula Rd
City McCall State ID Zip 83638

3.WELL LOCATION:
Twp. 18 North ☒ or South ☐ Rge. 03 East ☒ or West ☐
Sec. 30 ___ 1/4 SE 1/4 SE 1/4
(10 acres / 40 acres / 160 acres)
Gov't Lot ___ County Valley
Lat. 44 ° 51.8606 (Deg. and Decimal minutes)
Long. -116 ° 07.6298 (Deg. and Decimal minutes)
Address of Well Site 14055 Nisula Rd
City McCall
(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 Dual Rotary

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
Bentonite	0	60	1600	Pullback & Pour

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6	+2	283	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 283

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method
Manufactured screen ☒ Y ☐ N Type Wire Wound
Method of installation Set & Pullback

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
283	293	14		5	Stainless	.250

Length of Headpipe 8' Length of Tailpipe 2'
Packer ☒ Y ☐ N Type K

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) 78 Static water level (ft) 120
Water temp. (°F) 50 Bottom hole temp. (°F)
Describe access port Turtle Cap

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
140	90	60

Test method:

Pump	Bailer	Air	Flowing artesian
☐	☐	☒	☐
☐	☐	☐	☐

Water quality test or comments: Ph=8.1, TDS=44, Fe=.3mg/l, gpg=6

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	10	Clay Brown & Cobbles		X
10	10	55	Clay Brown		X
10/6	55	135	Sand & Gravel Brown	X	
6	135	148	Sand Brown	X	
6	148	173	Clay Brown, Sand & Gravel Streaks	X	
6	173	176	Clay Gray		X
6	176	187	Sand & Gravel Brown	X	
6	187	226	Sandstone Brown, Gravel Streaks	X	
6	226	232	Clay Tan Sticky		X
6	232	270	Sand Brown	X	
6	270	278	Clay Tan, Sand Streaks	X	
6	278	295	Sand & Gravel	X	
6	295		Clay Tan		X

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WATER RESOURCES
WESTERN REGION

Completed Depth (Measurable): 295
Date Started: 7/1/2022 Date Completed: 7/5/2022

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 Cold Steel Mechanical Co. No. 793
*Principal Driller Allan Wisneberger Date 7/29/2022
*Driller Date
*Operator II Date
Operator I Matt McNew Date 7/29/2022

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

#1625

Form 238-7
6/07

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IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 107778
Drilling Permit No. 922227
Water right or injection well #

2. OWNER: Emmers LLC
Name
Address Po Box 710
City McCall State ID Zip 83638

3.WELL LOCATION:
Twp. 18N North ☐ or South ☐ Rge. 03E East ☐ or West ☐
Sec. 29 ____ 10 acres ____ 1/4 NW 40 acres 1/4 SE 160 acres 1/4
Gov't Lot ____ County Valley
Lat. 44 ° 52.0228 (Deg. and Decimal minutes)
Long. -116 °06.9581 (Deg. and Decimal minutes)
Address of Well Site 12 Big Moose Rd
(Give at least name of road + Distance to Road or Landmark) City McCall
Lot. 18 Blk. ____ Sub. Name Moon View

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 Dual Rotary

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
Bentonite	0	42	1150	Pullback & Pour

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6	+2	427	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 427

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method
Manufactured screen ☒ Y ☐ N Type Wire Wound
Method of installation Set in

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
447	452	30		5	Stainless	.250

Length of Headpipe 7' Length of Tailpipe 2'
Packer ☒ Y ☐ N Type K

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) 70 Static water level (ft) 68
Water temp. (°F) 48 Bottom hole temp. (°F)
Describe access port Turtle Cap

