MUNICIPAL WATER AND PRESSURIZED IRRIGATION SYSTEM MASTER PLAN

AVIMOR DEVELOPMENT

Prepared for

Avimor Development, LLC
c/o Brad Pfannmuller
18454 N McLeod Way
Boise, ID 83714

APPROVED
By: Adam Bussan
State of Idaho
Department of Environmental Quality
Date: Apr 18, 2022

Prepared by

SPF Water Engineering, LLC
300 East Mallard Drive, Suite 350
Boise, ID 83706

REVISED
March 29, 2022

PROFESSIONAL ENGINEER REGISTERED 13323 STATE OF IDAHO JASON W. THOMPSON
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SPF WATER ENGINEERING

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Executive Summary

- Avimor is planning future development phases, expected to ultimately include up to 9,190 additional residences plus commercial space. The future development is expected to be served by a municipal public water system. The water system will provide for in-home residential demands and fire protection. Irrigation is expected to be supplied from a separate non-potable system.
- The total average day demand for Avimor at build-out is estimated to be about 1.43 million gallons (MG) per day (990 gpm), the total maximum day demand is estimated to be about 3.44 MG per day (2,390 gpm), and the total peak hour demand is estimated to be 4,029 gpm. These in-home and commercial domestic demands are projected based on metered water data from Avimor Village 1, and include irrigation of two phases in Boise County.
- The source of supply for the proposed water system is anticipated to be two new wells located on Avimor property or on lands where Avimor has an access agreement. One test well (Well 1) has recently been constructed and tested. This test well will be converted to a production well before being used for municipal supply. For build-out, it is expected that up to four wells may be needed to supply the total maximum day demand with any well out of service (with equalization storage).
- The target aquifer for Avimor production wells is expected to be the Willow Creek Aquifer, in an area is collectively referred to as the "Western Well Field". Well 1 and test wells in the target aquifer area suggest a productive aquifer, capable of supporting well yields of 1,500 to 2,000 gpm. Well 1 produces water meeting primary drinking water standards, but there is the potential for future wells to encounter water with elevated arsenic. If the wells produce water with elevated arsenic or exceed any other primary drinking water standard, then treatment or blending will be implemented.
- Avimor owns municipal water right permit 63-32061 with four points of diversion. Well 1 and future production wells are expected to be constructed and put to use under this permit. The 5 cfs (2,244 gpm) of groundwater than can be diverted under this permit is nearly adequate for build-out maximum day demand. Avimor is finalizing the purchase of an additional 5-cfs water right permit, for a total of 10 cfs, to cover build-out demands.
- The new Well 1 was completed in July 2021, with 16-inch steel casing and stainless steel well screen to a total depth of 645 feet. Well 1 has a projected sustainable yield of 1,500 gpm, and produces groundwater meeting primary drinking water standards. Additional production wells would be sited and constructed to public water system standards. Future production wells are expected to be up to 800-feet deep, constructed with 16-inch casing and screen.
- Each production well is expected to be equipped with vertical turbine pumps, with a design capacity of 1,200 gpm. Pump horsepower is expected to range from 400- to 450-hp. Each well pump is expected to be controlled with a variable frequency drive (VFD) and operated off of system pressure. At least one well will need to be equipped with an emergency backup generator (assuming emergency standby storage is not

provided). Well pumps are expected to deliver water to a booster pump station, which will then deliver water to storage tanks.

- A transmission main will connect production wells in the Western Well Field to a proposed booster pump station and storage tanks (Tanks 1 and 2). This transmission main could be up to 6.5 miles long if Well 4 is needed. The transmission main length on Avimor (and Sage Investment) property is 28,800 feet (5.5 miles). Another transmission main (~5.1 miles) will deliver water from Tanks 1 and 2 to a third storage tank (Tank 3), requiring two booster pump stations. The main is expected to be a minimum of 16-inch diameter. It is expected that water distribution and services, with associated pressure reducing stations, will occur off of the transmission main at intervals imposed by development.
- Storage will be provided to meet peaking demands and operational storage of the proposed development. Three storage tanks are expected for build-out, with construction phased per development plans. Tanks 1 and 2, at elevation 3,810 feet, will meet peak and fire flow demands of Planning Areas 1 and 2. Tank 3, at elevation 4,760 feet, will meet peak and fire flow demands of Planning Area 3. Each of the tanks are expected to be 500,000 gallons.
- A booster pump station (BPS 1), at an approximate elevation of 3,300 feet, will be required to pump water from the Western Well Field to Tanks 1 and 2. BPS 1 is expected to be designed to pump the maximum day demand of approximately 2,400 gpm with redundancy, and include three 1,200-gpm, 250-hp pumps.
- Two additional booster pump stations (BPS 2 and BPS 3), at elevations 3,810 feet and 4,290 feet, will pump water from Tanks 1 and 2 up to Tank 3. BPS 2 and BPS 3 are expected to be designed to pump the maximum day demand of Avimor Planning Area 3, approximately 500 gpm, with any pump out of service. Each of these two pump stations are anticipated to include two 100-hp pumps.
- The booster pumps are expected to be short-set vertical turbine pumps installed in sealed pump cans. Each of the booster pumps are expected to each be controlled by VFDs and operated to maintain tank level or off of system pressure. Each booster pump station will be equipped with emergency standby power. Booster pump stations will be designed to accommodate forward and reverse flow operation and anticipated pipeline hydraulic surge.
- A total of eleven pressure zones are expected in Planning Areas 1 and 2, in order to maintain static pressure below 80 psi and dynamic pressure above 40 psi during peak hour demand. Tanks 1 and 2 at an elevation of 3,810 feet will determine the hydraulic grade lines of these pressure zones, with pressure reducing stations required below the highest gravity zone. For Planning Area 3, a total of twelve pressure zones will be required, with Tank 3 at an elevation of 4,760 feet establishing the hydraulic grade lines.
- One alternative to a stand-alone Avimor water system is to connect to the Spring Valley municipal water system to the west. This option could include larger Avimor Tanks 1 and 2, higher capacity Avimor and Spring Valley booster pump stations, and

a larger transmission main (minimum 20-inch diameter). Infrastructure sizing would be done in coordination with Spring Valley and the City of Eagle.

- A second alternative is to connect to the City of Eagle municipal water system, at both the Western Service Area and the Eastern Service Area. This alternative would create a regional water system serving Spring Valley, Avimor, and other development in the foothills north of Eagle. This option would include a transmission main connecting the City service areas, routed through Spring Valley and Avimor. This option would require a total of five booster pump stations to lift water from the City service areas to the Avimor tanks, with those tanks enlarged or duplicated to meet area demand projections.
- A separate pressurized irrigation (PI) system is expected to supply water to future Avimor development phases for the irrigation of residential lots, commercial areas, and common areas. The PI system will not serve phases on the east side of Highway 55.
- The total average day irrigation demand for Avimor (residential, commercial, and common area) served by the PI system at build-out is estimated to be about 3.26 MG per day (2,263 gpm; 1,831 acre-feet), the total maximum day demand is estimated to be about 6.51 MG per day (4,521 gpm).
- There are several options for PI system supply. The preferred option utilizes treated wastewater from the Avimor Water Reclamation Facility and groundwater wells. Treated wastewater would be discharged to new infiltration basins at the Sandy Hill Aquifer, located on Avimor property in Planning Area 1. This aquifer would be used for reclaimed water winter storage. Recovery wells located at the Sandy Hill Aquifer would supply the PI system, with peaking supplied by irrigation wells.
- If surface water is used for aquifer recharge at the Sandy Hill Aquifer, then the irrigation volume deficit is estimated to be 127 acre-feet, which could be supplied from one irrigation well operating at about 500 gpm for 8 hours per day during the irrigation season. If surface water recharge is not implemented, then the irrigation groundwater volume deficit of 638 acre-feet could be addressed by completing several wells with a combined yield of about 2,400 gpm, operating over a shorter time period (8 hours).
- Irrigation of residential lots requires wastewater to be treated to Class A standards. The Avimor Water Reclamation Facility currently treats water to Class B standards. Typically, a treatment upgrade would be required, but there is the possibility that the Idaho Department of Environmental Quality could classify Class B wastewater infiltrated and recovered from the Sandy Hill Aquifer as Class A (groundwater).
- The use of the Sandy Hill Aquifer for irrigation would require water right action and possibly re-use permitting.
- Wastewater treatment could be upgraded to Class A standards, allowing for the irrigation of residential and common areas. Above-ground storage in the form of a lined pond or reservoir could be used for winter storage, instead of the Sandy Hill Aquifer. With this option, the aquifer would be reserved for potable storage. Groundwater recovered from the aquifer will need to be treated for arsenic if used for potable purposes.

1. INTRODUCTION

The Avimor Development (Avimor) is a planned community located near the intersection of the Ada County/Boise County/Gem County lines north of Eagle and Boise, Idaho. A vicinity map is provided as Figure 1.

Avimor currently includes "Village 1", which has been under active construction since approximately 2006. Village 1 currently includes approximately 700 homes and limited commercial development. Village 1 is expected to ultimately include up to 779 residential units, 60 multi-family units, and approximately 140,000 square feet (ft^2) of commercial space. Village 1 currently receives or is planned to receive water service from Suez Water Idaho (Suez).

Avimor is planning future phases beyond Village 1, expected to ultimately include up to 9,190 additional single family residential units and 860,000 ft^2 of commercial space on a total of approximately 19,400 acres. The future residential units and commercial space are expected to be served by a municipal water system.

This Master Plan (Plan) describes the proposed municipal water system and a separate pressurized irrigation (PI) system that will serve future phases of Avimor. Current development plans for these future phases are preliminary in nature, so this Plan is intended to provide a general overview of municipal water and PI sources of water supply and backbone infrastructure required to serve future phases. Backbone water infrastructure refers to wells, large transmission pipelines, water storage reservoirs, and booster pump stations. In the future, more detailed Planning Unit Master Plans (PUMPs) will be developed describing infrastructure to serve specific phases or planning units within the overall development.

This plan describes the proposed water system service area, anticipated potable and irrigation demands, important design assumptions and criteria, municipal water and PI supply options, and backbone municipal water and PI infrastructure. The municipal water system will be designed and constructed in accordance with the Idaho Rules for Public Drinking Water Systems (IRPDWS, IDAPA 58.01.08).

This Plan include four primary service and operational options: (1) operation as a stand-alone entity, without connection to any other municipal water providers, (2) a connection to the Spring Valley Development water system, that will ultimately be owned and operated by the City of Eagle (City), (3) a connection to the Western and Eastern Service Areas of the City water system, and (4) a connection to the Suez Water Idaho municipal water system.

Avimor is currently in negotiations with the City for a Water Service Agreement (Agreement). Under this agreement, the City will be the municipality that owns, operates, and maintains the stand-alone municipal water system after the water system construction is completed by Avimor. Since the Agreement has not been signed, this Plan presents the aforementioned options, with the selected option to be finalized following negotiations with the City.

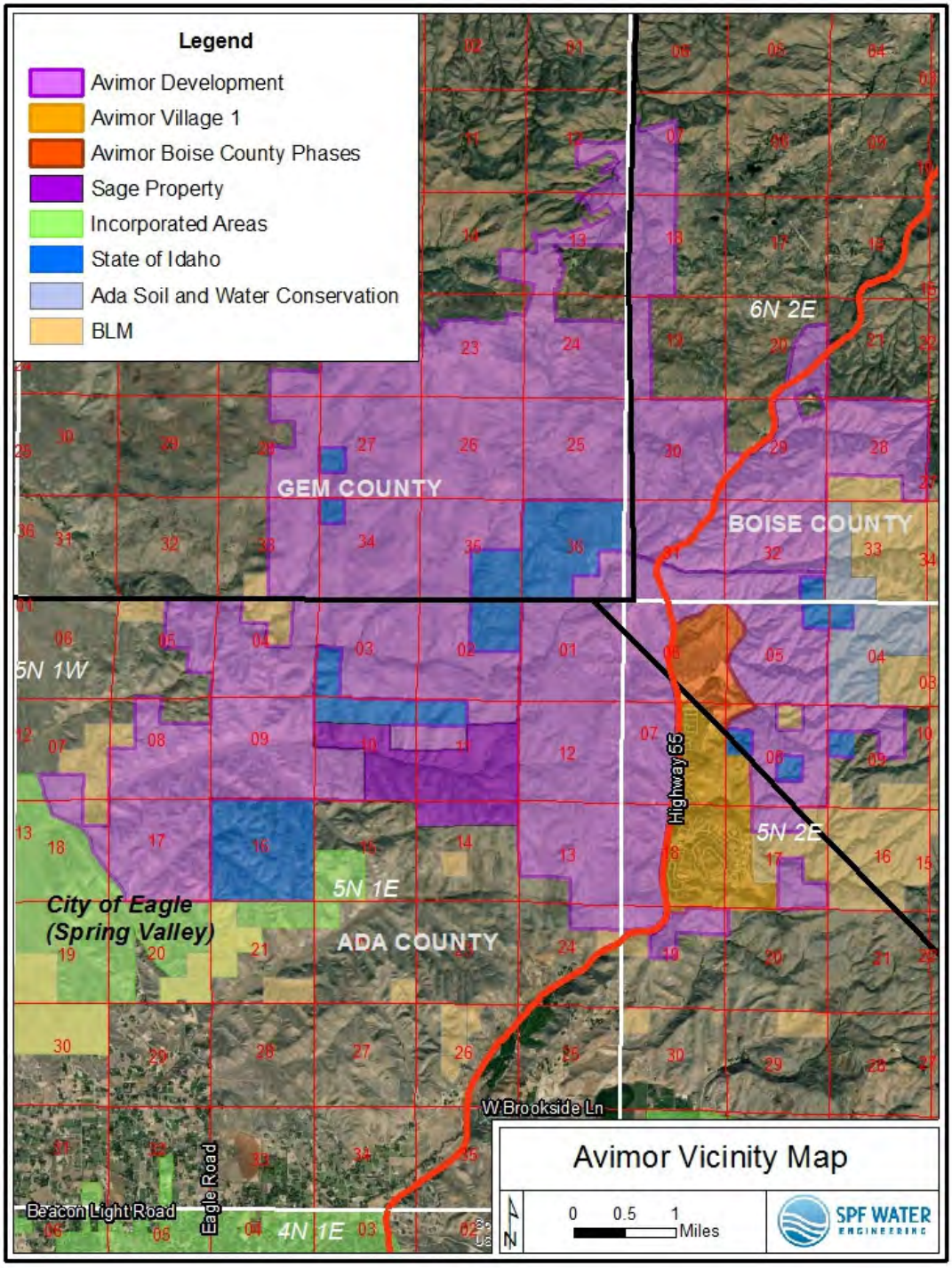

Figure 1. Vicinity map of project

2. WATER DEMANDS

2.1. Water System Service Area

Avimor is planned to be phased over a period of approximately 30 to 40 years. The Avimor phasing schedule will ultimately depend upon housing demand and population growth.

The most recent available Avimor Master Land Use Plan, dated March 2022, is included in Appendix A. The Land Use Plan includes three planning areas, as shown in Figure 2. The proposed number of residential dwelling units, residential development area, commercial space, commercial development area, and irrigated common area in each planning area are summarized in Table 1. Table 1 does not include any existing or planned development of Avimor Village 1, currently or planned to be served by Suez.

A total of 9,190 residential dwelling units are planned within the three planning areas, based on the proposed City of Eagle Avimor Ordinance. These dwelling units will be constructed on a total of 4,741 acres identified for residential development. The total commercial (or mixed use) building area is estimated to be 860,000 ft^2, located on a total of 172 acres. The total area of irrigated common space is estimated to be 500 acres. Planning Area 1 in Table 1 includes 350 residential units and 162,000 ft^2 (30 development acres) of commercial / mixed use in Boise County that is planned to be served by the municipal water system. Irrigation of the Boise County development will be from the municipal system; irrigation for the remainder of the project will be from a separate PI system. The Boise County phases could also be served by Suez, but this Plan only considers service from a stand-alone municipal water system. The development summarized in Table 1 will be used for the purpose of estimating water demands for the new municipal water system and PI system described in this Plan.

It is also possible that the Avimor water system will serve an adjoining property, owned by Sage Investments. Development plans for this property are not known at this time. If the Avimor water system serves the Sage Investment property, then a Facility Plan update will be prepared by Sage Investments to address this change. If Sage Investment property is served by its own water system, then that entity will prepare its own Facility Plan.

Table 1. Summary of planning areas

Development Type	Planning Area 1	Planning Area 2	Planning Area 3	TOTAL
Residential Units	4,514	2,843	1,833	9,190
Residential Area (acres)	1,548	1,547	1,646	4,741
Commercial Space (ft^2)	750,000	105,000	5,000	860,000
Commercial Area (acres)	149	22	1	172
Irrigated Common Area (acres)	225	100	175	500

2.2. Anticipated Water System Demands

2.2.1. Introduction

The proposed municipal water system will be used to meet in-home domestic and commercial water demands of future development at Avimor. The municipal system is also expected to provide water for fire protection. Water for residential and common area irrigation associated with future Avimor development is expected to be provided from a separate non-potable PI system, except for the Boise County phases on the east side of Highway 55. The source of supply for the Avimor PI system is expected to include re-use water from Avimor wastewater treatment plant, referred to as the Avimor Water Reclamation Facility (AWRF).

2.2.2. Existing Avimor Water Demands

The IRPDWS require that the capacity of a public water system be at least 800 gallons per day (gpd) per residence, reflecting maximum daily demand excluding irrigation and fire flow. This is equivalent to 0.56 gallons per minute (gpm) per residence. However, the IRPDWS also allows for a lower design capacity if the water system owner can demonstrate that the actual maximum day demand (excluding irrigation and fire flow) is less than 800 gpd.

Avimor currently includes Village 1, with metered water service from Suez. The water service is used for both in-home and residential irrigation water demands. Village 1 incorporates water conservation practices, including low-flow residential fixtures and recirculation pumps. These practices will be continued in all future Avimor development phases, with meters.

To estimate actual in-home residential water use, water meter data from 2015 to 2016 was examined, representing water use in Village 1. This data was originally presented in a 2016 report by SPF Water Engineering (SPF 2016)[1], and subsequently analyzed by Mountain Waterworks (MWW 2018)[2]. In the 2016 SPF report, the average day demand and maximum day demand were estimated using 2015 residential service meter data, which included residential irrigation. The residential irrigation component was separated from in-home water use by using the difference between service meter data and metered wastewater flow.

Table 2 summarizes water demand data per residence, taken from the 2016 SPF report and subsequently in the MWW 2018 report (except for peak hour demand as noted below). The data indicates a peaking factor of 2.4 between maximum day demand and average day demand. For reference, the most recent Suez Master Plan (MSA 2015)[3] identified a system-wide peaking factor of 2.0 between maximum day and average day demand. The 2015 City of Eagle Master Plan (Holladay Engineering 2015)[4] identified an Eastern Service Area peaking factor of 1.7 between in-home maximum day and in-home average day demand.

1 SPF Water Engineering, 2016, *Technical Memorandum: Avimor Core Area – Water System Capital Improvement Plan*.
2 Mountain Waterworks, 2018, *Conceptual Water and Pressurized Irrigation System Plan, Avimor Development, Planning Areas 1 through 3*.
3 Murray, Smith & Associates, 2015, *United Water Idaho Master Facilities Plan*.
4 Holladay Engineering Co., 2015, *Water System Master Plan 2015 Update, City of Eagle*.

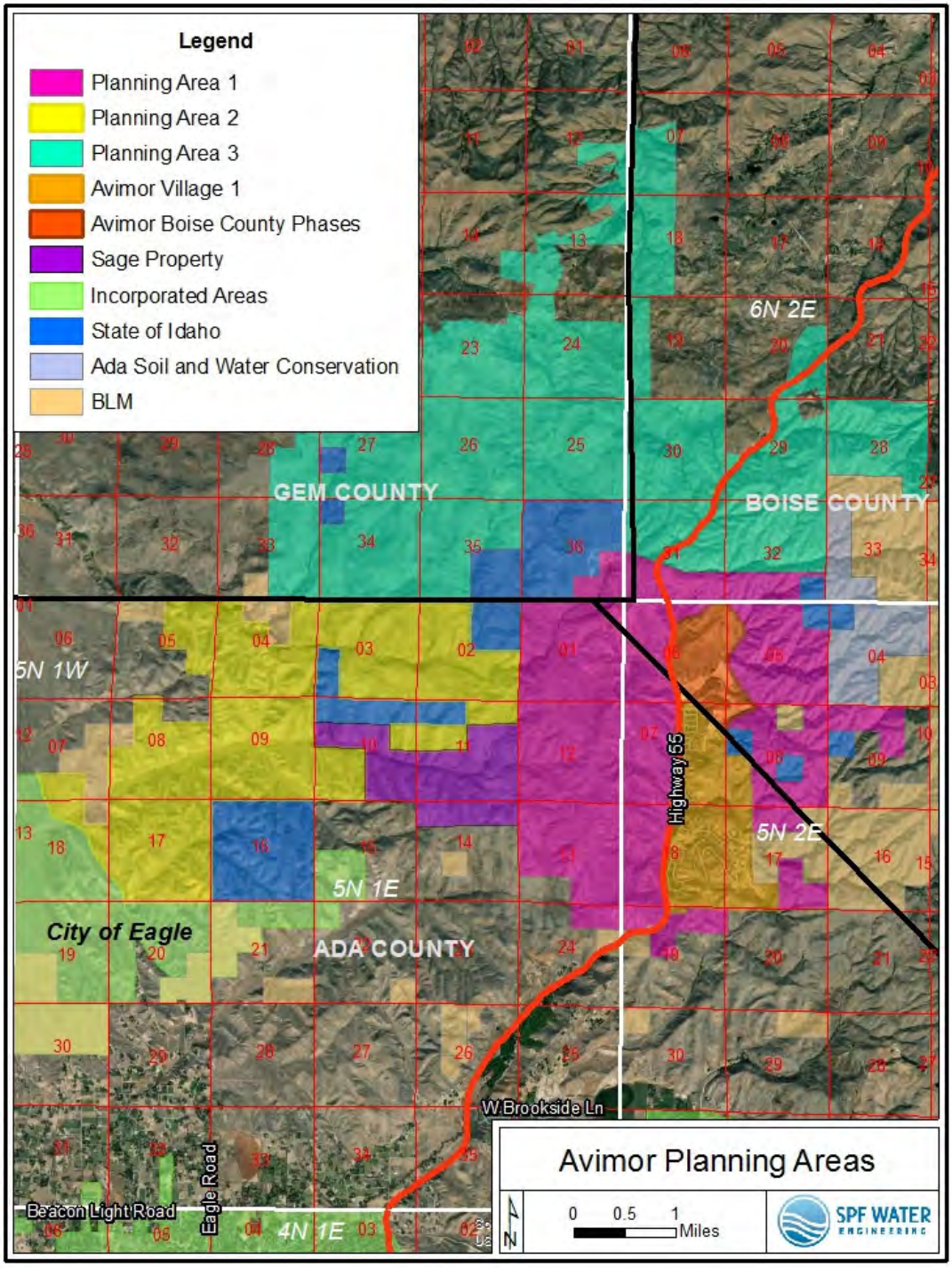

Figure 2. Avimor Planning Area Map

To estimate the peak hour demand presented in Table 2, a peaking factor of 1.7 was used between peak hour demand and maximum day demand. This is the peaking factor reported in the 2015 City of Eagle Master Plan, which does not include an irrigation component. For reference, the most recent 2015 Suez Master Plan identified a system-wide peaking factor of 1.8 between peak hour demand and maximum day demand, which includes irrigation.

Table 2. Water demand data from Avimor Village 1 (2015 to 2016)

Demand Type	Average Day Demand per Residence (ADD, gpd)	Average Day Demand per Residence (ADD, gpm)	Maximum Day Demand per Residence (MDD, gpd)	Maximum Day Demand per Residence (MDD, gpm)	Peak Hour Demand per Residence (PHD, gpm)[4]
Residential (In-Home)[1]	135	0.09	329	0.23	0.39
Residential (Irrigation)[2]	192	0.13	471	0.33	0.56
Residential (Total)[3]	327	0.23	800	0.56	0.94

1 - Estimated from wastewater inflows to AWRF (2015 to 2016)

2 - Calculated as difference between total residential and in-home residential demands

3 - Estimated from water meter data (2015 to 2016)

4 - Estimated using a peaking factor of 1.7 applied to MDD

2.2.3. Projected Municipal Water Demands

2.2.3.1. Residential Demands

Water demand data from Village 1 is considered representative of water demands in future development phases, and are considered relevant for planning purposes. The same water conservation measures in Village 1 will be implemented in these future phases. Future phases will also be metered. For future PUMPS and associated Preliminary Engineering Reports and construction plans, water demand factors will be updated based on the most currently available demand data from Avimor.

To project future residential demands in each planning area, the total number of future residences in each planning area were multiplied by the in-home demand factors summarized in Table 2 that are based on actual water use.

A summary of in-home residential average day demand is summarized in Table 3. At full build-out, the total in-home average day demand is projected to be approximately 1.24 million gallons (MG) per day, or 862 gpm.

A summary of in-home residential maximum day demand is summarized in Table 4. At full build-out, the total in-home maximum day demand is projected to be approximately 3.02 MG per day, or 2,100 gpm.

Table 3. Residential (In-Home) Average Day Demand

Planning Area	Estimated Planned Dwelling Units	Average Day Demand per Residence (ADD, gpd)	Total Average Day Demand (ADD, gpd)	Average Day Demand per Residence (ADD, gpm)	Total Average Day Demand (ADD, gpm)
1	4,514	135	609,388	0.09	423
2	2,843	135	383,746	0.09	266
3	1,833	135	247,516	0.09	172
TOTAL	9,190	135	1,240,650	0.09	862

Table 4. Residential (In-Home) Maximum Day Demand

Planning Area	Estimated Planned Dwelling Units	Maximum Day Demand per Residence (MDD, gpd)	Maximum Day Demand (MDD, gpd)	Maximum Day Demand per Residence (MDD, gpm)	Maximum Day Demand (MDD, gpm)
1	4,514	329	1,485,102	0.23	1,031
2	2,843	329	935,203	0.23	649
3	1,833	329	603,206	0.23	419
TOTAL	9,190	329	3,023,510	0.23	2,100

A summary of in-home residential peak hour demand is summarized in Table 5. At full build-out, the total in-home peak hour demand is projected to be 3,569 gpm for the anticipated 9,190 dwelling units.

Table 5. Residential (In-Home) Peak Hour Demand

Planning Area	Estimated Planned Dwelling Units	Peak Hour Demand per Residence (PHD, gpm)	Peak Hour Demand (PHD, gpm)
1	4,514	0.39	1,753
2	2,843	0.39	1,104
3	1,833	0.39	712
TOTAL	9,190	0.39	3,569

2.2.3.2. Commercial Demands

The SPF 2016 report used Suez commercial accounts to predict commercial water demands at Avimor. Meter data from commercial areas within the City of Boise between February 2005 and December 2007 were analyzed to calculate average day demand per commercial area (acres), and includes both potable (in-building) and irrigation demands. The data indicates a peaking factor of 2.11 between maximum day demand and average day demand. The data indicates a peaking factor of 3.17 between peak hour demand and average day demand. Results are summarized in Table 6.

Table 6. Water demand estimates for commercial area

Demand Type	Average Day Demand per Acre (ADD, gpd)[1]	Average Day Demand per Acre (ADD, gpm)[1]	Maximum Day Demand per Acre (MDD, gpd)[2]	Maximum Day Demand per Acre (MDD, gpm)[2]	Peak Hour Demand per Acre (PHD), gpm)[3]
Commercial (In-Building)[4]	590	0.41	1,253	0.87	1.31
Commercial (Irrigation)	605	0.42	1,267	0.88	1.32
Commercial (Total)	1,195	0.83	2,520	1.75	2.63

1 - Estimated from Suez water data

2 - Calculated as ADD multiplied by 2.11 from Suez water data

3 - Calculated as MDD multiplied by 1.5 from Suez water data

4 - In-building demand estimated to be 50% of total demand

Future in-building commercial water demand in each planning area was estimated by multiplying the commercial area (acres) by the in-building demand factors summarized in Table 6.

A summary of in-building commercial average day demand is summarized in Table 7. At full build-out, the total in-building commercial average day demand is projected to be 101,726 gpd, or 71 gpm. A summary of in-building commercial maximum day demand is summarized in Table 8. At full build-out, the total in-building commercial maximum day demand is projected to be 215,857 gpd, or 150 gpm. A summary of in-building commercial peak hour demand is summarized in Table 9. At full build-out, the total in-building commercial peak hour demand is projected to be approximately 226 gpm.

Table 7. Commercial (In-Building) Average Day Demand

Planning Area	Commercial Development Area (acres)	Average Day Demand per Acre (ADD, gpd)	Total Average Day Demand (ADD, gpd)	Average Day Demand per Acre (ADD, gpm)	Total Average Day Demand (ADD, gpm)
1	149	590	87,970	0.41	61
2	22	590	12,989	0.41	9
3	1	590	768	0.41	1
TOTAL	172	590	101,726	0.41	71

Table 8. Commercial (In-Building) Maximum Day Demand

Planning Area	Commercial Development Area (acres)	Maximum Day Demand per Acre (MDD, gpd)	Maximum Day Demand (MDD, gpd)	Maximum Day Demand per Acre (MDD, gpm)	Maximum Day Demand (MDD, gpm)
1	149	1,253	186,667	0.87	130
2	22	1,253	27,562	0.87	19
3	1	1,253	1,629	0.87	1
TOTAL	172	1,253	215,857	0.87	150

Table 9. Commercial (In-Building) Peak Hour Demand

Planning Area	Commercial Development Area (acres)	Peak Hour Demand per Acre (PHD), gpm)[3]	Peak Hour Demand (PHD), gpm)
1	149	1.31	195
2	22	1.31	29
3	1	1.31	2
TOTAL	172	1.31	226

2.2.3.3. Irrigation Demands

The Boise County development phases will be irrigated from the municipal water system; irrigation for the remainder of the project will be from a separate PI system. The Boise County phases include 350 residential units and 30 acres of commercial / mixed use.

Irrigation demand data from Village 1 is considered representative of demands in Boise County, as similar landscaping type and area are expected in these future phases. To project future residential irrigation demands in Boise County, the total number of residences and commercial acreage were multiplied by the irrigation demand factors summarized in Table 2.

A summary of Boise County irrigation average day demand is summarized in Table 10, with a total demand of 59 gpm. A summary of Boise County irrigation maximum day demand is

summarized in Table 11, with a total demand of 141 gpm. The total Boise County peak hour irrigation demand is estimated to be 234 gpm, as summarized in Table 12.

Table 10. Boise County Irrigation Average Day Demand

Estimated Planned Dwelling Units / Commercial Development Area (acres)	Average Day Demand per Residence/Acre (ADD, gpd)	Total Average Day Demand (ADD, gpd)	Average Day Demand per Residence/Acre (ADD, gpm)	Total Average Day Demand (ADD, gpm)
350	192	67,200	0.13	47
30	605	18,144	0.42	13
TOTAL	---	85,344	---	59

Table 11. Boise County Irrigation Maximum Day Demand

Estimated Planned Dwelling Units / Commercial Development Area (acres)	Maximum Day Demand per Residence/Acre (MDD, gpd)	Maximum Day Demand (MDD, gpd)	Maximum Day Demand per Residence/Acre (MDD, gpm)	Maximum Day Demand (MDD, gpm)
350	471	164,850	0.33	114
30	1,267	38,016	0.88	26
TOTAL	---	202,866	---	141

Table 12. Boise County Irrigation Peak Hour Demand

Estimated Planned Dwelling Units / Commercial Development Area (acres)	Peak Hour Demand per Residence/Acre (PHD, gpm)	Peak Hour Demand (PHD, gpm)
350	0.56	195
30	1.32	40
TOTAL	---	234

2.2.3.4. Total Municipal Demands

A summary of total municipal water demands, including in-home residential, in-building commercial, and irrigation demands for Boise County phases (in Planning Area 1) are summarized in Table 13. The total average day demand is estimated to be about 1.43 MG per day (990 gpm), the total maximum day demand is estimated to be about 3.44 MG per day (2,390 gpm), and the total peak hour demand is estimated to be 4,029 gpm.

Table 13. Total Municipal Water Demands

Description	Total Average Day Demand (ADD, gpd)	Total Average Day Demand (ADD, gpm)	Total Maximum Day Demand (MDD, gpd)	Total Maximum Day Demand (MDD, gpm)	Total Peak Hour Demand (PHD, gpm)
Planning Area 1	782,702	544	1,874,635	1,302	2,183
Planning Area 2	396,735	276	962,764	669	1,133
Planning Area 3	248,284	172	604,834	420	714
TOTAL	1,427,720	991	3,442,233	2,390	4,029

2.2.4. Projected Irrigation Demands

2.2.4.1. Residential Irrigation Demands

Water for residential irrigation associated with future Avimor development is expected to be provided from a separate non-potable PI water system, with the exception of the Boise County phases. Irrigation demand data from Village 1 is considered representative of demands in future development phases, as similar landscaping type and area are expected in these future phases. As development proceeds, the irrigation demand factors will be updated to obtain the most accurate irrigation demand data for future planning efforts.

To project future residential irrigation demands for the PI system in each planning area, the total number of future residences in each planning area were multiplied by the irrigation demand factors summarized in Table 2 that are based on actual water use. The 350 dwelling units in Boise County in Planning Area 1 were not included in these irrigation demands, since they will be irrigated from the municipal system.

A summary of residential irrigation average day demand is summarized in Table 14. At full build-out, the total residential irrigation average day demand is projected to be approximately 1.7 MG per day, or 1,179 gpm. A summary of residential irrigation maximum day demand is summarized in Table 15. At full build-out, the total residential irrigation maximum day demand is projected to be approximately 4.16 MG per day, or 2,891 gpm.

Table 14. Residential Irrigation Average Day Demand

Planning Area	Estimated Planned Dwelling Units	Average Day Demand per Residence (ADD, gpd)	Total Average Day Demand (ADD, gpd)	Average Day Demand per Residence (ADD, gpm)	Total Average Day Demand (ADD, gpm)
1	4,164	192	799,486	0.13	555
2	2,843	192	545,772	0.13	379
3	1,833	192	352,023	0.13	244
TOTAL	8,840	192	1,697,280	0.13	1,179

Table 15. Residential Irrigation Maximum Day Demand

Planning Area	Estimated Planned Dwelling Units	Maximum Day Demand per Residence (MDD, gpd)	Maximum Day Demand (MDD, gpd)	Maximum Day Demand per Residence (MDD, gpm)	Maximum Day Demand (MDD, gpm)
1	4,164	471	1,961,238	0.33	1,362
2	2,843	471	1,338,846	0.33	930
3	1,833	471	863,556	0.33	600
TOTAL	8,840	471	4,163,640	0.33	2,891

2.2.4.2. Commercial Irrigation Demands

Future commercial irrigation water demand in each planning area was estimated by multiplying the commercial area (acres) by the irrigation demand factors summarized in Table 6 that are based on actual water use data. The commercial area does not include the 30 acres in Boise County served from the municipal water system.

A summary of commercial irrigation average day demand is summarized in Table 16. At full build-out, the total commercial irrigation average day demand is projected to be approximately 86,000 gpd, or 60 gpm. A summary of commercial irrigation maximum day demand is summarized in Table 17. At full build-out, the total commercial irrigation maximum day demand is projected to be approximately 180,300 gpd, or 125 gpm.

Table 16. Commercial Irrigation Average Day Demand

Planning Area	Commercial Development Area (acres)	Average Day Demand per Acre (ADD, gpd)	Total Average Day Demand (ADD, gpd)	Average Day Demand per Acre (ADD, gpm)	Total Average Day Demand (ADD, gpm)
1	119	605	71,971	0.42	50
2	22	605	13,306	0.42	9
3	1	605	786	0.42	1
TOTAL	142	605	86,063	0.42	60

Table 17. Commercial Irrigation Maximum Day Demand

Planning Area	Commercial Development Area (acres)	Maximum Day Demand per Acre (MDD, gpd)	Maximum Day Demand (MDD, gpd)	Maximum Day Demand per Acre (MDD, gpm)	Maximum Day Demand (MDD, gpm)
1	119	1,267	150,797	0.88	105
2	22	1,267	27,878	0.88	19
3	1	1,267	1,647	0.88	1
TOTAL	142	1,267	180,323	0.88	125

2.2.4.3. Common Area Irrigation Demands

Future common area irrigation water demand in each planning area was estimated using the irrigated common area acreage identified in Table 1 and the net irrigation requirement for turf grass and drought-tolerant plants. For the net irrigation requirement, it was assumed landscaping consisted of 30% turf grass and 70% drought-tolerant plants, based on current and future landscaping in the development and as assumed by Mountain Waterworks (2018). The mean monthly net irrigation requirement (as defined by the precipitation deficit) for turf grass and drought-tolerant plants is summarized in Table 18, along with the weighted average (assuming 30% turf grass and 70% drought-tolerant plants). The weighted average varies from 1.16 mm/day (0.05 inches per day) in April to 3.65 mm/day (0.14 inches per day) in July. The average day irrigation demand is estimated to be about 2,950 gpd per acre, using the weighted average precipitation deficit throughout the entire 183-day irrigation season (April 1 through September 30) and assuming 90% irrigation efficiency. This high efficiency is appropriate for predominantly drip irrigation. The maximum day irrigation demand is estimated to be about 4,333 gpd per acre, using the weighted average precipitation deficit for July (0.14 inches per day) and assuming 90% irrigation efficiency.

Table 18. Mean Monthly Precipitation Deficit

Month	Mean Monthly Precipitation Deficit[1]			Irrigation Demand (gallons per day per acre)[3]	Irrigation Demand (gallons per month per acre)[3]
	Turf Grass (mm/day)	Drought Tolerant Plants (mm/day)	Weighted Average (mm/day)[2]		
April	1.65	0.95	1.16	1,378	41,334
May	3.29	1.42	1.98	2,353	72,942
June	5.04	2.3	3.12	3,708	111,246
July	6.21	2.55	3.65	4,333	134,322
August	5.35	2.03	3.03	3,594	111,420
Sept	3.56	1.24	1.94	2,300	68,986
TOTAL (gal per year per acre)					540,251
TOTAL (acre-feet per year per acre)					1.7
AVERAGE (gal per day per acre)					2,952

1 - Allen, Richard G. and Clarence W. Robison, 2009. Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho: Supplement updating the Time Series through December 2008, Research Technical Completion Report, Kimberly Research and Extension Center, University of Idaho, Moscow, ID.

2 - Calculated assuming 30% grass and 70% drought tolerant plants

3 - Assumes 90% irrigation efficiency (appropriate for sprinklers and drip)

Irrigation demands associated with the common areas in each planning area are summarized in Table 19. The average day demand for common area irrigation in each planning area can be calculated using the average day irrigation demand (2,952 gpd per acre) from Table 18 and the irrigated common area acreage identified in Table 1. The total average day demand is estimated to be about 1.48 MG per day (829 acre-feet per year), or 1,025 gpm.

The maximum day demand for common area irrigation in each planning area can be calculated using the maximum day irrigation demand (4,333 gpd per acre) from Table 18. The total maximum day demand is estimated to be about 2.17 MG per day or 1,505 gpm. These demand estimates conservatively assume irrigation of all areas occurs every day.

Table 19. Common area irrigation demands

Planning Area	Irrigated Common Area (acres)	Irrigation Demand (acre-feet per year)[1]	Average Day Irrigation Demand (gpd)[2]	Average Day Irrigation Demand (gpm)[2]	Maximum Day Irrigation Demand (gpd)[3]	Maximum Day Irrigation Demand (gpm)[3]
1	225	373	664,243	461	974,921	677
2	100	166	295,219	205	433,298	301
3	175	290	516,633	359	758,272	527
TOTAL	500	829	1,476,095	1,025	2,166,491	1,505

1 - Calculated assuming 30% grass and 70% drought tolerant plants

2 - Calculated assuming 183-day irrigation season (April 1 through September 30)

3 - Calculated assuming weighted average demand of 0.14 in/day for July

2.2.4.4. Total Irrigation Demands

A summary of total irrigation demands, including residential, commercial, and common area for future Avimor development are summarized in Table 20. The total average day demand is estimated to be about 3.26 MG per day (1,831 acre-feet per year) or 2,263 gpm. The total maximum day demand is estimated to be 6.51 MG per day (4,521 gpm).

Table 20. Total Irrigation Demands

Description	Irrigation Demand (acre-feet per year)	Total Average Day Irrigation Demand (ADD, gpd)	Total Average Day Irrigation Demand (ADD, gpm)	Total Maximum Day Irrigation Demand (MDD, gpd)	Total Maximum Day Irrigation Demand (MDD, gpm)
Planning Area 1	862	1,535,699	1,066	3,086,956	2,144
Planning Area 2	480	854,296	593	1,800,023	1,250
Planning Area 3	488	869,442	604	1,623,475	1,127
TOTAL	1,831	3,259,438	2,263	6,510,453	4,521

2.3. Fire Flow Requirements

Fire flow for future development at Avimor is expected to be supplied from the municipal water system. For the purpose of determining the required fire flow, the 2018 International Fire Code (IFC), as adopted by the Idaho State Fire Marshal, was used. The local fire authority, understood to be the Eagle Fire Department, will have ultimate determine the fire flow requirements based on building area, construction type, and other factors. A letter from the Eagle Fire Department describing the fire flow requirement is included in Appendix B.

For one-family dwellings (type V-B construction), the 2018 IFC requires a fire flow of 1,000 gpm for one hour for a building area of 3,600 ft^2 and less and no fire sprinklers. For building

areas between 3,600 ft^2 and 4,800 ft^2, the fire flow requirement is 1,750 gpm for two hours without fire sprinklers. For building areas between 4,800 ft^2 and 6,200 ft^2, the fire flow requirement is 2,000 gpm for two hours without fire sprinklers. If fire sprinklers are provided, the fire flow and duration can be reduced by 50%.

For the purpose of this study, it is assumed that all commercial buildings will be equipped with fire sprinklers. Under this scenario, a fire flow of 2,500 gpm for two hours is acceptable for buildings (type V-B construction) in excess of 85,000 ft^2, unless the sprinkler system demand is greater. For buildings equipped with an approved automatic sprinkler system, the water supply shall be capable of providing the greater of the sprinkler system demand (with hose stream allowance) or the required fire flow.

In addition to requirements set forth in the 2018 IFC, the IRPDWS requires that public water systems that provide fire flow shall provide the maximum day demand plus fire flow. Fire flow must be provided with any pump out of service. Fire pumping redundancy can be reduced or eliminated with adequate fire suppression storage or upon approval by the jurisdictional authority. The IRPDWS also requires that new community public water systems have dedicated on-site standby power (or storage) to pressurize the water system for 8 hours at average day demand plus fire flow. Standby storage requires the storage of water for 8 hours at average day demand.

3. DESIGN STANDARDS

3.1. Introduction

The proposed municipal water system serving future development of Avimor will be designed and constructed in accordance with the Idaho Rules for Public Drinking Water Systems (IRPDWS, IDAPA 58.01.03), the Idaho Standards for Public Works Construction (ISPWC), and any relevant municipal supplements to the ISPWC.

3.2. Idaho Rules for Public Drinking Water Systems

Sections of the IRPDWS that are relevant to the proposed water system are summarized in Table 21. The IRPDWS form the basis of the design criteria for the proposed water system. Additional design criteria not covered in the IRPDWS are discussed where appropriate in the water system conceptual design, and are typically based on standard engineering practice and relevant experience.