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
	100+ at 438	60

Test method: Pump ☐ Bailer ☐ Air ☒ Flowing artesian ☐

Water quality test or comments: Ph 9, Tds 60, Fe .1mg/l, gpg 11

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	Fill dirt		X
10/6	3	55	Tan Clay		X
6	55	118	Tan Sand and Gravel	X	
6	118	125	Cemented Sand and Gravel		X
6	125	341	Tan Sand with muddy orange	X	
			sand streaks		
6	341	347	Gray Clay		X
6	347	364	Ultra fine tan sand with black mica	X	
6	364	382	Clay Gray		X
6	382	387	Gray Sand	X	
6	387	388	Clay Gray		X
6	388	398	Tan clay with small sand streaks	X	
6	398	438	Course gray sand	X	
	438		Dark Gray Clay		X

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WATER RESOURCES
WESTERN REGION

Completed Depth (Measurable): 454
Date Started: 9/23/2025 Date Completed: 9/28/2025

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 Cold Steel Drilling Co. No. 793
*Principal Driller Allan Steinberger Date 10/11/2025
*Driller Matt McDermottroe Date 10/11/2025
*Operator II Date
Operator I Date

* Signature of Principal Driller and rig operator are required.

#1510

Form 238-7
6/07
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IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 100082
Drilling Permit No. 911964
Water right or injection well #

2. OWNER: Aaron Cramblet
Name
Address 13885 Farm to Market Rd
City McCall State ID Zip 83638

3.WELL LOCATION:
Twp. 18 North ☒ or South ☐ Rge. 03 East ☒ or West ☐
Sec. 28 ____ 1/4 (10 acres) NW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot ____ County Valley
Lat. 44 ° 51.9919 (Deg. and Decimal minutes)
Long. -116 ° 06.2404 (Deg. and Decimal minutes)
Address of Well Site Compass Lane
(Give at least name of road + Distance to Road or Landmark) City McCall
Lot. 3 Blk. ____ Sub. Name 360 Ranch

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 Dual Rotary

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
Bentonite	0	60	1700	Pullback & Pour

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6	+2	417	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 417

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method
Manufactured screen ☒ Y ☐ N Type Wire Wound
Method of installation Set & Pullback

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
417	437	14		5	Stainless	.250

Length of Headpipe 8' Length of Tailpipe 2'
Packer ☒ Y ☐ N Type K

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) 131 Static water level (ft) 131
Water temp. (°F) 51 Bottom hole temp. (°F)
Describe access port Turtle Cap

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
	110 @ 400'	60

Test method:

Pump	Bailer	Air	Flowing artesian
☐	☐	☒	☐
☐	☐	☐	☐

Water quality test or comments: Ph=8, tds=95, Fe=.8mg/l, gpg=9

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	15	Clay Dark Brown		X
10	15	34	Sand & Gravel		X
10/6	34	110	Clay Tan, Gravel Mix		X
6	110	223	Clay Tan, Orange Sand Streaks	X	
6	223	244	Clay Tan		X
6	244	247	Clay Gray		X
6	247	375	Clay Gray, Muddy Sand Streaks	X	
6	375	397	Clay Gray		X
6	397	418	Clay Gray, Sand Streaks	X	
6	418	423	Sand Gray	X	
6	423	428	Sand Gray Course	X	
6	428	437	Sand Gray Medium	X	
6	437	438	Clay Green		X
6	438	439	Sand White Course	X	
	439		Clay Green		X

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WATER RESOURCES
WESTERN REGION

Completed Depth (Measurable): 439
Date Started: 8/24/2023 Date Completed: 8/27/2023

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 Cold Steel Drilling Co. No. 793
*Principal Driller Alan Winebarger Date 9/30/2023
*Driller Date
*Operator II Matt McNew Date 9/30/2023
Operator I Date

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

#1491

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6/07
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WATER RESOURCES
WESTERN REGION

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 100068
Drilling Permit No. 910493
Water right or injection well #