Table 21. Relevant sections of the IRPDWS

Requirement	IDAPA 58.01.08 Citation	Description
Groundwater Source Redundancy	501.17	New community water systems served by ground water shall have a minimum of two (2) sources if they are intended to serve more than twenty-five (25) connections or equivalent dwelling units (EDUs). Under normal operating conditions, with any source out of service, the remaining source(s) shall be capable of providing either peak hour demand of the system or a minimum of the maximum day demand plus equalization storage.
System Pressure	552.01.b.i	Any public water system shall be capable of providing sufficient water during maximum day demand conditions, including fire flow where provided, to maintain a minimum pressure of twenty (20) psi throughout the distribution system, at ground level, as measured at the service connection.
	552.01.b.v	Any public water system constructed or substantially modified after July 1, 1985, or any new service areas of public water systems shall maintain a minimum pressure of forty (40) psi throughout the distribution system, during peak hour demand conditions, excluding fire flow, measured at the service connection.
	552.01.b.vi	Any public water system shall keep static pressure within the distribution system below one hundred (100) psi and should ordinarily keep static pressure below eighty (80) psi.
Storage	544.01.a	Storage facilities shall have sufficient capacity, as determined from engineering studies that consider peak flows, fire flow capacity, and analysis of the need for various components of finished storage as defined under the term “Components of Finished Water Storage”.
	003.15	Components of Finished Water Storage: Dead Storage: Storage that is either not available for use in the system or can provide only substandard flows and pressures. Operational Storage: Operational storage supplies water when, under normal conditions, the sources are off. This component is the larger of (i) The volume required to prevent excessive pump cycling or (ii) The volume needed to compensate for the sensitivity of the level sensors. Equalization Storage: Storage of finished water in sufficient quantity to compensate for the difference between a water system's maximum pumping capacity and peak hour demand. Fire Suppression Storage: The water needed to support fire flow where provided. Standby Storage: Standby storage provides a measure of reliability or safety factor should sources fail or when unusual conditions impose higher than anticipated demands. Normally used for emergency operation, if standby power is not provided, to provide water for eight (8) hours of operation at average day demand.
Emergency Operation	501.07	New community public water systems constructed after April 15, 2007, are required to have sufficient dedicated on-site standby power, with automatic switch-over capability, or standby storage so that water may be treated and supplied to pressurize the entire distribution system during power outages. During a power outage, the water system shall be able to meet the operating pressure requirements of Subsection 552.01.b. for a minimum of eight (8) hours at average day demand plus fire flow where provided.
Booster Pump Stations	541.04.c	Each booster pumping station shall contain not less than two (2) pumps with capacities such that peak hour demand, or a minimum of maximum day demand plus equalization storage (pumping to storage), can be satisfied with any pump out of service.
	501.07.c	Booster pumps intended to increase system capacity shall be provided with standby power or equivalent unless, during a power outage, the public water system or distribution system pressure zone can already meet the minimum operating capacity and pressure requirements in Subsection 501.07 for a minimum of eight (8) hours at average day demand plus fire flow where provided for each pressure zone.
Redundant Fire Flow Capacity	501.18.a	Public water systems that provide fire flow shall be designed to provide maximum day demand plus fire flow. Pumping systems supporting fire flow capacity must be designed so that fire flow may be provided with any pump out of service.
	501.18.b.i	The requirement for fire flow pumping redundancy may be reduced or eliminated where fire suppression storage is provided or if the local fire authority justifies that the fire flow capacity of the system is acceptable and is compatible with the water demand of existing and planned fire-fighting equipment and fire-fighting practices in the area served by the system.

4. MUNICIPAL WATER SYSTEM SUPPLY

4.1. Hydrogeological Assessment

4.1.1. Introduction

The proposed municipal water system is expected to provide potable water for in-home and commercial uses. The municipal water system is also expected to provide fire flow. Irrigation of residential, commercial, and common areas is expected to be provided from a separate non-potable PI system. The PI system is discussed in Section 9.

The source of supply for the proposed municipal water system is expected to initially include two on-site groundwater wells, with one serving as a redundant source. The extent of development that can be served by these two wells will depend on well capacity and the nature of development. Up to four wells may be needed to meet the maximum day demand of Avimor at full build-out (estimated to be 2,390 gpm). This assumes that equalization storage is provided to supply the difference between supply and peak hour demand.

4.1.2. Groundwater Studies

There has been extensive groundwater exploration activities associated with the Avimor property and the Spring Valley Development (Spring Valley) to the west. These studies along with other local information related to geology, groundwater production, water quality, and water levels, provide a basis for this hydrogeologic assessment.

4.1.3. Geology

A geologic map of the project vicinity is included as Figure 3. The geology is derived from the Geologic Map of the Boise Quadrangle[5]. The southwest portion of the property and the area along Highway 55 is underlain by Quaternary sediments of the Idaho Group, specifically geologic unit QTi, described as Idaho Formation consisting of clay, silt, sand, volcanic ash, and fine gravel. This unit extends to the west and south of the property. The Idaho Formation is bisected by unit Qtm in the area, described as sediments of the TenMile Gravel Formation.

In the central part of the property, the surficial geology primarily consists of Tertiary-age igneous rocks including Owyhee Rhyolite (unit Tor) and Columbia River Basalt (unit Tcr). The Cretaceous-age granite and granodiorite of the Idaho Batholith (unit Kg) also occurs in the central part of the property and dominates the east portion of the property.

Farther to the south and southwest, alluvial sediments (clay, silt, sand, and gravel) are the dominant geologic features in the Boise River valley. Unit Qal (stream alluvium) occurs in the valley bottom while unit Qcn (Caldwell-Nampa sediments) can be found on the upper river terrace. Big Gulch, Little Big Gulch, and Woods Gulch (Figure 4) are filled with stream alluvium in their lower reaches and Tenmile Gravel sediments in their upper reaches.

5 Mitchell, V.E. and E.H. Bennett, 1979, *Geologic Map of the Boise Quadrangle*, Idaho Department of Lands Bureau of Mines and Geology, Geologic Map Series.

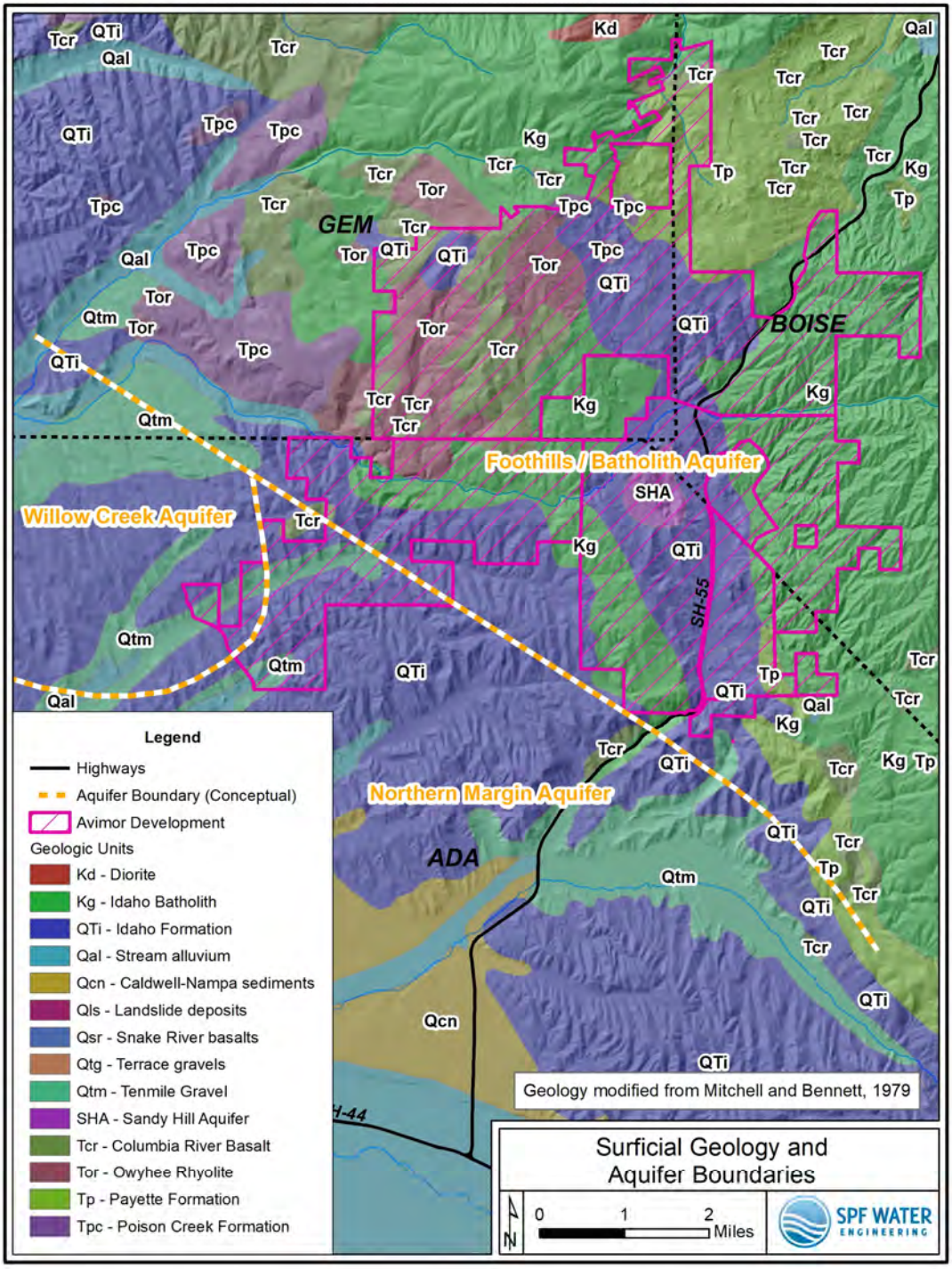

Figure 3. Surficial geology and aquifer boundaries

4.1.4. Aquifer Systems

4.1.4.1. Introduction

There are three generalized aquifer areas in the foothills of northwest Ada County. The boundaries between these aquifer areas are not distinct, and are probably transitional in nature. There are a limited number of wells and well testing data in the foothills north of Eagle, so aquifer boundaries and characteristics are established based on the available data. A generalized description of the aquifers follows. Conceptual aquifer boundaries and associated geology are described in Figure 3.

4.1.4.2. Foothills/Batholith Aquifers

The Foothills/Batholith aquifer group consists of aquifers located in upland areas of the Boise Front. These aquifers are generally found in low permeability sediments and volcanic rocks that overlie granitic rocks of the Idaho Batholith. Wells completed in these aquifers typically have low yields so these aquifers generally have low potential for significant groundwater development. Recharge is primarily from infiltration of precipitation falling on the aquifer area.

Four test wells (SVR 1, SVR 2, SVR 4, and SVR 5) located on the Avimor property along Highway 55 were completed in these aquifers (Scanlan Engineering 2003[6], SPF 2004a[7]). These wells were drilled as part of a groundwater exploration program in support of identifying and evaluating potential water supplies for the development in the early 2000s. These wells are shown on Figure 4 and well driller's reports are included in Appendix C. These wells were drilled to depths ranging from 440 to 1,220 feet, and all had sustainable yields of less than 50 to 60 gpm. The study concluded that that aquifer conditions along the Highway 55 corridor through Avimor cannot support the development of high-capacity wells. Another well was drilled in 2007 (RAP-8) near SVR 5, and produced less than 5 gpm from shallow sand zones at depths of less than 150 feet.

These aquifers have been found on occasion to include areas of high permeability sediments but with limited areal extent, resulting in highly productive wells that have low sustainable yields. A good example of this is the Sandy Hill Aquifer, located on Avimor property in Ada County on the west side of Highway 55. The Sandy Hill Aquifer (unit SHA) is shown on Figure 3.

The Sandy Hill Aquifer has been investigated through the drilling of numerous test wells, including SVR 3 (Scanlan Engineering 2003). A high-capacity test well TPW 1 and SVR 8 were also completed in the Sandy Hill Aquifer (SPF 2004b[8]). These wells are shown on Figure 4 and test well driller's reports are included in Appendix C.

SVR 3 was drilled to a total depth of 970 feet in 2002 and encountered a coarse-grained sand unit extending from ground surface to a depth of 275 feet described as the Sandy Hill Aquifer.

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6 Scanlan Engineering, April 2003, *Groundwater Exploration Drilling in the Spring Valley Ranch Vicinity of Gem, Ada, and Boise Counties, Idaho*, Prepared for SunCor Development Company.
7 SPF Water Engineering, June 17, 2004a, *Well Construction and Aquifer Testing of Spring Valley Ranch Exploration Well No. 5*, Prepared for SunCor Development Company.
8 SPF Water Engineering, June 18, 2004b, *Well Construction and Aquifer Testing in the Sandy Hill Area of Spring Valley Ranch*, Prepared for SunCor Development Company.

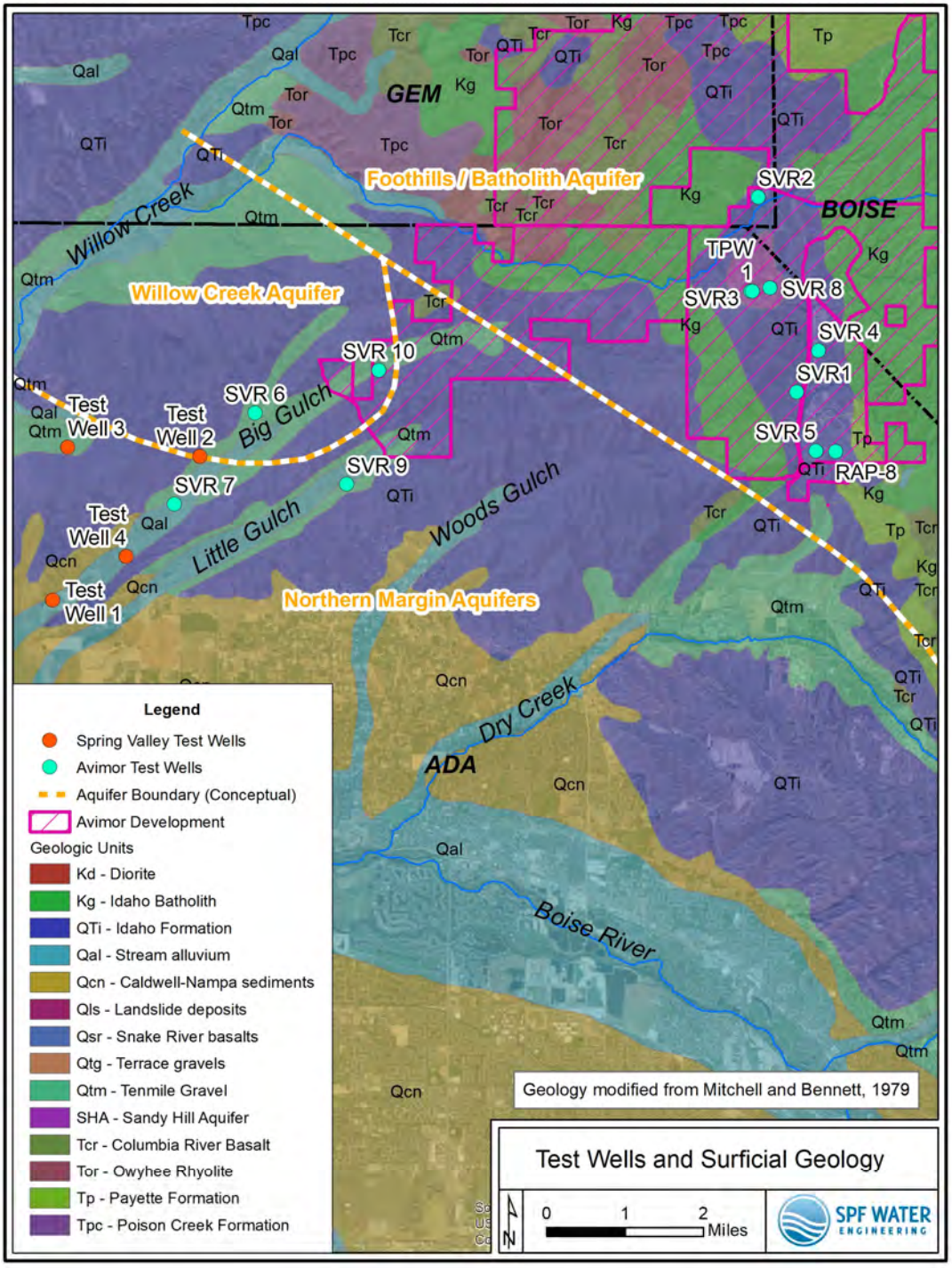

Figure 4. Test wells and surficial geology

Testing of SVR 3 suggested a productive aquifer, so a high-capacity test well was drilled into the aquifer. The test well TPW 1 was drilled to a depth 292 feet, and was tested at 2,000 gpm with 17 feet of drawdown after 3 days (specific capacity of 118 gpm per foot). This well targets a gray clay with interbedded coarse sand that was encountered at a depth ranging from 227 to 292 feet.

Testing suggests that the Sandy Hill Aquifer may support high-capacity wells (in excess of 2,000 gpm) but the long-term sustainability of the aquifer is restricted by limited areal extent. The Sandy Hill aquifer has been evaluated for aquifer storage and recovery (ASR), with groundwater recharge occurring during low-demand winter months and pumping from the aquifer occurring during high demand summer months. The use of Sandy Hill Aquifer for ASR in support of either potable (Section 5.9) or irrigation (Section 10.4) is discussed later in this report.

4.1.4.3. Northern Margin Aquifers

The Northern Margin Aquifers consists of aquifers found along the north side of the Boise Valley, refer to Figure 3. These aquifers are characterized by interbedded fine to coarse-grained sand, silt, and clay described as Idaho Group sediments, and are typically underlain by a very thick (hundreds of feet) unit of gray or blue clay. The Idaho Group sediments within the aquifer area south of Homer Road and west of Eagle Road are predominantly sands, resulting in productive aquifers. Numerous productive wells are completed in this area. In the Dry Creek, Woods Gulch, and Little Gulch areas, clays generally predominate resulting in lower productivity wells.

The aquifers are recharged primarily by irrigation and irrigation canal leakage north of the Boise River. Other sources of recharge include infiltration of precipitation and underflow from the Foothills/Batholith aquifers. Discharge from the aquifers occurs to wells, drain ditches, and the Boise River, and as underflow to other Boise Valley aquifers to the south and west, and as underflow to the Willow Creek aquifer to the north. The temperature of water produced from these aquifers is generally less than 70°F.

A groundwater exploration program was performed in Big Gulch and Little Gulch in support of identifying and evaluating potential water supplies for the Avimor development (SPF 2004c[9]). Four test wells were drilled as part of this program (SVR 6, SVR 7, SVR 9, and SVR 10) and are shown on Figure 4. Driller's reports are included in Appendix C. Well depths ranged from 740 to 1,005 feet.

SVR 7 encountered interbedded sand and clay to a depth of 440 feet, underlain by thick blue clay. The static water level in SVR 7 is reported at 161 feet below ground on the driller's log. Testing of SVR 7 indicates a productive (in excess of 1,000 gpm) cold-water aquifer, suitable for municipal water supply.

The driller's log for SVR 9 describes thin layers of sand and clay to a depth of 265 feet, then gray blue clay to about 800 feet. Static water level is reported at 193 feet below ground. The

9 SPF Water Engineering, October 2004c, *Aquifer Evaluation in the Big Gulch and Little Gulch Areas of Spring Valley Ranch*, Prepared for SunCor Development Company.

aquifer at SVR 9 in Little Gulch is thinner and less productive (100 gpm) compared to the aquifer found at SVR 7 in lower Big Gulch.

Evidence suggests that SVR 7 and 9 are completed in the Northern Margin aquifers. The water-bearing section of the aquifer appears to be 200 to 300 feet thick at SVR 7 in lower Big Gulch, and less than 100 feet thick at SVR 9 in Little Gulch. The highly productive aquifer in Big Gulch does not appear to extend into Little Gulch, apparently because the aquifer pinches out to the northeast with limited groundwater development potential.

Two test wells were constructed southwest of SVR 7 in lower Big Gulch to assess groundwater quality for production wells associated with Spring Valley west of Avimor. These wells were designed by HydroLogic, Inc and are identified as Test Wells 1 and 4 on Figure 4. These test wells encountered a similar lithology as SVR 7, considered to be Northern Margin aquifers. A thick zone of sand interbedded with thinner clay layers was encountered from a depth of about 300 feet to about 600 feet, underlain by thick blue/gray clay. The bottom hole temperature was measured at 75°F at a depth of 790 feet (Test Well 1) and about 68°F at a depth of 660 feet (Test Well 4). Static water level in these wells was about 100 to 130 feet below ground surface. Spring Valley test well driller's reports and test well as-built schematics are included in Appendix C.

Two more test wells were constructed in upper Big Gulch (Test Well 2) and between Big Gulch and Willow Creek (Test Well 3) as shown on Figure 4. Both of these test wells exhibit characteristics of a transitional zone between Northern Margin aquifers and the Willow Creek Aquifer. Test Well 2 encountered similar lithology as SVR 9, with a medium to coarse sands with thin interbedded clay to a depth of about 350 feet, underlain by a thick layer of grey clay and mudstone to a depth of 800 feet. Static water level is reported at about 215 feet below ground. The bottom hole temperature at a depth of about 800 feet was 79°F. Test Well 2 suggests a thinning of the lower Big Gulch productive aquifer in upper Big Gulch at the transition between Northern Margin aquifers and the Willow Creek Aquifer.

Test Well 3 encountered gray sands with interbedded clay lenses between a depth of about 300 and 500 feet. Static water level is reported at about 260 feet below ground. The bottom hole temperature at a depth of about 900 feet was 72°F.

4.1.4.4. Willow Creek Aquifer

The Willow Creek Aquifer is found in primarily coarse-grained sediments in the Willow Creek and Big Gulch areas, refer to Figure 3. The Willow Creek Aquifer differs from the Northern Margin aquifers in several ways, with the Willow Creek Aquifer containing a much thicker profile of coarse-grained sediments with occasional fine gravel zones with a static water level about 150 feet lower than wells just to the south completed in the Northern Margin aquifers. Groundwater levels in the Willow Creek Aquifer are similar to levels to the north in the Payette River Valley near Emmett.

Water-level differences, combined with lithologic differences, suggest a hydrogeologic discontinuity between the Northern Margin Aquifer in lower Big Gulch and the Willow Creek Aquifer. This discontinuity is probably a fault, dividing the coarse-grained alluvial sands and gravels of the Willow Creek Aquifer and the layered lake-bed and deltaic sediments of the Northern Margin Aquifer. A similar discontinuity likely forms the northeast boundary of the Willow Creek Aquifer.

Based on similarities in geology, temperature, chemistry, and water levels, it appears that test wells SVR 6 and SVR 10 in the Big Gulch area encountered the Willow Creek Aquifer (SPF 2004c), as depicted on Figure 4. SVR 6 encountered the Willow Creek Aquifer sands at a depth below 400 feet, with a deep static water level (455 feet). The saturated aquifer thickness at SVR 6 is more than 285 feet. Testing of this well suggested a very productive aquifer, but with a temperature exceeding 80°F. Wells in the Willow Creek Valley farther to the northwest of Avimor also indicate sustainable well yields in excess of 2,000 gpm are possible from this aquifer. The presence of fluoride and warm water suggest geothermal inflow into the Willow Creek Aquifer.

Test well SVR 10 encountered the Willow Creek Aquifer sands at a depth below 500 feet. SVR 10 is probably near the eastern margin of the Willow Creek Aquifer, and may produce water that is a mix of Willow Creek and Northern Margin aquifers. Water was measured at 76°F from SVR 10. The saturated aquifer thickness at SVR 10 is about 150 feet, suggesting a thinning of the aquifer at the eastern margins supporting lower well yield. The Willow Creek Aquifer appears to extend from the central portion of Big Gulch northwest beneath the Willow Creek Valley towards Emmett, and does not appear to extend east into Little Gulch where SVR 9 was drilled.

Recharge to the Willow Creek Aquifer occurs as underflow from the Foothills/Batholith Aquifers to the northeast, and the Northern Margin Aquifers to the south and east. Additional recharge occurs from infiltration falling on the aquifer area, and from leakage from the stream beds of Big Gulch and Willow Creek. Groundwater within the aquifer is believed to flow toward the Payette River Valley, with discharge into Payette Valley aquifers, wells, and drains.

4.1.5. Potentiometric Surface

Available water level data and associated groundwater surface elevations from exploration wells and existing wells in the vicinity of Avimor can be used to establish groundwater flow direction. In general, groundwater flows from the Boise foothills in the northeast to the Lower Boise River Valley in the southwest, reflecting local topography. However, potentiometric surface contours indicate groundwater flow in the Willow Creek Aquifer toward the Payette River. The Northern Margin aquifers are laterally extensive to the south, southeast, and southwest from the Willow Creek Aquifer.

Groundwater levels in the Northern Margin aquifers are above 2,475 feet on the east side of Highway 16. Aquifer water-level elevations are between 2,350 and 2,500 feet in the Willow Creek Aquifer (about 325 to 425 feet below ground surface, depending upon local topography).

4.2. Groundwater Development Potential

4.2.1. Introduction

The potential for groundwater supply development on and in the vicinity of Avimor can be assessed using geology, test well data, and well driller's reports from wells in the area. Municipal supply for Avimor development is expected to come from on-site wells.

4.2.2. Foothills/Batholith Aquifers

The Foothills/Batholith aquifer system is generally found in low permeability sediments and volcanic rocks that are underlain by granite. Much of the Avimor property is underlain by this aquifer system, and it is also the predominant system in upland areas of the Boise Front.

Four test wells (SVR 1, SVR 2, SVR 4, and SVR 5) on Avimor property encountered this aquifer (Scanlan Engineering 2003, SPF 2004a). All of these wells had low sustainable yields of less than 50 to 60 gpm, suggesting low potential for significant groundwater development. These aquifers occasionally include isolated areas of high permeability sediments, resulting in highly productive wells that have low sustainable yield (i.e. the Sandy Hill Aquifer).

4.2.3. Willow Creek Aquifer

The Willow Creek Aquifer located in upper Big Gulch and Willow Creek west of Avimor can be very productive (yields in excess of 2,000 gpm). This aquifer appears to thin out at its eastern edge. Water from this aquifer is warm, but expected to be less than the low temperature geothermal threshold of 85°F. This aquifer appears promising as a source of supply for Avimor. Sustainable groundwater supply annual volume has been projected to be approximately 3,500 acre-feet from the Willow Creek Aquifer (SPF 2004c).

4.2.4. Northern Margin Aquifers

The Northern Margin aquifers are characterized by interbedded fine to coarse-grained sand, silt, and clay underlain by hundreds of feet of gray or blue clay. These aquifers are found to the west in alluvium of lower Big Gulch, and consist of interbedded sand and clay to a depth 500 to 600 feet, capable of supporting very productive wells in excess of 2,000 gpm with good water quality. The test well SVR 7 and Spring Valley test wells 1 and 4 were completed in these aquifers. In the Dry Creek, Woods Gulch, and Little Gulch areas, clays generally predominate resulting in lower productivity wells.

In addition to the test wells, two municipal wells associated with Spring Valley were completed in lower Big Gulch. These wells are shown in Figure 5. Spring Valley municipal Well 1 was drilled to a total depth of 481 feet, and was screened between 341 and 481 feet in fine to coarse sand and gravel. Static water level was measured at about 92 feet below ground surface, and bottom-hole temperature was measured at about 69°F. This well produced 2,700 gpm with about 140 feet of drawdown (specific capacity of 19 gpm per foot). Driller's reports for the Spring Valley municipal wells are included in Appendix D.

Spring Valley municipal Well 2 was drilled to a total depth of 520 feet, and was screened between 342 and 516 feet in fine to coarse sand. Static water level was measured at about 130 feet below ground surface, and bottom-hole temperature was measured at about 71°F. This well produced about 2,100 gpm with about 60 feet of drawdown (specific capacity of 35 gpm per foot). The productive aquifers found in lower Big Gulch do not appear to extend to the west into Little Gulch, as evidenced by test well SVR 9.

Northern Margin aquifers found in alluvium and upper river terrace sediments of the Boise River valley located to the south of Avimor are also very productive. Many productive wells are completed in these aquifers. Good examples include the City of Eagle municipal wells 1 (Lexington Hills), 3 (Brookwood), 4 (Legacy), 5 (Eaglefield), and 6 (Palmer). These wells are shown on Figure 5.

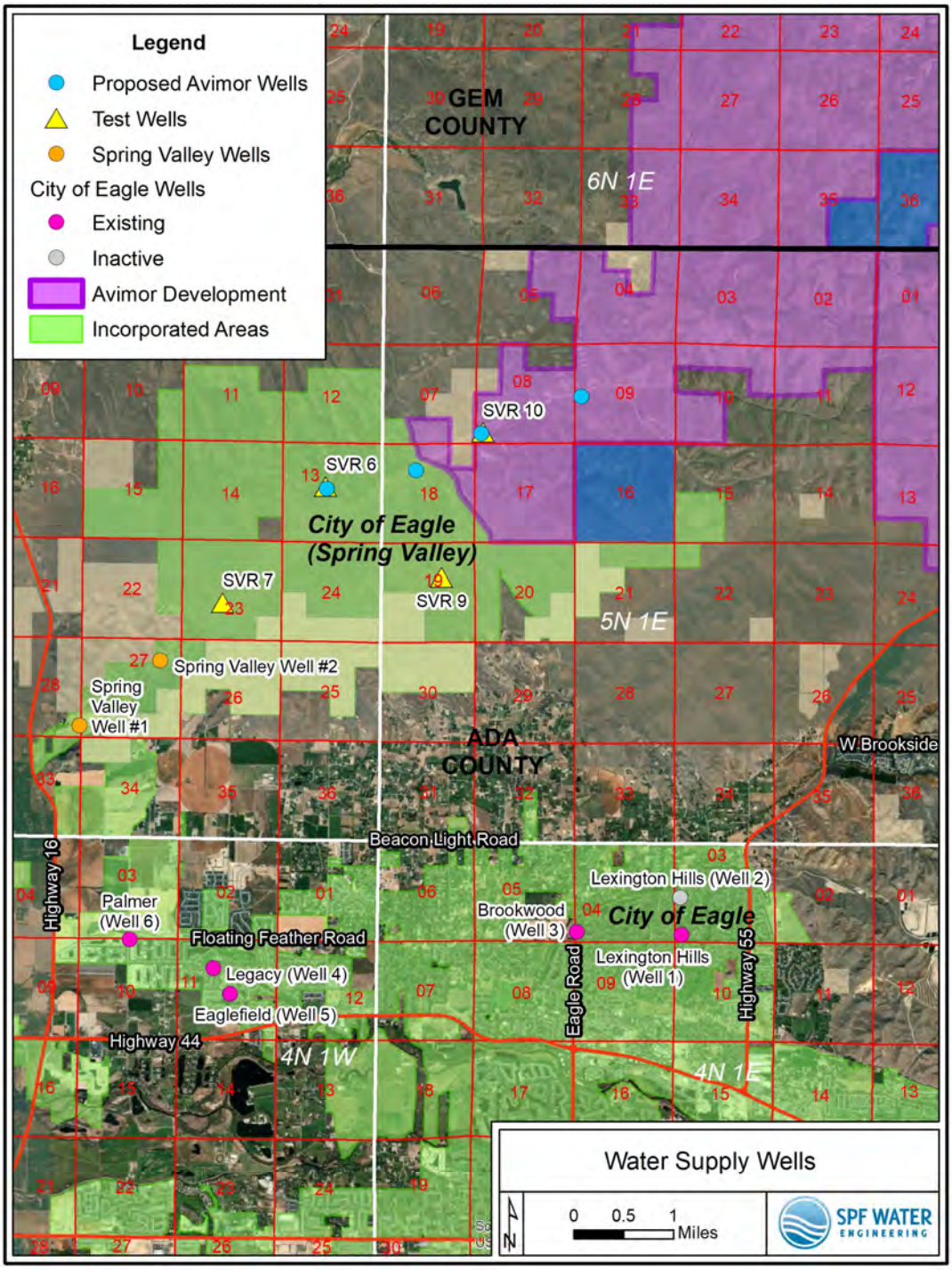

Figure 5. Water supply wells

4.2.5. Conclusions

The best opportunity for groundwater development for Avimor appears to be from the Willow Creek Aquifer in upper Big Gulch. This aquifer in upper Big Gulch and Willow Creek west of Avimor consists of a thick layer of profile of coarse-grained sediments and is capable of supporting well yield greater than 2,000 gpm. This aquifer appears to thin out at its eastern edge on Avimor property, with resultant lower well yields (500 to 1,000 gpm).

The Northern Margin aquifers to the south and west of Avimor are productive, but these aquifers in upper Little Gulch are thinner with limited development potential. Much of the Avimor property is underlain by the Foothills/Batholith aquifer system, generally found in low permeability sediments and volcanics with very low potential for groundwater development.

4.3. Municipal Water Rights

According to Idaho Department of Water Resources (IDWR) records, Avimor currently owns one groundwater right permit (63-32061) for municipal purposes. The permit allows for the diversion of 5 cubic feet per second (cfs) for municipal purposes from four points of diversion. The permit was approved in 2008, and proof of beneficial use extensions have been granted to August 1, 2023. A map of the place of use and points of diversion associated with permit 63-32061 is provided as Figure 6. A copy of the municipal water right permit is included in Appendix E.

The diversion rate of 5 cfs (2,240 gpm) authorized under permit 63-32061 is very close to the build-out maximum day demand of 2,390 gpm. Avimor is also pursuing the purchase of an additional 4.5-cfs water right application (63-34801), for a total of 5.5 cfs, to cover build-out demands. This application is under the name of Devon McDonald, and requests 0.5 cfs for irrigation and 4.46 cfs for domestic use. The place of use includes an adjoining property formerly owned by Devon McDonald and a portion of Avimor property. The application includes 13 points of diversion, all located on the former McDonald property. A copy of the application is included in Appendix F.

The existing municipal permit limits irrigation to ½-acre per lot, and requires use of any appurtenant surface water rights for irrigation prior to using groundwater. The permit also requires that treated wastewater be used for the irrigation of common areas within the permit place of use prior to using potable water. This condition may not apply to small isolated areas where delivery of treated wastewater is not feasible. If the municipal water system (and associated water right permit) is not used for irrigation, then these permit conditions may not apply.

The municipal permit condition #12 states that an ongoing monitoring and data submittal plan shall be developed that demonstrates that groundwater diverted under the permit is tributary to the Payette River drainage. This plan shall be approved by IDWR prior to diversion of water under the permit. Avimor or their consultant will prepare this plan and obtain IDWR approval prior to diversion of water under the permit.

If groundwater exploration activities identify additional well locations on the Avimor property with good potential for groundwater development, then Avimor will file for a new water right permit with IDWR for additional diversion rate, with these well locations identified as points of diversion.

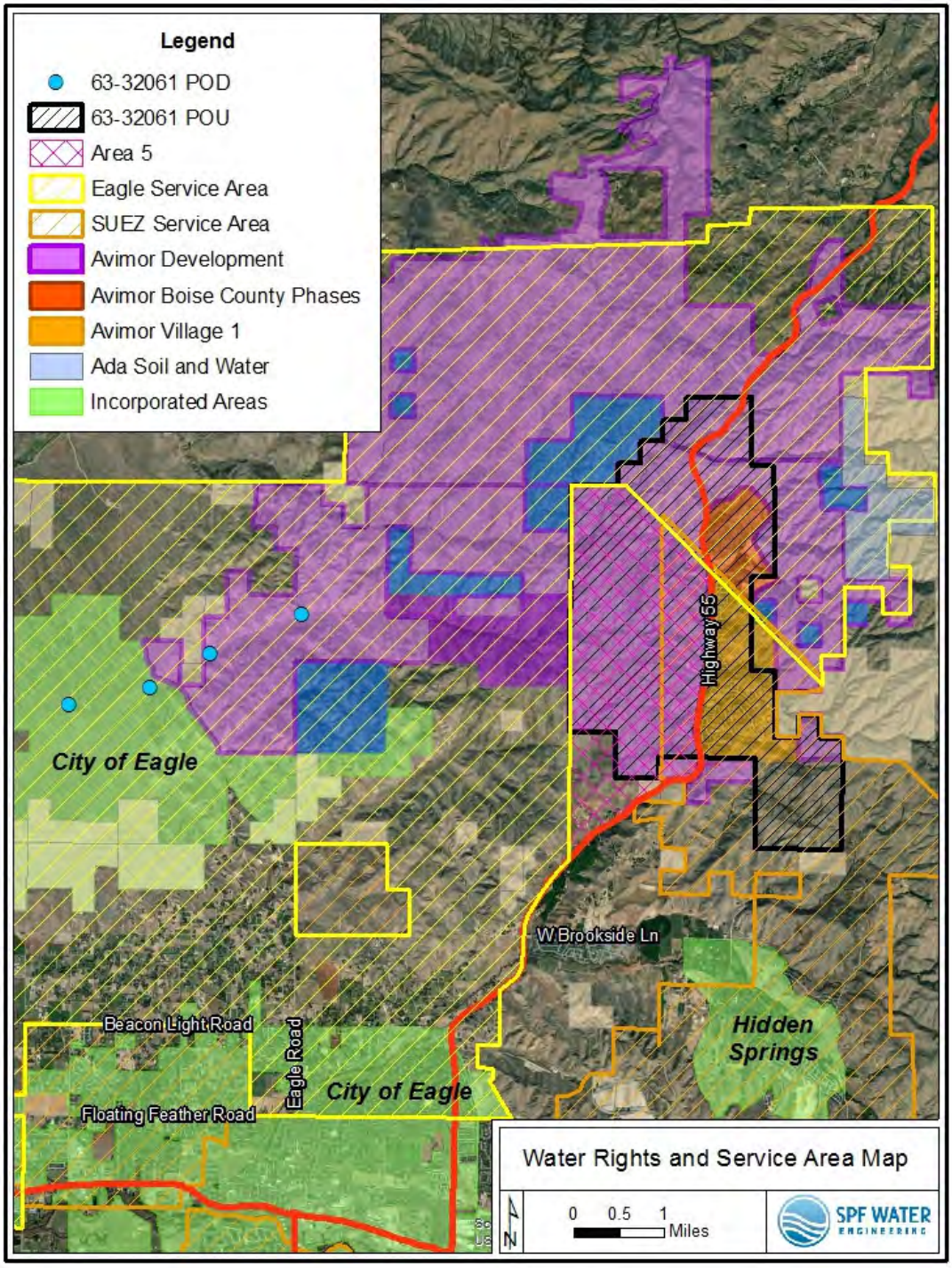

Figure 6. Water rights and service area map

Most of the Avimor property is located within the City of Eagle service area and associated City water right place of use, as shown on Figure 6. The southeast portion of Avimor, including Village 1, is located within Suez service area. Avimor property in Ada County located between Highway 55 to the east and the Eagle service area to the west is designated as "Area 5" in the 2021 Water Management Agreement between City of Eagle and Suez[10]. The Agreement states that if Eagle annexes any area within Area 5, then the City shall have the exclusive right to provide water service to those areas, unless Suez has already received a request to serve or is already serving a part of Area 5. If this were to occur, the Eagle service area (and associated City water right place of use), would be expected to be expanded to cover Avimor property within "Area 5".

If the City annexes Avimor, then Avimor would assign the municipal permit 63-32061 to the City. The City would then be expected to integrate the permit into their overall water right portfolio, expanding the place of use of the permit to the City service area. When Avimor completes the purchase of water right application 63-34801, Avimor would also assign the application to the City, and the City would then be expected to integrate the application into their overall water right portfolio, expanding the place of use of the application to the City service area. Avimor would be then be served water under the City water rights, but limited to the diversion rate authorized under the municipal permit and application.

The timing of completion of the McDonald water right application purchase by Avimor is not known, but the process has been on-going. As noted above, if the water right application purchase does not occur, then Avimor will file for a new water right permit with IDWR for additional diversion rate, and ultimately convey that application or permit to the City.

5. MUNICIPAL WATER SYSTEM CONCEPTUAL DESIGN

5.1. Overview

Future Avimor development will be served by a municipal water system. The municipal water system will be located on Avimor property, or on property where Avimor has an access agreement. The municipal water system is anticipated to be supplied by new wells completed in the Willow Creek Aquifer in an area is collectively referred to as the "Western Well Field". Wells will be drilled under Avimor's municipal water right permit and/or future water right permits. The water system project will be constructed in phases as development occurs. The water system is expected to be initially be supplied by two groundwater supply wells, but up to four wells may be needed to meet build-out demands. The wells are expected to provide the maximum day demand of the project at build-out. Three storage tanks are expected to meet peak demands and to provide for fire protection, with one tank planned for initial development and two additional tanks added as development progresses. Three booster pump stations are anticipated, one to pump from the Western Well Field to the lower storage tank and two pump stations to pump from the lower storage tank to the upper storage tank.

10 2021 City of Eagle – Suez Water Idaho Inc. – Water Management Agreement, dated February 2021.

An overview of the proposed water system is provided in Figure 7.

5.2. Supply Wells

5.2.1. Introduction

At least two new wells will be constructed to meet the maximum day demand for initial phases of the Avimor development, with one serving as a redundant source. To date one well (Well 1) has been drilled and tested, near test well SVR 10. Well 1 was constructed as a test well, due to uncertainties over well capacity and water quality. A request will be made to the Idaho Department of Environmental Quality (IDEQ) to convert test Well 1 to a municipal source of supply per IDAPA 58.01.08.510.07. The extent of development that can be served by these two wells (with one being redundant) will depend on well capacity and the nature of development. Equalization storage will be provided to supply the difference between supply and peak hour demand. Storage is also expected to meet fire flow requirements. Up to four wells may be needed to meet the maximum day demand of Avimor at full build-out.

5.2.2. Well Sites

One test well (Well 1) has been constructed on Avimor property near test well SVR 10 (refer to Figure 7). Additional proposed well locations are shown in Figure 7, authorized as points of diversion under Avimor's municipal water right 63-32061 (see Section 4.3). These points of diversion are located on Avimor property or on the Spring Valley property to the west where Avimor reportedly has an easement or agreement for well construction and access. Well 1 was and future wells are expected to be completed in the Willow Creek Aquifer in an area is collectively referred to as the Western Well Field. Well 1 was drilled at one of the points of diversion, while the test well SVR 6 was drilled at another location. These wells provide good data on potential well production and water quality. Avimor is also planning additional groundwater exploration activities on the property in an attempt to identify productive aquifers with acceptable water quality.

Each well will be constructed on a dedicated well lot that will provide a minimum of 50 feet of separation from any potential contamination source. Each well lot will be owned and controlled by the municipal water provider.

5.2.3. Well Construction

Well 1 was completed in July 2021. The well was constructed as a test well to public water system standards, based on the IRPDWS. The well was drilled to a total depth of 645 feet, encountering predominantly light gray cemented and non-cemented sand from a depth of 480 feet to total depth. A geophysical log was completed on May 18, 2021, confirming the presence of the thick sand zone. Based on the observed well cuttings and geophysical log, Well 1 was constructed with 16-inch steel casing and stainless steel well screen, with the screen placed from a depth of 560 to 640 feet. A 3/8-inch minus gravel pack was installed opposite the screen interval, from a depth of 450 feet to 645 feet. The well was sealed with ¾-inch bentonite chips from the top of the filter pack at 450 feet to ground surface. The driller's log for Well 1 is included in Appendix G.

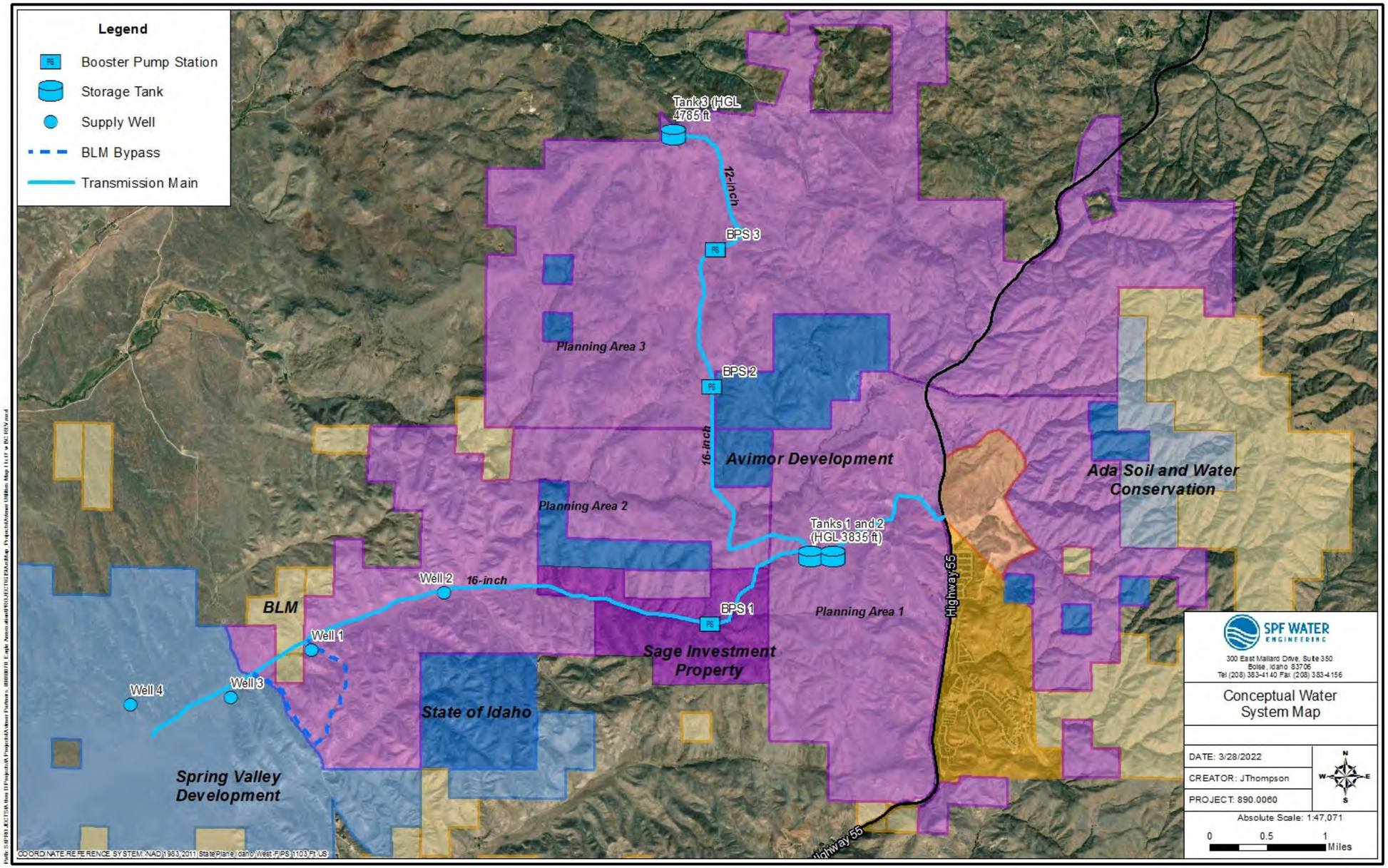

Figure 7. Conceptual water system map

Additional wells will be constructed to public water system standards. Proposed well construction can be based on the test wells SVR 6 and the recently completed Well 1. The anticipated maximum well depth is 800 feet. Each well is expected to be constructed with 16-inch well casing and stainless steel well screen. The 16-inch well casing can accommodate a 14-inch pump capable of producing 2,000 gpm. Final pump sizing will depend upon well capacity determined after well construction and testing. Each new well is expected to be constructed with a surface seal extending to a depth exceeding 400 feet, exceeding the minimum 58-foot seal required by the IRPDWS (IDAPA 58.01.08.510.03.b.).

5.2.4. Well Capacity

Well 1 was tested for 24 hours starting on August 12, 2021, and ending on August 13, 2021. Static water level was measured at 487 feet below ground surface before the start of the test. After pumping at 1,200 gpm for 24 hours, the pumping water level was measured at 520 feet, for a total drawdown of 33 feet. The specific capacity of Well 1 based on this test is 36 gpm per foot of drawdown. At a pumping rate of 1,500 gpm, the drawdown is projected to be 42 feet, for a pumping water level of about 530 feet. This water level is still 30 feet above the top of the screen. At a pumping rate of 2,000 gpm, the pumping water level is projected to be less than 545 feet, or 15 feet above the screen.

Future well capacity can be estimated based on testing results and hydrogeologic data from the Well 1 and SVR 6. During construction of test well SVR 6, 8-inch diameter casing was driven to a total depth of 738 feet. The casing was perforated from 560 to 720 feet in primarily quartz sand. Static water level was measured at 455 feet below ground surface. The well was test pumped for 24 hours at an average pumping rate of 358 gpm, with almost 3 feet of drawdown (specific capacity of over 100 gpm per foot of drawdown. The aquifer targeted by SVR 6 appears to be very productive.

Based on testing of SVR 6 and Well 1, production wells completed in the Western Well Field are capable of yields of 1,500 to 2,000 gpm.

The anticipated maximum day demand for Avimor for in-home residential and commercial uses at build-out is estimated to be 2,390 gpm, so it appears likely to be able to meet this demand with three wells (each producing approximately 1,200 gpm and assuming one is out of service). However, to be conservative it is possible that up to four wells are going to be needed at project build-out. Well 1 has a projected sustainable yield of 1,500 gpm, so the remaining three wells would need to produce about 800 gpm assuming Well 1 is out of service. The Avimor municipal water right includes four points of diversion, as described in Section 4.3.

5.2.5. Groundwater Quality

Water quality samples were collected during test pumping of Well 1. Results are included in Appendix H. Sampling results indicate that the well produces water meeting primary and secondary drinking water standards. The concentration of arsenic is 0.0081 mg/L, below the primary drinking water standard of 0.01 mg/L. A second sample was collected on January 21, 2022, and analyzed for arsenic. The result was slightly less than the initial sample at 0.0078 mg/L. The uranium concentration is below the detection limit of 1 ug/L. The concentration of nitrate is 4 mg/L, below the primary drinking water standard of 10 mg/L. The fluoride

concentration is 0.17 mg/L, below the primary and secondary standards of 4 mg/L and 2 mg/L, respectively. The water is considered to be slightly hard, with a total hardness of less than 50 mg/L. No volatile organic compounds (VOCs) or synthetic organic compounds (SOCs) were detected in the water. Two lab panel members reported a slight unidentified odor from a water sample. The threshold odor value of 2 T.O.N.is below the secondary drinking water standard of 3 T.O.N.

The level of iron and manganese were below the detection limit (0.05 and 0.005 mg/L, respectively). The water temperature was measured at 73°F. After well drilling, a bottom-hole temperature of 70°F was measured.

Water quality samples were also collected during test pumping of SVR 6. Sampling results indicate generally good quality water but with elevated arsenic (0.067 mg/L), above the primary drinking water standard of 0.010 mg/L (SPF 2004c). The water produced from SVR 6 was also warm, with a bottom-hole temperature of about 80°F. Even with the elevated temperature, the fluoride concentration was less than 1 mg/L (the secondary drinking water standard is 2 mg/L). The water temperature was not greater than 85°F, and therefore not considered to be a low temperature geothermal resource by IDWR.

The water produced from Well 1 does not need treatment to meet primary drinking water standards. However, it appears possible that future wells could produce water with an arsenic concentration exceeding its primary drinking water standard. If this occurs, then water treatment or operational remedies such as blending the water with a source that meets drinking water standards would be investigated and implemented. Options are discussed in more detail in Section 5.3.3.

5.3. Well Pumping Facilities

5.3.1. Well Pumps and Controls

At full build-out, supply wells will provide the total maximum day demand of Avimor (~2,400 gpm) with any well out of service. Testing of the new Well 1 and the test well SVR 6 suggests that production wells completed in the Western Well Field should have a long-term sustainable yield of 1,500 gpm. Therefore, the build-out maximum day demand should be able to be supplied by three wells (assuming one is out of service). If well yield is lower than anticipated, a fourth well would be constructed. For the purpose of this planning document, it is assumed at build-out there will be three wells, each equipped with a pump capable of producing 1,200 gpm. Final pump sizing will depend upon well capacity determined after well construction and testing.

Preliminary design criteria for each well pumping facility are summarized in Table 22. Well 1 is the test well that was recently completed near SVR 10. The design basis for Well 2 is the new Well 1, while the design basis for Well 3 is the test well SVR 6.

The target hydraulic grade line (HGL) for the well pumps is elevation 3,320 feet, or 20 feet above a proposed booster pump station located at elevation 3,300 feet. This booster pump station would deliver water to a storage tank with a base elevation of 3,810 feet (expected target HGL of 3,835 feet). Additional information on the proposed booster pump station and storage tank are provided in Sections 5.5 and 5.6.

Based on the design pumping rate and total dynamic head (TDH), each well will be equipped with a 14-inch pump equipped with motors ranging from 400-hp to 450-hp. The pump is expected to be a water-lubricated vertical turbine pump. Final pump sizing will occur after each well is constructed and tested. The pump setting is anticipated to be about 600 feet. A sounding tube will be installed in each well to allow for manual water-level measurements.

Each well pump is expected to be controlled with a variable frequency drive (VFD) and operated off of system pressure. Well house instrumentation will be connected to a municipal SCADA system for monitoring and alarm notification.

Table 22. Well pump design criteria

Well Pumping Facility	Elevation (ft, amsl)	Design Flow (gpm)	Hydraulic Grade Line (ft)	Design Total Dynamic Head (ft)	Calculated Horsepower (HP)	Design Horsepower (HP)
Well 1	2,910	1,200	3,320	1,113	422	450
2 (based on Well 1)	3,050	1,200	3,320	931	353	400
3 (based on SVR6)	2,850	1,200	3,320	1,136	430	450

5.3.2. Well Pumping Facility Appurtenances

Each well discharge will be equipped with equipment for operation and maintenance of the system and to meet the IRPDWS. The discharge piping from each well shall be equipped with a smooth nose sample tap, pressure gauge, isolation valve, pressure relief valve, accessible check valve, and instantaneous and totalizing flow meter. An air/vacuum valve will be provided in the discharge piping upstream of the check valve to allow air to enter and leave the column pipe when the pump stops and starts. The air valve outlet will be screened and provided with an air gap. Each well will be equipped to be able to be flushed to waste prior to the first service connection. The flush outlet will be screened and provided with an air gap.

5.3.3. Water Treatment

The water supply wells could produce water with levels of arsenic that exceed the primary drinking water standard of 0.01 mg/L. If this occurs, the drinking water standard for arsenic will be met through treatment or blending.

A study has been performed to evaluate arsenic treatment technologies for naturally occurring on-site groundwater (PACE 2004a[11]). That study narrowed arsenic treatment to the use of three potential technologies: adsorption, coagulation/filtration, or ion exchange. The report further recommended pilot testing for water treatment. A follow up report was completed that

11 Pacific Advanced Civil Engineering, Inc. (PACE), 2004a, *Arsenic Treatment Technologies Evaluation for Spring Valley Ranch*.

recommended coagulation and filtration to reduce arsenic concentrations below the primary drinking water standard (PACE 2004b[12]). Lastly, a water treatment pilot study was completed using coagulation and filtration to provide a basis for arsenic treatment design with preliminary infrastructure costs (PACE 2004c[13]). Results of the pilot study were that arsenic could be effectively and economically removed using coagulation/filtration technology.

Any required water treatment permitting and design will be addressed in future planning and engineering documents.

Blending could also be an option to lower the arsenic levels in the water. Blending would involve combining groundwater with elevated arsenic with groundwater from other sources with low arsenic, with the mixed water meeting drinking water standards. If this option were to be pursued, a pilot study would occur to investigate the feasibility of this approach. Other sources with low arsenic could be wells drilled on the Sage Investment property, where a test well drilled in April 2021 produced water with low arsenic, but low yield. Additional groundwater exploration could potentially discover higher yield aquifers with low arsenic. Blending could also be an option if Avimor were to connect to the City at Spring Valley or the City's Western Service Area.

The water produced from Well 1 has a threshold odor value of 2 T.O.N. that is below the secondary drinking water standard of 3 T.O.N. If the odor value exceeds the secondary drinking water standard, then treatment can be implemented to address the problem. The groundwater from the wells will be chlorinated before entering the transmission main and storage tank to maintain a chlorine residual in the system. Chlorination can be an effective treatment option for odor control. If that does not prove effective at eliminating the problem, then alternative solutions can be explored, such as granular activated carbon.

The chlorination system equipment would be housed in each well house. Equipment is expected to include a sodium hypochlorite storage tank, metering pump, and injection point. An emergency eyewash and shower will be provided in each well house.

5.3.4. Emergency Backup Power

If emergency standby storage is not provided, well pumping facilities will be equipped with emergency standby power such that average day demand can be met for eight (8) hours, as required by the IRPDWS. The average day demand is estimated to be less than 1,000 gpm. If one of the wells is equipped with a pump to produce 1,200 gpm, then only this well pumping facility would need to be equipped with an emergency generator. The emergency generator will be equipped with an automatic transfer switch. It is expected that a diesel generator will be used for backup power.

The generator will be located on the well lot, likely outside with a sound attenuating enclosure. This generator will meet the requirements of the IRPDWS. The generator fuel tank will be above ground, double-walled, and include spill prevention features and a spill containment structure.

12 Pacific Advanced Civil Engineering, Inc. (PACE), 2004b, *Arsenic Pilot Test Protocol for Spring Valley Ranch*.
13 Pacific Advanced Civil Engineering, Inc. (PACE), 2004b, *Arsenic Pilot Test for Spring Valley Ranch*.

5.4. Transmission Main

5.4.1. Introduction

A transmission main (West Main) will connect the proposed wells in the Western Well Field to a proposed booster pump station and storage tanks (Tanks 1 and 2, refer to Section 5.5). The transmission main will connect supply to the storage tank, but it is also expected that water distribution and services, with associated pressure reducing stations, will occur off of the transmission main at intervals imposed by development. The total transmission main length, from Well 4 to the storage tanks, is estimated to be 34,300 feet or about 6.5 miles. If Well 4 is not needed, the total transmission main length from Well 3 to the storage tanks is estimated to be 30,100 feet or about 5.7 miles. The transmission main length on Avimor (and Sage Investment) property is 28,800 feet (5.5 miles).

Another transmission main (North Main) will deliver water from Tanks 1 and 2 to another storage tank (Tank 3, refer to Section 5.5) that will be needed to serve Avimor Planning Area 3. It is expected that water distribution and services, with associated pressure reducing stations, will occur off of the transmission main at intervals imposed by development. The total transmission main length is estimated to be 27,000 feet or 5.1 miles. Two booster pumps stations are anticipated to supply Tank 3.

5.4.2. Location

The conceptual alignments for the West Main and North Main are shown on Figure 7. The West Main alignment generally follows an existing dirt road (Aerie Lane) to the site of the future tanks. The main crosses BLM property and property owned by Sage Investment. Avimor has a preliminary agreement with Sage Investment for a pipeline easement. The agreement for the easement will be finalized prior to any pipeline construction. Avimor is currently working through the BLM permitting for the transmission main. A bypass route around BLM property has been identified and will be pursued if the BLM permit is not approved when construction is ready to commence. This bypass is shown on Figure 7. The high point on the alignment is the storage tank expected to be at an elevation of 3,810 feet (overflow of 3,835 feet).

The North Main alignment generally follows a future collector road to the site of the future tank. The North Main is located entirely on Avimor property. The high point on the alignment is the storage tank expected to be at an elevation of 4,760 feet (overflow of 4,785 feet).

A gravel access road will be placed over the entire transmission main where there is not already a paved or gravel road providing access.

5.4.3. Pipeline Design Criteria

The West Main is proposed to be constructed of HDPE, ductile iron pipe size (DIPS). Two different pressure classes of pipe are expected to be required for the transmission main, 250 psi (DR9) and 200 psi (DR11). The majority of the main is expected to be DR11 pipe.

The following design criteria were used to size the West Main:

- Deliver the total maximum day demand of Avimor (~2,400 gpm) at a velocity of less than 5 feet per second (fps)

- Deliver the peak hour demand of Planning Areas 1 and 2 (those that could be served off of the transmission main) at a velocity of less than 10 fps.
- Deliver the maximum day demand and fire flow of Planning Areas 1 and 2 (those that could be served off of the transmission main) at a velocity of less than 10 fps. The fire flow under this scenario was assumed to be 2,500 gpm for commercial areas.

Based on the above design criteria, the recommended nominal diameter of the West Main is a minimum of 16 inches. As summarized in Table 23, this diameter satisfies the above design criteria, assuming a pipeline material of HDPE, ductile iron pipe size (DIPS), and pressure class of 200 psi (DR11). The pipeline velocity at a higher pressure class of 250 psi (DR9) slightly exceeds the design criteria of 5 fps under total maximum day demand and 10 fps under fire flow plus maximum day demand for Planning Areas 1 and 2. Pipeline velocities would be lower with a different pipe material, such as C900 PVC or ductile iron pipe, assuming the same nominal diameter.

Table 23. West Main design criteria

Demand Criteria	Value (gpm)	Acceptable Velocity (fps)	Calculated Main Diameter (in)	Design Main Diameter (in)	HDPE DIPS DR9 Velocity (fps)	HDPE DIPS DR11 Velocity (fps)
Total Maximum Day Demand	2,390	5	14.0	16	5.5	4.9
Peak Hour Demand (Planning Areas 1 and 2)	3,269	10	11.6	16	7.5	6.8
Maximum Day Demand and Fire Flow (Planning Areas 1 and 2)	4,443	10	13.5	16	10.3	9.2
HDPE DIPS DR9 ID (in)	13.302					
HDPE DIPS DR11 ID (in)	14.046					

Due to the conceptual nature of development along the West Main, design based on maximum velocity is considered to be a reliable approach. When development plans are better defined, hydraulic modeling will be conducted to verify distribution sizing and resulting static and dynamic system pressure. The results will be presented as part of future PUMPs.

The North Main will be used to deliver the maximum day demand of Avimor Planning Area 3 (447 gpm) from Tanks 1 and 2 to Tank 3, via two booster pump stations. The transmission main will also be used to meet the peak hour (760 gpm) and fire flow demands (assumed to be 1,500 gpm for residential areas) for Planning Area 3. Pressure reducing stations will be installed at appropriate locations along the main to limit static pressure to less than 80 psi.

Assuming a maximum velocity of 5 fps at maximum day demand, a nominal 8-inch diameter main (DIPS HDPE) would be needed. Assuming a fire flow of 1,500 gpm at maximum day

demand, a nominal 12-inch diameter main (DIPS HDPE) would be needed. To allow for the most flexibility for future development and the possibility of a 2,500-gpm fire flow in Planning Area 3, a nominal 16-inch diameter main (DIPS HDPE) is recommended between Tanks 1 and 2 and the upper booster pump station (BPS 3. A nominal 12-inch diameter main (DIPS HDPE) is recommended between the upper booster pump station (BPS 3) and Tank 3. The pipe diameter may change if a different pipe material, such as C900 PVC or ductile iron pipe is used.

Two different pressure classes of pipe are expected to be required for the transmission main, 250 psi (DR9) and 200 psi (DR11), assuming HDPE mainline.

5.4.4. Valving

Air valves will be installed along the transmission main at appropriate intervals to prevent the build-up of air. A detailed design analysis will be performed to determine the exact number and location of these air valves. Air valves will be installed in accordance with applicable municipal standards and the ISPWC.

Isolation valves will be installed at appropriate intervals for proper maintenance and repair. Valves are expected to be ductile iron resilient seated gate valves and double eccentric butterfly valves for larger diameter applications (greater than 12 inches). The exact locations of isolation valves will be identified at final design.

5.4.5. Pipe Installation and Testing

The transmission main will be installed and tested in accordance with applicable municipal standards and the ISPWC. These standards describe acceptable backfill, cover, and bedding. These standards also outline pipe hydrostatic and compaction testing and disinfection requirements. Appropriate inspections will occur during installation to ensure compliance with the project plans and specifications and municipal standards and requirements.

5.5. Storage Tanks

5.5.1. Introduction

Storage will be provided to meet peaking demands and operational storage as required by the IRPDWS. The required volume for Avimor build-out is expected to ultimately be met by three storage tanks, with construction phased per development plans.

5.5.2. Storage Location

Two storage tanks are expected to be located on Avimor property at a ground elevation of 3,810 feet. The proposed locations are shown on Figure 7. This is the highest point on the property in Planning Areas 1 and 2. Nearly all of these two planning areas can be served by gravity from storage at this elevation. A third storage tank is expected to be located on Avimor property at a ground elevation of 4,760 feet to serve Planning Area 3 (refer to Figure 7). The third storage tank is expected to be supplied by two booster pump stations.

Water system pressure zones are discussed in more detail in Section 5.8.

5.5.3. Storage Volume

Storage is proposed to meet peak potable and fire flow demands for the Avimor development. Storage volume will also account for operational and dead storage. The estimated storage volume is not expected to include emergency standby storage. It is assumed that emergency backup power will be provided on a well pumping facility to meet average day demand (total of 990 gpm) for eight hours.

Equalization storage is the storage required to account for the difference between a water system's maximum pumping capacity and the peak hour demand. With equalization storage, the supply wells must be capable of meeting the maximum day demand with any source out of service. Operational storage is the volume needed to account for the sensitivity of water level sensors and pump operation. Dead storage is volume not available for use and is typically assumed to be the bottom 6 inches in the tank.

The initial storage tank (Tank 1) will be designed to support Avimor Planning Areas 1 and 2, which will be able to be supplied from this tank by gravity. The second tank (Tank 2), located next to the first tank, will also serve Planning Areas 1 and 2. The third tank (Tank 3) will support Planning Area 3 development.

The components of storage required for Planning Areas 1 and 2 are summarized in Table 24. For Planning Areas 1 and 2, the projected maximum day demand is 2.84 million gallons per day (MGD). The associated equalization storage, calculated per IDEQ guidance[14], is equal to the peak hour demand (3,316 gpm) minus the source capacity (1,970 gpm), then multiplied by 150 minutes, equal to approximately 201,840 gallons. This calculation conservatively assumes that source capacity is equal to the maximum day demand. Storage volume assumes a fire flow requirement of 2,500 gpm for 2 hours (300,000 gallons) for commercial areas. The required operational storage is assumed to be equal to 10% of the maximum day demand, equal to approximately 283,740 gallons. Dead storage is calculated to be the bottom 6 inches of the tank, equal to nearly 19,000 gallons. The total required water volume is therefore about 804,400 gallons. The anticipated storage volume does not include standby storage, as a backup generator will be provided for a supply well to meet average day demand for 8 hours. The total required tank volume is estimated to be about 861,000 gallons, accounting for dead space at the top of the tank.

To provide for future flexibility, a total of 1 MG of storage is planned. A single tank with a diameter of 80 feet and height of 26.5 feet would satisfy the design volume of 1 MG. The final dimensions will be determined during the design phase.

14 Guidance for Determining Equalization Water Storage for Public Water Systems, Idaho Department of Environmental Quality Drinking Water Program, Revised March 2013.

Table 24. Storage volume required for Planning Areas 1 and 2 (single tank)

Storage Components	Value	Unit	Assumptions
Tank Diameter	80	ft	Tank diameter
Fire Storage	300,000	gal	Fire flow of 2,500 gpm for 2 hours
Equalization Storage	201,838	gal	(pkhr-source capacity)*150 min
Operational Storage	283,740	gal	10% of maximum day demand
Dead Storage	18,799	gal	0.5 ft at bottom
Total Water Volume	804,377	gal	Design volume for water storage
Tank Overflow Height	21.9	ft	Includes 0.5 ft above water level
Total Tank Height	22.9	ft	Includes 1 ft above overflow
Total Tank Volume w/o Standby Storage	861,182	gal	Includes volume above overflow (1 ft)

Rather than install a single 1-MG tank to serve Planning Areas 1 and 2, two smaller 500,000-gallon tanks (Tanks 1 and 2) may be installed. A tank diameter of 60 feet and total tank height of 23.6 feet would satisfy the volume requirements (not including standby storage, see Table 25). The final dimensions will be determined during the design phase. Tank 1 would be installed initially, but would be required to provide the entire fire flow volume of 300,000 gallons. If the fire flow and dead storage volume are removed, the remaining equalization and operational storage components should be able to support about 2,800 residential units (assuming a maximum day demand of 329 gpd per residence). Once Tank 2 is constructed, then the fire flow volume can be met from either tank.

Table 25. Storage volume required for Tank 1

Storage Components	Value	Unit	Assumptions
Tank Diameter	60	ft	Tank diameter
Fire Storage	300,000	gal	Fire flow of 2,500 gpm for 2 hours
Equalization Storage	65,452	gal	(pkhr-source capacity)*150 min
Operational Storage	92,012	gal	10% of maximum day demand
Dead Storage	10,575	gal	0.5 ft at bottom
Total Water Volume	468,039	gal	Design volume for water storage
Tank Overflow Height	22.6	ft	Includes 0.5 ft above water level
Total Tank Height	23.6	ft	Includes 1 ft above overflow
Total Tank Volume w/o Standby Storage	500,000	gal	Includes volume above overflow (1 ft)

The components of storage for Tank 3 required for Planning Area 3 is summarized in Table 26. For Planning Area 3, the projected maximum day demand is about 605,000 gpd. The associated equalization storage, calculated per IDEQ guidance, is equal to the peak hour demand (714 gpm) minus the source capacity (420 gpm), then multiplied by 150 minutes, equal to about 44,100 gallons. This calculation assumes that source capacity is equal to the maximum day demand of 420 gpm, supplied by a booster pump station. Storage volume assumes a fire flow requirement of 2,500 gpm for 2 hours (300,000 gallons) for commercial areas. The required operational storage is assumed to be equal to 10% of the maximum day demand, equal to approximately 60,500 gallons. Dead storage is calculated to be the bottom 6 inches of the tank, equal to approximately 10,500 gallons. The total required water volume for Tank 3 is therefore nearly 415,000 gallons. The total tank volume is estimated to be about 450,000 gallons, accounting for dead space at the top of the tank. To provide for future flexibility, a total of 500,000 gallons of storage is planned. A single tank with a diameter of 60 feet and height of 23.6 feet would satisfy the design volume. The final dimensions will be determined during the design phase.

Table 26. Storage volume required for Planning Area 3

Storage Components	Value	Unit	Assumptions
Tank Diameter	60	ft	Tank diameter
Fire Storage	300,000	gal	Fire flow of 2,500 gpm for 2 hours
Equalization Storage	44,070	gal	(pkhr-source capacity)*150 min
Operational Storage	60,483	gal	10% of maximum day demand
Dead Storage	10,575	gal	0.5 ft at bottom
Total Water Volume	415,128	gal	Design volume for water storage
Tank Overflow Height	20.1	ft	Includes 0.5 ft above water level
Total Tank Height	21.1	ft	Includes 1 ft above overflow
Total Tank Volume w/o Standby Storage	447,062	gal	Includes volume above overflow (1 ft)

5.5.4. Storage Details

The storage tanks are proposed to be bolted steel. Each tank will be coated per NSF standards. Bolted steel tanks with factory-applied coatings can be expected to have a life expectancy exceeding 40 years when constructed and installed per ANSI/AWWA D103-87 standards. Each storage tank will meet the requirements of the IRPDWS and the American Waterworks Association (AWWA), including construction to provide protection from contamination and being equipped with access, drain, overflow, and vent. The drain and tank overflow are expected to be routed to an on-site retention pond, with an appropriate air gap.

The tank site will be provided with utility power for instrumentation, lighting, etc. The tank will be equipped with water-level sensors to control the booster pumps, and low-level and high-level floats for alarm signals. These sensors will be connected to the municipal water SCADA

system, and SCADA system requirements will be coordinated with the municipal provider (City of Eagle if annexation occurs).

An earthen berm will be installed around the tanks to limit visibility and protect the tanks from vandalism. The tank site will be fenced to prevent unauthorized access.

5.6. Booster Pump Stations

5.6.1. Introduction

Booster pump stations will be required to deliver water from the Western Well Field to Tanks 1 and 2, and from Tanks 1 and 2 up to Tank 3. Booster pump stations will be designed to meet the IRPDWS and applicable municipal standards.

5.6.2. Locations

The booster pump station (BPS 1) that will lift water from the Western Well Field to Tanks 1 and 2 is expected to be located at an elevation of approximately 3,300 feet. An approximate location for BPS 1 is shown on Figure 7. Two booster pump stations (BPS 2 and 3) will be required to lift water from Tanks 1 and 2 to Tank 3. BPS 2 is expected to be located at an elevation of approximately 3,770 feet. BPS 3 is expected to be located at an elevation of approximately 4,300 feet. Approximate locations for BPS 2 and BPS 3 are shown on Figure 7.

5.6.3. Capacity

The IRPDWS require that booster pump stations that pump to storage must be capable of pumping maximum day demand with any pump out of service (firm capacity). BPS 1 is expected to be utilized to meet the maximum day demand of Avimor build-out (2,390 gpm). The construction of BPS 1 will allow it to be expanded in the future with additional pumps should the need arise. BPS 1 will be used to deliver supply water from the Western Well Field to Tanks 1 and 2, where BPS 2 will be used to deliver supply water to BPS 3 and ultimately to Tank 3. Tanks 1 and 2 will serve Planning Areas 1 and 2 while Tank 3 will serve Planning Area 3. BPS 2 and BPS 3 are expected to be utilized to meet the maximum day demand of Avimor Planning Area 3 (447 gpm).

5.6.4. Booster Pumps and Controls

Preliminary design criteria for BPS 1 are summarized in Table 27. BPS 1 is expected to include three (3) pumps, each with a design capacity of 1,200 gpm and a design TDH of 548 feet. The firm capacity will be 2,400 gpm (the maximum day demand of Avimor build-out). The pump station will be constructed to allow for additional pumps for future expansion. The TDH is based on pumping to an HGL of 3,835 feet (the top of Tanks 1 and 2). Each of the pumps are expected to be 250-hp. BPS 1 has an assumed suction HGL of 3,320 feet, supplied by the Western Well Field well pumps. The booster pumps are expected to be short-set vertical turbine pumps installed in sealed pump cans. Each of the booster pumps are expected to each be controlled by VFDs and operated to maintain tank level.

Table 27. Design criteria for BPS 1.

Booster Pump Station	Elevation (ft)	Suction HGL (ft)	Target HGL (ft)	BPS Firm Capacity (gpm)	Pump	Design Flow (gpm)	Design TDH (ft)	Pump Discharge Pressure (psi)	Calculated HP	Design HP
1	3,300	3,320	3,835	2,400	1	1,200	548	237	221	250
					2	1,200	548	237	221	250
					3	1,200	548	237	221	250

Preliminary design criteria for BPS 2 and BPS 3 are summarized in Table 28. BPS 2 is expected to include two (2) pumps, each with a design capacity of 500 gpm and a design TDH of 503 feet. The firm capacity will be 500 gpm. The TDH is based on pumping to an HGL of 4,320 feet (20 feet above the elevation of BPS 3, expected to be at 4,300 feet). Each of the pumps are expected to be 100-hp. BPS 2 has an assumed suction HGL of 3,824 feet, supplied by BPS 1 (and Tanks 1 and 2).

BPS 3 is also expected to include two (2) pumps, each with a design capacity of 500 gpm and a design TDH of 473 feet. The firm capacity will be 500 gpm. The TDH is based on pumping to an HGL of 4,785 feet (the top of Tank 3). Each of the pumps are expected to be 100-hp. BPS 3 has an assumed suction HGL of 4,320 feet, supplied by BPS 2.

The booster pumps are expected to be short-set vertical turbine pumps installed in sealed pump cans. Each of the booster pumps are expected to each be controlled by VFDs and operated to maintain tank level.

Table 28. Design criteria for BPS 2 and BPS 3.

Booster Pump Station	Elevation (ft)	Suction HGL (ft)	Target HGL (ft)	BPS Firm Capacity (gpm)	Pump	Design Flow (gpm)	Design TDH (ft)	Pump Discharge Pressure (psi)	Calculated HP	Design HP
2	3,770	3,824	4,320	500	1	500	503	218	85	100
					2	500	503	218	85	100
3	4,300	4,320	4,785	500	1	500	473	205	80	100
					2	500	473	205	80	100

5.6.5. Booster Pump Appurtenances

Each booster pump station must meet the requirements of the IRPDWS. The discharge line of each of the booster pumps will be provided with a check valve and isolation valve. The suction line of each of the booster pumps will be provided with an isolation valve. The common discharge line from all the booster pumps will be provided with a pressure gauge, pressure sensor, flow meter, and pressure relief valve. The common suction line to all the booster

pumps will be provided with a pressure sensor. The suction pressure sensor will automatically shut off the booster pumps in the event of low suction pressure (less than 10 psi, adjustable). The pressure relief valve will serve to protect the booster pump station and transmission main from excessive pressure.

Combination air/vacuum valves will be placed on the pump system manifold to allow the pipeline to be filled and drain without vacuum pressures and allow air release under pressure. Air/vacuum valves will be placed on the pump discharges to allow air from the pump discharge columns to discharge upon startup and break vacuum pressures upon shutoff. This will serve to limit air entrainment and associated water hammer and capacity reduction in the transmission pipe. Lastly, combination air valves will be placed on the pump cans to allow accumulated air under pressure to be vented.

A detailed surge analysis is planned for the transmission main. Based on the results of that analysis, each booster pump station may be equipped with surge tanks or surge anticipation valves to prevent excessive surge in the transmission main in the event of the power outage or main break. Surge can also be minimized through hydraulic valve opening and closing speeds and pump startup and shut-down speeds.

Booster pump stations will be designed to accommodate forward and reverse flow operation. This will be accomplished through the use of a reverse bypass line around the pumps equipped with a pressure reducing valve and flow control valve installed in series. The two control valves are connected in series to provide redundant system protection, with pressure monitoring between the valves to monitor valve operation. The flow meter in the booster pump station will be able to measure and record forward and reverse flow rates and total volume.

Booster pump station instrumentation will be connected to the municipal SCADA system for monitoring and alarm notification.

5.6.6. Emergency Backup Power

Each booster pump station will be equipped with emergency standby power such that average day demand can be met for eight (8) hours, given that storage is not expected to include standby storage. Backup power is also being provided to prevent excessive hydraulic surge.

The emergency generator will be equipped with an automatic transfer switch. It is expected that a diesel generator will be used for backup power. The generator will be located on the booster pump station lot, likely outside with a sound attenuating enclosure.

5.7. Buildings

The required well houses and booster pump station buildings will be constructed to meet the IRPDWS and applicable municipal design standards. It is expected that the buildings will be constructed of CMU block with a metal roof. The buildings will be fenced to prevent unauthorized access. The IRPDWS require:

- Buildings will be protected from flooding and be adequately drained.
- The building floors will be greater than 6 inches above surrounding grade.
- The buildings will be of durable construction (fire and weather resistant).
- Heat will be provided to prevent freezing of pipes and equipment.

- Ventilation will be provided as required by local and/or state codes.
- Each building will have locking doors to prevent unauthorized access.
- No hazardous materials will be stored in the well house buildings (except for chlorine solution in the well houses).
- Floor drains will be provided to accommodate leaks and minor discharge from pump packing boxes, floor drains will discharge to gravel sump located at least 30 feet from the buildings.
- A roof hatch will be provided at each building for pump removal and servicing.

5.8. Pressure Zones

5.8.1. Requirements

The IRPDWS require that a minimum pressure of 40 psi will be maintained in the distribution system during peak hour demand. A minimum pressure of 20 psi shall be maintained in the distribution system during fire flow and maximum day demand per the IRPDWS. The static pressure in the system shall not exceed 100 psi and normally stay below 80 psi. Where system pressure exceeds 80 psi but is less than 100 psi, IDEQ allows for the installation of pressure reducing devices at individual service connections on a case-by-case basis. IDEQ requires a demonstration that main-line pressure reducing stations are not an economical, physical, or an otherwise viable option for efficient system operation. Any customers served by individual pressure reducing devices must be notified by the water purveyor.

5.8.2. Pressure Zones

In order to maintain static pressure below 80 psi and dynamic pressure above 40 psi during peak hour demand, pressure zones will be established across the Avimor development property. Pressure zones will be established and maintained through the use of pressure reducing stations. Distribution lines and pressure reducing stations will tee off of the transmission main to serve each pressure zone, at locations dictated by development plans. Pressure reducing valves in the booster pump stations will also reduce pressure through the pump station during reverse flow conditions.

Since the development will be served by gravity from storage tanks, the pressure zones will be delineated based on tank elevation. The tank overflow elevation establishes the HGL for the tank service area. Avimor Planning Areas 1 and 2 will have pressure zones based on a storage tank or tanks located at an elevation of 3,810 feet; Planning Area 3 will have pressure zones based on a storage tank located at an elevation of 4,760 feet.

For Planning Areas 1 and 2, a total of eleven pressure zones will be required, based on the elevation difference across the planning areas and the need to maintain a minimum static pressure of 45 psi and a maximum static pressure of 80 psi. This assumes a minimum service area elevation of 2,850 feet above sea level, a maximum service area elevation of 3,730 feet, and a tank overflow elevation of 3,835 feet.

A map showing the eleven pressure zones is included as Figure 8. The range of elevation associated with each of the pressure zones in Planning Areas 1 and 2 is described in Table 29. Pressure Zone 1 (3,835 HGL) in Table 29 can be supplied by gravity directly from the tank (or tanks). The other ten pressure zones will require pressure reducing stations. For

any residences with a static pressure above 80 psi, individual pressure reducing valves will be installed at each service connection to maintain static pressure below 80 psi.

Table 29. Pressure zones for Planning Areas 1 and 2

Pressure Zone	HGL (feet)	Minimum Elevation (80 psi)	Maximum Elevation (45 psi)	Delivery Approach
1	3,835	3,650	3,731	Gravity
2	3,754	3,569	3,650	Gravity, PRV
3	3,673	3,489	3,569	Gravity, PRV
4	3,592	3,408	3,489	Gravity, PRV
5	3,512	3,327	3,408	Gravity, PRV
6	3,431	3,246	3,327	Gravity, PRV
7	3,350	3,165	3,246	Gravity, PRV
8	3,269	3,084	3,165	Gravity, PRV
9	3,188	3,003	3,084	Gravity, PRV
10	3,107	2,923	3,003	Gravity, PRV
11	3,027	2,842	2,923	Gravity, PRV

For Planning Area 3, a total of twelve pressure zones will be required, based on the elevation difference across the planning area and the need to maintain a minimum static pressure of 45 psi and a maximum static pressure of 80 psi. This assumes a minimum service area elevation of 3,730 feet, a maximum service area elevation of 4,680 feet, and a tank overflow elevation of 4,785 feet. The tank base will be located at an approximate elevation of 4,760 feet. The minimum service area elevation coincides with the maximum service area elevation of Planning Areas 1 and 2.

A map showing the twelve pressure zones is included as Figure 9. The range of elevation associated with each of the pressure zones in Planning Area 3 is described in Table 30. The 4,785-foot pressure zone in Table 30 can be supplied by gravity directly from the tank. The other eleven pressure zones will require pressure reducing stations. For any residences with a static pressure above 80 psi, individual pressure reducing valves will be installed at each service connection to maintain static pressure below 80 psi.

This pressure zone analysis is based on preliminary development plans and available topographic data (40-foot contours), and is intended to provide a general overview of the pressure zones. A detailed hydraulic analysis and model using the best available topographic data will be developed for the project as part of future PUMPs. The model will be used to define and evaluate exact pressure zone boundaries based on maximum static pressure and minimum pressures during maximum day demand, peak hour demand, and fire flow events. It may be necessary to serve a limited number of isolated residential units using individual pressure reducing devices to limit static pressure to less than 80 psi, rather than main-line pressure reducing stations. The IRPDWS allow these devices on a case-by-case basis.

Table 30. Pressure zones for Planning Area 3

Pressure Zone	HGL (feet)	Minimum Elevation (80 psi)	Maximum Elevation (45 psi)	Delivery Approach
1	4,785	4,600	4,681	Gravity
2	4,704	4,519	4,600	Gravity, PRV
3	4,623	4,439	4,519	Gravity, PRV
4	4,542	4,358	4,439	Gravity, PRV
5	4,462	4,277	4,358	Gravity, PRV
6	4,381	4,196	4,277	Gravity, PRV
7	4,300	4,115	4,196	Gravity, PRV
8	4,219	4,034	4,115	Gravity, PRV
9	4,138	3,953	4,034	Gravity, PRV
10	4,057	3,873	3,953	Gravity, PRV
11	3,977	3,792	3,873	Gravity, PRV
12	3,896	3,711	3,792	Gravity, PRV

5.8.3. Pressure Reducing Stations

Pressure reducing stations will be required to maintain static pressure below 80 psi. Pressure reducing stations will be designed per applicable municipal standards. Each station is expected to include dual valves for low- and high-flow applications. Stations shall be located in dedicated right-of-way or permanent utility easement. Final station locations and elevations will be identified through hydraulic modeling, with the results presented in future PUMPs.

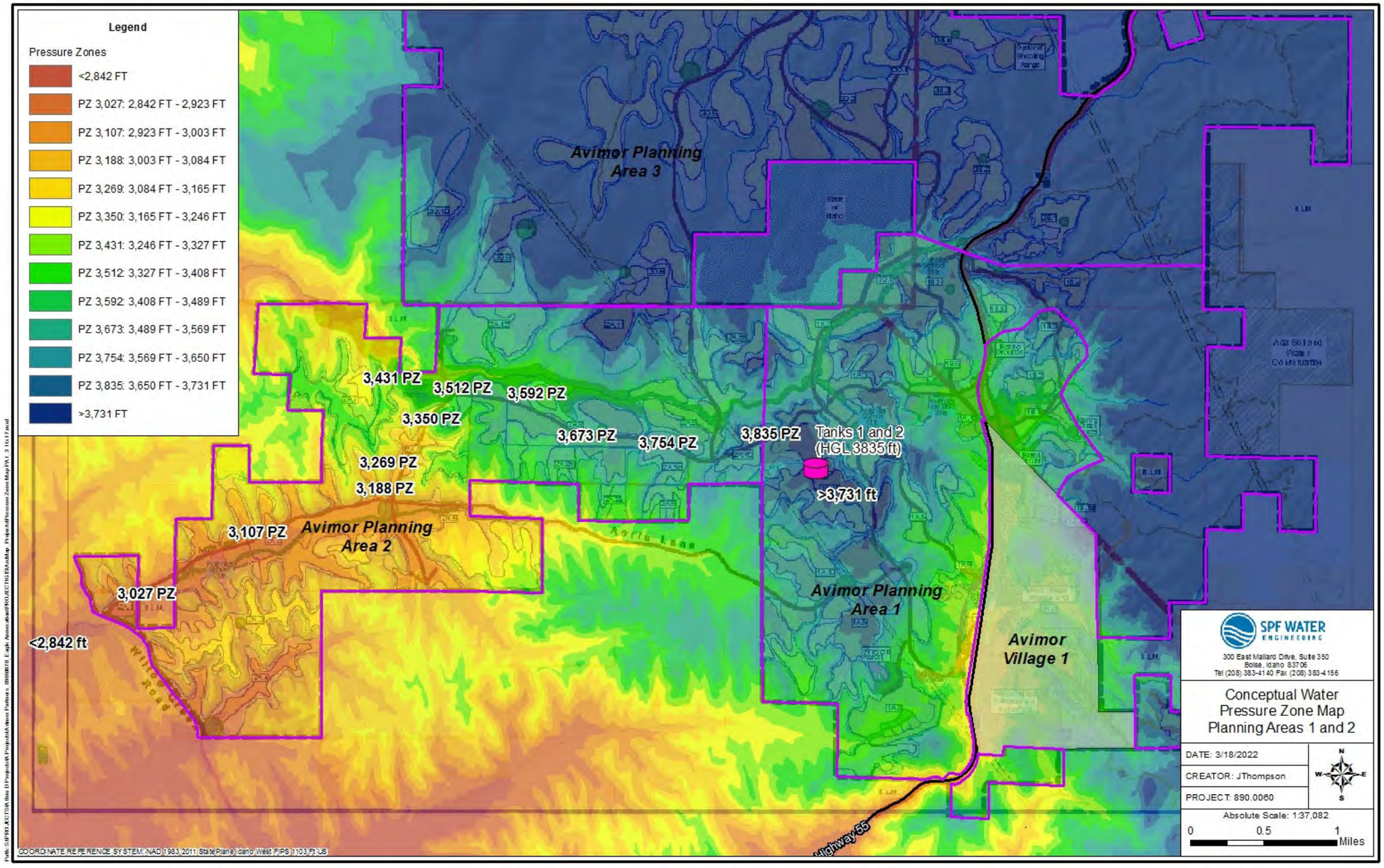

Figure 8. Conceptual water system pressure zone map for Planning Areas 1 and 2

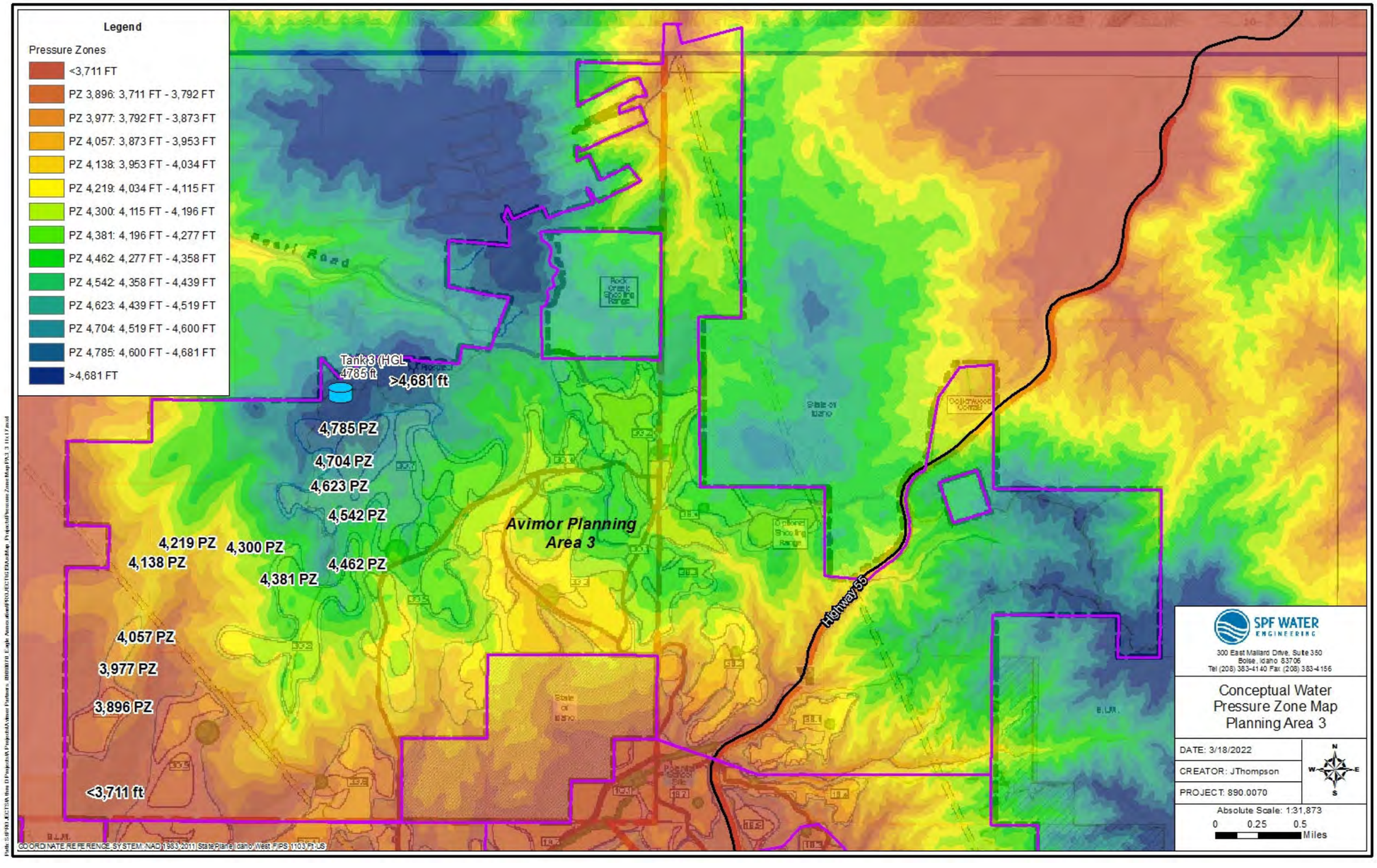

Figure 9. Conceptual water system pressure zone map for Planning Area 3

5.9. Distribution System

This Plan primarily focuses on water backbone infrastructure, including the primary transmission main. Water distribution and services for development, with associated pressure reducing stations, will branch off the transmission main at intervals imposed by development. A conceptual distribution system water main layout is provided as Figure 10, using the most current Master Land Use Plan (March 2022). PUMP 1 is shown on the figure for reference. This layout is based on serving the development areas as identified on the Master Land Use Plan. This general water main layout is considered appropriate for master planning. Detailed distribution system design, including line sizing and final layout, will occur for future planning units, once development plans are better defined, and will be reviewed and approved with the development plans.

Hydraulic modeling will be conducted to verify distribution sizing to maintain pressure design criteria, namely a minimum of 40 psi at peak hour demand and 20 psi at fire flow and peak day demand. Water mains will not be smaller than 8 inches in diameter. The results will be presented as part of future PUMPs, for review and approval by IDEQ and other regulatory authority such as the City, prior to construction of any water distribution.

Design and construction of the distribution system will be per the IRPDWS, the latest version of the ISPWC, and any relevant municipal supplements to the ISPWC. For example, assuming the City owns and operates the water system, design and construction will be per the City of Eagle Water Supplemental Standards for Public Works Construction, September 2020. This will include pipe, fittings, valves, fire hydrants, and services.

Distribution system piping with a diameter of 12 inches or less is expected to be constructed of AWWA C900 DR18 pipe, rated for 235 psi. Piping with a diameter greater than 12 inches is expected to be constructed of AWWA C905 DR25 pipe, rated for 165 psi. If the piping has a static pressure greater than the working pressure rating, then pipe with an appropriate pressure rating will be used. Pipe fittings are expected to be ductile iron, meeting AWWA C153. Pipe backfill, bedding, restraints, disinfection and testing (hydrostatic, compaction), and horizontal and vertical separations from non-potable mains shall be per the IRPDWS, ISPWC, and any relevant municipal supplements. Water mains will have a minimum cover of 48 inches and a maximum cover of 60 inches. Appropriate inspections will occur during installation to ensure compliance with the project plans and specifications and municipal standards and requirements.

Isolation valves will be ductile iron resilient seat gate valves, meeting AWWA C509 or C515. Isolation valves will be installed on all legs of crosses and tees and at all water main stubs before the blow-off. Approved dead-end mains will have a hydrant for flushing. Any required air valves will be installed in accordance with applicable municipal standards and the ISPWC.

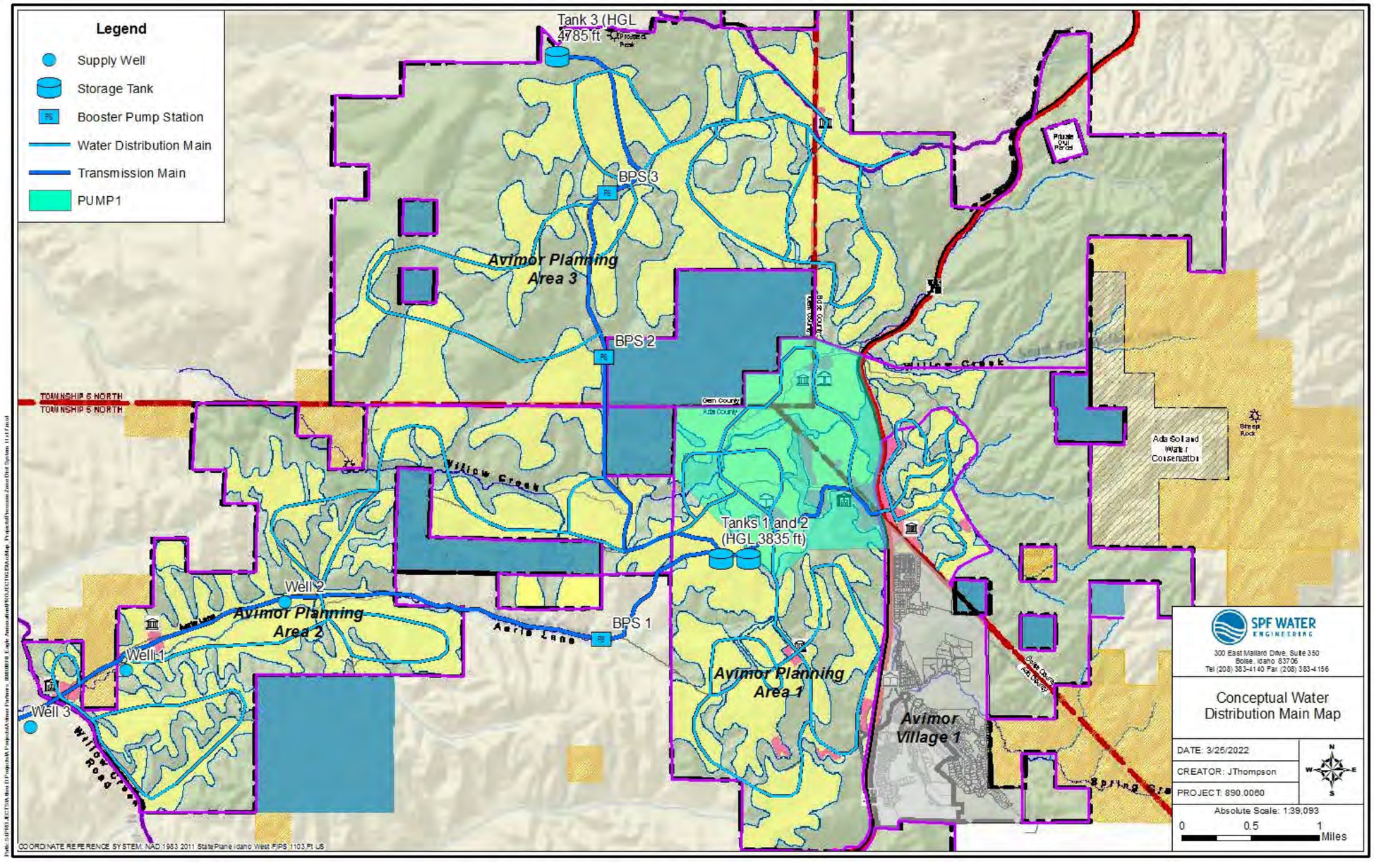

Figure 10. Conceptual water distribution main map

5.10. Sandy Hill Aquifer Storage and Recovery

The Sandy Hill Aquifer (SHA) is located west of Highway 55, in Planning Area 1. The SHA is shown in Figure 11. This aquifer has been investigated through the drilling of several test wells. Test Wells SVR 3, TPW 1 and SVR 8 were all drilled before 2005. The test well TPW 1 was drilled to a depth 292 feet, and was tested at 2,000 gpm with 17 feet of drawdown after 3 days (specific capacity of 118 gpm per foot). This well targets a gray clay with interbedded coarse sand that was encountered at a depth ranging from 227 to 292 feet. An additional three monitoring wells were drilled in 2005, including MW-1, MW-2, and MW-3. MW-1 was abandoned after drilling to 180 feet. MW-2 was completed with 6-inch steel casing to 288 feet and stainless steel screen from 288 to 293 feet. MW-3 was completed with 2-inch PVC casing to 29 feet and PVC screen from 29 to 39 feet. Three more monitoring wells (UWID-1, UWID-2, and UWID-3) were completed for United Water Idaho (Suez) between 2010 and 2013. UWID-1 was completed with 2-inch PVC casing to a depth of 227 feet and PVC screen from 227 to 247 feet. UWID-2 was completed with 5-inch PVC casing to a depth of 230 feet and stainless steel screen from 230 to 240 feet. UWID-3 was completed with 5-inch PVC casing to a depth of 219 feet and stainless steel screen from 219 to 229 feet. Driller's reports are included in Appendix C.

Testing suggests that the SHA may support high-capacity wells (in excess of 2,000 gpm) but the long-term sustainability (volume and recharge) of the aquifer is restricted by limited areal extent. However, the SHA has been evaluated for aquifer storage and recovery (ASR). Water could be injected into the aquifer during low demand periods (Fall to Spring) from the Western Well Field or other reliable water source, and then be withdrawn (pumped) from the aquifer during high demand periods (Spring to Fall). The SHA would essentially serve as a very large subsurface storage reservoir.

However, preliminary water quality testing has indicated that groundwater from the SHA contains arsenic at concentrations above the primary drinking water standard. The water would require treatment if used in a potable application. Suez (formerly United Water Idaho) later completed an ASR study on the SHA (United Water Idaho 2006[15]). Results indicated that water injected into the aquifer had increased arsenic concentration upon recovery from the aquifer.

Given the elevated arsenics in the SHA and that there appears to be adequate groundwater of acceptable water quality from on-site wells, and the possibility of additional supply from Spring Valley or the City, the use of SHA for ASR for potable water applications should not be needed. However, SHA could be utilized for irrigation storage, refer to Section 10.4.

15 United Water Idaho, 2006, *ASR Testing at the Sandy Hill Aquifer*.

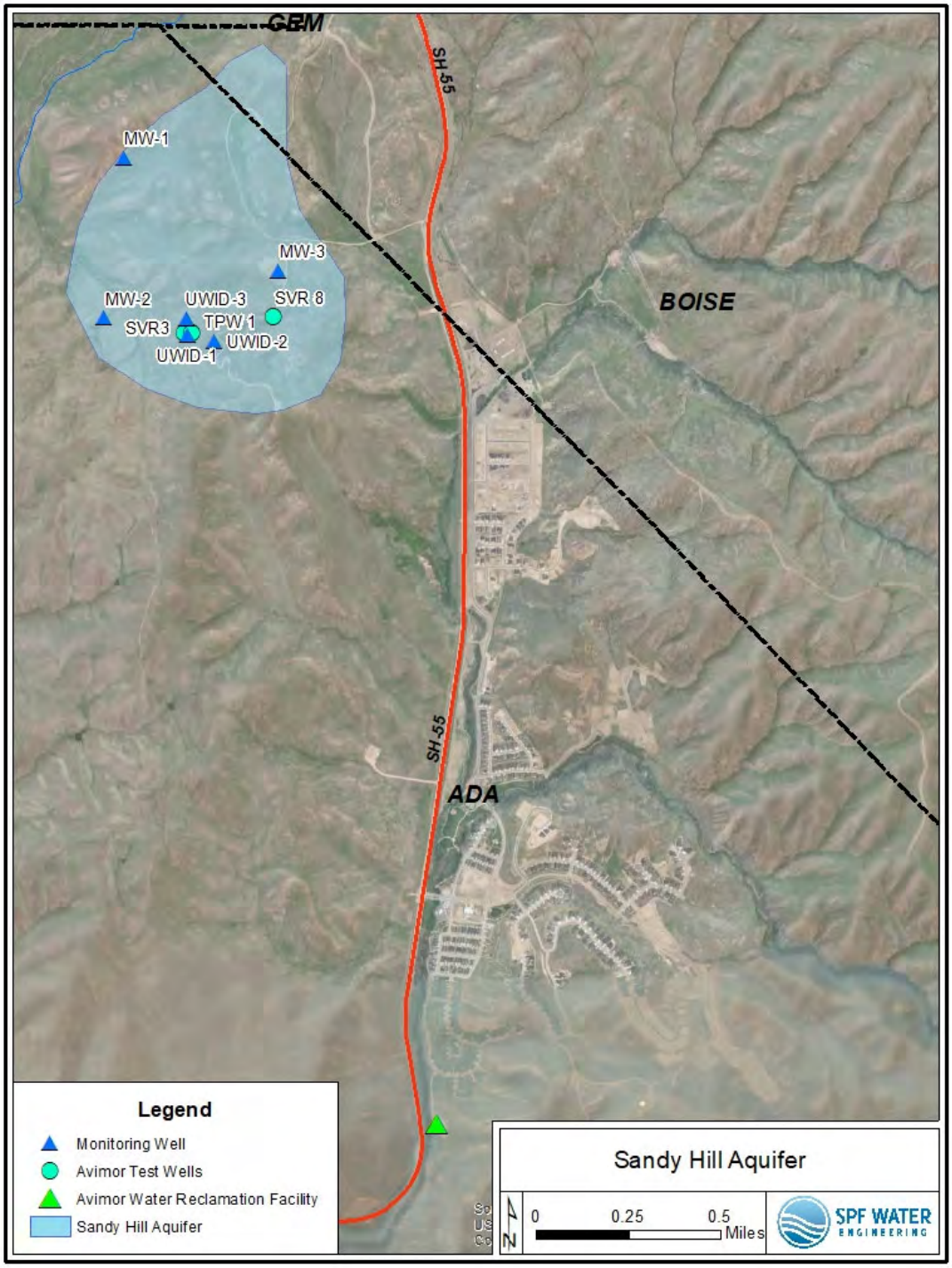

Figure 11. Sandy Hill Aquifer

6. WATER SYSTEM ADMINISTRATION

6.1. Water System Financing, Management, and Operations

Water system construction will be financed by the owners of Avimor. Once constructed, the water system will be owned, operated, and maintained by the municipality. The municipality will be granted easements for all water infrastructure, including transmission main, booster pump stations, wells and associated pumping facilities, storage tanks, and pressure reducing stations.

Licensed operators will operate the water system. Any required water treatment system will be operated by an operator with a water treatment license.

Avimor is currently in negotiations with the City for a Water Service Agreement. Under this agreement, the City will be the municipality that owns, operates, and maintains the stand-alone municipal water system after the water system construction is completed by Avimor. The agreement has provisions for the City to be reimbursed for contributed costs such as engineering and legal expenses, and for Avimor to be reimbursed for construction of facilities that benefit "late-comers," and cost-sharing for special facilities.

A Technical, Financial, and Managerial (TFM) capacity document will be prepared and submitted to IDEQ demonstrating that the water system will have adequate technical, financial and managerial capacity to construct, operate, and maintain the water system. Demonstration of capacity can be submitted concurrently or prior to the plans and specifications for the water system. The demonstration will follow the requirements listed in IDAPA 58.01.08.500 and be submitted on the IDEQ standard form. If the City ultimately owns, operates, and maintains the water system, the TFM document will be prepared in coordination with the City.

The TFM capacity document will demonstrate adequate technical capacity, including that the system will be designed and constructed in accordance the IRPDWS, there is an adequate source of drinking water supply, there are plans in place for an emergency response and source protection, there is a capital improvement plan, and that the water system is operated by trained and qualified personnel.

The TFM capacity document will demonstrate adequate financial capacity, including documentation that there are adequate financial and organizational arrangements to construct and operate the water system to meet the IRPDWS. It is anticipated that the TFM will include an estimate of construction and operation costs associated with the water system. The TFM will demonstrate the financial means by which Avimor will construct the water system and the City will operate and maintain the system. The City's billing and collection procedures, rate structure for billing, fiscal controls, and process for accruing a capital replacement fund will be identified. A preliminary operating budget will be developed for the project.

The TFM capacity document will demonstrate adequate managerial capacity, including the plan for transfer of water system ownership from Avimor to the City and the City's water system managerial structure including operators. Operator experience, qualifications, and training will be identified. The TFM will include the City's procedures and policies for water system management, communication between the water department and customers,

regulatory agencies, and contractors, and planning for growth and infrastructure maintenance and replacement.

7. PROJECT SCHEDULE AND BUDGETARY COST ESTIMATE

7.1. Project Schedule

The proposed water system is needed to serve Boise County phases 1 and 2 by the fall of 2022. The project schedule contemplates having the backbone infrastructure, including two wells and well houses, booster pump station, and one 500,000-gallon tank permitted and constructed to meet this schedule. Subsequent development phases and associated distribution and pressure reducing stations will be permitted and constructed per the Avimor Master Land Use Plan. PUMP 1 is the next development planned after the Boise County phases.

7.2. Budgetary Cost Estimate

A budgetary cost estimate has been prepared for the initial backbone infrastructure, including the transmission main, 2 wells and well houses, the pump station (BPS 1), and a 500,000-gallon storage tank. The total budgetary cost is estimated to be over $11 million dollars, as summarized in Table 31.

Table 31. Budgetary Cost Estimate

Item	Cost
Transmission Main, Valves	$5,250,000
Supply Wells (2)	$400,000
Well Houses, Complete (2)	$1,850,000
Pump Station	$1,200,000
Storage Tank, 500,000-gallons	$550,000
Contingency (20%)	$1,850,000
Total	$11,100,000

8. FUTURE WATER SYSTEM CONNECTIONS

8.1. Introduction

The Avimor municipal water system conceptual design presented in Section 5 includes up to four supply wells, transmission mains, three storage tanks, and three booster pump stations. The proposed water system is a stand-alone entity, without connection to any other municipal water providers. This stand-alone system is located entirely on Avimor property, or on property where Avimor as an access agreement. This stand-alone system is expected to meet all the requirements of the IRPDWS.

This section describes future potential water system connections, including (1) a connection to the Spring Valley municipal water system located to the west of Avimor; (2) two connections to the City municipal water system, to the west and south of Avimor; and (3) a connection to the Suez municipal water system.

At this time the assumption is that Avimor will be served by a stand-alone municipal water system, as presented in Section 5. This stand-alone system could be considered Phase 1 of a larger, regional water system in the foothills north of Eagle. This regional water system would be owned and operated by the City, providing service to Avimor, Spring Valley, and other future developments in the vicinity. Subsequent phases could be connections to Spring Valley and the City's Western and Eastern service areas. These phases would be constructed by other developers in coordination with the City, with the City ultimately owning and operating the water system. The timing of these phases will depend upon overall development in the area.

These future connections are not needed for the Avimor water system, but are presented herein to provide a complete overall picture of potential water system planning in the area. The options as presented are not intended to imply agreements or consent between parties. For any of these options to be advanced further would require significant additional coordination and approvals between the parties and regulatory agencies involved.

8.2. Alternative 1: Connection to Spring Valley Development

8.2.1. Introduction

The Spring Valley development, located west of Avimor, has already been annexed into the City. The City will own and operate the Spring Valley municipal water system once it is constructed. This development already has an approved Facility Plan (J-U-B Engineers 2013)[16] and a Preliminary Engineering Report[17] (Alliance Consulting 2021) has recently been prepared for the Spring Valley water system. This conceptual plan contemplates a connection

16 J-U-B Engineers, Inc., 2013, *Spring Valley Water Facility Plan.*

[17] Alliance Consulting, July 2021, *Preliminary Engineering Report, Spring Valley Water Distribution System*, Prepared for GWC Capital.

to the Spring Valley municipal water system, but it is not intended to serve as an update or notice of modifications to the Spring Valley Facility Plan and PER or imply consent from Spring Valley or the City.

Under this scenario, Spring Valley could utilize planned Avimor storage for peaking and fire protection. Avimor may utilize Spring Valley groundwater supply, particularly if blending is needed to meet primary drinking water standards. This alternative could also lead to a single connected municipal water system serving Spring Valley and Avimor, owned and operated by the City.

An overview map of Alternative 1 is provided as Figure 12.

8.2.2. Supply Wells

The Spring Valley municipal water system currently includes two municipal supply wells (refer to Figure 12). These wells were test pumped with yields exceeding 2,000 gpm. These wells are expected to meet the maximum day demand of Spring Valley PUMP #1, according to the PER. The Spring Valley PER contemplates at least one additional well to meet maximum day demand for the overall development.

The water quality from the existing wells meets primary drinking water standards. These wells are owned by the City and serve as points of diversion under water right permit 63-32573. This permit authorizes the diversion of 23.18 cfs (~10,400 gpm) and 6,535 acre-feet of groundwater from a total of 27 authorized points of diversion for municipal purposes on the Spring Valley property.

8.2.3. Water System Infrastructure

8.2.3.1. Storage

The Spring Valley PER includes a total of three 1-MG storage tanks, one of which (Tank 3) is located on Avimor property with an HGL of 3,200 feet. This tank would be used to serve by gravity the upper elevations of the Spring Valley property (elevation ranging from 2,960 to 3,090 feet). This pressure zone is approximately equal to pressure zone 6 (HGL of 3,200 feet) in Avimor Planning Areas 1 and 2. Spring Valley Tank 3 would also serve lower Spring Valley pressure zones through pressure reducing stations. The PER identifies a maximum day demand of 1,330 gpm and a peak hour demand of 2,375 gpm for the pressure zones associated with Tank 3.

The stand-alone Avimor water system conceptual design includes three storage tanks. Tanks 1 and 2 are designed to meet the peaking and fire flow demands of Avimor Planning Areas 1 and 2, and are located at an elevation of 3,810 feet. Tank 3 is designed to meet the peaking and fire flow demands of Avimor Planning Area 3, and is located at an elevation of 4,760 feet. The storage tanks are proposed to be bolted steel, coated per NSF standards, meeting the requirements of the IRPDWS and the AWWA.

The storage volume planned for Avimor Tanks 1 and 2 could be increased to accommodate peaking demands of Spring Valley. The equalization and operational storage associated with Spring Valley Tank 3 totals approximately 380,000 gallons. The fire flow volume planned for Tanks 1 and 2 may be adequate to serve Spring Valley, but this will be evaluated in future PUMPs.

It is also possible that Avimor pressure zones 6 and 7 could be served from an expanded Spring Valley Tank 3. This tank would need to be up-sized because the projected volume only accounts for Spring Valley demands. It is also possible that a second tank could be located at that elevation to serve Avimor demands.

8.2.3.2. Booster Pump Stations

Up to three booster pump stations are expected to be required for Spring Valley build-out, one of which (BPS 2) pumps to the proposed Spring Valley Tank 3 (HGL of 3,200 feet). The PER indicates a design flow of 735 gpm for BPS 2.

The stand-alone Avimor water system conceptual design includes a booster pump station (BPS 1, Figure 7) that will deliver water from the Western Well Field to Storage Tanks 1 and 2. The firm capacity of BPS 1 is expected to be 2,400 gpm, sized to pump the Avimor build-out maximum day demand.

Under Alternative 1, the Spring Valley BPS 2 could be up-sized to deliver more water to Avimor Tank 1 and 3, with reverse flow to cover peak demands of Spring Valley from these tanks. Avimor BPS 1 would be up-sized accordingly, and the design will accommodate expansion. Pump station sizing would be done in coordination with Spring Valley and the City, and identified in future PUMPs as appropriate.

Each booster pump station would be designed for forward and backward operation, allowing water delivery between Avimor and Spring Valley. Each booster pump station must meet the requirements of the IRPDWS, and will be equipped accordingly (refer to Section 5.6.5). Booster pump station instrumentation will be connected to the City SCADA system for monitoring and alarm notification. Each booster pump station will be equipped with emergency standby power such that average day demand can be met for eight (8) hours, given that storage is not expected to include standby storage.

The booster pump station buildings will be constructed to meet the IRPDWS. It is expected that the buildings will be constructed of CMU block with a metal roof. The buildings will be fenced to prevent unauthorized access. During the design phase, the City will be consulted on design standards for the buildings.

8.2.3.3. Transmission Main

The Spring Valley PER includes a 14-inch main mostly on Avimor property, between BPS 2 and the proposed Spring Valley Tank 3 (HGL of 3,200 feet). This main is currently sized to serve the Spring Valley pressure zones to be served from Tank 3. The PER identifies a maximum day demand of 1,330 gpm and a peak hour demand of 2,375 gpm for the pressure zones associated with Tank 3.

For Alternative 1, the Spring Valley transmission main on Avimor property would need to be up-sized to accommodate Spring Valley peak demands. The Avimor West Main described in Section 5.4 would connect to the Spring Valley transmission main on Avimor property, see Figure 12. The West Main would also need to be up-sized from the nominal 16-inch diameter contemplated for the stand-alone Avimor water system. The connected system would be designed to operate from Spring Valley to the Avimor tank(s) and vice versa, allowing water to be delivered back and forth between the two developments.

If the same design criteria (refer to Section 5.4.3) for sizing the West Main is used for sizing the Alternative 1 transmission main between Spring Valley and Avimor Tanks 1 and 3, then a 20-inch main would be adequate. The design criteria and resulting velocities for DR9 and DR11 HDPE are summarized in Table 32.

The diameter, material, and pressure class of the transmission main between Spring Valley and Avimor will ultimately be determined based on future peaking and fire flow demands associated with Avimor and Spring Valley, in coordination with the City.

Table 32. Transmission Main design criteria

Demand Criteria	Value (gpm)	Acceptable Velocity (mxdy,fps)	Calculated Main Diameter (in)	Design Main Diameter (in)	HDPE DIPS DR9 Velocity (fps)	HDPE DIPS DR11 Velocity (fps)
Total Maximum Day Demand	3,720	5	17.4	20	5.6	5.0
Peak Hour Demand (Planning Areas 1 and 2)	5,644	10	15.2	20	8.5	7.6
Maximum Day Demand and Fire Flow (Planning Areas 1 and 2)	5,773	10	15.4	20	8.6	7.8
HDPE DIPS DR9 ID (in)	16.512					
HDPE DIPS DR11 ID (in)	17.436					

Air valves will be installed along the transmission main at appropriate intervals to prevent the build-up of air. A detailed design analysis will be performed to determine the exact number and location of these air valves. Air valves will be installed in accordance with applicable municipal standards and the ISPWC.

Isolation valves will be installed at appropriate intervals for proper maintenance and repair. Valves are expected to be ductile iron resilient seated gate valves and double eccentric butterfly valves for larger diameter applications (greater than 12 inches). The exact locations of isolation valves will be identified at final design.

The transmission main will be installed, tested, and inspected in accordance with applicable municipal standards and the ISPWC.

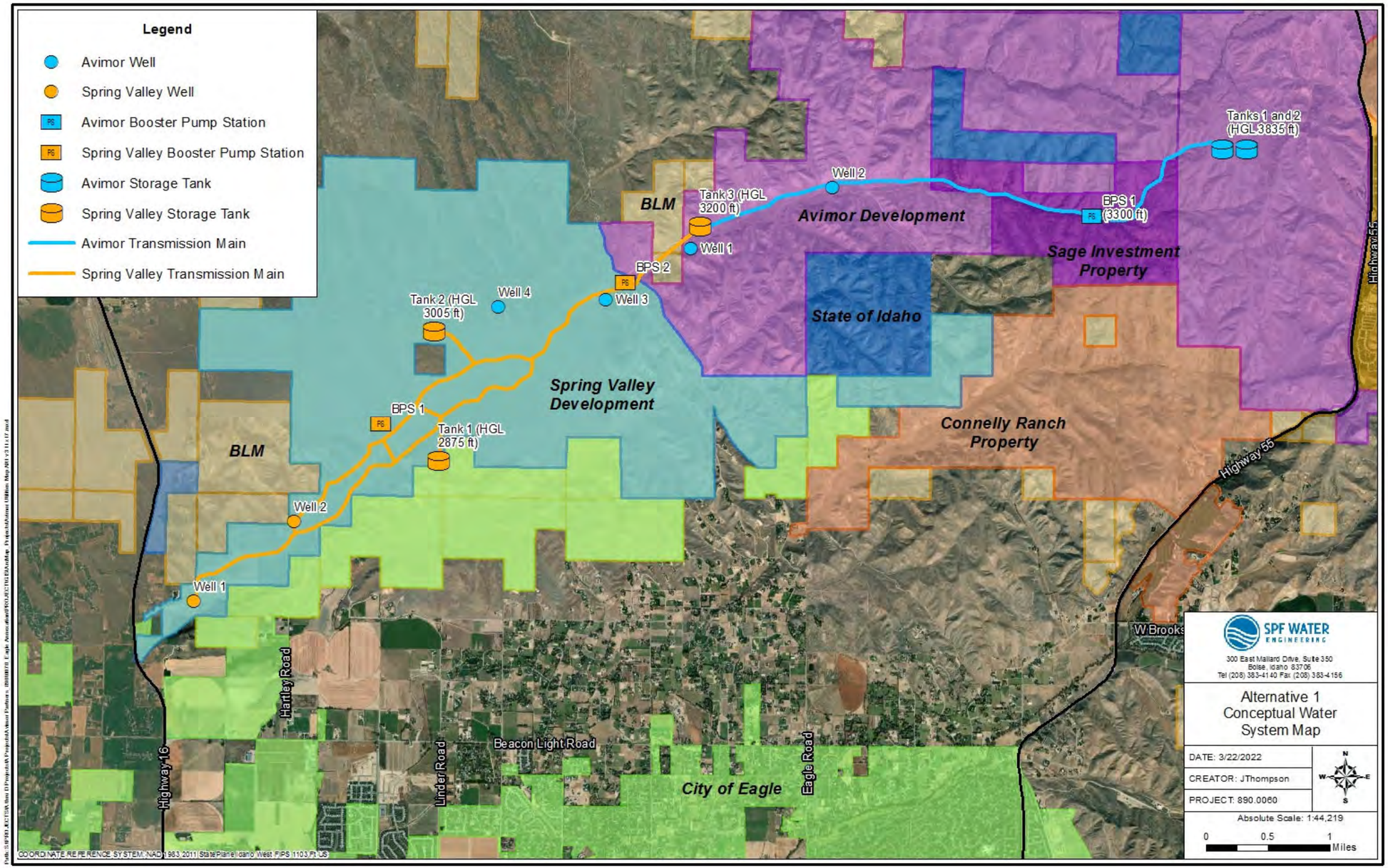

Figure 12. Alternative 1 conceptual water system map

8.3. Alternative 2: Connection to City of Eagle

8.3.1. Introduction

The City water system is currently divided into the Eastern Service Area and the Western Service Area. The two service areas are not inter-connected and are operated as separate water systems by the City.

Alternative 2 expands upon Alternative 1. Under Alternative 2, connections are made between the Avimor water system and the City Western Service Area (through Spring Valley) and the Eastern Service Area. Booster pump stations are expected be required to lift water from the City's service areas to Avimor Tanks 1 and 2. This scenario anticipates future groundwater supply in both the City's Western and Eastern Service Areas.

Alternative 2 contemplates a regional water system in the foothills north of Eagle, providing water to Avimor, Spring Valley, and other future developments in the vicinity. This regional water system would be owned and operated by the City. This alternative is also considered in the Spring Valley PER.

Alternative 2 would be considered to be an expansion of the City municipal water system, but this scenario is not intended to serve as an update or notice of modifications to any City planning documents nor is it meant to imply consent from the City.

An overview map of Alternative 2 is provided as Figure 13.

8.3.2. Supply Wells

The City currently has Well 1 (Lexington Well), Well 3 (Brookwood Well), Well 4 (Legacy Well), Well 5 (Eaglefield Well), and Well 6 (Palmer Well). Wells 1 and 3 are located in the Eastern Service Area while Wells 4, 5, and 6 are located in the Western Service Area. Well 2, located north of Well 1, is not currently used as a source of supply.

Alternative 2 would incorporate water supply from Avimor, Spring Valley, and the City into a single combined system. This scenario anticipates future supply wells in both the City's Western and Eastern Service Areas, along with existing Spring Valley wells and proposed Avimor wells. In particular, a new well is anticipated at the City's existing storage tank in the Eastern Service Area, with a yield of 2,000 gpm based on wells in the vicinity.

8.3.3. Water System Infrastructure

8.3.3.1. Transmission Main

A transmission main will connect the City Eastern and Western Service Areas. The conceptual transmission main alignment is shown in Figure 13. The water delivery system will be designed to operate from the City to the Avimor tank(s) and vice versa. When complete, the transmission main would allow water to be delivered back and forth between the City service areas.

The west alignment is essentially the same as described in Alternative 1 (Section 8.2), except that there is a direct connection to the City's Western Service Area. The system connection occurs at the 20-inch main that the City is planning to install along Hartley Road. The City also plans to construct a 1.5-MG storage tank at this location.

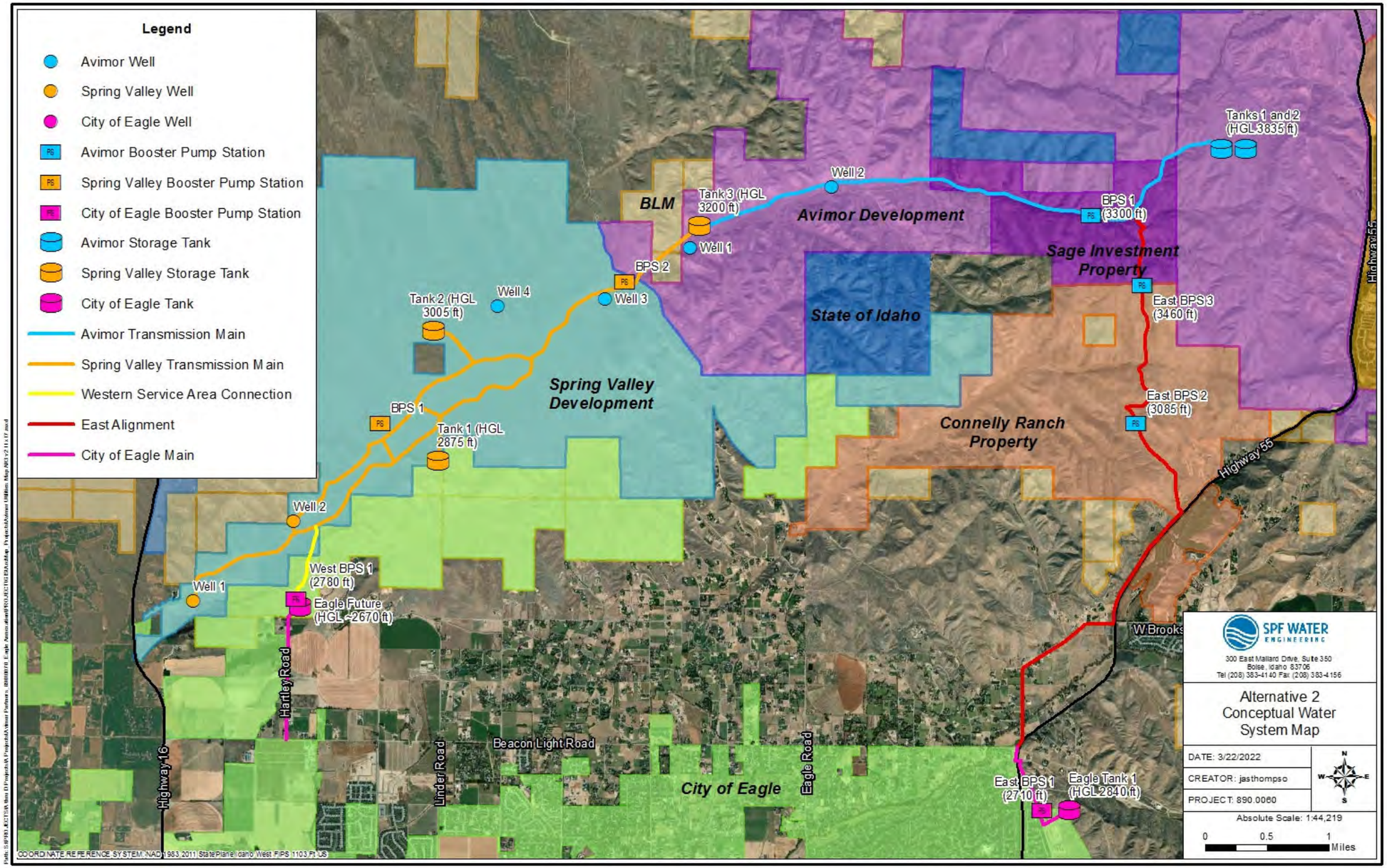

Figure 13. Alternative 2 conceptual water system map

The east alignment would connect to a 16-inch main that the City is installing along Old Horseshoe Bend Road during the summer/fall of 2021. This main will run from the existing 1-MG storage tank to Beacon Light Road, terminating on the west side of Highway 55. The east alignment will then follow N Brookside Lane, crossing Dry Creek. The alignment then follows Highway 55, before entering the private Connelly Ranch property and Sage Investment property. The proposed east alignment terminates near Avimor's BPS 1 (elevation of 3,300 feet). The east alignment has a maximum elevation of about 3,475 feet.

The west alignment would be as described in Alternative 1 (Section 8.2.3.3), with design (size, material, and pressure class) ultimately based on Spring Valley and City coordination and an analysis of overall future demands in the project vicinity. It is anticipated that the west alignment will be at least 20 inches in diameter.

The diameter of the east alignment is expected to be at least 16 inches, based on a design flow of 2,000 gpm (assumed new City well capacity). However, the east alignment could be up-sized in anticipation of additional supply for future development along the alignment.

The proposed main between BPS 1 and Tanks 1 and 2 will be sized to accommodate the design flows of both the west and east alignments.

The number of residences that could be served from 20-inch and 24-inch transmission mains can be estimated, as summarized in Table 33. Using a maximum velocity of 5 fps at maximum day demand, the number of residences varies from about 14,600 to 16,300 using 20-inch pipe (DR9 and DR11). The number of residences varies from about 20,800 to 23,200 using 24-inch pipe (DR9 and DR11). The estimate assumes a maximum day demand of 329 gpd per residence.

The number of residences were also estimated using a maximum velocity of 10 fps at peak hour demand and at maximum day demand plus fire flow (1,500 gpm). These criteria resulted in a higher number of residences, so the maximum day demand at 5 fps appears to be the limiting factor.

Air valves will be installed along the transmission main at appropriate intervals to prevent the build-up of air, with a future analysis performed to determine the exact number and location of air valves. Air valves will be installed in accordance with the City of Eagle Water Supplemental Standards for Public Works Construction (amended September 22, 2020), specifically Supplemental Standard Drawing SD-W7. Isolation valves will be installed at appropriate intervals for proper maintenance and repair. Valves are expected to be ductile iron resilient seated gate valves and double eccentric butterfly valves for larger diameter applications (greater than 12 inches). The exact locations of isolation valves will be identified at final design. The City Supplemental Standards do not specify a valve interval, but the City will be consulted during design to ensure that adequate valving is provided to meet their requirements. The exact locations of isolation valves will be identified at final design.

The transmission main will be installed and tested in accordance with the City Supplemental Standards. These standards describe acceptable backfill, cover, and bedding. These standards also outline pipe hydrostatic and compaction testing and disinfection requirements. City inspections during construction shall be per the Supplemental Standards.

Table 33. Number of residential units based on pipeline diameter

Nominal Main Diameter	Pressure Class (psi)	Inside Diameter (in)	Acceptable MDD (gpm)[1]	Maximum Number of Residences[2]	Acceptable PHD (gpm)[3]	Maximum Number of Residences[4]	Acceptable MDD w Fire Flow (gpm)[5]	Maximum Number of Residences[2]
20	250 (DR9)	16.512	3,335	**14,599**	6,671	17,105	5,171	22,633
20	200 (DR11)	17.436	3,719	**16,279**	7,438	19,073	5,938	25,992
24	250 (DR9)	19.722	4,758	**20,827**	9,517	24,402	8,017	35,089
24	200 (DR11)	20.829	5,308	**23,231**	10,615	27,218	9,115	39,896

1 - calculated assuming a max velocity of 5 fps

2 - calculated assuming a maximum day demand of 329 gpd per residence

3 - calculated assuming a max velocity of 10 fps

4 - calculated assuming a peak hour demand of 0.39 gpm per residence

5 - calculated assuming a fire flow of 1,500 gpm and max velocity of 10 fps

8.3.3.2. Storage

Under Alternative 2, the equalization storage in Avimor Tanks 1 and 2 could be increased in coordination with the City based on demand projections in the project vicinity. A third tank at this location may ultimately be needed to serve growth in the vicinity. An expansion of the Spring Valley Tank 3 or a second tank at this location could also be evaluated.

8.3.3.3. Booster Pump Stations

Booster pump stations will be required to deliver water between the two Eagle service areas and complete the transmission main loop. Booster pump stations will be designed to meet the IRPDWS and applicable City standards.

This alternative anticipates a total of five booster pump stations, refer to Figure 13. Two are anticipated along the west alignment, including one at the City's proposed tank on Hartley Road (elevation ~2,780 feet) and the other one considered to be an expansion of the Spring Valley BPS 2.

Two booster pump stations are also anticipated along the east alignment, including one at the City's existing tank on Old Horseshoe Bend Road (elevation ~2,710 feet) and one on the Connelly Ranch property (elevation ~3,000 feet). The fifth pump station is needed to deliver water from the two alignments up to Tanks 1 and 2. This pump station is at the same location as the BPS 1 described in Section 5.6 (elevation ~3,300 feet), and could be considered an expansion of that station as needed. The design of BPS 1 will accommodate potential expansion.

The IRPDWS require that booster pump stations that pump to storage must be capable of pumping the maximum day demand of the service area with any pump out of service (firm

capacity). Booster pump station capacity will ultimately be determined after consultation with the City, in anticipation of future demand and growth projections.

Each booster pump station must meet the requirements of the IRPDWS, and will be equipped accordingly (refer to Section 5.6.5). Booster pump station equipment, controls and communication, building, and site improvements would be coordinated with the City.

8.4. Connection to Suez

Suez currently serves Village 1. It is possible that Suez could serve Boise County phases of Avimor. However, Suez serving the remainder of the Avimor development is not considered viable for the following reasons: (1) limited Suez groundwater supply in the area, (2) the close proximity of Avimor to the City, and (3) Avimor's location within the City service area.

9. WASTEWATER TREATMENT

Wastewater from Avimor is currently treated at the Avimor Water Reclamation Facility (AWRF). The AWRF currently treats wastewater to Class B standards, using primary screening, conventional activated sludge with biological nutrient removal, chemical phosphorous reduction, and membrane solids separation (membrane bio-reactor), chlorination, and then rapid infiltration (RI) at five RI basins. The AWRF utilizes an aerated sludge tank for storage and treatment of biosolids.

Wastewater infiltration is utilized during the non-growing season. During the growing season, treated wastewater is used for common area irrigation within Village 1, including parks and landscaped roadway buffers. The current re-use irrigation system includes a non-potable water storage tank and the pressure irrigation system.

Avimor had a National Pollutant Discharge Elimination System (NPDES) permit (ID0028371) to discharge to Spring Valley Creek between October 1 and March 31. This NPDES permit has expired, so discharge to Spring Valley Creek will not occur until a new permit is issued. Avimor is currently in the process of re-applying for an NPDES permit.

The AWRF and the associated wastewater collection system and reuse system are owned and operated by the Avimor Water Reclamation Company LLC.

10. PRESSURIZED IRRIGATION SYSTEM SUPPLY

10.1. Introduction

Avimor is expected to develop a separate pressurized irrigation (PI) system to provide for the irrigation of residential lots, commercial areas, and common areas in Planning Areas 1, 2, and 3. There will be no cross connections between the municipal water system and the PI system. The Village 1 residential and commercial irrigation will continue to be supplied by Suez. Avimor's municipal water right permit 63-32061 requires that treated wastewater be used for the irrigation of common area within the permit place of use prior to using potable water. This

condition may not apply to small isolated areas where delivery of treated wastewater is not feasible.

The source of water for the PI system is expected to be a combination of re-use water from the Avimor Water Reclamation Facility (AWRF), groundwater from irrigation wells, and potentially surface water. The Village 1 common areas are currently irrigated from a separate non-potable irrigation system, supplied by re-use water, groundwater, surface water, and supplemented with potable water from the Suez municipal water system as needed. The existing PI system is expected to operate as an independent system from a new PI system serving future development.

10.2. Irrigation Demands

Projected irrigation demands by planning area are summarized in Section 2.2.4. The total average day demand at build-out is estimated to be about 3.26 MG per day (1,831 acre-feet per year) or 2,263 gpm over a 24-hour period. The total maximum day demand is estimated to be 6.51 MG per day (~4,500 gpm). These values do not include Boise County phases that will be irrigated from the municipal system.

10.3. Irrigation Water Rights

The irrigation water rights appurtenant to the Project are summarized in Table 34. Irrigation water right reports and maps are included in Appendix I. A map of the irrigation rights is provided as Figure 14.

Avimor owns a decreed water right (63-5386) from Spring Valley Creek, with a diversion rate of 1.86 cfs (833 gpm) for the irrigation of 93 acres. The 93 acres identified on the water right are all located within Village 1, but the water right does have a larger permissible place of use of 207 acres. IDWR needs to be notified of the 93 acres to be irrigated within the permissible place of use if they differ from the water right place of use. The water right does not include surface water storage. Two points of diversion are identified on Spring Valley Creek, in the SESESE of Section 7 T5N R2E and in the NENWNE of Section 18 T5N R2E. The flow in Spring Valley Creek typically significantly diminished in through the summer, so the creek is not a reliable supply for the full irrigation season. It is understood that this surface water is currently used for Village 1 common area irrigation.

First American Title Insurance Company Trust (for the benefit of Avimor) owns a decreed water right (63-5387) from Willow Creek, with a diversion rate of 1.0 cfs (448 gpm) for the irrigation of 36 acres. The water right does not include surface water storage. One point of diversion is identified on Willow Creek, in the NESE of Section 31 T6N R2E. This water right is understood to be in the Water Supply Bank through 2023. As with right 63-5386, this right is not considered to be available for a full irrigation season due to declines in Willow Creek flow.

First American Title Insurance Company Trust (for the benefit of Avimor) owns a decreed groundwater right (63-18974) with a diversion rate of 1.14 cfs (511 gpm) and an annual volume of 256.5 acre-feet for the irrigation of 57 acres. One point of diversion is identified in the NWNWNE of Section 7 T5N R2E. This point of diversion is an existing irrigation well on the property.

Table 34. Avimor irrigation water rights

Water Right No.	Source	Type	Use	Diversion Rate (cfs)	Points of Diversion
63-5386	Spring Valley Creek	Decreed	Irrigation, Stockwater	1.86 / 0.02	SESESE S7 T5N R2E
					NENWNE S18 T5N R2E
63-5387	Willow Creek	Decreed	Irrigation, Stockwater	1.00 / 0.01	NESE S31 T6N R2E
63-18974	Groundwater	Decreed	Irrigation	1.14	NWNWNE S7 T5N R2E
63-34946	Groundwater	Application	Irrigation / Fire Protection	4.06 / 0.96	SESW S1 T5N R1E
					SESE S1 T5N R1E
					NWSW S6 T5N R2E
					SWSW S6 T5N R2E

Avimor has also filed one water right application for irrigation and fire protection. Application 63-34946 requests the irrigation of 203 acres at a diversion rate of at 0.02 cfs per acre or a total of 4.06 cfs (1,819 gpm). Four points of diversion are identified on the application, in the SESW of Section 1 T5N R1E, SESE of Section 1 T5N R1E, NWSW (Lot 6) of Section 6 T5N R2E, and the SWSW (Lot 7) of Section 6 T5N R2E. These points of diversion are located near the Sandy Hill Aquifer, where aquifer storage and recovery may be utilized for irrigation (see Section 10.4.4). This application also includes 0.96 cfs (430 gpm) for fire protection. The place of use for the application includes the property along the Highway 55 corridor, including Sections 5, 6, 7, and 18 of T5N R2E and Section 31 of T6N R2E.

Any changes to Avimor's existing water rights and pending applications that would be needed to accommodate irrigation of future development would need to be accomplished through a water right transfer or application amendment. A new groundwater permit for irrigation is also an option. These actions are reviewed by IDWR and advertised to the public before approval.

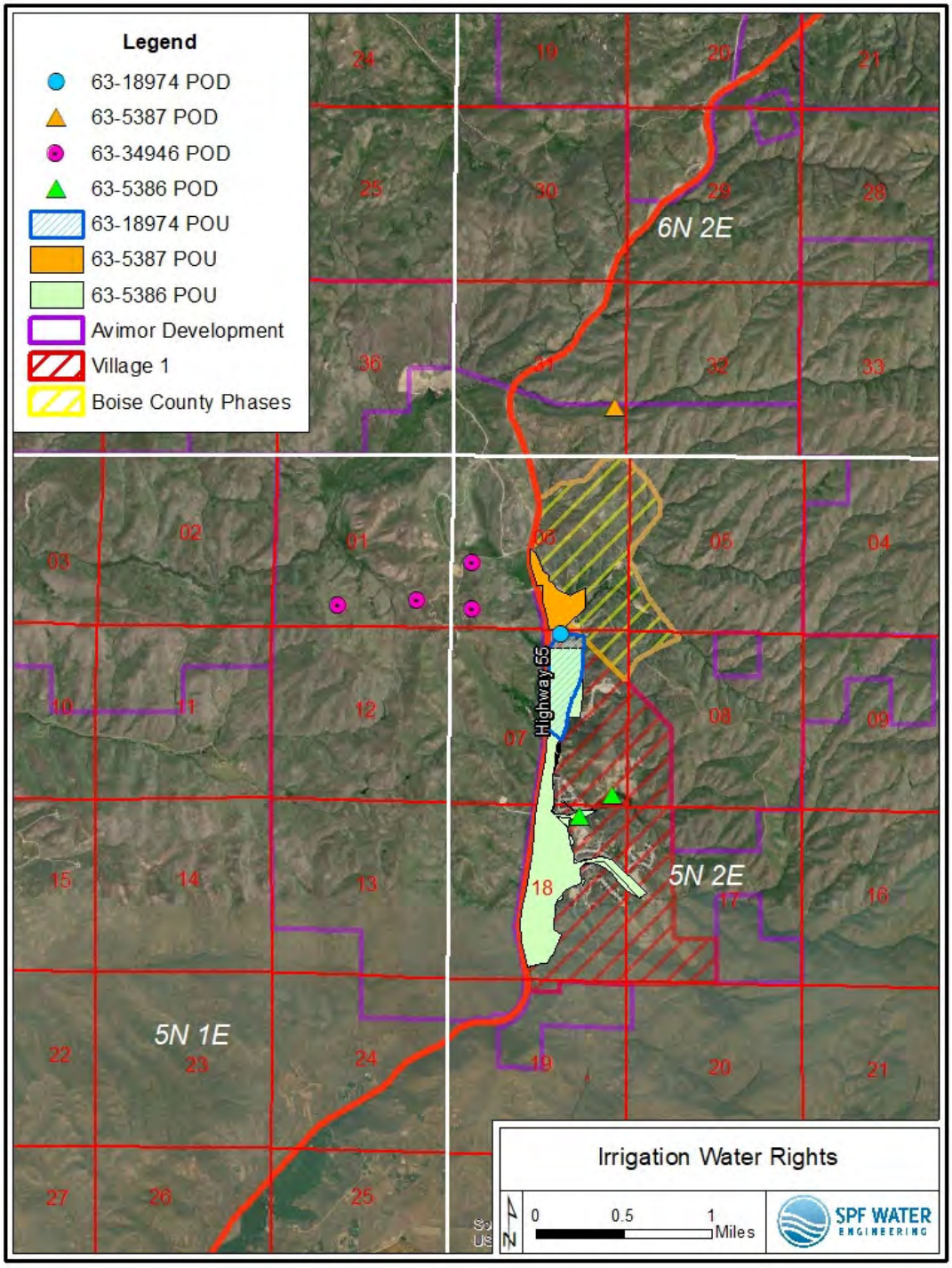

Figure 14. Irrigation water rights

10.4. Irrigation Supply

10.4.1. Introduction

The source of water for the proposed PI system is expected to be a combination of re-use water from the AWRF, groundwater from irrigation wells, and potentially surface water.

10.4.2. Avimor Water Reclamation Facility (AWRF)

The AWRF currently treats wastewater to Class B standards. The Re-use Permit M-211-03 for the AWRF allows for treated wastewater to be disposed of in rapid infiltration (RI) basins near the AWRF year-round and to be also used for common area irrigation within Village 1 during the growing season.

According to Idaho's Recycled Water Rules (IDAPA 58.01.17), water that is treated to Class B standards (as at the AWRF) may only be used for irrigation of open space areas during times of non-use by the public (i.e. night-time hours). As the majority of wastewater is generated during daytime hours, the reclaimed water requires storage during the day for subsequent use at night. This is provided by an above-ground storage tank. Therefore, reclaimed water from the AWRF can be pumped to storage for later use, pumped directly into the PI system, or disposed of in the RI basins.

10.4.3. Irrigation Wells

There is one existing irrigation well in Village 1; this well is the original one used to irrigate the ranch property. Diversion from this well is authorized under water right 63-18974. While the water right authorizes the diversion of 511 gpm and an annual volume of 256.5 acre-feet, the actual well capacity is much lower. The available flow rate from the irrigation well is approximately 65 gpm (SPF 2009). The current condition of the well is not known.

There is another test well SVR 4 located near the northern portion of Village 1. This well has a limited sustainable production rate of approximately 40 gpm. This well could conceivably be used for irrigation supply, probably in Village 1. This well would need to be identified as a point of diversion on a new water right permit or an amendment of an existing application.

The pending irrigation water right application allows for the diversion of about 1,800 gpm for the irrigation of 203 acres, from four points of diversion (see Figure 14). So additional wells could be drilled at these locations once the applications are approved by IDWR. The applications could also be amended to add other points of diversion or change the place of use.

10.4.4. Sandy Hill Aquifer

The Sandy Hill Aquifer (SHA) has been identified as a good candidate for ASR, given its high productivity but relatively low volume and recharge (see Section 5.9). The SHA is shown in Figure 11. However, the groundwater produced from the SHA has arsenic above the primary drinking water standard, and a limited ASR study indicated that water injected into the aquifer had a higher arsenic concentration when recovered from the aquifer. As such, treatment would be needed to use the water for potable purposes. The SHA is not preferred for potable ASR due to the high arsenic and availability of other groundwater sources with acceptable water quality. However, use of the SHA for irrigation ASR appears to be a viable option.

The water recharge to the SHA is relatively small and the aquifer is limited in areal extent, so the volume of water that the aquifer can sustainably support is limited. Well testing in the aquifer and observation of spring discharge indicates that the sustainable water supply from this aquifer is roughly 100 acre-feet per year (SPF 200918).

However, the SHA is highly productive such that high water withdrawal rates are possible (SPF, 2004a). Well testing indicates that maximum instantaneous withdrawal rates from the aquifer may be as high as 5,000 gpm. Due to aquifer characteristics, the SHA has substantial potential for ASR. Recharge using reclaimed water from the AWRF could occur during the low-demand winter months, with pumping from the aquifer occurring during the irrigation season. Essentially the SHA could serve as a very large subsurface water reservoir to meet peak irrigation demands.

There are a total of eight test and monitoring wells were completed near SHA (MW-1 was abandoned; refer to Section 5.9 and Figure 11). The TPW-1 well is a large 16-inch well and is constructed to potable water system standards. SVR 3, SVR 8, and MW-2 are 6-inch test/monitoring wells. MW-3 and UWID-1 are 2-inch monitoring wells. UWID-2 and UWID-3 are 5-inch monitoring wells.

10.4.5. Options

10.4.5.1. Overview

There are several options for PI system supply, as summarized below:

1. Option 1 would continue to treat wastewater to Class B standards, with discharge to the existing RI basins. Only common areas would be irrigated with re-use water and irrigation wells. Residential and commercial areas would be irrigated with municipal water.
2. Option 2 is the same as Option 1, but winter storage would be provided using a lined, above-ground storage basin.
3. Option 3 would be the same as Option 1, but the SHA would be used for rapid infiltration of Class B treated wastewater in addition to the existing RI basins.
4. Option 4 would upgrade the treatment at the AWRF to Class A standards, with rapid infiltration at the SHA. Recovered reclaimed water and irrigation wells would be used for the irrigation of residential and common areas. If IDEQ classifies Class B wastewater infiltrated and recovered from SHA as Class A (groundwater), then treatment would not have to be upgraded to Class A standards.
5. Option 5 is similar to Option 4, but would include surface water recharge at SHA. Recovered SHA water and irrigation wells would be used for the irrigation of residential and common areas.

18 SPF Water Engineering, August 24, 2009, *Avimor Development: Sources of Water Supply and Backbone Water Facilities Study*, Prepared for SunCor Idaho, Inc.

6. Option 6 would involve treatment to Class A standards for residential irrigation, but utilizing above-ground winter storage of treated wastewater. Under this option, SHA would be reserved for future potable storage.

10.4.5.2. Option 1

The existing re-use permit allows for the irrigation of 164.3 acres during the growing season, and allows for a maximum hydraulic loading of 0.19 MGD at the RI basins year-round.

The existing RI basins are not capable of significant winter storage for later recovery. In the past, treated wastewater from the AWRF was discharged during winter months to the adjacent Spring Valley Creek or lost to aquifer leakage beneath the rapid infiltration basins. Avimor had a National Pollutant Discharge Elimination System (NPDES) permit (ID0028371) to discharge to Spring Valley Creek between October 1 and March 31. This NPDES permit has expired, so discharge to Spring Valley Creek cannot occur until a new permit is issued. Avimor is currently in the process of re-applying for an NPDES permit.

If the RI basins cannot be used for winter storage, then the RI basins can be expected to only support short-term irrigation season use. The average day potable demand at Avimor build-out is estimated to be 1.43 MGD. If it is conservatively assumed that 70% of this water is available for irrigation, accounting for losses between consumption and waste and in recovery, then about 561 acre-feet would be available over the 183-day irrigation season. Based on the re-use permit, a maximum of 16.2 acres of common area irrigation is allowed in Village 1, which is estimated to require 27 acre-feet of irrigation. Therefore, the amount of re-use water available for irrigation in future development is estimated to be about 534 acre-feet. The total common area average irrigation demand at build-out is projected to be about 1.5 MGD, or 829 acre-feet per year (see Table 19). Therefore, there is expected to be a deficit of 295 acre-feet per year.

Option 1 is not considered a viable option for irrigation of future Avimor development phases due to the lack of winter storage resulting in a major irrigation deficit and the subsequent reliance on municipal water.

10.4.5.3. Option 2

Option 2 is essentially the same as Option 1, except winter storage is provided using a lined, above-ground storage basin. The volume required for the storage basin is estimated to be approximately 100 million gallons, which is a significant amount of storage. Assuming a basin 10 feet deep, about 30 acres of storage would be required. This amount of storage is significant and not considered economically feasible given the other options available.

10.4.5.4. Option 3

Under this option, wastewater treatment would continue to Class B standards and re-use water would only be used to irrigate common areas. Under this option, the SHA would serve as an additional rapid infiltration site for reclaimed water from the AWRF. Treated wastewater would be pumped to the SHA for infiltration and eventual recovery on a year-round basis. A preliminary assessment of the SHA suggests that it can provide winter storage for eventual recovery and re-use. The existing RI basins would also continue to be used, providing short-term storage for Village 1 common area irrigation.

If winter storage is provided, then the annual volume of treated wastewater available for irrigation is estimated to be 1,093 acre-feet, assuming 70% is available for irrigation and subtracting the Village 1 common area irrigation requirement. The total common area average irrigation demand at Avimor build-out is projected to be 829 acre-feet per year, so there appears to be adequate reclaimed water for the irrigation of future common areas. Under this scenario, SHA could be used to store the entire 1,093 acre-feet of reclaimed water, but reclaimed water may be also pumped directly into the PI system as an alternative to discharge and infiltration into the SHA. Aquifer testing suggests that the SHA has an available recharge capacity of 500 million gallons per year (1,534 acre-feet) (SPF 2009), so SHA should theoretically be able to accept 1,093 acre-feet of reclaimed water. If this volume of water is injected 24 hours per day, 365 days per year, then an average of 677 gpm would need to be infiltrated into SHA. This rate doubles to 1,355 gpm if infiltration is assumed to occur over a 12-hour period per day.

The quantity of water that can be pumped from the aquifer is estimated to range from 2,000 gpm to 5,000 gpm. The total average daily irrigation demand for common areas at project build-out is estimated to be 1,025 gpm, and the maximum day demand is estimated to be 1,505 gpm. Therefore, it appears that instantaneous withdrawals from SHA can support common area irrigation demands.

Option 3 appears to be feasible based on preliminary information. Additional studies would be needed to verify the SHA is an acceptable location for rapid infiltration, including the design hydraulic loading rate. Rapid infiltration and water recovery would also need to be tested at the SHA, so the amount of water that may be stored and subsequently recovered is better understood. If the SHA proves to provide less storage capacity or recovery than anticipated, then above-ground storage (tank or lined pond) might be required.

If the existing re-use permit does not authorize rapid infiltration at SHA, then a new re-use permit (or modification to an existing permit) would be required, with associated IDEQ approvals. Compliance with the Idaho Ground Water Quality Rule (IDAPA 58.01.11) would need to be demonstrated. If SHA is used for storage of re-use water, then it cannot be used in the future for potable supply.

Avimor's pending water right application 63-34946 requests a diversion rate of 4.06 cfs (1,819 gpm) for the irrigation of 203 acres from four wells located near the SHA. This diversion rate is adequate to cover the estimated common area maximum day demand of 1,505 gpm. The place of use identified on this application does not include the entire Avimor property. A place of use change could be accomplished using a future water right transfer. This action is reviewed by IDWR and advertised to the public before approval.

10.4.5.5. Option 4

Under this option, wastewater treatment would be upgraded to Class A standards, allowing for the irrigation of residential and common areas. The SHA would be used for rapid infiltration of treated wastewater, or injection wells might be used for reclaimed water ASR if permitted by IDEQ. Infiltration would occur year-round, with the SHA acting as winter storage. Reclaimed water wells and irrigation wells would be used for the irrigation of residential and common areas. The existing RI basins would also continue to be used, providing short-term storage for Village 1 common area irrigation.

It is possible that IDEQ could classify Class B wastewater infiltrated and recovered from SHA as Class A (groundwater), which could then be used for residential irrigation. If this occurs, then Option 4 could be implemented without the need to upgrade treatment at the AWRF to Class A standards. Additional discussion with IDEQ is needed to evaluate this possibility.

As described under Option 3, if winter storage is provided, then the annual volume of treated wastewater available for irrigation is estimated to be 1,093 acre-feet, which could be pumped to SHA year-round. The total average irrigation demand at Avimor build-out is projected to be 1,831 acre-feet per year (residential, commercial, and common area, excluding Boise County phases irrigation). Therefore, there is a deficit of 738 acre-feet. The natural recharge at the SHA is estimated to be 100 acre-feet per year (SPF 2009). If this recharge is accounted for, the remaining irrigation deficit is estimated to be 638 acre-feet.

The irrigation deficit of 638 acre-feet can be made up with groundwater using irrigation wells. This deficit could be addressed by completing one well that produces about 800 gpm, with continuous discharge to the SHA during the irrigation season. Alternatively, several wells with a combined yield of about 2,400 gpm could be constructed that would operate over a shorter time period (8 hours) during the irrigation season. Under this scenario, the wells may not pump to the SHA but rather connect to the PI system and supplement the SHA recovery wells to meet peak demands as needed. Available testing data from Well 1 and test wells completed in the Western Well Field suggests that the aquifer system can support well yields of 1,500 to 2,000 gpm.

The decreed groundwater right 63-18974 provides for an annual volume of 256.5 acre-feet for irrigation. The pending water right application requests irrigation of 203 acres. Assuming a volume of 4.5 acre-feet per acre, the volume associated with this application is 913.5 acre-feet. Therefore, the total volume for irrigation allowed under Avimor's water right and pending application may total 1,170 acre-feet.

Assuming a total groundwater irrigation requirement of 1,831 acre-feet, then there is a water right volume deficit of 661 acre-feet (1,831 acre-feet – 1,170 acre-feet). Re-use water used directly for irrigation is covered under the municipal permit 63-32061 (but is limited to the municipal place of use). In order to use Avimor's existing water right and applications, transfers would need to be filed with IDWR changing the place of use and adding points of diversion as appropriate. A new groundwater irrigation permit appears to be needed to cover the volume deficit of 661 acre-feet, assuming the municipal system is not used for irrigation.

The average day irrigation demand at project build-out is projected to be 2,263 gpm. The maximum day demand is expected to be 4,521 gpm. The quantity of water that can be pumped from the SHA is estimated to range from 2,000 gpm to 5,000 gpm. Therefore, it appears possible that instantaneous withdrawals from SHA can support irrigation demands. The groundwater right 63-18974 and application 63-34946 provide for a diversion rate of 5.2 cfs (2,334 gpm). Therefore, additional irrigation water rights (and wells) are needed to account for the maximum day deficit of 2,187 gpm (1,769 acre-feet). The maximum day deficit may be partially offset with storage to meet peak demands.

Option 4 appears to be feasible based on preliminary information, but as with Option 3, additional studies are needed to verify the capacity, recharge, and recovery from SHA. If the SHA proves to provide less storage capacity or recovery than anticipated, then above-ground storage (tank or lined pond) and/or irrigation wells may be required. The re-use and water

right permitting requirements outlined for Option 3 would apply to Option 4, with additional water right actions (new water right permit, water right transfer, application amendment, etc.) needed for new irrigation wells.

Option 4 is desirable because it significantly reduces the supply and pumping requirements for the potable system by maximizing the reclaimed water resource. It also provides a reliable supply of irrigation water during drought years. The benefit to cost ratio of Option 4 compared to Option 3 is better because a lot of the infrastructure required for Option 4 is also required for Option 3, but with the added benefit of significantly more irrigated area. If SHA is used for storage of re-use water, then it cannot be used in the future for potable supply.

10.4.5.6. Option 5

Option 5 is the same as Option 4, but surface water would be used for ASR at SHA to help offset the irrigation volume deficit of 638 acre-feet. Recovered SHA water and irrigation wells would be used for the irrigation of residential and common areas.

Water rights 63-5386 and 63-5387 allow for the diversion of 1.86 cfs (833 gpm) from Spring Valley Creek and 1.0 cfs (448 gpm) from Willow Creek. The volume associated with 63-5386 is 4.5 acre-feet per acre, or 418.5 acre-feet for 93 acres. There is not a volume limit listed for 63-5387, but for this report it is assumed to be 162 acre-feet for 36 acres (4.5 acre-feet per acre). The total surface water volume is 580.5 acre-feet.

The flow in Spring Valley Creek and Willow Creek typically significantly diminish through the summer, so the creeks are not a reliable supply for the full irrigation season. However, if it is assumed that the full diversion rate of 2.86 cfs were to be available for 90 days from March through May, then the total volume available would be 510 acre-feet of water that could be used to recharge the SHA. The water right volume is 580.5 acre-feet. The creek flows and wastewater flows would total 1,603 acre-feet, in-line with the estimated annual SHA recharge capacity of 1,534 acre-feet.

With creek flow, the irrigation volume deficit is reduced to 127 acre-feet, which could be supplied from one irrigation well operating at about 500 gpm for 8 hours per day during the irrigation season.

In order for Option 5 to be viable, a storage component would need to be added to the surface water rights through a transfer. Option 5 would reduce the amount of groundwater withdrawals required for irrigation, and the associated wells, pumps, and other infrastructure. However, pumps and pipelines would need to be installed between the surface water points of diversion and SHA. If this option is to be considered, long-term streamflow monitoring should be performed to better assess annual variability and potential recharge value of the resource. Spring Valley Creek is currently used to irrigate Village 1, so this option could also reduce the irrigation supply for Village 1.

10.4.5.7. Option 6

Under Option 6, wastewater treatment would be upgraded to Class A standards, allowing for the irrigation of residential and common areas. However, above-ground storage in the form of a lined pond or reservoir would be used for winter storage, instead of SHA. The SHA would be reserved for potable storage. Assuming non-irrigation season (182-day) storage of the annual 1,093 acre-feet generated from the AWRF, a total storage volume of about 545 acre-

feet would be needed. This would require over 54 acres of storage, 10-feet deep. Irrigation wells would be required to offset the irrigation deficit.

This option allows for SHA to be used in the future for potable storage as part of an ASR program. Potable water from Avimor wells or other municipal wells would be injected into the aquifer during low demand periods (Fall to Spring) and then recovered (pumped) from the aquifer during high demand periods (Spring to Fall). Available testing indicates that water recovered from SHA would require treatment for arsenic. If used for irrigation, the recovered water would not need to be treated.

At this time there appears to be adequate groundwater of acceptable water quality from on-site wells, and there is the possibility of additional supply from Spring Valley or the City. Therefore, the use of SHA for ASR for potable water applications should not be required. If conditions change based on additional investigations, then potable ASR with SHA may need to be further evaluated. If SHA is needed for potable storage, then residential irrigation may not be feasible using reclaimed wastewater given the significant amount of above-ground winter storage required.

10.4.5.8. Conclusions

Available information suggests that there is sufficient reclaimed water, groundwater, and potentially surface water to support a separate PI system for residential, commercial, and common area irrigation within Planning Areas 1, 2, and 3. The recommended irrigation supply option includes using the SHA for aquifer storage and recovery, irrigation wells for peaking, and surface water recharge at SHA. If IDEQ classifies Class B wastewater infiltrated and recovered from SHA as Class A (groundwater), then AWRF treatment would not have to be upgraded to Class A standards. The feasibility of this system will ultimately depend on additional testing of SHA, further evaluation of regulatory requirements, groundwater supply exploration, and a detailed cost analysis.

10.5. Irrigation Infrastructure

A separate PI system is proposed for residential, commercial, and common area irrigation. Infrastructure associated with this system is expected to include irrigation wells and pumps, booster pumps, transmission mains, pressure reducing stations, and distribution. Under Options 3 through 5, a transmission main is needed between the AWRF and SHA. If SHA is used for infiltration or injection and water recovery, then associated infrastructure is needed at that location. The existing test well TPW-1 could serve as an injection well or extraction well. Several recovery wells may be needed depending upon the reclaimed water demand. Additional above-ground storage (tank or lined pond) may be needed if the SHA cannot store all of the treated wastewater generated by the AWRF.

Additional detail on required infrastructure can be defined in future PUMPs once the irrigation supply options has been further vetted and the preferred option selected. It is anticipated that the PI system will be implemented in phases in conjunction with development.

APPENDIX A

Avimor Master Land Use Plan

AVIMOR
Master Land Use Plan

DRAFT
March 2022

Legend

- Avimor Annexation Boundary
- County Line
- Road - Highway 55
- State of Idaho Lands
- B.L.M. Lands

Land Use

- Potential Mixed Use/Commercial
- Potential Residential
- Potential Library
- Potential School
- Potential Fire/EMS Station

N

0 4000 8000 Feet

DISCLAIMER: Descriptions and Illustrations of Avimor are based upon current development concepts which are subject to change without notice. All renderings are artists' conceptions and are not intended to be exact duplications of homes, amenities, building images or landscaping.

Feb 22, 2022

APPENDIX B

Fire Flow Letter

EAGLE FIRE DEPARTMENT
1119 E. State St. • Suite 240
Eagle, Idaho 83616
208.939.6463

Community Risk Reduction Division

April 1, 2022

Jason Thompson, P.E.
Senior Project Manager
HDR/SPF
300 E. Mallard Dr. Suite 350
Boise, Idaho 83706

Reference: AVIMOR Development Water Master Plan

Dear Mr. Thompson,

This letter is in response to your e-mail regarding the proposed water system infrastructure. It is understood that the following components will be the backbone of the system.

Two wells, each producing 1,200 gpm. Both of the well pumps will have backup power.

The wells will pump to a booster pump station.

The booster pump station will have three 250-HP pumps each sized for 1,200 gpm. One pump will be a backup so Capacity is 2,400 gpm. The Booster Pump Station will have backup power.

The booster pump station will pump to a storage tank.

The storage tank will be 500,000 gallons with a reserve of 300,000 gallons for fire flow, which is equal to 2,500 gpm for 2 hours.

The storage tank will gravity feed into the development with numerous pressure zones.

Appendix B of the 2018 International Fire Code is the section of the fire code that is used for determining fire flow based on construction type and square footage of the fire flow calculation area. The fire flow calculation area is the area of all floor levels within the exterior walls, and under the horizontal projections of the roof of the building.

Appendix B also determines what the fire flow requirement will be. If approved fire sprinkler systems are installed in a building in accordance with Chapter 9 of the 2018 International Fire Code.

AVIMOR should be aware that building size will be limited by the above conditions set out in Appendix B of the 2018 International Fire Code.

Base on the information you have provided The Eagle Fire Department believes the system is appropriate for the development.

Please contact me if you have any questions.

Respectfully,

Scott Buck
Fire Marshal

APPENDIX C

Test Well Driller's Reports

788454

Form 238-7
11/97

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

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

1. WELL TAG NO. D 0025898 WELL #1
DRILLING PERMIT NO. 874391-788454
Other IDWR No. _____

2. OWNER:
Name Sun Cor Development
Address 80 East Rio Salado Pkwy. #410
City Tempe State AZ Zip 85281

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

N / W / E / S

Twp. 5 North XX or South ☐
Rge. 2 East XX or West ☐
Sec. 18, ____ 10 acres 1/4 N/E 1/4 N/W 160 acres 1/4
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site west side of hiway 55 in Spring Valley
City _____
(Give at least name of road + Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. Name _____

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

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

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

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
bentonite grout	0	98	7 sk	pumped

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	98	250	steel	XX	☐	☐	☐
8	+1	5	250	steel	☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

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

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

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
20 ft. below ground Artesian pressure _____ lb.
Depth flow encountered 20 ft. Describe access port or control devices: _____

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

Yield gal./min.	Drawdown	Pumping Level	Time

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

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8	0	5	topsoil		X
	5	40	sandstone, brown		X
	40	85	sandstone, gray	X	
	85	125	shale like hard gray		X
	125	140	very fine sand	X	
	140	205	shale like, hard gray		X
	205	240	sandstone & gray clay		X
	240	260	shale like, hard gray		X
	260	270	sandstone, gravel, some clay		X
	270	340	granite, gravel, sandstone, rhyolite	X	
	340	350	clay w/ some sand & gravel	X	
	350	400	decomposed granite	X	
	400	445	increasingly harder		

SCANNED
JAN 27 2003

RECEIVED
JAN 15 2003
WATER RESOURCES
WESTERN REGION

Completed Depth 445 (Measurable)
Date: Started 10/21/02 Completed 11/27/02

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

Company Name Stevens & Sons Firm No. 153
Firm Official Ron Stevens Date 12/20/02
and
Driller or Operator _____
(Sign once if Firm Official/Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
11/97

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

788455

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

0025899 WELL # 2

1. WELL TAG NO. D ~~874392-788455~~
DRILLING PERMIT NO. ____-____-____-_____-_____
Other IDWR No. _____

2. OWNER:
Name Sun Cor Development Co
Address 80 East Rio Salado Pkwy #410
City Tempe State AZ Zip 85281

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

N / W / E / S

Twp. 6 North XX or South ☐
Rge. 1 East XX or West ☐
Sec. 36, ____ 1/4 (10 acres) N/E 1/4 S/E 1/4 (160 acres)
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site west side of hiway 55 in Spring Valley
City _____
(Give at least name of road + Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. Name _____

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

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

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

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
bentonite grout	0	300	11 sk	pumped

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	300	250	steel	☐XX	☐	☐	☐
8	+1	5	250	steel	☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

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

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

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

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

Yield gal./min.	Drawdown	Pumping Level	Time

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

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8	0	6	topsoil		X
	6	20	brown clayw/ gravel		X
	20	29	granite sand		X
	29	35	sand, some water	X	
	35	60	sandy clay w/ gravel		X
	60	70	sandstone, some brown clay		X
	70	90	clay, less sand		X
	90	120	shale, green gray		X
	120	130	sandstone		X
	130	140	fine sand	X	
	140	150	sandy clay		X
	150	200	shale green-gray-blue		X
	200	210	sandstone		X
	210	240	clay, sandstone		X
	240	310	sandstone, some clay		X
	310	360	gray clay, some sand		X
	360	440	sandstone		X
	440	540	brown clay		X
	540	570	sandstone, some clay		X
	570	610	hard basalt		X
	610	640	sandstone		X
	640	660	cemented sand	X	
	660	670	gray clay		X
	670	760	sandstone		X
	760	840	decomposed granite		X

RECEIVED
JAN 15 2003
WATER RESOURCES
WESTERN REGION

Completed Depth 846' (Measurable)
Date: Started 11/5/02 Completed 11/27/02

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

Company Name Stevens & Sons Firm No. 153
Firm Official _____ Date 1/7/03
and
Driller or Operator _____ Date _____
(Sign once if Firm Official's Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
11/97

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Location Corrected by IDWR To:
T05N R01E Sec. 1 SESE
By: bragan 2013-05-24

1. WELL TAG NO. D 0029004 W ELL #3
DRILLING PERMIT NO. 874852-789296
Other IDWR No.

2. OWNER:
Name Sun Cor Deyelopment Co
Address 80 Rio Salado Pkwy #410
City Tempe State AZ Zip 85281

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

N / W / E / S

Twp. 5 North XX or South ☐
Rge. 1 East XX or West ☐
Sec. 1 . 1/4 S/W 1/4 S/E 1/4 (10 acres / 40 acres / 160 acres)
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site 3/4 mile west of hiway 55 City
(Give at least name of road + Distance to Road or Landmark)
Lt. Blk. Sub. Name Spring Valley Ranch area

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

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

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

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
bentonite grout	0	150	12 sk pumped	

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
8	+1	5	250	steel	XX	☐	XX	☐
6	+2	165	250	steel	☐	XX	XX	☐
6	175	195	250	steel	☐	XX	XX	☐
6"	215-230	.250	steel	liner welded				
6"	240-260	.250	"	"				

Length of Headpipe Length of Tailpipe

9. PERFORATIONS/SCREENS
Perforations Method
Screens Screen Type Johnson v-wire

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
165	175	40		6	stnls	☐	XX
195	215	30		6	stnls	☐	XX
230	240	35		6	stnls	☐	XX

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

11. WELL TESTS: 1/4 1/4 1/4 Lat: : : Long: : :
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

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

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8	0	9	topsoil		X
	9	220	sand (water at 185)		
	220	280	sand, some organic		X
	280	360	green clay, some sand		X
	360	400	siltstone, some clay		X
	400	540	gray-brown clay, some sand		X
	540	570	siltstone		X
	570	600	brown-gray shale		X
	600	640	siltstone		X
	640	690	shale		X
	690	700	siltstone		X
	700	810	shale, hard clay, brown-gray		X
	810	860	basalt, hard		X
	860	930	siltstone		X
	930	940	gray clay		X
	940	950	siltstone		X
	950	970	sticky gray clay		X

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WATER RESOURCES
WESTERN REGION

Completed Depth 240 (Measurable)
Date: Started 11/27/02 Completed 12/20/02

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

Company Name Stevens & Sons Firm No. 153
Firm Official Ron Stevens Date 1/6/03
and
Driller or Operator Date
(Sign once if Firm Official & Operator)

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790901

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

Form 238-7
3/95-C96

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. DRILLING PERMIT NO. - - - -
Other IDWR No. **D0029075**

2. OWNER:
Name **Suncore Development Co.**
Address **80 E. Rio Saledo Pkwy. Suite #10**
City **Tempe** State **AZ** Zip **85281**

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

N
W X E
S

Twp. **5** North **X** or South ☐
Rge. **2** East **X** or West ☐
Sec. **7** 1/4 (10 acres) **NW** 1/4 (40 acres) **SE** 1/4 (160 acres)
Gov't lot ____ County **Ada**
Lat: : : Long: : :
Address of Well Site **hwy 55 – Spring Valley Ranch**
City **Eagle**
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection **X** Other **Test**

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

6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Cement	**0**	**60**	**1.5 yds**	**Pumped**

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
10.75	0	60	375	Steel	X	☐	X	☐
8.625	+1	255	332	Steel	X	☐	X	☐
6.625	235	255	250	Steel	☐	X	X	☐
6.625	295	305	250	Steel		X	X	

Length of Headpipe **21'** Length of Tailpipe **10'**

9. PERFORATIONS/SCREENS
☐ Perforations Method ____
X Screens Screen Type **Johnson**

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
255	295	.030		6"	SS	☐	X
						☐	☐
						☐	☐

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

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

Yield gal/min.	Drawdown	Pumping Level	Time
75+ 100		305	3.5 hrs.

Water Temp. ____ Bottom hole temp. **64**
Water Quality test or comments: ____
Depth first Water Encountered **75'**

12. LITHOLOGIC LOG: (Describe repair or abandonment)

Bore Dia.	From	To	Remarks:Lithology, Water Quality & Temp.	Water Y	Water N
14	0	6	Top Soil		X
14	6	18	Blue Clay		X
14	18	62	Blue Shale		X
8	62	75	Sand Seam	X	
8	75	145	Fine Sand	X	
8	155	240	Gray Clay & Sand Stone		X
8	240	295	Coarse Sand Quartz	X	
8	295	920	Soft Gray & White Granite		X
8	920	1090	White & Brown Granite		X
6	1090	1140	Clear Granite	X	
6	1140	1220	Gray & White Granite	X	

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WATER RESOURCES
WESTERN REGION

Completed Depth: **305'** (Measurable)
Date: Started **02-04-03** Completed **03-05-03**

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

Firm Name **Hiddleston & Son, Inc.** Firm No. **35**
Firm Official Kevin D. Kael Date **4-8-03**
Supervisor or Operator John Smith Date **4/10/03**
(Sign once if Firm Official & Operator)

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 809802
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0030891
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Spring Valley Development LLC
Address 485 E. Riverside Dr
City Eagle State Id Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North ☒ or South ☐
Rge. 2 East ☒ or West ☐
Sec. 18, ____ 1/4 (10 acres) SW 1/4 (40 acres) SE 1/4 (160 acres)
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site ¼ mile east of Hwy 55
City Eagle
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

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

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	38	1050	over bore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 38'
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	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method
Screen Type & Method of Installation none

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

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WATER RESOURCES
WESTERN REGION

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

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

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

Yield gal./min.	Drawdown	Pumping Level	Time
85		140'	1 hour

Water Temp. 58° Bottom hole temp.
Water Quality test or comments: Iron .5 PH 7.5
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	10	brown soil & clay		
"	10	22	hard brown clay		
"	22	38	brown clay & granit pcs		
6	38	42	blue clay		
"	42	80	dark blue clay	X	
"	80	81	fractured clay	X	
"	81	98	blue clay		
"	98	102	fractured clay	X	
"	102	110	blue clay		
"	110	114	green hard clay		
"	114	121	dark blue clay		
"	121	142	black rock/Lava		
"	142	145	black & red rock	X	
"	145	170	green & multi-color material	X	
"	170	175	green & brown clay		
"	175	206	tan clay turning to ash		
"	206	218	dark gray rock		
"	218	260	greenish & multi colored ash		
"	260	280	white ash material		
"	280	290	cemented gravel		
"	290	330	tan, very hard clay rocks		
"	330	400	clayish decomp. granit		
"	400	420	Pea size conglomerate - all colors		
"	420	430	granit pcs		
"	430	440	granit pcs		
			Bridged off at 147'		

Total Depth 440' (Measurable)
Date: Started 1.20.04 Completed 1.22.04

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 Adamson Pump & Drilling Firm No. 457
Principal Driller Dave Adamson Date 1.29.04
and
Driller or Operator II Dave Adamson Date 1.29.04
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

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Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only	
Well ID No.	809803
Inspected by	
Twp	Rge Sec
1/4	1/4 1/4
Lat: : :	Long: : :

1. WELL TAG NO. D 0030892
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Spring Valley Development LLC
Address 485 E. Riverside Dr
City Eagle State Id Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North ☒ or South ☐
Rge. 1 East ☐ or West ☒
Sec. 13 , 1/4 (10 acres) SE 1/4 (40 acres) NW 1/4 (160 acres)
Gov't Lot County Ada
Lat: : : Long: : :
Address of Well Site 1 mile SW of Willow Creek Rd
Big Gulch (Give at least name of road + Distance to Road or Landmark) City Eagle
Lt. Blk: Sub. Name

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

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	105	3150 #	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 738'
Was drive shoe seal tested? ☐ Y ☒ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
8"	+2	738'	250	Steel	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method STAR PERF. 4 ROWS @ JOINT 90 PERFS
Screen Type & Method of Installation none PER ROW

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
560	580	1/4	360	8"	.250 WALL	☒	☐
580	600	1/4	360	8"	CASING	☒	☐
600	620	1/4	360	8"	〃	☒	☐
620-640		1/4	360	8"	〃	☒	

Filter Material	From	To	Weight / Volume	Placement Method
Continued on page 2				

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

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

Yield gal./min.	Drawdown	Pumping Level	Time
175			6 hours

Water Temp. 80° Bottom hole temp.
Water Quality test or comments: Iron .5 PH 7.5
Grams 2 Depth first Water Encounter 590'

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
12	0	10	sandy soil		
〃	10	96	tan clay		
〃	96	105	blue clay		
8	105	134	blue clay		
〃	134	140	tan clay		
〃	140	195	pea gravel & clay		
〃	195	360	Lt gray sand & clay		
〃	360	367	coarse sand & clay like pea gravel		
〃	367	505	Fine & coarse sand		
〃	505	540	larger pea gravel		
〃	540	590	pea gravel w/ large sand quartz		
〃	590	595	quartz sand	X	
〃	595	605	Finer tan sand		
〃	605	620	quartz sand	X	
〃	620	640	Finer sand	X	
〃	640	645	quartz sand	X	
〃	645	655	quartz sand & some pea gravel	X	
〃	655	660	gravel & quartz sand	X	
〃	660	670	big sand		
〃	670	680	big sand	X	
〃	680	685	big sand		
〃	685	690	big sand	X	
〃	690	730	big sand	X	
〃	730	740	big sand	X	
	Due to heaving sand - a mixture of sand & cement was placed from 730' to 740'				

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WATER RESOURCES WESTERN REGION

Completed Depth 730' (measurable)
Date: Started 01-26-04 Completed 02-27-04

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 Adamson Pump & Drilling Mach No. 457
Principal Driller Dave Adamson Date 3-15-04
and
Driller or Operator II Dave Adamson Date 3-15-04
Operator I Date
Principal Driller and Rig Operator *Required*.
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
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 0030892 pg 2
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Spring Valley Development LLC
Address 485 E. Riverside Dr
City Eagle State Id Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North X or South
Rge. 1 East or West X
Sec. 13, 1/4 (10 acres) SE 1/4 (40 acres) NW 1/4 (160 acres)
Gov't Lot County Ada
Lat: : : Long: : :
Address of Well Site 1 mile SW of Willow Creek Rd
Big Gulch (Give at least name of road – Distance to Road or Landmark) City Eagle
Lt. Blk. Sub. Name

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

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

6. DRILL METHOD:
X 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 STAR PERF. 4 ROWS @ JOINT 90 PERFS
Screen Type & Method of Installation PER ROW (360)

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
640	660	1/4	360	8"	.250 WALL	X	☐
660	680	1/4	360	8"	CASING	X	☐
680	700	1/4	360	8"	"	X	☐
700 - 720		1/4	360	8"	"	X	

Filter Material	From	To	Weight / Volume	Placement Method
720 - 730				

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

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 Adamson Pump & Drilling Firm No. 457
Principal Driller Dave Adamson Date 3-15-04
and
Driller or Operator II Dave Adamson Date 3-15-04
Operator I Date

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

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Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 871501
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0031062
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Spring Valley Development LLC
Address 485 E. Riverside Dr Suite # 300
City Eagle State Id Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North ☒ or South ☐
Rge. 1 East ☐ or West ☒
Sec. 23, ____ 1/4 (10 acres) NE 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site Big Gulch SW of Willow Creek Rd (Give at least name of road + Distance to Road or Landmark) City Eagle
Lt. ____ Blk. ____ Sub. Name

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

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
30% Grout	815	380	—	Pressure Grout
30% Grout	240	0	—	Pressure Grout

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
8"	+2	278	250	Steel	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method Perf. 8" Casing 10 FT
Screen Type & Method of Installation Shutter Screen 60 FT

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
280	340	1/8	Many	8"	Steel	☐	☐
340	350	1/8	60	8"	Steel	☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
5/16 Pea Gravel	380	242	—	Pour

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

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

Yield gal./min.	Drawdown	Pumping Level	Time
100 - 200			1 hour

Water Temp. 72° Bottom hole temp.
Water Quality test or comments: Iron .5 PH 7.5 Grains 5 Depth first Water Encounter

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
12	0	3	top soil & clay		
"	3	30	coarse sand		
"	30	55	brown clay		
"	55	60	sand		
"	60	70	brown clay		
"	70	120	soft & hard clay layers		
"	120	130	sand & clay		
"	130	135	coarse sand		
"	135	150	clay		
"	150	190	clay w/some sand layers		
"	190	200	sand		
"	200	210	clay w/sand		
"	210	280	coarse sand w/little clay		
"	280	290	coarse sand		
"	290	340	coarse sand		
"	340	350	bluish coarse sand w/some wood		
"	350	380	coarse blue sand		
"	380	440	coarse blue sand		
"	440	470	blue clay		
"	470	815	blue clay		

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WATER RESOURCES
WESTERN REGION

Completed Depth 350' (Measurable)
Date: Started 3/10/04 Completed 4.10.04

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 Adamson Pump & Drill Firm No. 457
Principal Driller Dave Adamson Date 4.15.04
and
Driller or Operator II Dave Adamson Date 4.15.04
Operator I ____ Date
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 82970
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 00 31220
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name SunCor Idaho, LLC
Address 485 E. Riverside Dr, Suite 300
City Eagle State Id Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North ☒ or South ☐
Rge. 2 East ☒ or West ☐
Sec. 6, ____ 1/4 (10 acres) SW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site ½ mile west of Hwy 55
City Eagle
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name Spring Valley Ranch

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

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

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

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0	20	800 #	overbore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 133'
Was drive shoe seal tested? ☐ Y ☒ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2	133	250	Steel	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 11' Length of Tailpipe
Packer ☒ Y ☐ N Type K. Packer

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
136	141	.040		5"	SS	☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

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

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

Yield gal./min.	Drawdown	Pumping Level	Time
100+			.5 hour

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments:
Depth first Water Encounter 80'

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
10	0	20	sand		
6	20	40	sand & clay pcs		
"	40	80	big sand		
"	80	141	big sand	X	

RECEIVED
APR 19 2004
WATER RESOURCES
WESTERN REGION

Completed Depth 141' (Measurable)
Date: Started 4.12.04 Completed 4.12.04

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 Adamson Pump & Drill Firm No. 457
Principal Driller Dave Adamson Date 4.14.04
and
Driller or Operator II Andy Paye Date 4.14.04
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Location Corrected by IDWR To:
T05N R01E Sec. 19 NESWNE
By: mciscell 2012-12-27

1. WELL TAG NO. D 0031492
DRILLING PERMIT NO. 815596
Water Right or Injection Well No. 386274

2. OWNER:
Name SUNCOR
Address 485 E Riverside Dr. #300
City Eagle State ID Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North XX or South ☐
Rge. 1 East XX or West ☐
Sec. 9, 1/4 (10 acres) S/W 1/4 (5 acres) N/E 1/4 (10 acres)
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site ½ mile SW of Willow Creek Rd
City Eagle
(Give st. hwst name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection XX Other test #9

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

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

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
bentonite grout	806	265	1250 gal	pumped
bentonite grout	215	0	300 gal	pumped

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
8"	+2	235	250	steel	XX	☐	XX	☐
6"	245	253	250	steel	XX	☐	XX	☐
					☐	☐	☐	☐

Length of Headpipe +2 Length of Tailpipe 0
Packer ☐ Y ☐ N Type ____

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
235	245	30		6"	stnls	XX	☐
253	263	30		6"	stnls	XX	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
#8-12 sand			3000#	

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
193'4 ft. below ground Artesian pressure ____ lb.
Depth flow encountered 198 ft. Describe access port or control devices: ____

12. WELL TESTS:
____ 1/4 ____ 1/4 ____ 1/4 Lat: : : Long: : :
XX Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
43	14'	207	4½hr

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

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8	0	10	topsoil, sandy clay		X
	10	27	sand, brown clay		X
	27	60	tan gray clay		X
	60	90	sandy brown clay w/ gray streaks		X
	90	104	gray clay		X
	104	110	sandy brown clay		X
	110	155	coarse sand w/ gray streaks		X
	155	198	coarse to medium sand w/ clay streaks	X	
	198	210	reddish sand	X	
	210	243	fine sand w/ clay streaks	X	
	243	265	sand w/ wood, clay streaks	X	
	265	430	silty gray blue clay		X
	430	530	sticky gray blue clay		X
	530	531	hard shale		X
	531	780	gray blue clay		X
	780	781	hard shale		X
	781	806	gray blue clay		X
			topped with chips 20 sks		

RECEIVED
JUN 29 2004
WATER RESOURCES
WESTERN REGION

Completed Depth 806 drilled, 263 cased (Measurable)
Date: Started 6/1/04 Completed 6/25/04

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 Stevens & Sons Firm No. 153
Principal Driller ____ Date 6/28/04
and
Driller or Operator II ____ Date ____
Operator I ____ Date ____
Principal Driller and the 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. 815597
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D D0031493
DRILLING PERMIT NO. 815597
Water Right or Injection Well No.

2. OWNER:
Name SUNCOR
Address 485 EAST RIVERSIDE DR SUITE 300
City EAGLE ID State ID Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 05 North ☒ or South ☐
Rge. 01 East ☒ or West ☐
Sec. 8, SW 1/4 (10 acres) SW 1/4 (40 acres) ____ 1/4 (160 acres)
Gov't Lot ____ County ADA
Lat: : : Long: : :
Address of Well Site 1/2 MILE NE OF WILLOW CREEK RD (Give at least name of road + Distance to Road or Landmark) City EAGLE
Lt. ____ Blk. ____ Sub. Name

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

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
30% B. GROUT	1	500	4000 LB	PRESSURE GROUTED
30% B. GROUT	1000	770	1470 LB	PRESSURE GROUTED

Was drive shoe used? ☒Y ☐N Shoe Depth(s)
Was drive shoe seal tested? ☐Y ☒N How?
GRAVEL 3/8 FROM 770 TO 666

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
8"	+2	600	.250	STEEL	☒	☐	☐	☐
6"	630	600	.269	STEEL	☐	☒	☒	☐
					☐	☐	☐	☐

Length of Headpipe 25 FT Length of Tailpipe 0
Packer ☒Y ☐N Type

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
640	630	.40	—	6"	STAINLESS	☐	☐
600	580	.30	—	6"	STAINLESS	☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
NONE				

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

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

Yield gal./min.	Drawdown	Pumping Level	Time
AIR 50 GPM	—	—	—

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

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
12	1	15	TOP SOIL & SAND		
	15	35	SANDY CLAY		
	35	360	COARSE SAND		
	360	380	COARSE SAND & CLAY		
	380	480	COARSE SAND & CLAY MIX		
	480	490	COARSE SAND & CLAY MIX		
	490	505	TAN CLAY		
	505	520	SAND & CLAY MIX		
	520	530	SAND		
	530	560	SAND & CLAY		
	560	590	MORE SAND LESS CLAY COARSE		
	590	620	CLAY TAN & WHITE		
	620	632	CLAY W/ SAND STREAKS		
	632	640	SHORT SAND STREAKS IN CLAY		
	640	660	TAN CLAY		
	660	670	TAN CLAY		
	670	680	SOFT WHITISH CLAY		
	680	687	WHITISH CLAY & BLUE CLAY-SAND		
	687	690	HARD CLAY BLUISH		
	690	715	BLUE CLAY - COARSE SAND		
	715	740	BLUE CLAY HARD & SOFT		
	740	760	BLUE CLAY		
	760	800	BLUE CLAY		
	800	825	BLUE CLAY SHORT SOFT SPOTS		
	825	835	BLUE CLAY		
	835	860	BLUE & WHITE CLAY		
	860	880	BLUE CLAY W/ COARSE SAND		
	880	920	SOFT BLUE CLAY		
	920	940	BLUE CLAY		
	940	980	BLUE CLAY		
	980	1005	BLUE CLAY		

RECEIVED
AUG 16 2004
WATER RESOURCES
WESTERN REGION

Completed Depth 770' (Measurable)
Date: Started 6-7-04 Completed 7-29-04

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 ADAMSON PUMP & DRILLING Firm No. 457
Principal Driller Dave Adamson Date 7-30-04
and
Driller or Operator II Dave Adamson Date 7-30-04
Operator I Date
Principal Driller and Rig Operator *Required*.
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Location Corrected by IDWR To:
T05N R01E Sec. 1 SESE
By: bragan 2013-05-24

1. WELL TAG NO. D 0030890
DRILLING PERMIT NO. ____
Water Right or Injection Well No. ____

2. OWNER:
Name Duncan Idaho LLC
Address 485 E Riverside Drive Suite 300
City Eagle State Id Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North X or South ☐
Rge. 1 East X or West ☐
Sec. 1, 1/4 (10 acres) SW 1/4 (40 acres) SE 1/4 (160 acres)
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site 1/2 mile West of Spring Valley Ranch (Give at least name of road + Distance to Road or Landmark) City Eagle
Lt. ____ Blk. ____ Sub. Name ____

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

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

6. DRILL METHOD:
☐ Air Rotary ☐ Cable ☐ Mud Rotary X Other reverse

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
5% Bentonite	0	220	18.75 yd	dry pour

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
10"	+2	238	.365	steel	X	☐	X	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method ____
Screen Type & Method of Installation Johnson SS wire wrap

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
238	290	.040		10"	SST	X	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
3/8 pea gravel	220	292	10.5 yd	dry pour

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

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

Yield gal./min.	Drawdown	Pumping Level	Time
2000 gpm	18'	196	72 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
24	0	2	Top Soil		
	2	38	Coarse Sand		
	38	52	med Sand		
	52	82	Coarse Sand w/some Clay mixed @ 72'-82'		
	82	134	fine to med Sand & Brn Clay		
	134	227	Coarse Sand		
	227	292	Gray Clay w/coarse Sand @ 227'-289'		

RECEIVED
MAY 21 2004
WATER RESOURCES
WESTERN REGION

Completed Depth 292' (Measurable)
Date: Started 3-25-04 Completed 3-30-04

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 Riverside Dinc Firm No. 333
Principal Driller ____ Date ____
and
Driller or Operator II ____ Date 4-20-04
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

605

844500

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 4146065
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0047608
DRILLING PERMIT NO. 897842-844500
Water Right or Injection Well No.

2. OWNER:
Name SunCor Idaho LLC
Address 485 E Riverside Dr ste 300
City EAgle State ID Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North ☒ or South ☐
Rge. 2 East ☒ or West ☐
Sec. 18, 10 acres 1/4 ~~40 acres~~ ~~1/4~~ ~~160 acres~~ ~~1/4~~
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site ½ mile east of Hwy 55
(Give at least name of road + Distance to Road or Landmark) City Boise
Lt. ____ Blk. ____ Sub. Name #RAP-8

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

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	19	11 sk	poured
bentonite grout	90	110	4½ sk	pumped

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
10"	+1	19	250	steel	☒	☐	☐	☐
6"	+1	44	SDR 15	PVC	☐	☒	☐	☒
6"	84	124	SDR 15	PVC	☐	☒	☐	☒

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

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
44	84	20		6	PVC	☐	☒
124	134	20		6	PVC	☐	☒

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
8-12 sand	34	90	20 cu'	poured
8-12 sand	110	145	11 cu'	poured

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
98' 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
3.5	22'	120'	2 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
16	0	3	brown sandy clay		X
	3	20	coarse white sand		X
10	20	25	fine to coarse sand, cemented		X
	25	30	fine brown sand, cemented		X
	30	40	brown silt & clay		X
	40	60	medium to coarse tan sand		X
	60	75	fine tan sand, cemented		X
	75	100	brown siltstone, cemented		X
	100	122	brown silt & clay		X
	122	135	fine to medium tan sand, cemented	X	
	135	152	silty clay, tan-brown		X
	152	186	siltstone, silt clay, darkbrown		X
	186	220	clay, siltstone, tan to brown		X
	+1	34	bentonite chips 11 sk poured		
	145	200	bentonite chips 15 sk poured		

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APR 0 5 2007
WATER RESOURCES
WESTERN REGION

Completed Depth 134' (Measurable)
Date: Started 2/8/07 Completed 3/15/07

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 Stevens & Sons Firm No. 153
Principal Driller Ron Stevens Date 3/20/07
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

63

896228-841797

Form 238-7
6/07
Pg 1 of 3

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT
AMENDED

1. WELL TAG NO. D 0047215

Drilling Permit No. 896228-841797

Water right or injection well # 63-32573

2. OWNER

Name M3 Eagle, LLC Test Well #1

Address 533 E. Riverside Drive, Suite, 110

City Eagle State ID Zip 83616

3. WELL LOCATION:

Twp. 5 North ☒ or South ☐ Rge. 1 East ☐ or West ☒

Sec. 28 SW (10 acres) 1/4 SE (40 acres) 1/4 SE (160 acres) 1/4

Gov't Lot ____ County Ada

Lat. 43 ° 44'12.39" (Deg. and Decimal minutes)

Long. 116 ° 27'26.86" (Deg. and Decimal minutes)

Address of Well Site Big Gulch Rd., Approx. 2000 ft. NE of State Highway 16 City Eagle

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

Lot. ____ Blk. ____ Sub. Name ____

4. USE:

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

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

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

6. DRILL METHOD:

☐ Air Rotary ☒ Mud Rotary ☐ Cable ☐ Other Direct Mud Rotary

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
30% Grout	800'	580'	2.0 Yds.	Pumped
30% Grout	428'	444'	0.2 Yds.	Pumped

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
8"	+1'	13'	.250	Steel	☒	☐	☐	☒
2"	+3'	514	Sch80	PVC	☒	☐	☒	☐
2"	+3'	467	Sch80	PVC	☒	☐	☒	☐

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

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method ____

Manufactured screen ☒ Y ☐ N Type Sch 80 PVC Slotted

Method of installation Lowered & Tagged into place

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
514'	556'	.020	Zone1	2"	PVC	Sch80
467'	507'	.020	Zone2	2"	PVC	Sch80
395'	425'	.020	Zone3	2"	PVC	Sch80

Length of Headpipe 0 Length of Tailpipe 0

Packer ☐ Y ☒ N Type N/A

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method
#8-#16 Sand	444'	580'	1.6 Yds	Poured
#8-#16 Sand	305'	428'	0.9 Yds	Poured

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) See Table on Pg3

Describe control device ____

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 91' bgl Statis water level (ft) 91

Water temp. (°F) See Table Bottom hole temp. (°F) 74.97° F

Describe access port 5 - 2" Tube Wells inside a locked well head

Well test: Test method:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
NO	PUMP TEST	OTHER	☒	☒	☒	☐
THAN	AIR	LIFTING				
AND	PUMP	SAMPLES				

Water Quality test or comments: See Table Pg. 2

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
15	0	1	Top Soil		X
15	1	3	Caliche		X
15	3	9	Brown Clay		X
8	9	13	Brown Clay		X
8	13	21	Brown Sand		X
8	21	24	Tan Clay		X
8	24	26	Brown Coarse Sand		X
8	26	108	Med. Sands&Tacky Tan -Brwn Clays	X	
8	108	111	Med. Slightly Cemented Sand	X	
8	111	138	Med Sands & Tacky Tan -Brown Clays	X	
8	138	269	Tacky Brown to Dk Greenish Gray Clay	X	
8	269	288	Bluish-Gray Clay Lenses	X	
8	288	355	Sandy Tacky Greenish- Bluish-Gray Clays	X	
8	355	363	Medium Brown Sand	X	
8	363	366	Sandy Tan Clay	X	
8	366	382	Fine Tan Sand w/ Minor Tan Clay Lenses	X	
8	382	388	Sandy Greenish-Gray Clay	X	
8	388	393	Fine Tan Sand	X	
8	393	398	Sticky Greenish-Gray Clay	X	
8	398	403	Medium - Fine Brown Sand	X	
8	403	406	Tacky Tan Clay	X	
8	406	410	Medium - Fine Brown Sand	X	
8	410	417	Sandy Tacky Tan Clay	X	
8	417	426	Medium - Coarse Tan Sand	X	
8	426	435	Tan Med Sand & Tacky Tan Clay	X	
8	435	442	Medium Tan Sand	X	
8	442	447	Sandy Tan Clay	X	
8	447	449	Fine - Medium Tan Sand	X	
8	449	453	Sandy Tan Clay	X	
8	453	471	Fine - Medium Tan Sand	X	
8	471	481	Coarse Tan Sand	X	
8	481	484	Sandy Tan Clay	X	

RECEIVED
MAY 22 2008
WATER RESOURCES
WESTERN REGION

Completed Depth (Measurable) 800'

Date: Started 9/5/2006 Completed 9/15/2006

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 Treasure Valley Drilling Co. No. 560

*Principal Driller ____ Date 9/18/2006

*Driller ____ Date 9/18/2006

*Operator II ____ Date ____

Operator I ____ Date ____

* Signature of Principal Driller and rig operator are required.

Form 238-7
6/07
Pg 2 of 3

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0047215 Pg2
Drilling Permit No. 896228-841797
Water right or injection well # 63-32573

2. OWNER
Name M3 Eagle, LLC Test Well #1
Address 533 E. Riverside Drive, Suite 110
City Eagle State ID Zip 83616

3. WELL LOCATION:
Twp. 5 North ☒ or South ☐ Rge. 1 East ☐ or West ☒
Sec. 28 SW (10 acres) 1/4 SE (40 acres) 1/4 SE (160 acres) 1/4
Gov't Lot ____ County Ada
Lat. 43 ° 44'12.39" (Deg. and Decimal minutes)
Long. 116 ° 27'26.86" (Deg. and Decimal minutes)
Address of Well Site Big Gulch Rd., Approx. 2000 ft. NE of State Highway 16 City Eagle
(Give at least name of road + Distance to Road or Landmark)
Lot. ____ Blk. ____ Sub. Name ____

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

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

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

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
30% Grout	144'	305'	1.0 Yds.	Pumped Bentonite
30% Grout	0	67'	0.4 Yds.	Pumped Bentonite

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
2"	+3'	395	Sch80	PVC	☒	☐	☒	☐
2"	+3'	353	Sch80	PVC	☒	☐	☒	☐
2"	+3'	97	Sch80	PVC	☒	☐	☒	☐

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

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method ____
Manufactured screen ☒ Y ☐ N Type Sch 80 PVC Slotted
Method of installation Lowered & Tagged into place

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
353'	383'	.020	Zone4	2"	PVC	Sch 80
97'	137'	.020	Zone5	2"	PVC	Sch 80

Length of Headpipe 0 Length of Tailpipe 0
Packer ☐ Y ☒ N Type N/A

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method
#8-#16 Sand	67'	144'	0.4 Yds	Poured

11. FLOWING ARTESIAN:
Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) See Table on Pg3
Describe control device ____

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft) 91 bgl Statis water level (ft) 91
Water temp. (°F) See Table Bottom hole temp. (°F) 74.97°F
Describe access port 5 - 2" Tube Wells inside a locked well head

Well test: Test method:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
NO	PUMP TEST	OTHER	☒	☒	☒	☐
THAN	AIR	LIFTING				
AND	PUMP	SAMPLES				

Water Quality test or comments: See Table Pg. 2

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
8	484	489	Coarse Tan Sand	X	
8	489	496	Med. Tan Sand w/ Minor Clay Lenses	X	
8	496	541	Fine - Medium Greenish-Gray Sand w/ Minor Clay Lenses	X	
8	541	543	Sandy Greenish-Gray Sticky Clay	X	
8	543	561	Lt. Gray Medium Sand	X	
8	561	564	Sandy Greenish-Gray Clay	X	
8	564	578	Gray Medium Sand	X	
8	578	599	Sandy Very Dark Gray Sticky Clay	X	
8	599	702	Very Dark Gray Sticky Clay	X	
8	702	709	Clayey Greenish-Gray Fine Sand	X	
8	709	717	Fine Greenish-Gray Sand	X	
8	717	724	Sandy Greenish-Gray Clay	X	
8	724	739	Med. Greenish-Gray sand with One Minor Clay Lens	X	
8	739	800	Fine Sandy Greenish-Gray Sticky Clay	X	
			ARTESIAN PRESSURES:		
Z-1	352'	152	psi		
Z-2	352'	152	psi		
Z-3	209'	91	psi		
Z-4	209'	91	psi		
Z-5	0	0	Water Table Unconfined		
			CHEMISTRY:		
Z-1	ph	7.2	D.O. = 1.7 Cond. = 305µS		
Z-2	ph	7.2	D.O. = 2.6 Cond. = 295µS		
Z-3	ph	7.3	D.O. = 4.9 Cond. = 274µS		
Z-4	ph	7.1	D.O. = 2.6 Cond. = 258µS		
Z-5	ph	6.7	D.O. = 9.5 Cond. = 265µS		

Completed Depth (Measurable) 800'
Date: Started 9/5/2006 Completed 9/15/2006

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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 Treasure Valley Drilling Co. No. 560
*Principal Driller ____ Date 9/18/2006
*Driller ____ Date 9/18/2006
*Operator II ____ Date ____
Operator I ____ Date ____
* Signature of Principal Driller and rig operator are required.

Form 238-7
6/07
Pg 3 of 3

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0047215 Pg 3
Drilling Permit No. 896228-841797
Water right or injection well # 63-32573

2. OWNER
Name M3 Eagle, LLC Test Well #1
Address 533 E. Riverside Drive, Suite 110
City Eagle State ID Zip 83616

3. WELL LOCATION:
Twp. 5 North ☒ or South ☐ Rge. 1 East ☐ or West ☒
Sec. 28 SW (10 acres) 1/4 SE (40 acres) 1/4 SE (160 acres) 1/4
Gov't Lot ____ County Ada
Lat. 43 ° 44'12.39" (Deg. and Decimal minutes)
Long. 116 ° 27'26.86" (Deg. and Decimal minutes)
Address of Well Site Big Gulch Rd., Approx. 2000 ft. NE of State Highway 16 City Eagle
(Give at least name of road + Distance to Road or Landmark)
Lot ____ Blk. ____ Sub. Name ____

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

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

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

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
3/4" Bentonite Chips	0	13'	10 Bags	Poured

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☐ N Method ____
Manufactured screen ☐ Y ☐ N Type ____
Method of installation ____

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

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

10. FILTER PACK:

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

11. FLOWING ARTESIAN:
Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) See Table on Pg3
Describe control device ____

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft) 91 bgl Statis water level (ft) 91
Water temp. (°F) See Table Bottom hole temp. (°F) 74.97 °F
Describe access port 5 - 2" Tube Wells insided locked well head

Well test: **Test method:**

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
NO	PUMP TEST	OTHER	☒	☒	☒	☐
THAN	AIR	LIFTING				
AND	PUMP	SAMPLES				

Water Quality test or comments: See Table

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
			WELL DEVELOPMENT:		
			Cable Tool Swabbed and Air-Lifted		
			Until Clear		
8	800	580	All Grouts are >30% Solids CETCO		
8	444	428	Bentonite by weight pumped under		
8	305	144	pressure from bottom up		
8	67	0			
			GRADED FILTER SAND PLACEMENTS		
Z-1	580	444			
Z-2	580	494	All Sand Filters "Bird Seed" #8-#16		
Z-3	428	305	Graded Sand poured from surface &		
Z-4	428	305	tagged into place		
Z-5	144	67			
			WATER LEVEL & TEMPERATURE		
Z-1	556	514	SWL = 92.13 , 67.1 F		
Z-2	507	467	SWL = 92.17 , 66.0 F		
Z-3	425	395	SWL = 94.86 , 64.7 F		
Z-4	383	353	SWL = 95.47 , 63.8 F		
Z-5	137	97	SWL = 93.03 , 57.4 F		
			Well Design By:		
			Hydro Logic, Inc.		

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Completed Depth (Measurable) 800'
Date: Started 9/5/2006 Completed 9/15/2006

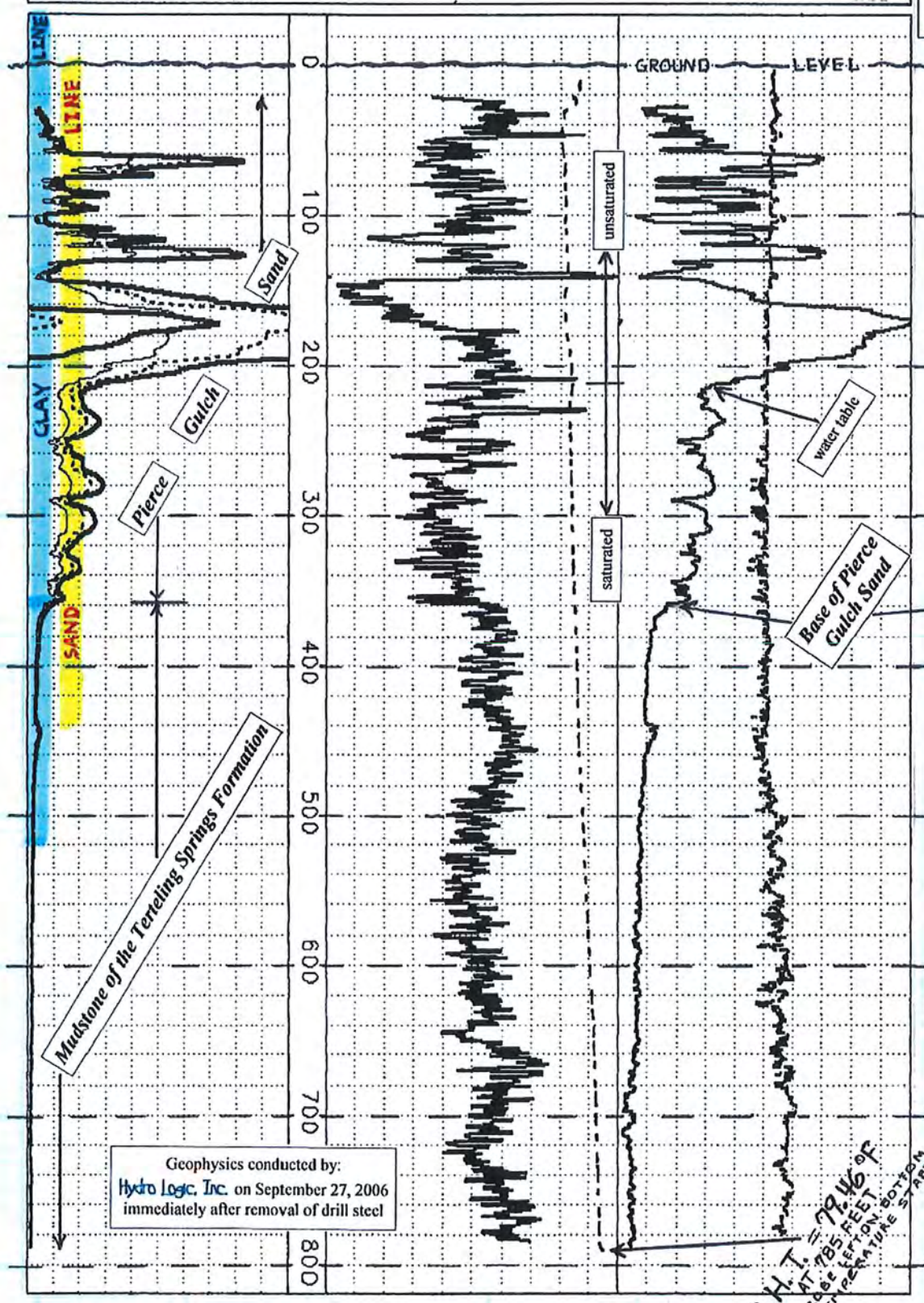
14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name Treasure Valley Drilling Co. No. 560
*Principal Driller ____ Date 9/18/2006
*Driller ____ Date 9/18/2006
*Operator II ____ Date ____
Operator I ____ Date ____
* Signature of Principal Driller and rig operator are required.

M3 Eagle - Test Well #2

T. 5 N., R. 1 W., Section 23, NE¼, NW¼, NE¼
Latitude 43° 45' 50.63" Longitude 116° 25' 6.58"
Well completed October 2006

REGISTERED PROFESSIONAL GEOLOGIST
EDWARD SQUIRES
968
STATE OF IDAHO

Geophysical Logs



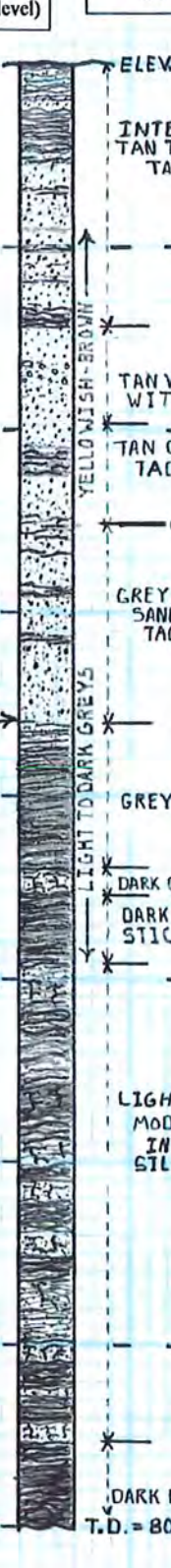
Geophysics conducted by:
Hydro Logic, Inc. on September 27, 2006
immediately after removal of drill steel

B.H.T. = 79.46°F AT 785 FEET
PROBE LEFT ON BOTTOM UNTIL TEMPERATURE STABILIZED

Depth
(feet below ground level)

Lithology

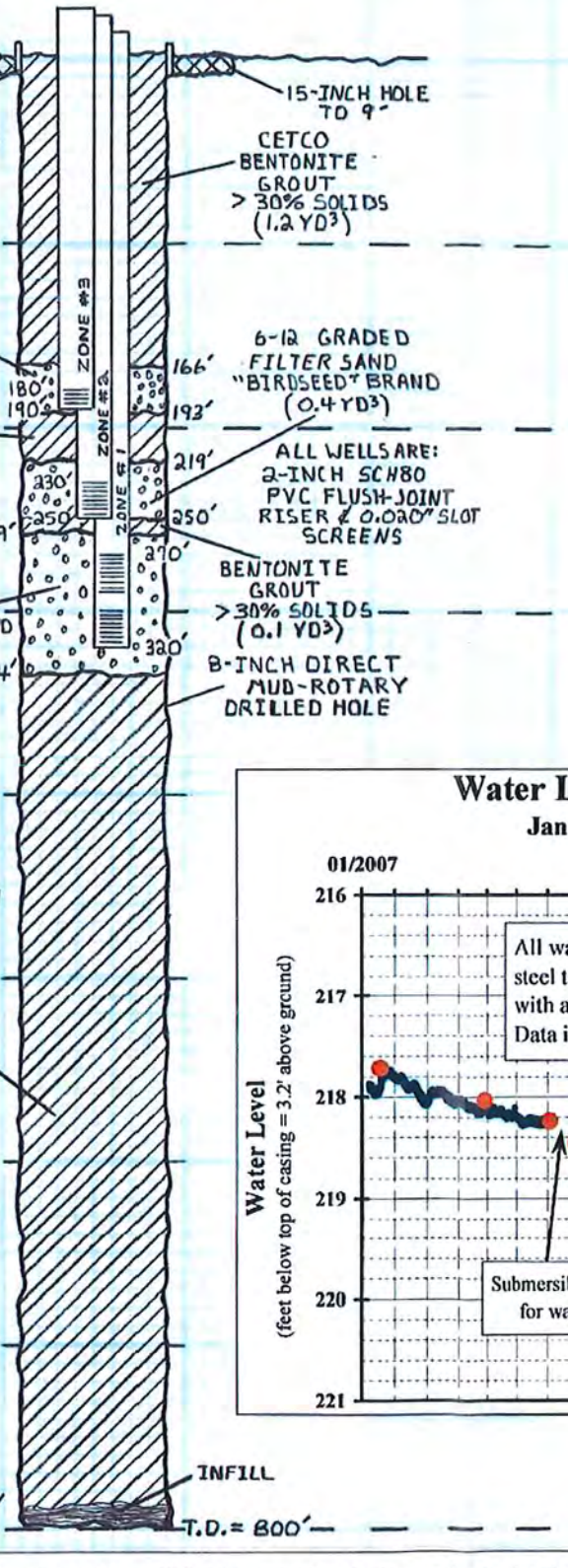
Hydro Logic, Inc. lithologic log is interpreted and drawn from geophysical logs and drilled cuttings from the borehole.



drafted March 2008
by Loren Pearson

As-Built Well Construction

(horizontal scale 0.1"=1.0")
(vertical scale 1"=100')



ALL BENTONITE GROUTS CONTAIN GREATER THAN 30 PERCENT SOLIDS BY WEIGHT AND WERE PUMPED FROM THE BOTTOM UP THROUGH TREMIE AND TAGGED INTO PLACE.

Water Levels

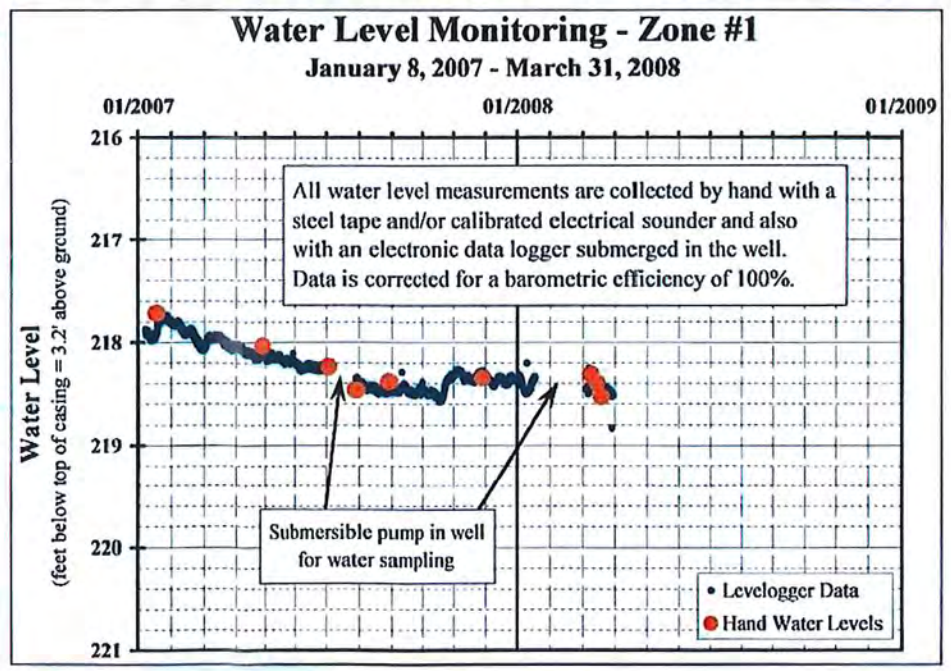
(feet below measure point = 3.0 feet above ground)

Date / Time (24-hr clock)	ZONE #1 (320 - 270 feet bgl)	ZONE #2 (250 - 230 feet bgl)	ZONE #3 (190 - 180 feet bgl)
10/10/06 13:05	216.87	-	unsaturated zone (installed to confirm water table depth)
11/07/06 12:00	217.23	217.36	
1/18/07 14:27	217.19	217.37	
4/30/07 15:25	216.97	215.76	
6/01/07 12:00	216.17	216.75	
7/24/07 12:30	-	217.11	
7/31/07 13:00	217.58	217.91	
8/30/07 12:20	217.60	217.93	
9/19/07 16:30	215.93	216.26	

Water levels recorded by Hydro Logic, Inc.

Water Level Monitoring - Zone #1

January 8, 2007 - March 31, 2008



On site supervision, well design, pump test design, and water level monitoring by Hydro Logic, Inc., Boise, ID
Direct mud-rotary drilling and well construction by Treasure Valley Drilling and Pump, Inc., Weiser, I
Wells developed by McLeran Well Drilling, LLC, New Plymouth, ID.

Figure 5.

Pg 1 of 3

Form 238-7
11/97 JGE

IDAHO DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

843865
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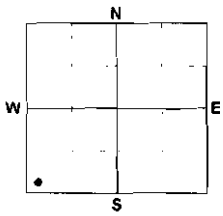
Inspected by
Twp Rge Sec
1/4 1/4 1/4
Lat Long

1. WELL TAG NO. D 0047648
DRILLING PERMIT NO. 897492-843865
Other IDWR No.

2. OWNER:
Name M3 Eagle, L.L.C.
Address 533 E. Riverside Drive, Suite 110
City Eagle State ID Zip 83616

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

M3 EAGLE - TEST WELL #3



Twp. 5 North [X] or South
Rge. 1 East or West X
Sec. 15 SW 1/4 (10 acres) SW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot County Ada
Lat: 43° 45' 56.5" Long: 116° 27' 16.3"
Address of Well Site 8550 State Hwy 16,
North of Eagle on W. Roseway Lane City Eagle
(Give at least name of road + Distance to Road or Landmark)
Lt Blk Sub. Name 4000 ft E of Hwy 16

4. USE:
[ ] Domestic [ ] Municipal [X] Monitor [ ] Irrigation
[ ] Thermal [ ] Injection [X] Other Piezometer Nest

5. TYPE OF WORK: check all that apply (Replacement etc.)
[X] New Well [ ] Modify [ ] Abandonment Other

6. DRILL METHOD:
[ ] Air Rotary [ ] Cable [X] Mud Rotary Other

7. SEALING PROCEDURES:

Seal/Filter Pack Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bent Grout	920'	532'	1496 gal	Pumped
5/8" Gravel	532'	477'	.65 C.Y.	Poured
Cement Grout	477'	442'	43 gals.	Pumped

Was drive shoe used? Y [X] N Shoe Depth(s) N/A
Was drive shoe seal tested? Y [X] N How? N/A

8. CASING/LINER:

Diameter	From	To	Guage	Material	Casing	Liner	Welded	Threaded
8"	+2	80'	.250	Steel	X		X	
2"	+2	432'	Sch80	PVC	X			X
2"	+2'	399'	Sch80	PVC	X			X

Length of Headpipe None Length of Tailpipe None

9. PERFORATIONS/SCREENS:
[ ] Perforations Method Lowered & Sand-Packed
[X] Screens Screen Type PVC Sch 80 Slotted

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
430'	440'	.020	Zone1	2"	PVC	X	
390'	410'	.020	Zone2	2"	PVC	X	
370'	380'	.020	Zone3	2"	PVC	X	

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
262 ft. below ground Artesian pressure ~22 lb.
Depth flow encountered 314 ft. Describe access port or control devices: Five - 2" Diameter Piezometer Tube Wells

11. WELL TESTS:
[X] Pump X Bailer X Air [ ] Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
Not Water	Measured Quality	Sampling	Only

Water Temp. 63° F Bottom hole temp. 71.8° F
Water Quality test or comments: Cond = 310uS, pH = 7.5
ORP= +110mV, No Odor Depth first Water Encounter 314' bgl

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
14"	0	6'	Top Soil		
14"	6'	12'	Tan Sand		
14"	12'	16'	Clay & Tan Sand		
14"	16'	31'	Tan Sand		
8"	31'	59'	Tan Sand & Clay		
8"	59'	90'	Mica Sand & Clay		
8"	90'	95'	Med. to Fine Sand		
8"	95'	97'	Sandy Clay		
8"	97'	108'	Sand Quartz		
8"	108'	112'	Tan Clay		
8"	112'	185'	Tan Clay & Sand Seams		
8"	185'	210'	Fine Tan Sand		
8"	210'	265'	Tan Clay		
8"	265'	295'	Tan Clay & Sand Seams		
8"	295'	344'	Blue Clay		
8"	344'	388'	Sand		
8"	388'	394'	Clay		
8"	394'	453'	Sandy		
8"	453'	478'	Blue Clay & Sand		
8"	478'	611'	Blue Clay & Mudstone		
8"	611'	630'	Fine Grained Sandstone & Siltstone		
8"	630'	704'	Blue Clay & Mudstone		
8"	704'	714'	Fine Gravel, Sandstone & Siltstone		
8"	714'	920'	Blue Clay & Mudstone		

Well design by Hydro Logic, Inc.

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Cable-tool & air-lift development until clear

Completed Depth 442' (Measurable)
Date: Started 12/5/2006 Completed 12/20/2006

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

Company Name Treasure Valley Drilling Firm No. 560
Firm Official and Driller or Operator (Sign once if Firm Official & Operator) Date 1/4/2007
Date 1/4/2007

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Pg 2

Form 238-7
11/97 JGE

IDAHO DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

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

1. WELL TAG NO. D 0047648 - 2

DRILLING PERMIT NO. 897492-843865
Other IDWR No.

2. OWNER:

Name M3 Eagle, L.L.C.
Address 533 E. Riverside Drive, Suite 110
City Eagle State ID Zip 83616

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location. M3 EAGLE - TEST WELL #3

N / W / E / S

Twp. 5 North X or South
Rge. 1 East or West X
Sec. 15 SW 1/4 (10 acres) SW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot County Ada
Lat: 43°45'56.51" Long: 116°27 8.3'
Address of Well Site 8550 State Hwy 16,
North of Eagle on W Roseway Lane City Eagle
(Give at least name of road + Distance to Road of Landmark)
Lt. Blk. Sub. Name 4000 ft E of Hwy 16

4. USE:

Domestic Municipal X Monitor Irrigation
Thermal Injection Other

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

X New Well Modify Abandonment Other

6. DRILL METHOD:

Air Rotary Cable X Mud Rotary Other

7. SEALING PROCEDURES:

Seal/Filter Pack Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite Grout	391'	381'	20 gal.	Pumped
Bentonite Grout	360'	355'	10 gals.	Pumped
Bentonite Grout	303'	267'	46 gals.	Pumped
Bentonite Grout	267'	0	1030 GAL	Pumped

Was drive shoe used? Y X N Shoe Depth(s) N/A
Was drive shoe seal tested? Y X N How? N/A

8. CASING/LINER:

Diameter	From	To	Guage	Material	Casing	Liner	Welded	Threaded
2"	+2'	369'	Sch80	PVC	X			X
2"	+2'	334'	Sch80	PVC	X			X
2"	+2'	238'	Sch80	PVC	X			X

Length of Headpipe Length of Tailpipe

9. PERFORATIONS/SCREENS:

Perforations Method Lowered & Sand-Packed
X Screens Screen Type PVC Sch 80 Slotted

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
354'	334'	.020	Zone4	2"	PVC	X	
258'	238'	.020	Zone5	2"	PVC	X	

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

262 ft. below ground Artesian pressure ~22 lb.
Depth flow encountered 314 ft. Describe access port or control devices: Five - 2" Diameter Piezometer Tube Wells

11. WELL TESTS:

Pump / Bailer / Air / Flowing Artesian	Yield gal./min.	Drawdown	Pumping Level	Time
	Not	Measured		

Water Temp. 63° F Bottom hole temp. 71.8° F
Water Quality test or comments: Cond = 310uS, pH = 7.5
ORP = + 110mV Depth first Water Encounter 314 ft bgl

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks Lithology, Water Quality & Temperature	Water Y	Water N
			BENTONITE GROUTS		
			See: Sealing Procedures		
			Used CETCO Geothermal Grout		
			Percent Solids by Weight =		
			29%		
			FILTER SAND PLACEMENTS		
	DEPT		TYPE		
	From:				
	442'	391'	Throep 8-16 Filter Sand		
	381'	360'	Throep 8-16 Filter Sand		
	355'	303'	Throep 8-16 Filter Sand		
	267'	220'	Throep 8-16 Filter Sand		
			GPS_COORDINATES		
			Latitude 43° 45' 56.5"		
			Longitude 116° 27' 08.3"		
			Elevation=2,780 ft AMSL		
			Well Design by Hydro Logic, Inc.		
			Inferred fracture in mud-stone below 500 ft. (530 ft. to ???) which required large volume of grout & gravel to seal		

Completed Depth 442' (Measurable)
Date: Started 12/5/2006 Completed 12/20/2006

13. DRILLER'S CERTIFICATION:

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

Company Name Treasure Valley Drilling Firm No. 560
Firm Official and Driller or Operator (Sign once if Firm Official & Operator) Date 1/11/2007
Date 1/11/2007

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

849721

1. WELL TAG NO. D D0052429 PAGE 1 OF 3

Drilling Permit No. 902734-849721

Water right or injection well # _____

2. OWNER

Name M3 Eagle, LLC (Test Well #4)

Address 533 E. Riverside Drive, Suite 110

City Eagle State ID Zip 83616

3. WELL LOCATION:

Twp. 5 North ☒ or South ☐ Rge. 1 East ☐ or West ☒

Sec. 27 NW 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)

Gov't Lot _____ County ADA

Lat. 43 ° 44.812 (Deg. and Decimal minutes)

Long. 116 ° 26.243 (Deg. and Decimal minutes)

Address of Well Site Big Gulch Rd. 8,000 ft northeast of State Hwy 16

City Eagle

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

Lot. _____ Blk. _____ Sub. Name _____

4. USE:

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

☒ Other Piezometer Nest

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

☒ New Well ☐ Replacement well ☐ Modify existing well

☐ Abandonment ☐ Other _____

6. DRILL METHOD:

☐ Air Rotary ☒ Mud Rotary ☐ Cable ☒ Other Direct Mud-Rotary

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
¾" bent. chip	0	26	113.4 cu. ft	poured
cement grout	0	55	10.8 cu. ft	pumped

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
24"	+1	26	SC10	steel	☒	☐	☐	☒
8"	+3	27	SC40	steel	☒	☐	☐	☒
2"	+3	61	SC80	PVC-ZONE #1	☒	☐	☒	☐

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

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method _____

Manufactured screen ☒ Y ☐ N Type Factory slotted PVC (SCH80)

Method of installation Lowered and tagged into proper depth

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
61	71	0.020	480	2"	PVC	SC80-Zone4
181	201	0.020	480	2"	PVC	SC80-Zone3
326	556	0.020	480	2"	PVC	SC80-Zone2

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
#6-#12 sand	55	83	5.6 cu. ft	Poured thru Tremie
#8-#16 sand	166	211	10.5 cu. ft	Poured thru Tremie

11. FLOWING ARTESIAN:

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

Describe control device none

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) _____ Static water level (ft) TABLE PG 3

Water temp. (°F) TABLE PG 3 Bottom hole temp. (°F) 67.6

Describe access port Four 2" tube wells in a locked steel well head

Well test: **Test method:**

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
NO	PUMP TEST	OTHER	☒	☐	☒	☐
THAN	AIR	LIFTING				
AND	PUMP	SAMPLES				

Water Quality test or comments: TABLE PAGE 3

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
24	0	6	Top soil		X
24	6	25	Tan sand		X
8	25	32	Sticky tan clay		X
8	32	34	Small tan clay mixed with sand		X
8	34	37	Sandy clay		X
8	37	40	Clay & coarse sand		X
8	40	50	Clay with fine-coarse sand		X
8	50	54	Tan sand with some clay		X
8	54	57	Tan clay & sand		X
8	57	59	Tan clay with a little sand		X
8	59	65	Tan clay	X	
8	65	66	Tan clay & coarse-fine sand	X	
8	66	71	Tan sand	X	
8	71	76	Tan clay & sand	X	
8	76	84	Tan clay	X	
8	84	91	Tan clay & fine tan sand	X	
8	91	104	Tan clay with brown tacky clay	X	
8	104	136	Blue tacky clay	X	
8	136	141	Blue & brown clay	X	
8	141	157	Blue clay	X	
8	157	163	Brown tacky clay	X	
8	163	172	Blue & brown clay	X	
8	172	175	Blue clay with a little sand	X	
8	175	181	Green & blue clay	X	
8	181	185	Tan coarse-fine sand	X	
8	185	209	Tan medium-fine sand	X	
8	209	214	Blue silty clay	X	
8	214	229	Green clay with some blue clay & sand	X	
8	229	242	Blue sticky clay	X	
			CONTINUED ON PAGE 2		

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WATER RESOURCES
WESTERN REGION

Completed Depth (Measurable) 670

Date: Started 11/09/2007 Completed 11/16/2007

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 Treasure Valley Drilling Co. No. 560

*Principal Driller _____ Date _____

*Driller _____ Date _____

*Operator II _____ Date _____

Operator I _____ Date _____

* Signature of Principal Driller and rig operator are required.

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D D0052429 PAGE 2 OF 3

Drilling Permit No. 902734-849721

Water right or injection well # _____

2. OWNER

Name M3 Eagle, LLC (Test Well #4)

Address 533 E. Riverside Drive, Suite 110

City Eagle State ID Zip 83616

3. WELL LOCATION:

Twp. 5 North ☒ or South ☐ Rge. 1 East ☐ or West ☒

Sec. 27 NW 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)

Gov't Lot _____ County ADA

Lat. 43 ° 44.812 (Deg. and Decimal minutes)

Long. 116 ° 26.243 (Deg. and Decimal minutes)

Address of Well Site Big Gulch Rd. 8,000 ft northeast of State Hwy 16

City Eagle

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

Lot. _____ Blk. _____ Sub. Name _____

4. USE:

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

☒ Other Piezometer Nest

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

☒ New Well ☐ Replacement well ☐ Modify existing well

☐ Abandonment ☐ Other _____

6. DRILL METHOD:

☐ Air Rotary ☒ Mud Rotary ☐ Cable ☒ Other Direct Mud-Rotary

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
SEE PG3				

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
2"	+3	181	SC80	PVC-ZONE #2	☒	☐	☒	☐
2"	+3	326	SC80	PVC-ZONE #3	☒	☐	☒	☐
2"	+3	626	SC80	PVC-ZONE #4	☒	☐	☒	☐

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

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method _____

Manufactured screen ☒ Y ☐ N Type Factory slotted PVC (SCH80)

Method of installation Lowered and tagged into proper depth

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
626	646	0.020	480	2"	PVC	SC80-Zone1

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
#8-#16 sand	298	564	72.9 cu. ft	Poured thru Tremie
#8-#16 sand	617	655	10.8 cu. ft	Poured thru Tremie

11. FLOWING ARTESIAN:

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

Describe control device none

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) _____ Static water level (ft) TABLE PG 3

Water temp. (°F) TABLE PG 3 Bottom hole temp. (°F) 67.6

Describe access port Four 2" tube wells in a locked steel well head

Well test: **Test method:**

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
NO	PUMP TEST	OTHER	☒	☐	☒	☐
THAN	AIR	LIFTING				
AND	PUMP	SAMPLES				

Water Quality test or comments: TABLE PAGE 3

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
8	242	250	Fine sand	X	
8	250	258	Blue clay	X	
8	258	265	Tan coarse sand	X	
8	265	273	Tan medium-fine sand	X	
8	273	280	Blue tacky clay	X	
8	280	295	Coarse-fine sand	X	
8	295	317	Blue clay & sand	X	
8	317	358	Coarse-fine sand	X	
8	358	369	Blue clay with some sand	X	
8	369	401	Tan coarse-fine sand with some tan clay	X	
8	401	427	Dk tan coarse-fine sand w/ tan clay beds	X	
8	427	448	Medium tan sand	X	
8	448	466	Coarse sand and tan clay layers	X	
8	466	473	Tan coarse sand with little clay	X	
8	473	481	Clayey medium tan sand	X	
8	481	496	Clayey coarse tan sand	X	
8	496	504	Sandy clay	X	
8	504	518	Blue sand with thin clay layers	X	
8	518	524	Blue medium sand with thin clay beds	X	
8	524	536	Medium sand with blue & brown clay and some wood	X	
8	536	544	Medium-fine sand with blue clay layers	X	
8	544	573	Fine sand with blue & brown clay layers	X	
8	573	611	Tacky blue clay	X	
8	611	643	Gray fine sand with dark grey clay beds	X	
8	643	670	Dark gray sticky clay		

Completed Depth (Measurable) 670

Date: Started 11/09/2007 Completed 11/16/2007

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 Treasure Valley Drilling Co. No. 560

*Principal Driller _____ Date _____

*Driller _____ Date _____

*Operator II _____ Date _____

Operator I _____ Date _____

* Signature of Principal Driller and rig operator are required.

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D D0052429 PAGE 3 OF 3

Drilling Permit No. 902734-849721

Water right or injection well #

2. OWNER

Name M3 Eagle, LLC (Test Well #4)

Address 533 E. Riverside Drive, Suite 110

City Eagle State ID Zip 83616

3. WELL LOCATION:

Twp. 5 North ☒ or South ☐ Rge. 1 East ☐ or West ☒

Sec. 27 NW 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)

Gov't Lot County ADA

Lat. 43 ° 44.812 (Deg. and Decimal minutes)

Long. 116 ° 26.243 (Deg. and Decimal minutes)

Address of Well Site Big Gulch Rd. 8,000 ft northeast of State Hwy 16

City Eagle

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

Lot. Blk. Sub. Name

4. USE:

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

☒ Other Piezometer Nest

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

☒ New Well ☐ Replacement well ☐ Modify existing well

☐ Abandonment ☐ Other

6. DRILL METHOD:

☐ Air Rotary ☒ Mud Rotary ☐ Cable ☒ Other Direct Mud-Rotary

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
SEE PG3				

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method

Manufactured screen ☒ Y ☐ N Type Factory slotted PVC (SCH80)

Method of installation Lowered and tagged into proper depth

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

Length of Headpipe Length of Tailpipe

Packer ☐ Y ☐ N Type

10. FILTER PACK:

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

11. FLOWING ARTESIAN:

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

Describe control device none

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) Static water level (ft) TABLE PG 3

Water temp. (°F) TABLE PG 3 Bottom hole temp. (°F) 67.6

Describe access port Four 2" tube wells in a locked steel well head

Well test: **Test method:**

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
NO	PUMP TEST	OTHER	☒	☐	☒	☐
THAN	AIR	LIFTING				
AND	PUMP	SAMPLES				

Water Quality test or comments: SEE PAGE 3

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
			ARTESIAN PRESSURES			
ZN	FT	PSI				
Zn1	487	211				
Zn2	167	72				
Zn3	31	14				
			WATER LEVELS & CHEMISTRY			
Zn1	617	655	WL=126.8;T=68.9F;pH=7.45;cond=307uS			
Zn2	326	556	WL=127.2;T=68.9F;pH=7.45;cond=307uS			
Zn3	181	201	WL=131.3;T, pH, and cond. not taken			
Zn4	61	71	unsaturated - vadose zone confirmed			
			SEALS CONTINUED			
	83	96	30% solids bentonite grout	2.9 cu. ft		
	96	152	cement grout	12.8 cu. ft		
	152	166	30% solids bentonite grout	4.0 cu. ft		
	211	243	30% solids bentonite grout	7.6 cu. ft		
	243	266	cement grout	6.4 cu. ft		
	266	298	30% solids bentonite grout	8.3 cu. ft		
	564	597	30% solids bentonite grout	9.8 cu. ft		
	597	607	cement grout	2.9 cu. ft		
	607	617	30% solids bentonite grout	2.9 cu. ft		

Completed Depth (Measurable) 670

Date: Started 11/09/2007 Completed 11/16/2007

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 Treasure Valley Drilling Co. No. 560

*Principal Driller Date

*Driller Date

*Operator II Date

Operator I Date

* Signature of Principal Driller and rig operator are required.

63

836982

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 407453
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0042181
DRILLING PERMIT NO. 891847-836982
Water Right or Injection Well No.

2. OWNER:
Name SunCor Idaho LLC
Address 485 E Riverside Dr #300
City Eagle State ID Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North XX or South ☐
Rge. 1 East XX or West ☐
Sec. 1, ____ 1/4 (10 acres) S/W 1/4 (40 acres) N/E 1/4 (160 acres)
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site 1 mile west of Hwy 55
8 miles northeast of City Eagle
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name
Spring Valley Ranch

4. USE:
☐ Domestic ☐ Municipal XX Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other no 1

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

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

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
bentonite chips	0	180	2500#	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
					☐	☐	☐	☐
		NONE			☐	☐	☐	☐
					☐	☐	☐	☐

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
						☐	☐
		NONE				☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
NONE				

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
6	0	10	sandy topsoil		X
	10	135	coarse white sand		X
	135	173	tan clay with white clay &		
			sand streaks		X
	173	175	dark brown clay		X
	175	180	dark XXXXXgray clay		X
			blue		

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APR 19 2006
WATER RESOURCES
WESTERN REGION

RECEIVED
DEC 15 2005
WATER RESOURCES
WESTERN REGION

Completed Depth 0' (Measurable)
Date: Started 10/27/05 Completed 10/27/05

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 Stevens & Sons Firm No. 153
Principal Driller Tom Stevens Date 10/30/05
and
Driller or Operator II Date
Operator I Date

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

FORWARD WHITE COPY TO WATER RESOURCES

63

836983

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 407454
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0042180
DRILLING PERMIT NO. 891848-836983
Water Right or Injection Well No.

2. OWNER:
Name Suncor Idaho LLC
Address 485 E Riverside Dr #300
City Eagle State ID Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North ☒ XX or South ☐
Rge. 1 East ☒ XX or West ☐
Sec. 1, 10 acres 1/4 S/W 1/4 S/E 1/4 XXX
Gov't Lot ____ County ADA
Lat: : : Long: :
Address of Well Site 1 mile west of hiway 55
Spring Valley Ranch (Give at least name of road + Distance to Road or Landmark) City Eagle
Lt. ____ Blk. ____ Sub. Name
8 miles east of Eagle

4. USE: well #2
☐ Domestic ☐ Municipal XX ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

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

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

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
bentonite chips	0	40	14 cu ft	overbore

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

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6	+1'6"	288	250	steel	XX ☒	☐	XX ☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 5' Length of Tailpipe 0
Packer XX ☒ Y ☐ N Type Johnson 304 stnls steel

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
288	293	30		5	SS	☐	XX ☒
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
185 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
No Test			

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

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
12	0	40	sandy brown soil		X
8	40	138	sandy brown soil with brown clay streaks		X
	138	159	dark brown clay		X
	159	180	coarse white sand		X
6	180	270	coarse white sand	X	
	270	295	brown sand	X	
	295	315	silty brown sand	X	
	315	360	silty brown sand with cemented streaks	X	
	360	375	gray green clay		X

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DEC 15 2005
WATER RESOURCES
WESTERN REGION

Completed Depth ____ (Measurable)
Date: Started 12/2/05 Completed 12/6/05

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 Stevens & Sons Firm No. 153
Principal Driller ____ Date 12/10/05
and
Driller or Operator ____ Date
Operator I ____ Date

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

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63

Form 238-7
6/02

836984

Office Use Only
Well ID No. 407455
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 D0042179
DRILLING PERMIT NO. 891849-836984
Water Right or Injection Well No.

2. OWNER:
Name SunCor Idaho LLC
Address 485 E Riverside Dr #300
City Eagle State ID Zip 83616

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 5 North XX or South ☐
Rge. 2 East XX or West ☐
Sec. 6, ____ 1/4 (10 acres) N/W 1/4 (40 acres) S/W 1/4 (160 acres)
Gov't Lot ____ County Ada
Lat: : : **Long:** : :
Address of Well Site ½ mile west of Hwy 55
8 miles northeast of City Eagle
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name
Spring Valley Ranch

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor no. 3 ☐ 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
5/8" bentonite chips	0	20	4 sk	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"	+1	5'	250	steel	XX			
2"	+1	29'	sch	80 PVC		XX		

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

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

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
29	39	20		2"	PVC		XX

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
coarse sand	20'	80'	80 gal	poured

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
6	0	10	sandy cemented topsoil		X
	10	38	sand		X
	38	45	brown clay		X
	45	80	blue gray clay		X

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APR 19 2006
WATER RESOURCES
WESTERN REGION

RECEIVED
DEC 15 2005
WATER RESOURCES
WESTERN REGION

Completed Depth 39' (Measurable)
Date: Started 11/15/05 Completed 11/16/05

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 Stevens & Sons Firm No. 153
Principal Driller Ron Stevens Date 11/16/05
and
Driller or Operator II Steve Matlock Date 11/16/05
Operator I Date
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

RP

859674
RECEIVED
SEP 20 2010
DEPARTMENT OF WATER RESOURCES

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0059016
Drilling Permit No. 911028-859674
Water right or injection well #

2. OWNER: UNITED WATER IDAHO INC.
Name
Address 8248 W. Victory Rd
City Boise State ID Zip 83709

3. WELL LOCATION:
Twp. 5 North ☒ or South ☐ Rge. 1 East ☒ or West ☐
Sec. 1 NW 10 acres 1/4 SE 40 acres 1/4 SE 160 acres 1/4
Gov't Lot County ADA
Lat. 43 ° 47.721 (Deg. and Decimal minutes)
Long. 116 ° 16.696 (Deg. and Decimal minutes)
Address of Well Site 71 miles w of hwy 55,4.16 m n of w woods gulch 1 City Boise
(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 SONIC

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
BENT CHIPS	0	176	56 BAGS	POUR
BENT ~~GROUT~~ CHIP	176	225	~~150 gallons~~ 38 Bag	~~TREMMIE GROUT~~ Pour

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
2"	0	227	sch 80	pvc	☐	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☐ N Method
Manufactured screen ☒ Y ☐ N Type PVC Machine Slot
Method of installation

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
227	247	.010	20	2"	PVC	Sch 80

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
10/20 Sand	225	247	10 bags	pour

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) 176' Static water level (ft) 117.6
Water temp. (°F) 53 Bottom hole temp. (°F)
Describe access port

Well test:

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

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

Water quality test or comments:

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
9	0	7	soil		X
9	7	10	course sand		X
9	10	15	med sand		X
9	15	17	course sand		X
9	17	35	some clay		X
9	35	52	fine-med sand		X
9	52	55	brn clay		X
9	55	150	course sand-olive color		X
6	150	221	fine sand	X	
6	221	247	black sand	X	
6	247	286	course gry sand	X	

RECEIVED
SEP 21 2010
WATER RESOURCES
WESTERN REGION

Completed Depth (Measurable): 247'
Date Started: 8.11.10 Date Completed: 8.23.10

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 BOART LONGYEAR Co. No. 610
*Principal Driller [signature] Date 9-15-10
*Driller Date
*Operator II [signature] Date 9-16-10
Operator I Date

* Signature of Principal Driller and rig operator are required.

Borgeman, Sherry

From: Kamenzind, Stephanie [skamenzind@boartlongyear.com]
Sent: Friday, September 24, 2010 4:57 PM
To: Borgeman, Sherry
Subject: FW: United Water

Depth is 247'

static water level: 177.6 feet below ground

For Address of Well Site it looks kind of like "71 miles west of Hwy 55" instead of the actual distance of 0.71 miles.

And there is no bentonite grout: the entire seal was a pour (the rules allow a pour through less than 50 feet of water with a minimum annular space of 1-5/8": the construction meets this criteria).

Lat: 43 degrees and 47.721 decimal minutes
Long: -116 degrees and 16.696 decimal minutes

As far as the number of bags of bentonite ....94 bags (50lb)

Stephanie Kamenzind
Administrative Assistant

Boart Longyear E & I
Fife Washington
Ph 253.883.5200
Fx 253.883.5201
skamenzind@boartlongyear.com

Form 238-7
6/07

03

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

WELL #2

1. WELL TAG NO. D 0064184
Drilling Permit No. 916445-867671
Water right or injection well # _____

2. OWNER: United Water Idaho Inc
Name _____
Address 8248 W Victory Rd
City Boise State ID Zip 83709

3.WELL LOCATION:
Twp. 5 North [X] or South [ ] Rge. 1 East [X] or West [ ]
Sec. 1 N/W 10 acres 1/4 S/E 40 acres 1/4 S/E 160 acres 1/4
Gov't Lot _____ County Ada
Lat. 43 ° 47.732 (Deg. and Decimal minutes)
Long. 116 ° 16.691 (Deg. and Decimal minutes)
Address of Well Site .71 miles west of Hwy 55, 4.16 miles north of W Woods Gulch Boise
(Give at least name of road + Distance to Road or Landmark) City
Lot. _____ Blk. _____ Sub. Name _____

4. USE:
[ ] Domestic [ ] Municipal [X] Monitor [ ] Irrigation [ ] Thermal [X] Injection
[ ] Other _____

5. TYPE OF WORK:
[X] New well [ ] Replacement well [ ] Modify existing well
[ ] Abandonment [ ] Other _____

6. DRILL METHOD:
[ ] Air Rotary [X] Mud Rotary [ ] Cable [ ] Other _____

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
bentonite	228	0	4000#	chips poured

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+2'	9	.250	steel	[X]	[ ]	[ ]	[ ]
5"	9'	230	SDR 17	certa-lock PVC	[ ]	[X]	[ ]	[ ]
					[X]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Was drive shoe used? [ ] Y [X] N Shoe Depth(s) _____

9. PERFORATIONS/SCREENS:
Perforations [ ] Y [ ] N Method _____
Manufactured screen [X] Y [ ] N Type Johnson
Method of installation _____

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
230	240	40	10	5"	stainless	

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
silica sand	251	228	1200#	poured

11. FLOWING ARTESIAN:
Flowing Artesian? [ ] Y [X] N Artesian Pressure (PSIG) _____
Describe control device _____

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft) 178 Static water level (ft) _____
Water temp. (°F) _____ Bottom hole temp. (°F) _____
Describe access port _____

Well test:

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

Test method: [ ] Pump [ ] Bailer [ ] Air [ ] Flowing artesian

Water quality test or comments: _____

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
10	0	8	brown soil & coarse sand		X
	8	10	cemented coarse sand		X
	10	58	coarse sand, some fine		X
	58	88	cemented coarse sand, some small gravel		X
	88	130	fine brown sand		X
	130	205	coarse to fine white sand	X	
	205	219	gold/brown coarse sand	X	
	219	223	fine black sand/silt	X	
	223	228	fine to coarse black to gray sand	X	
	228	251	gray coarse sand (some fine)	X	

RECEIVED
JUN 25 2013
WATER RESOURCES
WESTERN REGION

Completed Depth (Measurable): 240'
Date Started: 5/27/13 Date Completed: 5/29/13

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 Stevens & Sons Co. No. 153
*Principal Driller _____ Date _____
*Driller _____ Date 6/22/13
*Operator II _____ Date _____
Operator I Kevin Chastain Date _____

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

Form 238-7
6/07

03

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

WELL #3

1. WELL TAG NO. D 0064185

Drilling Permit No. 911644-8607072

Water right or injection well # _____

2. OWNER: United Water Idaho Inc

Name _____

Address 8248 W Victory Rd

City Boise State ID Zip 83709

3.WELL LOCATION:

Twp. 5 North [X] or South [ ] Rge. 1 East [X] or West [ ]

Sec. 1 N/W 1/4 (10 acres) S/E 1/4 (40 acres) S/E 1/4 (160 acres)

Gov't Lot _____ County Ada

Lat. 43 ° 47.715 (Deg. and Decimal minutes)

Long. 116 ° 16.692 (Deg. and Decimal minutes)

Address of Well Site .71 miles west of Hwy 55, 4.16 miles north of W Woods Gulch City Boise
(Give at least name of road + Distance to Road or Landmark)

Lot. _____ Blk. _____ Sub. Name _____

4. USE:

[ ] Domestic [ ] Municipal [ ] Monitor [ ] Irrigation [ ] Thermal [X] Injection
[ ] Other _____

5. TYPE OF WORK:

[ ] New well [ ] Replacement well [ ] Modify existing well
[ ] Abandonment [ ] Other _____

6. DRILL METHOD:

[ ] Air Rotary [X] Mud Rotary [ ] Cable [ ] Other _____

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
bentonite chip	219	0	4000#	poured

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
6"	+2	18	250	steel	[X]	[ ]	[ ]	[ ]
5"	18	219	SDR	certa-lock PVC	[X]	[ ]	[ ]	[ ]
					[X]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Was drive shoe used? [ ] Y [X] N Shoe Depth(s) _____

9. PERFORATIONS/SCREENS:

Perforations [ ] Y [ ] N Method _____

Manufactured screen [ ] Y [X] N Type _____

Method of installation _____

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
219	229	40	10	5"	stainless	

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
silica sand	219	229	500#	poured

11. FLOWING ARTESIAN:

Flowing Artesian? [ ] Y [X] N Artesian Pressure (PSIG) _____

Describe control device _____

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 179' Static water level (ft) _____

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

Describe access port _____

Well test:

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

Test method: Pump [ ] Bailer [ ] Air [ ] Flowing artesian [ ]

Water quality test or comments: _____

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
10"	0	12	coarse white sand		X
	12	14	cemented sand		X
	14	58	coarse sand, some fine		X
	58	86	cemented coarse sand, some gravel		X
	86	132	fine brown sand		X
	132	205	coarse to fine white/gold sand	X	
	205	220	coarse gold to brown sand	X	
	220	223	fine black sand, silty	X	
	223	229	fine black& coarse gray sand	X	
	229	232	coarse gray sand	X	

RECEIVED
JUN 25 2013
WATER RESOURCES
WESTERN REGION

Completed Depth (Measurable): 229'

Date Started: 6/1/13 Date Completed: 6/3/13

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 Stevens & Sons Co. No. 153

*Principal Driller _____ Date _____

*Driller _____ Date 6/22/13

*Operator II Kevin Chastain Date _____

Operator I _____ Date _____

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

APPENDIX D

Municipal Well Driller's Reports

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

RECEIVED
MAR 10 2016
WATER RESOURCES
WESTERN REGION

1. WELL TAG NO. D 0070298 Page 1 of 2
Drilling Permit No. 970816-876873
Water right or injection well # 63-32573

2. OWNER
Name City of Eagle - Spring Valley Municipal Well #1
Address 660 East Civic Lane
City Eagle State ID Zip 83616

3. WELL LOCATION:
Twp. 05 North ☒ or South ☐ Rge. 01 East ☐ or West ☒
Sec. 28 SE (10 acres) 1/4 SE (40 acres) 1/4 SE (160 acres) 1/4
Gov't Lot N/A County Ada
Lat. 43 ° 44.235' North (Deg. and Decimal minutes)
Long. 116 ° 27.213' West (Deg. and Decimal minutes)
Address of Well Site ~2,800' NE of Highway 16 on Big Gulch Road and Farmer's Union Ditch. City Eagle
(Give distance and direction from nearest town or intersection)
Lot. N/A Blk. N/A Sub. Name Spring Valley

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

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☒ Other Previous test-bore tag #D0064155

6. DRILL METHOD:
☐ Air Rotary ☒ Mud Rotary ☐ Cable ☒ Other Auger drilled to 14 ft bgl

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
				SEE TABLE PAGE 2

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
24-inch	2'	16'	0.375"	steel	☒	☐	☐	☒
18-inch	+3	2'	0.250"	steel	☒	☐	☐	☒
17.4-inch	2'	364'	SDR17	splined PVC	☒	☐	☐	☐

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

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method Welded Vee-wire screens (304 SS)
Manufactured screen ☒ Y ☐ N Type Johnson "Hi-Flow" stainless steel
Method of installation Lowered, centralized and enveloped with filter sand

Lengths 15' 20'

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
341'	356'	0.035"	101 / ft	11-inch	stainless steel	Sch. 40 with
356'	456'	0.035"	101 / ft	11-inch	stainless steel	6-inch long
Also	see	table	on	page 2.		weld rings

Length of Headpipe 24-ft of screen Length of Tailpipe No tailpipe
Packer ☒ Y ☐ N Type Removable 12" w/ two 3-lip Figure "K" packers

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method
#8-#16 sand	343'	481'	94.5 ft³	Pour and tag into place
gradation				"Birdseed" brand

11. FLOWING ARTESIAN:
Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) 118 PSI (272 ft. H2O)
Describe control device 24"-to-18" steel well-head transition / security shelter

In addition to our drillers' observations of the cuttings and rig behavior, this log also has the benefit of an on-site geologist, Kurt Newbry (HLI), during sampling and HLI borehole geophysical logs were also used to develop the best record possible of the drilled section. - GP

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft) mud drill Static water level (ft) 92.3 ft bgl (2-23-2016)
Water temp. (°F) 66.7 °F Bottom hole temp. (°F) 69.29 °F at 600 ft bgl in test b
Describe access port Lockable 18-inch steel pipe-cap / security shelter

Well test: Test method:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
Testing by: Hydro Logic, Inc.			☒	☐	☐	☐
140.6 feet	2,700 gpm	80 hours				
Constant-rate discharge		testing.				

Water Chemistry: pH=7.29; cond. =299µS; DO=+2.1; ORP=-16.0mV
Water Quality test or comments: good taste, no sand, clear, very slight H2S

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
30"	0'	5'	Fine-grained olive brown colored silty sand		☒
30"	5'	8'	Olive brown-colored tacky sandy clay		☒
30"	8'	12'	Fine-to-coarse-grained tan sand with gravel		☒
30"	12'	14'	Tacky olive brown-colored clay		☒
23"	14'	25'	Sandy tacky olive brown-colored clay	n/a	n/a
23"	25'	42'	Medium-to-coarse-grained tan sand with gravel		
23"	42'	50'	Light yellowish brown-colored sandy tacky clay		
23"	50'	58'	Light gray medium-to-coarse-grained sand		
23"	58'		Interbedded light gray-colored sticky clays and		
		86'	medium-to-coarse-grained sands with gravel		
23"	86'		Olive gray, olive, and gray-to-dark gray-		
		203'	colored interbedded tacky clays		
23"	203'	212'	Dark greenish gray clayey sand		
23"	212'		Tacky greenish gray-colored clay with beds of		
			very fine-to-very coarse-grained greenish		
		289'	gray sands		
23"	289'	304'	Olive-colored tacky sandy clay		
23"	304'	364'	Tacky olive-colored clay		
16"	364'	368'	Tacky olive-colored clay		
16"	368'	378'	Fine-to-v. coarse-grained tan sand with gravel		
16"	378'	386'	Tacky olive-colored clay		
16"	386'	395'	Tan fine-to-v. coarse-grained sand with gravel		
16"	395'	403'	Sandy tacky olive-colored clay		
16"	403'		Fine-to-v. coarse-grained sands with thin		
16"		424'	olive-colored tacky clay beds		
16"	424'	429'	Tacky olive-colored clay		
16"	429'	450'	Very fine-to-coarse-grained tan sand		
16"	450'	453'	Olive-colored tacky clay		
16"	453'	465'	Fine-to-very coarse-grained pale yellow sand		
16"	465'	485'	Fine-to-very coarse-grained greenish gray sand		

=mud filled bore during drilli

Completed Depth (Measurable) 481 feet below ground
Date: Started January 6, 2016 Completed March 2, 2016

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name Post Drilling Inc. Co. No. 670
*Principal Driller George Post Date 3-8-2016
*Driller Greg Mitchell Date 3-8-2016
*Operator II Date
Operator I Date
* Signature of Principal Driller and rig operator are required.

Bottom hole temperature was measured in the 8-inch diameter test-bore with a calibrated (on-site) geophysical probe left on bottom until readings were stable at 600-feet below ground.

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0070298

Drilling Permit No. 970816-876873

Water right or injection well # 63-32573

2. OWNER

Name City of Eagle - Spring Valley Municipal Well #1

Address 660 East Civic Lane

City Eagle State ID Zip 83616

3. WELL LOCATION:

Twp. 05 North ☒ or South ☐ Rge. 01 East ☐ or West ☒

Sec. 28 SE (10 acres) 1/4 SE (40 acres) 1/4 SE (160 acres) 1/4

Gov't Lot N/A County Ada

Lat. 43 ° 44.235' North (Deg. and Decimal minutes)

Long. 116 ° 27.213' West (Deg. and Decimal minutes)

Address of Well Site ~2,800' NE of Highway 16 on Big Gulch Road and Farmer's Union Ditch. City Eagle

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

Lot. N/A Blk. N/A Sub. Name Spring Valley

4. USE:

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

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

☒ New Well ☐ Replacement well ☐ Modify existing well ☐ Abandonment ☒ Other Previous test-bore tag #D0064155

6. DRILL METHOD:

☐ Air Rotary ☒ Mud Rotary ☐ Cable ☒ Other Auger drilled to 14 ft bgl

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
				SEE TABLE AT RIGHT

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
24-inch	2'	15'	0.375"	steel	☒	☐	☐	☒
18-inch	+3	2'	0.250"	steel	☒	☐	☐	☒
17.4-inch	2'	364'	SDR17	splined PVC	☒	☐	☐	☐

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

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method Welded Vee-wire screens (304 SS)

Manufactured screen ☒ Y ☐ N Type Johnson "Hi-Flow" stainless steel

Method of installation Lowered, centralized and enveloped with filter sand

	From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
Length 5'	456'	476'	0.035"	101 / ft	11-Inch	stainless steel	Sch. 40 with
10'	476'	481'	0.035"	101 / ft	11-Inch	stainless steel	6-inch long
	Also	see	table	on	page 1.		weld rings

Length of Headpipe 24-ft of screen Length of Tailpipe No tailpipe

Packer ☒ Y ☐ N Type Removable 12" w/ two 3-lip Figure "K" packers

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method
#8-#16 sand	343'	481'	94.5 ft³	Pour and tag into place
gradation				"Birdseed" brand

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) 118 PSI (272 ft. H2O)

Describe control device 24"-to-18" steel well-head transition / security shelter

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) mud drill Static water level (ft) 92.3 ft bgl (2-23-2016)

Water temp. (°F) 65.7 °F Bottom hole temp. (°F) 69.29 °F at 600 ft bgl in test b

Describe access port Lockable 18-inch steel pipe-cap / security shelter

Well test: Test method:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
Testing by: Hydro Logic, Inc.			☒	☐	☐	☐
140.6 feet	2,700 gpm	80 hours				
Constant-rate discharge		testing.				

Water Chemistry: pH=7.29; cond. =299µS; DO=+2.1; ORP=-16.0mV

Water Quality test or comments: good taste, no sand, clear, very slight H2S

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
			SEALING PROCEDURES		
30"	0'	13'	Cement grout - pumped thru tremie - 40.1 ft³		
30"	13'	14'	3/4" bentonite chip - poured and tagged - 3.5 ft³		
23"	0'		Cement / Wyo-Ben Grout Well DF grout mixture		
		292'	pumped thru tremie - 238.3 ft³		
23"	292'	362'	Cement grout - pumped thru tremie - 63.6 ft³		
23"	362'	364'	3/4" bentonite chip - poured and tagged - 2.4 ft³		

SEALS AND SAND FILTER:
-Seals and sand filter depths were verified by tagging in the annulus between the mud-filled borehole and casing. Volumes of materials used were compared to volume calculations of the borehole caliper log minus the volume of the screen/casing (= annulus) and to the estimated volume of material removed from the borehole during drilling.

GROUT SEALS:
-Neat cement grout was mixed at a rate of 6-gallons of water to 94-pounds of Portland Type I/II cement powder.
-Cement/bentonite grout was mixed at rate of 24-gallons of water to 94-pounds of Portland Type I/II cement powder and 50-pounds of "Wyo-Ben" brand Grout Well DF bentonite powder.
-Grouts were pumped under pressure from the bottom-up.

ALL STAINLESS STEEL PACKER-REDUCER:
- total length = 3.5 feet
- 12" barrel = 3.0 feet
- two 3-lip Figure "K" neoprene packers
- top of packer assembly = 338 feet bgl
- overshot with three "L"-shaped slots that turn on clockwise over the three 1"-pins on headpipe
- turn packer counter-clockwise to remove
- packer design by E. Squires
- packer fabrication by Advantage Machine & Hydraulic, Nampa, Idaho

Completed Depth (Measurable) 481 feet below ground

Date: Started January 6, 2016 Completed March 2, 2016

14. DRILLER'S CERTIFICATION

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

Company Name Post Drilling Inc. Co. No. 670

*Principal Driller George Post Date 3-8-2016

*Driller Greg Mitchell Date 3-8-2016

*Operator II Date

Operator I Date

PROJECT MANAGER:
Bill Brownlee, Partner, M3 Eagle, LLC., Eagle, ID

PROJECT HYDROGEOLOGIST AND WELL DESIGN:
Ed Squires, RPG, Hydro Logic, Inc., Boise, ID

INSPECTION, HYDRAULIC TESTING, AND BOREHOLE GEOPHYSICS BY:
Hydro Logic, Inc., Boise, ID

SITE GEOLOGIST (DRILL, CONSTRUCT, DEVELOP, AND CAMERA):
Kurt Newbry, GIT, Hydro Logic, Inc. - Boise, ID

WELL DRILLING, CONSTRUCTION, and DEVELOPMENT BY:
Post Drilling Inc., Weiser, ID

PUMP CONTRACTOR:
Layne of Idaho, Inc., Nampa, ID

CITY OF EAGLE PROJECT MANAGER:
Ken Acuff, Superintendent, Eagle, ID

Form 238-7
6/07

ip3

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

RECEIVED
JUL 27 2016
WATER RESOURCES
WESTERN REGION

1. WELL TAG NO. D 0071692 Page 1 of 2

Drilling Permit No. 971742-877799

Water right or injection well # 63-32573

2. OWNER

Name City of Eagle - Spring Valley Municipal Well #2

Address 660 East Civic Lane

City Eagle State ID Zip 83616

3. WELL LOCATION:

Twp. 05 North ☒ or South ☐ Rge. 01 East ☐ or West ☒

Sec. 27 SW (10 acres) 1/4 NE (40 acres) 1/4 NE (160 acres) 1/4

Gov't Lot N/A County Ada

Lat. 43 ° 44.811' North (Deg. and Decimal minutes)

Long. 116 ° 26.232' West (Deg. and Decimal minutes)

Address of Well Site 1.55-miles northeast of State Highway 16 on Big Gulch Road. City Eagle

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

Lot N/A Blk. N/A Sub. Name Spring Valley

4. USE:

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

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

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

6. DRILL METHOD:

☐ Air Rotary ☒ Mud Rotary ☐ Cable ☒ Other Auger drilled to 27 ft bgl

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
				SEE TABLE PAGE 2

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
24-inch	2'	27'	0.375"	steel	☒	☐	☐	☒
18-inch	+3	2'	0.375"	steel	☒	☐	☐	☒
17.4-inch	2'	365'	SDR17	splined PVC	☒	☐	☐	☐

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s) Casings pushed into clay

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method Welded Vee-wire screens (304 SS)

Manufactured screen ☒ Y ☐ N Type Johnson "Hi-Flow" stainless steel

Method of installation Lowered, centralized and enveloped with filter sand

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
342'	356'	0.030"	119 / ft	11-inch	stainless steel	Sch. 40 with
356'	416'	0.030"	119 / ft	11-inch	stainless steel	6-inch long
Also	see	table	on	page 2.		weld rings

Lengths 14' 20'

Length of Headpipe 23-ft of screen Length of Tailpipe No tailpipe

Packer ☒ Y ☐ N Type Removable 12" w/ two 3-lip Figure "K" packers

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method
#8-#16 sand	344'	407'	40.5 ft³	Pour and tag into place
gradation				"Birdseed" brand

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) 102 PSI (235 ft. water)

Describe control device 24"-to-18" steel well-head transition / discharge head

In addition to our drillers' observations of the cuttings and rig behavior, this log also has the benefit of an on-site geologist, Kurt Newbry (HLI), during sampling and HLI borehole geophysical logs were also used to develop the best record possible of the drilled section. - GP

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) mud drill Static water level (ft) 130.37 ft bgl (7-16-2016)

Water temp. (°F) 65.2 °F Bottom hole temp. (°F) 71.48 °F at 620 ft bgl

Describe access port Lockable steel security shelter over 1" monitoring tubes

Well test: Test method:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
Testing by: Hydro Logic, Inc.			☒	☐	☐	☐
59.55 feet	2,125 gpm	96 hours				
Constant-rate discharge testing.						

Water Chemistry: pH=7.17; cond. =265µS; DO=+3.5; ORP=-38.9mV

Water Quality test or comments: good taste, no sand, clear, no odor, min. gas

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
30"	0'	2'	Pit run gravel pad and top soil (drill pad)		X
30"	2'	12'	Clayey tan-colored fine-to-medium-grained sand		X
30"	12'	22'	Fine-to-coarse-grained tan-colored sand		X
30"	22'	27'	Brown-colored tacky silty clay		X
23"	27'	36'	Brown-colored tacky silty clay	n/a	n/a
23"	36'	48'	Fine-to-coarse-grained olive-colored sand		
23"	48'	57'	Sandy tacky olive-colored clay		
23"	57'		Fine-to-very coarse-grained olive-colored		
		63'	sand with gravel up to 7/8-inch diameter		
23"	63'		Interbedded olive-colored clay and fine-to-very		
		99'	coarse-grained olive-colored sand lenses		
23"	99'	110'	Olive-colored tacky-to-sticky clay		
23"	110'	163'	Greenish-gray colored tacky-to-sticky clay		
23"	163'	194'	Coarse-to-fine-grained pale olive-colored sand		
23"	194'		Fine-grained light olive gray-colored sand with		
		239'	interbeds of tacky greenish gray clays		
23"	239'	262'	Tacky greenish-gray-colored clay		
23"	262'	276'	Fine-to-coarse-grained light gray-colored sand		
23"	276'	307'	Sandy sticky greenish-gray-colored clay		
23"	307'		Coarse-to-fine-grained light gray-colored sands		
		340'	with sticky greenish gray-colored clays		
23"	340'		Gray-colored fine-to-coarse-grained sands with		
		370'	sticky greenish gray colored clays		
15"	370'		Pale olive-colored medium-to-fine-grained		
		392'	sands with sticky olive-colored clays		
15"	392'		Very coarse-to-fine-grained pale olive-colored		
		430'	sands with some gravel and beds of tacky clay		
15"	430'		Medium-to-very fine-grained pale olive-colored		
			sands with olive-to-pale yellow-colored beds of		
		605'	tacky clay		
15"	605'	614'	Medium-to-very fine-grained gray-colored sand		
15"	614'	620'	Sticky greenish gray-colored clay		

Completed Depth (Measurable) 516 feet below ground

Date: Started February 23, 2016 Completed July 20, 2016

=mud filled bore during drilling.

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 Post Drilling Inc. Co. No. 670

*Principal Driller George Post Date 7-27-2016

*Driller Greg Mitchell Date 7-27-2016

*Operator II _____ Date _____

Operator I _____ Date _____

* Signature of Principal Driller and rig operator are required.

Bottom hole temperature was measured in the 8-inch diameter test-bore with a calibrated (on-site) geophysical probe left on bottom until readings were stable at 600-feet below ground.

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0071692
Drilling Permit No. 971742-877799
Water right or injection well # 63-32573

2. OWNER
Name City of Eagle - Spring Valley Municipal Well #2
Address 660 East Civic Lane
City Eagle State ID Zip 83616

3. WELL LOCATION:
Twp. 05 North ☒ or South ☐ Rge. 01 East ☐ or West ☒
Sec. 27 SW (10 acres) 1/4 NE (40 acres) 1/4 NE (160 acres) 1/4
Gov't Lot N/A County Ada
Lat. 43 ° 44.811' North (Deg. and Decimal minutes)
Long. 116 ° 26.232' West (Deg. and Decimal minutes)
Address of Well Site 1.55-miles northeast of State Highway 16 on Big Gulch Road. City Eagle
(Give at least name of road + Distance to Road or Landmark)
Lot. N/A Blk. N/A Sub. Name Spring Valley

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

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

6. DRILL METHOD:
☐ Air Rotary ☒ Mud Rotary ☐ Cable ☒ Other Auger drilled to 27 ft bgl

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
				SEE TABLE AT RIGHT

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
24-inch	2'	27'	0.375"	steel	☒	☐	☐	☒
18-inch	+3	2'	0.375"	steel	☒	☐	☐	☒
17.4-inch	2'	365'	SDR17	splined PVC	☒	☐	☐	☐

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s) Casings pushed into clay

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method Welded Vee-wire screens (304 SS)
Manufactured screen ☒ Y ☐ N Type Johnson "HI-Flow" stainless steel
Method of installation Lowered, centralized and enveloped with filter sand

Lengths	From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
20'	416'	496'	0.015"	139 / ft	11-inch	stainless steel	Sch. 40 with
15'	496'	511'	0.015"	139 / ft	11-inch	stainless steel	6-inch long
5'	511'	516'	0.015"	139 / ft	11-inch	stainless steel	weld rings

Length of Headpipe 23-ft of screen Length of Tailpipe No tailpipe
Packer ☒ Y ☐ N Type Removable 12" w/ two 3-lip Figure "K" packers

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method
#12-#20 sand	407'	516'	59.4 ft³	Pour and tag into place
gradation				"Birdseed" brand

11. FLOWING ARTESIAN:
Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) 102 PSI (235 ft. water)
Describe control device 24"-to-18" steel well-head transition / discharge head

12. STATIC WATER LEVEL and WELL TESTS:
Depth first water encountered (ft) mud drill Static water level (ft) 130.37 ft bgl (7-16-2016)
Water temp. (°F) 65.2 °F Bottom hole temp. (°F) 71.48 °F at 620 ft bgl
Describe access port Lockable steel security shelter over 1" monitoring tubes

Well test: Test method:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
Testing by: Hydro Logic, Inc.		
69.55 feet	2,125 gpm	96 hours
Constant-rate discharge		testing.

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

Water Chemistry: pH=7.17; cond. =265µS; DO=+3.5; ORP=-38.9mV

Water Quality test or comments: good taste, no sand, clear, no odor, min. gas

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
			SEALING PROCEDURES		
30"	0'	26'	Cement grout - pumped thru tremie - 72.9 ft³		
30"	0'	4'	3/4" bentonite chip - poured and tagged- 7.0 ft³		
23"	4'		Cement / Wyo-Ben Grout Well DF grout mixture		
		335'	pumped thru tremie - 280.8 ft³		
23"	335'	363'	Cement grout - pumped thru tremie - 18.9 ft³		
23"	363'	365'	3/4" bentonite chip - poured and tagged- 5.6 ft³		

SEALS AND SAND FILTER:
-Seals and sand filter depths were verified by tagging in the annulus between the mud-filled borehole and casings.
-Volumes of materials used were compared to volume calculations of the borehole caliper log minus the volume of the screen/casing (= annulus) and to the estimated volume of material removed from the borehole during drilling.

GROUT SEALS:
-Neat cement grout was mixed at a rate of 6-gallons of water to 94-pounds of Portland Type I/II cement powder.
-Cement/bentonite grout was mixed at rate of 24-gallons of water to 94-pounds of Portland Type I/II cement powder and 50-pounds of "Wyo-Ben" brand Grout Well DF bentonite powder.
-Grouts were pumped under pressure from the bottom-up.
-Chipped bentonite is 3/4" Baroid Hole Plug.

ALL STAINLESS STEEL PACKER-REDUCER:
- total length = 3.5 feet
- 12" barrel = 3.0 feet
- two 3-lip Figure "K" neoprene packers
- top of packer assembly = 339.3 feet bgl
- overshot with three "L"-shaped slots that turn on clockwise over the three 1"-pins on headpipe
- turn packer counter-clockwise to remove
- packer design by E. Squires
- packer-reducer fabrication by Advantage Machine & Hydraulic, Nampa, Idaho
- Neoprene packers constructed by Western Rubber & Manufacturing

Completed Depth (Measurable) 516 feet below ground
Date: Started February 23, 2016 Completed July 20, 2016

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

Company Name Post Drilling Inc. Co. No. 670
*Principal Driller George Post Date 7-27-2016
*Driller Greg Mitchell Date 7-27-2016
*Operator II Date
Operator I Date

PROJECT MANAGER:
Bill Brownlee, Partner, M3 Eagle, LLC., Eagle, ID

PROJECT HYDROGEOLOGIST AND WELL DESIGN:
Ed Squires, RPG, Hydro Logic, Inc., Boise, ID

INSPECTION, HYDRAULIC TESTING, AND BOREHOLE GEOPHYSICS BY:
Hydro Logic, Inc., Boise, ID

SITE GEOLOGIST (DRILL, CONSTRUCT, DEVELOP, AND CAMERA):
Kurt Newbry, PG, Hydro Logic, Inc. - Boise, ID

WELL DRILLING, CONSTRUCTION, and DEVELOPMENT BY:
Post Drilling Inc., Weiser, ID

PUMP CONTRACTOR:
Hydro Logic, Inc., Boise, ID

CITY OF EAGLE PROJECT MANAGER:
Ken Acuff, Superintendent, Eagle, ID

APPENDIX E

Avimor Municipal Water Right Permit

IDAHO Department of Water Resources

IDWR offices are open to the public and following the CDC guidelines for wearing masks and observing social distancing. For in-person visits, we encourage you to call ahead for an appointment.

WATER RIGHT REPORT

4/2/2021

IDAHO DEPARTMENT OF WATER RESOURCES

Water Permit Report

WATER RIGHT NO. 63-32061

Owner Type	Name and Address
Current Owner	AVIMOR PARTNERS LLC 18454 N MCLEOD WAY BOISE, ID 83714 2089390343
Attorney	MOFFATT THOMAS BARRETT ROCK & FIELDS CHTD PO BOX 829 BOISE, ID 83701-0829 2083452000
Representative	SPF WATER ENGINEERING LLC C/O TERRY SCANLAN 300 E MALLARD DR STE 350 BOISE, ID 83706-6660 2083834140
Original Owner	SUNCOR IDAHO LLC 18454 N MCLEOD WAY BOISE, ID 83714 2089390343

Priority Date: 01/25/2005

Status: Active

Source	Tributary
GROUND WATER	

Beneficial Use	From	To	Diversion Rate	Volume
MUNICIPAL	01/01	12/31	5 CFS	

Total Diversion		5 CFS	

Location of Point(s) of Diversion:

GROUND WATER	SWSW	Sec. 08	Township 05N	Range 01E	ADA County
GROUND WATER	SWNW	Sec. 09	Township 05N	Range 01E	ADA County
GROUND WATER	SENW	Sec. 13	Township 05N	Range 01E	ADA County
GROUND WATER	SENW	Sec. 18	Township 05N	Range 01E	ADA County

Place(s) of use: Large POU Info

Conditions of Approval:

1.	26A	Project construction shall commence within one year from the date of permit issuance and shall proceed diligently to completion unless it can be shown to the satisfaction of the Director of the Department of Water Resources that delays were due to circumstances over which the permit holder had no control.
2.	046	Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.
3.		Ground water discharged to a subsurface system must be authorized by a separate injection well permit. At the time of permit approval, reinjection of water diverted under this permit into the ground water is authorized at the following well locations and by the associated injection well permits: NWSESE, Section 1, T5N, R1E (injection well permit no. 63W208001); NWSESE, Section 1, T5N, R1E (injection well permit no. 63W208002); and NWSWSE, Section 6, T5N, R2E (injection well permit no. 63W208003).
4.		The water bearing zone to be appropriated is from 200 feet to 1,000 feet.
5.	128	The place of use is within the area served by the public water supply system of Avimor, LLC for use within the Spring Valley Ranch. The place of use is generally located within Sections 1, 12, 13, and 24, T5N, R1E; Sections 5-7, 17, 18, and 20, T5N, R2E; Section 36, T6N, R1E, B.M., and Sections 31 and 32, T6N, R2E.
6.	180	A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustration purposes.
7.		Use of water under this water right may be affected by a private agreement between Avimor (or its predecessor SunCor) and the North Ada County Foothills Association in connection with an agreed upon water level monitoring program.
8.	102	Water diverted under this right shall not be provided for the irrigation of land having appurtenant surface water rights as a primary source of irrigation water except when the surface water rights are not available for use. This condition applies to all land with appurtenant surface water rights, including land converted from irrigated agricultural use to other land uses but still requiring water to irrigate lawns and landscaping.
9.		The right holder shall fully utilize treated waste water for irrigation purposes on all common areas, including parks, playgrounds, golf courses and other similar areas, prior to applying any water under this right to such common area parcels. This condition shall not apply to small isolated common area parcels for which connection to the waste water reuse system is not feasible. The right holder shall provide the Department with a schematic of the waste water reuse system identifying any small isolated common area parcels for which the right holder requests this condition not apply.

10.	070	Water diverted under this right may be used for direct irrigation of up to one-half (½) acre per residential lot upon which a home has been constructed.
11.		Water used for recharge under this right and rediverted under right 63-31966 for irrigation use on common areas is subject to the condition that where feasible treated waste water shall be used first on these common areas as required by Condition 11.
12.		Prior to diversion of water under this right, the permit holder shall prepare and submit an ongoing monitoring and data submittal plan, acceptable to IDWR, to demonstrate that the ground water diverted from authorized points of diversion is tributary to the Payette River drainage.
13.		Prior to diversion of water under this right, the permit holder shall provide a means of measurement, acceptable to IDWR, from all authorized points of diversion which will allow determination of the total rate of diversion and volume of water diverted.
14.		Prior to or at the time of submitting a proof of beneficial use statement for municipal water use under this right, the permit holder shall provide IDWR with documentation showing the water supply system is being regulated by the Idaho Department of Environmental Quality as a public water supply system and that the permit holder has been issued a public water supply system number.
15.	121	The Director retains jurisdiction to require the right holder to provide purchased or leased natural flow or stored water to offset depletion of Lower Snake River flows if needed for salmon migration purposes. The amount of water required to be released into the Snake River or a tributary, if needed for this purpose, will be determined by the Director based upon the reduction in flow caused by the use of water pursuant to this permit.

Dates:

Proof Due Date: 08/01/2023

Proof Made Date:

Approved Date: 10/06/2008

Moratorium Expiration Date:

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Application Received Date: 01/25/2005

Protest Deadline Date: 05/23/2005

Number of Protests: 8

Field Exam Date::

Date Sent to State Off:

Date Received at State Off:

Other Information:

State or Federal:

Owner Name Connector:

Water District Number: TBD

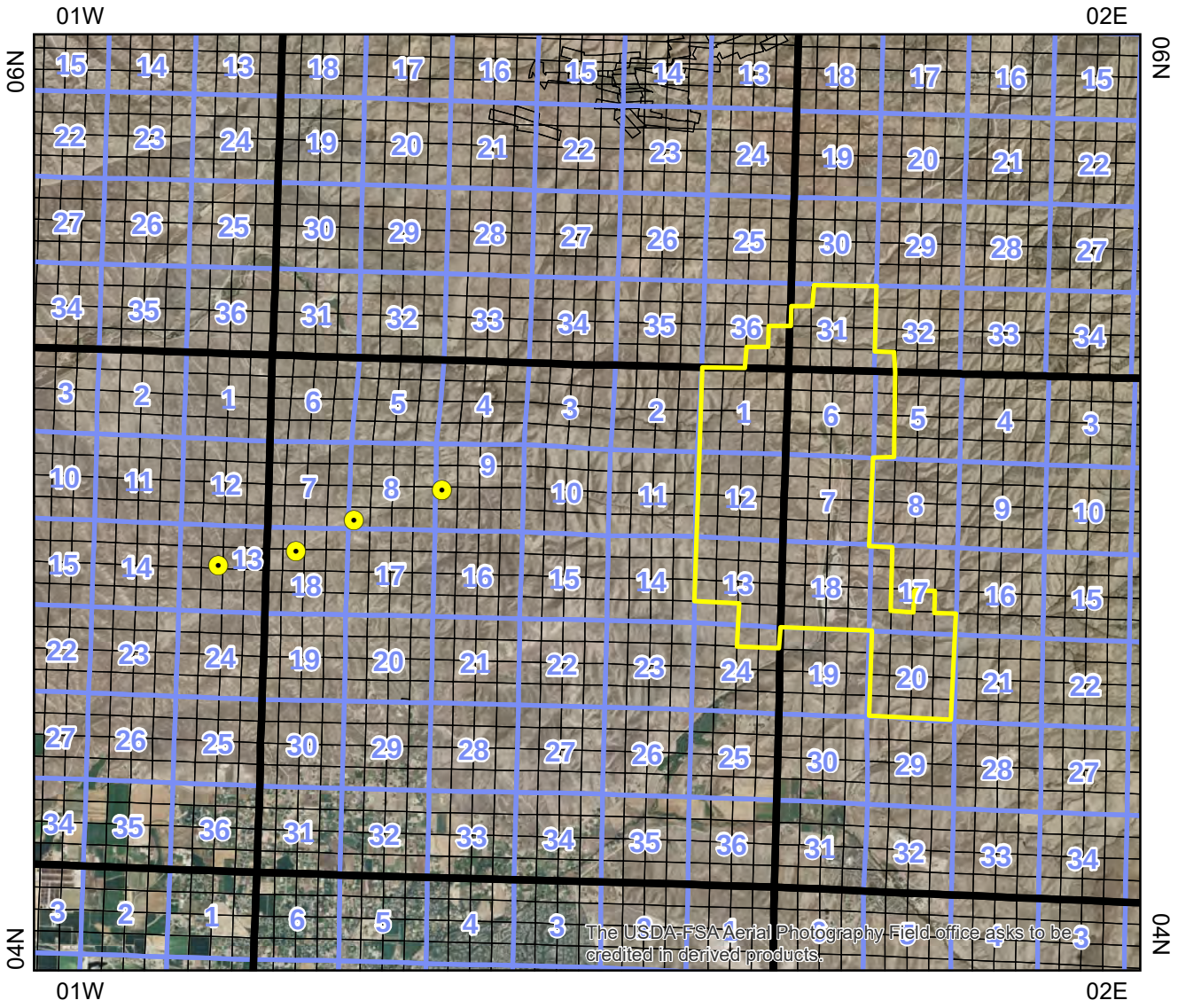
State of Idaho
Department of Water Resources

Permit To Appropriate Water

63-32061

MUNICIPAL

The map depicts the place of use for the water use listed above and point(s) of diversion of this right as currently derived from interpretations of the paper records and is used solely for illustrative purposes. Discrepancies between the computer representation and the permanent document file will be resolved in favor of the actual water right documents in the water right file.



Map produced on April 02, 2021

APPENDIX F

McDonald Water Right Application

IDAHO DEPARTMENT OF WATER RESOURCES

WATER RIGHT REPORT

11/29/2021

IDAHO DEPARTMENT OF WATER RESOURCES

Water Application Report

WATER RIGHT NO. 63-34801

Owner Type	Name and Address
Current Owner	DEVON MCDONALD 5700 WILLOW CREEK RD EAGLE, ID 83616-2024 2089990261
Representative	SPF WATER ENGINEERING LLC C/O LORI GRAVES 300 E MALLARD DR STE 350 BOISE, ID 83706-6660 2083834140

Priority Date: 09/27/2019

Status: Active

Source	Tributary
GROUND WATER	

Beneficial Use	From	To	Diversion Rate	Volume
IRRIGATION	03/01	11/15	0.5 CFS	
DOMESTIC	01/01	12/31	4.46 CFS	
Total Diversion			4.46 CFS	

Location of Point(s) of Diversion:

GROUND WATER	SWNE	Sec. 10	Township 05N	Range 01E	ADA County
GROUND WATER	SWNW	Sec. 10	Township 05N	Range 01E	ADA County
GROUND WATER	SENW	Sec. 10	Township 05N	Range 01E	ADA County
GROUND WATER	NESE	Sec. 10	Township 05N	Range 01E	ADA County
GROUND WATER	NWSE	Sec. 10	Township 05N	Range 01E	ADA County
GROUND WATER	SWNE	Sec. 11	Township 05N	Range 01E	ADA County
GROUND WATER	NESW	Sec. 11	Township 05N	Range 01E	ADA County

GROUND WATER	NWSW	Sec. 11	Township 05N	Range 01E	ADA County
GROUND WATER	NESE	Sec. 11	Township 05N	Range 01E	ADA County
GROUND WATER	NWSE	Sec. 11	Township 05N	Range 01E	ADA County
GROUND WATER	SWSE	Sec. 11	Township 05N	Range 01E	ADA County
GROUND WATER	SWSE	Sec. 11	Township 05N	Range 01E	ADA County
GROUND WATER	SESE	Sec. 11	Township 05N	Range 01E	ADA County

IRRIGATION Use:

Acre Limit: 25

DOMESTIC Use:

Number of homes: 4752

Place(s) of use:

Place of Use Legal Description: DOMESTIC ADA County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	01E	1		NENE			NWNE			SWNE			SENE	
				NENW			NWNW			SWNW			SENW	
				NESW			NWSW			SWSW			SESW	
				NESE			NWSE			SWSE			SESE	
		10		SWNE										
				SWNW			SENW							
				NESE			NWSE			SWSE			SESE	
		11		SWNE			SENE							
				NESW			NWSW			SWSW			SESW	
				NESE			NWSE			SWSE			SESE	
		12		NENE			NWNE			SWNE			SENE	
				NENW			NWNW			SWNW			SENW	
				NESW			NWSW			SWSW			SESW	
				NESE			NWSE			SWSE			SESE	
		13		NENE			NWNE			SWNE			SENE	
				NENW			NWNW			SWNW			SENW	
				NESW			NWSW							
				NESE			NWSE			SWSE			SESE	
		14		NENE			NWNE							
				NENW			NWNW							
		24		NENE			NWNE							
	02E	6	3	NENW		4	NWNW		5	SWNW			SENW	
				NESW		6	NWSW		7	SWSW			SESW	
		7		NENW		1	NWNW		2	SWNW			SENW	
				NESW		3	NWSW		4	SWSW			SESW	
		18		NENW		1	NWNW		2	SWNW			SENW	
				NESW		3	NWSW		4	SWSW			SESW	

Place of Use Legal Description: IRRIGATION ADA County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	01E	12		SWSW	1		SESW	2						
				SWSE	3		SESE	5						
		13		NENE	4		NWNE	5						
				NENW	2		NWNW	3						

Total Acres: 25

Dates:

Date Application Received: 09/27/2019

Date Application Denied:

Last Date of Beneficial Use:

Extension End Date:

Protest Deadline Date: 11/25/2019

Number of Protests: 1

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Other Information:

State or Federal: S

Owner Name Connector:

Water District Number: TBD

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Application Type: New Appropriation

Applicant Remarks: Application to replace application 63-34573 that was denied per Department order due to applicant default

Other Water Rights:

Time to Complete Works: 5

Transfer Affected Description:

Transfer Affected Contracts:

Old Transfer Number:

Transfer Reason:

Transfer Return Flows:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

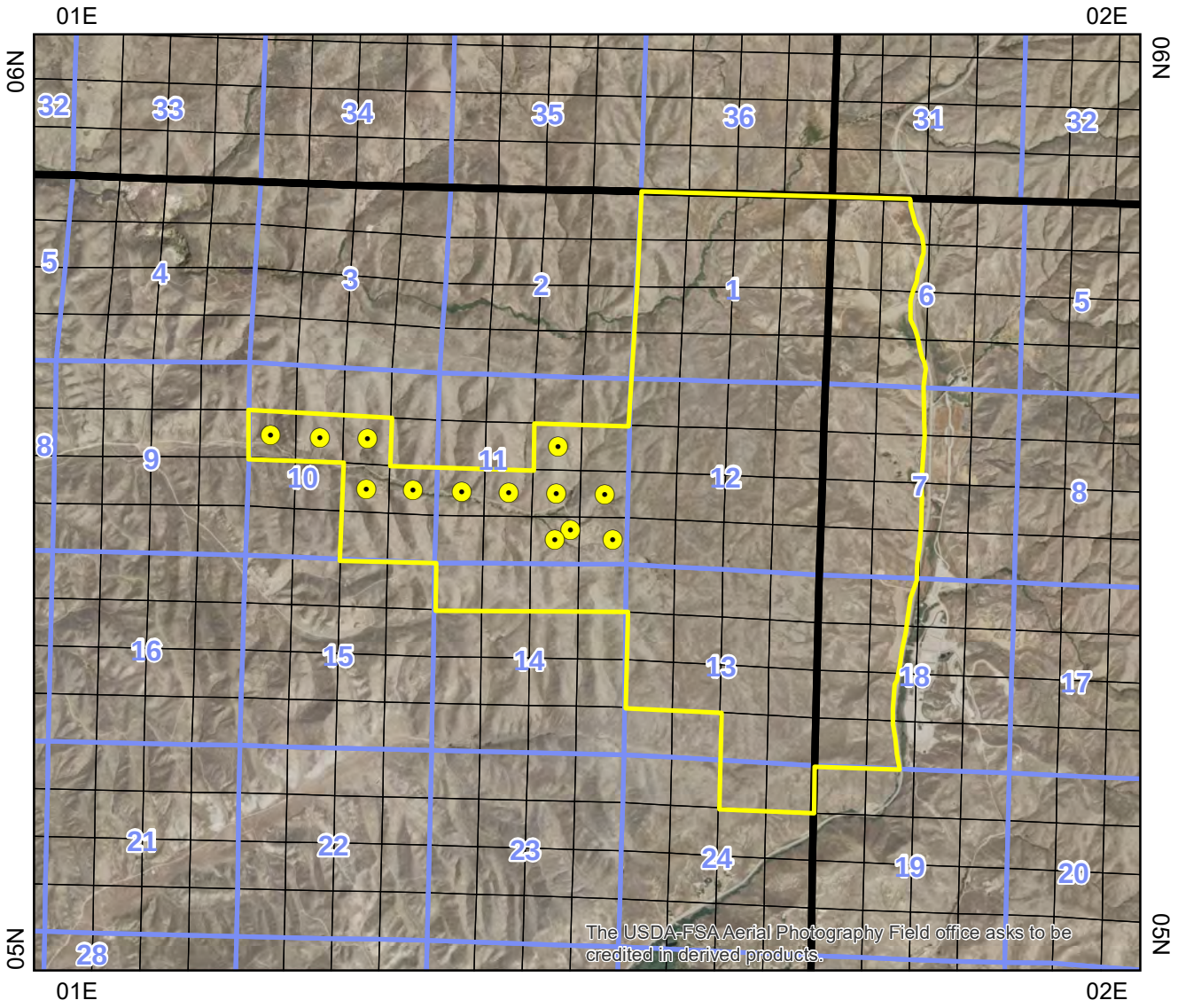
State of Idaho
Department of Water Resources

Application For Permit

63-34801

DOMESTIC

The map depicts the place of use for the water use listed above and point(s) of diversion of this right as currently derived from interpretations of the paper records and is used solely for illustrative purposes. Discrepancies between the computer representation and the permanent document file will be resolved in favor of the actual water right documents in the water right file.



Point of Diversion
Place Of Use Boundary
Townships
PLS Sections
Quarter Quarters

0 0.5 1 2 Miles

N

Map produced on March 17, 2022

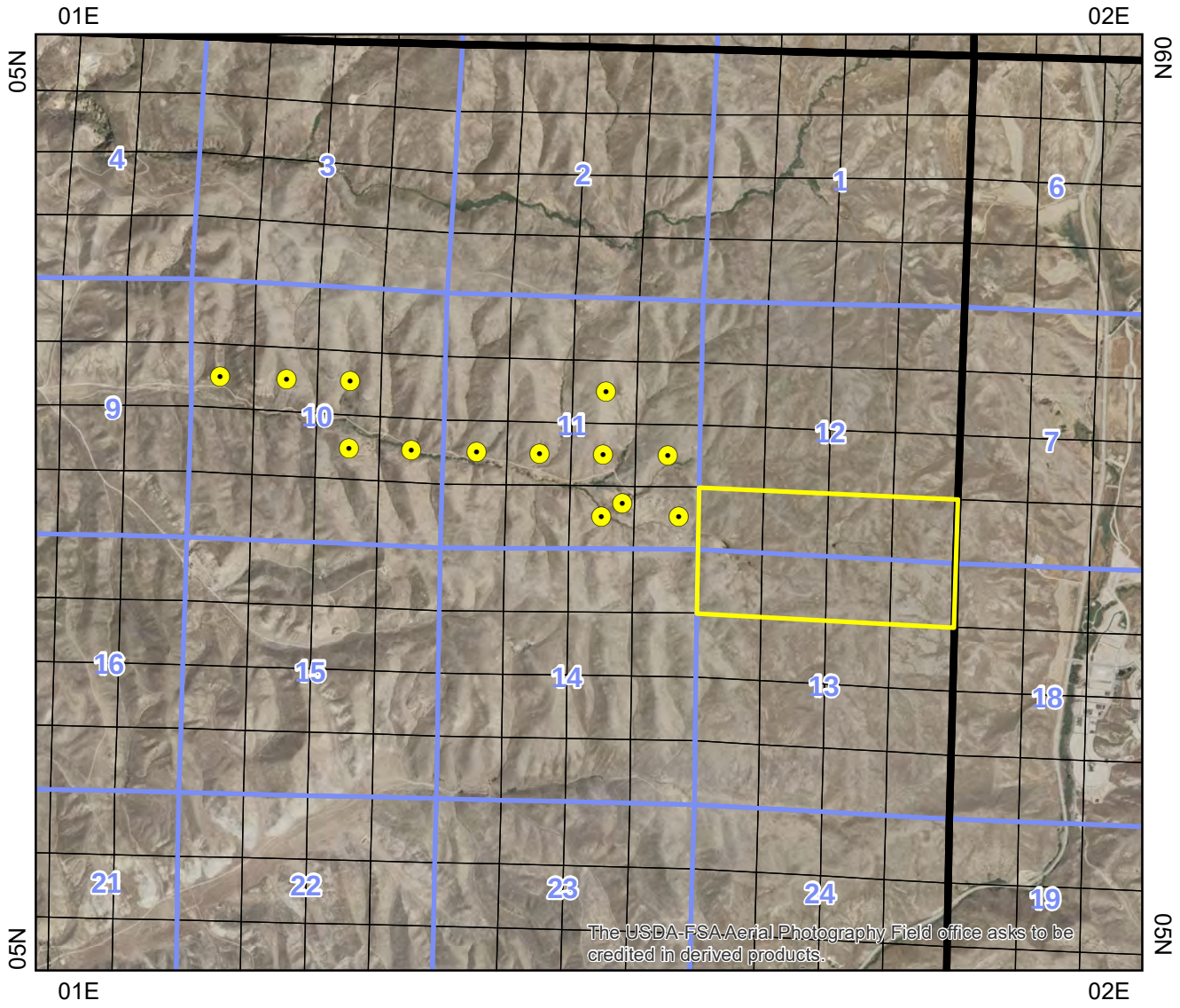
State of Idaho
Department of Water Resources

Application For Permit

63-34801

IRRIGATION

The map depicts the place of use for the water use listed above and point(s) of diversion of this right as currently derived from interpretations of the paper records and is used solely for illustrative purposes. Discrepancies between the computer representation and the permanent document file will be resolved in favor of the actual water right documents in the water right file.



Point of Diversion
Place Of Use Boundary
Townships
PLS Sections
Quarter Quarters

0 0.45 0.9 1.8 Miles

N

Map produced on March 17, 2022

APPENDIX G

Test Well 1 Driller’s Report

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0089053
Drilling Permit No. 897866
Water right or injection well # 63-32061
2. OWNER: Avimor Development
Name
Address 18454 N. McLeod Way
City Boise State ID Zip 83714

3.WELL LOCATION:
Twp. 05 North ☒ or South ☐ Rge. 01 East ☒ or West ☐
Sec. 8 ____ 10 acres 1/4 SW 40 acres 1/4 SW 160 acres 1/4
Gov't Lot ____ County Ada
Lat. 43 ° 46.754 (Deg. and Decimal minutes)
Long. -116 ° 22.405 (Deg. and Decimal minutes)
Address of Well Site N Willow Creek Rd
City Boise
(Give at least name of road + Distance to Road or Landmark)
Lot. ____ Blk. ____ Sub. Name

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

5. TYPE OF WORK:
☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other

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

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
Bentonite chips	0	451	49,000 lbs	Dry Pour

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
16	+3	560	.375	Steel	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

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

9. PERFORATIONS/SCREENS:
Perforations ☐ Y ☒ N Method
Manufactured screen ☒ Y ☐ N Type Wire Wrap
Method of installation Lower in one string

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
560	640	.040		16	Stainless	

Length of Headpipe ____ Length of Tailpipe Plate on bottom
Packer ☐ Y ☒ N Type

10.FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method
3/8" Pea gravel	451	645	30,500 lbs	Dry Pour

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) ____ Static water level (ft) 487'6"
Water temp. (°F) 72° Bottom hole temp. (°F) 70°
Describe access port 2" Pipe on side

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Test method: Pump	Bailer	Air	Flowing artesian
34	1,200	840	☒	☐	☐	☐
			☐	☐	☐	☐

Water quality test or comments:

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
24	0	12	Top soil		X
24	12	65	Medium - coarse white sand		X
24	65	396	Decomposed white granite w/white		X
			ash streaks		
24	396	398	Brown clay		X
24	398	470	Decomposed white granite w/ white		X
			ash streaks		
24	470	477	Sticky brown clay		X
24	477	534	Sandy white ash		X
24	534	540	Sticky brown clay		X
24	540	645	Sandy White ash	X	

Completed Depth (Measurable): 640'
Date Started: Apr 5, 2021 Date Completed: Sep 21, 2021

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. Co. No. 333
*Principal Driller ____ Date 10/20/21
*Driller ____ Date
*Operator II ____ Date
Operator I ____ Date 10/20/21
* Signature of Principal Driller and rig operator are required.

APPENDIX H

Test Well 1 Water Quality

SAMPLE TYPE CODE
S - Routine Sample
P - Repeat sample (at original tap)
E - Enforcement (chain of custody)
U - Upstream repeat
D - Downstream repeat
X -Other Repeat
W - Untreated
V - Invalidated by Lab
C - Construction / Special

ANALYTICAL LABORATORIES, INC.

ID00020
1804 N. 33rd Street
Boise, Idaho 83703
1-800-574-5773
1-208-342-5515
www.analyticallaboratories.com

X Public Water Supply **Private Water Supply** **Other**_____

NAME OF WATER SYSTEM	COUNTY	PWS

REPORT RESULTS TO:

JASON THOMPSON
S P F WATER ENGINEERING, LLC
300 E MALLARD DR STE 350
BOISE, ID 83706

DATE RECEIVED	8/13/2021
TIME RECEIVED	11:30
DATE ANALYZED	8/13/2021
TIME ANALYZED	18:20

SEND ADDITIONAL COPIES TO:

e-mail: jthompson@spfwater.com

Phone (208) 383-4140 **Ext** **Fax** 2083834156

IF RETEST, ORIGINAL SAMPLE DATE

CHILLED 10 C [X] **YES** [ ] **NO**

COLLECTED BY: P. KELLY

TRANSPORTED BY: P. KELLY

SAMPLE TYPE	COLLECTION DATE/TIME	Sampling Location	Cl res	TOTAL COLIFORMS SM 9223	*E. COLI* SM 9223	HPC SM 9215
C	8/13/2021 9:37	LAB# **2142001** AVIMOR WELL		**PRESENCE**	**ABSENCE**	
C	8/13/2021 9:37	LAB# **2142002** AVIMOR WELL		**PRESENCE**	**ABSENCE**	

REMARKS:

ANALYST: EM
DATE PRINTED: 8/14/2021

ANALYTICAL METHODS

Total Coliforms

SM 9222 Membrane Filter Technique, Parts 909 and 909A, Standard Methods....16th ed.,1985

SM 9221 Mutiple Tube Fermentation , Parts 908 and 908A, and 908B, Standard Methods....16th

SM 9223 MMO-MUG Test Per 40 CFR141.21(f)(3)(IV) Reported as per 100 mL

E. coli

MUG Test Per 141.214(x)(7) and 40 CFR 141.21(f)(6)(III)

HPC

Pour Plate, Part 907, Standard Methods..., 16th ed., 1985 Reported as CFU/mL

Records shall be retained and destroyed in accordance with IDAPA 58.01.08 and 40 CFR 141.33.
In general, records shall not be retained beyond prescribed retention times.

Analytical Laboratories, Inc.

_____

Brian McGovern **Date**
Laboratory Supervisor

Analytical Laboratories, Inc.

1804 N. 33rd Street
Boise, Idaho 83703
Phone (208) 342-5515

Attn: JASON THOMPSON
S P F WATER ENGINEERING, LLC
300 E MALLARD DR STE 350
BOISE, ID 83706

Collected By: P. KELLY
Submitted By: P. KELLY

Source of Sample:
AVIMOR WELL

Time of Collection: 9:37
Date of Collection: 8/13/2021
Date Received: 8/13/2021
Report Date: 9/15/2021

Field Temp:
PWS:
Temp Rcvd in Lab: 13.0 °C
PWS Name

Laboratory Analysis Report

Sample Number: 2142004

EPA Methods 504.1, 505, 515.4, 525.2, and 549.2 were performed by Anatek Labs (ATL).

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Barium, Ba	2	< 0.05	mg/L	0.05	EPA 200.7	8/16/2021	JMS
Cadmium Low	0.005	< 0.0005	mg/L	0.0005	EPA 200.8	8/17/2021	JH
Chromium Low	0.1	0.002	mg/L	0.002	EPA 200.8	8/17/2021	JH
Mercury, Hg	0.002	< 0.0002	mg/L	0.0002	EPA 245.1	8/17/2021	JD
Selenium Low	0.05	< 0.005	mg/L	0.005	EPA 200.8	8/17/2021	JH
Nickel, Ni	UR	< 0.02	mg/L	0.02	EPA 200.7	8/16/2021	JMS
Antimony Low	0.006	< 0.005	mg/L	0.005	EPA 200.8	8/17/2021	JH
Beryllium Low	0.004	< 0.0005	mg/L	0.0005	EPA 200.8	8/17/2021	JH
Thallium Low	0.002	< 0.001	mg/L	0.001	EPA 200.8	8/17/2021	JH
Sodium, Na	UR	10.5	mg/L	0.50	EPA 200.7	8/17/2021	JMS
Arsenic Low	0.01	0.0081	mg/L	0.0020	EPA 200.8	8/17/2021	JH
Aluminum, Al	UR	< 0.10	mg/L	0.10	EPA 200.7	8/16/2021	JMS
Calcium, Ca	UR	15.5	mg/L	0.50	EPA 200.7	8/17/2021	JMS
Copper, Cu	1.30	< 0.01	mg/L	0.01	EPA 200.7	8/16/2021	JMS
Iron, Fe	UR	< 0.05	mg/L	0.05	EPA 200.7	8/16/2021	JMS
Magnesium, Mg	UR	2.83	mg/L	0.50	EPA 200.7	8/17/2021	JMS

MCL = Maximum Contamination Level
MDL = Method/Minimum Detection Limit
UR = Unregulated

Date Report Printed: 9/15/2021 7:23:06 A

Laboratory Analysis Report

Sample Number: 2142004

EPA Methods 504.1, 505, 515.4, 525.2, and 549.2 were performed by Anatek Labs (ATL).

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Manganese, Mn	UR	< 0.005	mg/L	0.005	EPA 200.7	8/16/2021	JMS
Potassium, K	UR	1.8	mg/L	0.5	EPA 200.7	8/17/2021	JMS
Silver Low		< 0.001	mg/L	0.001	EPA 200.8	8/17/2021	JH
Silica	UR	43.6	mg/L	0.25	EPA 200.7	8/19/2021	JMS
Zinc, Zn	UR	< 0.01	mg/L	0.01	EPA 200.7	8/16/2021	JMS
Uranium, U	30	< 1	ug/L	1	EPA 200.8	8/17/2021	JH
Lead Low	0.015	< 0.005	mg/L	0.005	EPA 200.8	8/17/2021	JH
Calcium Hardness	UR	38.8	mg/L	1.25	EPA 200.7	8/17/2021	JMS
Ammonia Direct (as N)	UR	< 0.04	mg/L	0.04	EPA 350.1	8/16/2021	JPH
Nitrate + Nitrite (as N)	10	5.00	mg/L	0.02	EPA 353.2	8/18/2021	JPH
Nitrite (as N)	1.00	< 0.01	mg/L	0.01	EPA 353.2	8/13/2021	LW
Nitrate (as N)	10	4.0	mg/L	0.2	EPA 300.0	8/13/2021	LW
Ethylene Dibromide	0.05	<0.02	ug/L	0.02	EPA 504.1	8/24/2021	ATL
1,2-Dibromo-3-chloropropane	0.20	<0.04	ug/L	0.04	EPA 504.1	8/24/2021	ATL
Endrin	2	<0.02	ug/L	0.02	EPA 505	8/31/2021	ATL
gamma-BHC (Lindane)	0.2	<0.02	ug/L	0.02	EPA 505	8/31/2021	ATL
Methoxychlor	40	<0.1	ug/L	0.1	EPA 505	8/31/2021	ATL
Toxaphene	3	<1	ug/L	1	EPA 505	8/31/2021	ATL
Heptachlor	0.4	<0.04	ug/L	0.04	EPA 505	8/31/2021	ATL
Heptachlor epoxide	0.2	<0.02	ug/L	0.02	EPA 505	8/31/2021	ATL
Total PCB	0.5	<0.10	ug/L	0.1	EPA 505	8/31/2021	ATL
Chlordane(Total)	2	<0.1	ug/L	0.1	EPA 505	8/31/2021	ATL
Aldrin	UR	<0.2	ug/L	0.2	EPA 505	8/31/2021	ATL
Dieldrin	UR	<0.2	ug/L	0.2	EPA 505	8/31/2021	ATL
Dalapon	200	<1	ug/L	1	EPA 515.4	8/23/2021	ATL
Dicamba	UR	<0.2	ug/L	0.2	EPA 515.4	8/23/2021	ATL
2,4-D	70.0	<0.1	ug/L	0.1	EPA 515.4	8/23/2021	ATL
Dinoseb	7.00	<0.2	ug/L	0.2	EPA 515.4	8/23/2021	ATL
Pentachlorophenol	1.00	<0.04	ug/L	0.04	EPA 515.4	8/23/2021	ATL
Picloram	500	<0.1	ug/L	0.1	EPA 515.4	8/23/2021	ATL
Silvex	50.0	<0.2	ug/L	0.2	EPA 515.4	8/23/2021	ATL

MCL = Maximum Contamination Level
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Date Report Printed: 9/15/2021 7:23:06 A

Laboratory Analysis Report

Sample Number: 2142004

EPA Methods 504.1, 505, 515.4, 525.2, and 549.2 were performed by Anatek Labs (ATL).

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Bis(2-ethylhexyl)adipate	400	<0.2	ug/L	0.2	EPA 525.2	9/3/2021	ATL
Bis(2-ethylhexyl)phthalate	6	<0.6	ug/L	0.6	EPA 525.2	9/3/2021	ATL
Simazine	4	<0.15	ug/L	0.15	EPA 525.2	9/3/2021	ATL
Hexachlorocyclopentadiene	50	<0.2	ug/L	0.2	EPA 525.2	9/3/2021	ATL
Atrazine	3	<0.2	ug/L	0.2	EPA 525.2	9/3/2021	ATL
Alachlor (Lasso)	2	<0.4	ug/L	0.4	EPA 525.2	9/3/2021	ATL
Hexachlorobenzene	1	<0.2	ug/L	0.2	EPA 525.2	9/3/2021	ATL
Benzo(a)pyrene	0.2	<0.02	ug/L	0.02	EPA 525.2	9/3/2021	ATL
Butachlor	UR	<0.4	ug/L	0.4	EPA 525.2	9/3/2021	ATL
Metolachlor	UR	<1	ug/L	1	EPA 525.2	9/3/2021	ATL
Metribuzin	UR	<0.2	ug/L	0.2	EPA 525.2	9/3/2021	ATL
Propachlor	UR	<0.2	ug/L	0.2	EPA 525.2	9/3/2021	ATL
Aldicarb sulfoxide	4.0	<2.0	ug/L	2	EPA 531.2	8/25/2021	RG
Aldicarb sulfone	2.0	<2.0	ug/L	2	EPA 531.2	8/25/2021	RG
Oxamyl	200	<4.0	ug/L	4	EPA 531.2	8/25/2021	RG
Methomyl	UR	<2.0	ug/L	2	EPA 531.2	8/25/2021	RG
3-Hydroxycarbofuran	UR	<2.0	ug/L	2	EPA 531.2	8/25/2021	RG
Aldicarb	3.0	<2.0	ug/L	2	EPA 531.2	8/25/2021	RG
Propoxur (Baygon)		<2.0	ug/L	2	EPA 531.2	8/25/2021	RG
Carbofuran	40	<2.0	ug/L	2	EPA 531.2	8/25/2021	RG
Carbaryl	UR	<2.0	ug/L	2	EPA 531.2	8/25/2021	RG
Glyphosate	700	<10.0	ug/L	10	EPA 547	8/26/2021	RG
Endothall	100	<10	ug/L	10	EPA 548.1	8/20/2021	CG
Diquat	20.0	<0.8	ug/L	0.8	EPA 549.2	8/25/2021	ATL
Benzene	5	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Carbon tetrachloride	5	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Chlorobenzene	100	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
1,2-Dichlorobenzene	600	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
1,4-Dichlorobenzene	75	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
1,2-Dichloroethane	5	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
1,1-Dichloroethene	7	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY

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Date Report Printed: 9/15/2021 7:23:06 A

Laboratory Analysis Report

Sample Number: 2142004

EPA Methods 504.1, 505, 515.4, 525.2, and 549.2 were performed by Anatek Labs (ATL).

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
cis-1,2-Dichloroethene	70	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
trans-1,2-Dichloroethene	100	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
1,2-Dichloropropane	5	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Ethylbenzene	700	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Styrene	100	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Tetrachloroethene	5	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Toluene	1000	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
1,2,4-Trichlorobenzene	70	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
1,1,1-Trichloroethane	200	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
1,1,2-Trichloroethane	200	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Trichloroethene	5	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Vinyl chloride	2	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Total THM's	80	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Bromodichloromethane	----	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Bromoform	----	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Chloroform	----	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Dibromochloromethane	----	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Xylene, Total	10000	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Dichloromethane	5	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Methyl-tert-butylether	UR	<0.5	ug/L	0.5	EPA 524.2	8/13/2021	CY
Dibromofluoromethane (Surr)		106	% 70-130		EPA 524.2	8/13/2021	CY
Toluene-d5 Surrogate		92.0	% 70-130		EPA 524.2	8/13/2021	CY
Bromofluorobenzene Surrogate		81.2	% 70-130		EPA 524.2	8/13/2021	CY
Hardness	UR	48.4	mg/L	5.0	SM 2340-C	8/13/2021	LW
pH	UR	6.9	S.U.		EPA 150.1	8/13/2021	JH
Conductivity	UR	157	umhos/cm	2	EPA 120.1	8/13/2021	JH
Turbidity		0.8	NTU	0.5	EPA 180.1	8/17/2021	JMS
Corrosivity	UR	- 1.78			Langelier	8/24/2021	JH
Moderately Aggressive. No Field Temperature Provided, 16°C Used In the Calculation.							
Alkalinity	UR	50.6	mg/L CaCO3		EPA 310.1	8/17/2021	LW
Fluoride, F	4.0	0.17	mg/L	0.10	EPA 300.0	8/13/2021	LW

MCL = Maximum Contamination Level
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UR = Unregulated

Date Report Printed: 9/15/2021 7:23:06 A

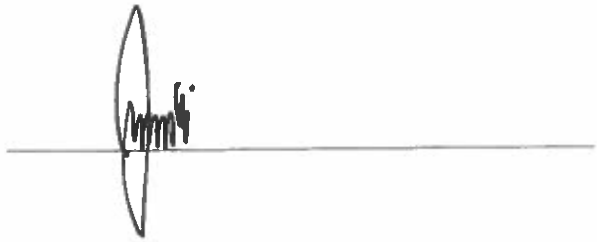
Laboratory Analysis Report

Sample Number: 2142004

EPA Methods 504.1, 505, 515.4, 525.2, and 549.2 were performed by Anatek Labs (ATL).

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Chloride, Cl	UR	3	mg/L	1	EPA 300.0	8/13/2021	LW
Sulfate, SO4	UR	6	mg/L	1	EPA 300.0	8/13/2021	LW
Cyanide, Total	0.20	< 0.005	mg/L	0.005	EPA 335.4	8/24/2021	DS
Total Dissolved Solids	UR	132	mg/L	25	SM 2540 C	8/17/2021	BDM
Color	UR	<5	C.U.	5	SM 2120	8/17/2021	MDM
Threshold Odor	UR	*2	T.O.N.		EPA 140.1	8/17/2021	MDM
* Two panel members reported a slight unidentified odor							
Surfactants	UR	<0.01	mg/L	.01	SM 5540 B	8/16/2021	MDM
Hydrogen Sulfide	UR	< 0.05	mg/L	0.05	SM 4500-S2 D	8/14/2021	EH
Total Suspended Solids		< 2	mg/L	2	USGS I-3765	8/17/2021	EH

MCL = Maximum Contamination Level
MDL = Method/Minimum Detection Limit
UR = Unregulated



Thank you for choosing Analytical Laboratories for your testing needs.
If you have