2. OWNER: BP Properties
Name
Address PO Box 4110
City McCall State ID Zip 83638

3.WELL LOCATION:
Twp. 18 North ☒ or South ☐ Rge. 03 East ☒ or West ☐
Sec. 28 ____ 10 acres 1/4 SE 40 acres 1/4 SE 160 acres 1/4
Gov't Lot ____ County Valley
Lat. 44 ° 51.8213 (Deg. and Decimal minutes)
Long. -116 °05.2143 (Deg. and Decimal minutes)
Address of Well Site Mulberry Ln
(Give at least name of road + Distance to Road or Landmark) City McCall
Lot. 4 Blk. ____ Sub. Name Pearson Landing

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 Dual Rotary

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
Bentonite	0	60	1750	Pullback & Pour

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6	+2	382	.250	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 382

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method
Manufactured screen ☒ Y ☐ N Type Wire Wound
Method of installation Set & Pullback

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
382	392	14		5	Stainless	.250

Length of Headpipe 8' Length of Tailpipe 1'
Packer ☒ Y ☐ N Type K

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) 134 Static water level (ft) 134
Water temp. (°F) 53 Bottom hole temp. (°F)
Describe access port Turtle Cap

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
	39 @ 370'	90

Test method:

Pump	Bailer	Air	Flowing artesian
☐	☐	☒	☐
☐	☐	☐	☐

Water quality test or comments: Ph=7.3, tds=75, Fe=.7mg/l, gpg=6

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	Top Soil		X
10	3	7	Clay Dark Brown		X
10	7	26	Clay Brown Gravel Mix		X
10	26	37	Sand & Gravel		X
10/6	37	80	Clay Brown Gravel Mix		X
6	80	98	Clay Tan Sandy		X
6	98	101	Clay Tan Sticky		X
6	101	139	Clay Tan Sand Streaks	X	
6	139	177	Sand Brown	X	
6	177	196	Clay Dark Brown, Organic Streaks		X
6	196	207	Clay Gray		X
6	207	212	Clay Green		X
6	212	214	Sand Gray	X	
6	214	220	Sand Brown Fine	X	
6	220	272	Clay Brown, Sand Streaks	X	
6	272	273	Clay Gray		X
6	273	298	Sand Gray Muddy	X	
6	298	301	Sand Gray	X	
6	301	314	Sand Gray Muddy	X	
6	314	316	Clay Dark Brown Sandy		X
6	316	319	Sand Gray Muddy	X	
6	319	321	Clay Dark Brown Sticky		X
6	321	347	Sand Gray Muddy, Wood Pieces	X	
6	347	382	Clay Gray , Muddy Sand Streaks	X	
6	382	383	Clay Gray		X
6	383	392	Sand Gray & White Course Clean	X	
6	392	393	Clay Gray Firm		X

Completed Depth (Measurable): 393
Date Started: 6/2/2023 Date Completed: 6/4/2023

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 Cold Steel Drilling Co. No. 793
*Principal Driller Adam Winebarger Date 7/29/2023
*Driller ____ Date
*Operator II Matt McVay Date 7/29/2023
Operator I ____ Date

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

SCANNED
AUG 08 2023

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES #724
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 805768
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : Long: : :

1. WELL TAG NO. D 0029948
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Mike Deboer
Address 307 E. Park St
City McCall State Id. Zip 83638

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 18 North ☒ or South ☐
Rge. 3 East ☒ or West ☐
Sec. 26, 1/4 NW 1/4 SW 1/4
Gov't Lot ____ County Valley
Lat: : : Long:
Address of Well Site 130 Sand Hill
(Give at least name of road + Distance to Road or Landmark) City McCall
Lt. M Blk. ____ Sub. Name Homestead Est.

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	25	12 Bgs	10" over bore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 194'
Was drive shoe seal tested? ☐ Y ☐ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	143	.250	Steel	☒	☐	☒	☐
4"	260	300	.160	PVC	☐	☒	☐	☐
4"	-10	220	.160	PVC	☐	☒	☐	☐

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

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
300	310	.020		4"	PVC	Screen	☐
220	260	.020		4"	PVC	Screen	☐
						☐	☐

0. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
10-20 Silica Sand	220	310	22 Bgs.	pour Annular

1. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
66 ft. below ground Artesian pressure ____ lb.
epth flow encountered 260 ft. Describe access port or control devices:
Well Cap

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

Yield gal./min.	Drawdown	Pumping Level	Time
8		260'	2 hrs.

Water Temp. 51° Bottom hole temp.
Water Quality test or comments: Clear
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	1	Top Soil		
	1	7	Brwn Clay		
	7	15	Boulders + Clay		
10"	15	25	Coarse gravel (cemented)		
6"	25	35	" " "		
	35	38	Brwn Clay		
	38	60	Cemented gravel (Basalt)		
	60	65	" " "		
	65	80	grey clay w/sand seams		
	80	102	Coarse Sand		
	102	108	Brwn Clay		
	108	110	grey gran.te		
	110	194	Decomp. gran.te		
	194	250	gran.te		
	250	260	Brwn gran.te	X	
	260	285	green gran.te		
6"	285	320	gran.te		

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WATER RESOURCES
WESTERN REGION

Completed Depth 320 (Measurable)
Date: Started 8.19.03 Completed 8.23.03

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 Menasco Drilling Firm No. 391
Principal Driller [signature] Date 9.4.03
and
Driller or Operator II ____ Date
Operator I ____ Date
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II

Form 238-7 05
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 823946
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0031961
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name ALEXANDER HOBAN CARTER
Address P.O. Box 904
City McCALL State Id. Zip 83638

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 18 North ☒ or South ☐
Rge. 4 East ☒ or West ☐
Sec. 30, ____ 1/4 (10 acres) SW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot ____ County VALLEY
Lat: : : **Long:** : :
Address of Well Site 14070 MORELL Rd.
City McCALL
(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 chips	0	18	400 Lbs.	POURED

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6	+2	38	.250	STEEL	☒	☐	☒	☐
4½	-6	106	160#	PVC	☐	☒	☒	☐
					☐	☐	☐	☐

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

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
106	226	.032		4½	PVC	☐	☒
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

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

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

Yield gal./min.	Drawdown	Pumping Level	Time
60		226	1 HR.

Water Temp. 47° Bottom hole temp. ____
Water Quality test or comments: Good
Depth first Water Encounter 42'

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
10	0	2	FILL DIRT		X
10	2	4	TOP SOIL		X
10	4	15	BROWN SANDY CLAY		X
10	15	18	BROWN Decomposed GRANITE		X
6	18	42	BROWN Decomposed GRANITE	½ gpm	
6	42	47	HARD GRAY GRANITE		X
6	47	48	LT. BROWN FRACT. GRANITE	1 gpm	
6	48	58	HARD. LT. BROWN GRANITE		X
6	58	62	Med. HARD BROWN GRANITE		X
6	62	70	HARD LT. BROWN GRANITE		X
6	70	75	BROWN + GRAY FRACT. GRANITE	1⅓ gpm	
6	75	110	HARD LT. BROWN GRANITE		X
6	110	112	BROWN + GRAY FRACT. GRANITE	8½ gpm	
6	112	130	HARD GRAY GRANITE		X
6	130	137	LT. BROWN + GRAY GRANITE W/ FRACT.		X
6	137	139	LT. BROWN + GRAY BROKEN GRANITE	30 gpm	
6	139	150	Med. HARD BROWN GRANITE W/ FRACT.	35 gpm	
6	150	210	HARD GRAY GRANITE		X
6	210	212	LT. BROWN FRACT. GRANITE	X	
6	212	219	HARD GRAY GRANITE		X
6	219	221	LT. BROWN FRACTURED GRANITE	60 gpm	
6	221	226	HARD GRAY GRANITE		X

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WATER RESOURCES
WESTERN REGION

Completed Depth 226 (Measurable)
Date: Started 8-27-04 Completed 8-31-04

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 GESTRIN WELL DRILLING, INC. Firm No. 408
Principal Driller Robert W. Gestrin Date 9-5-04
and
Driller or Operator II ____ Date ____
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES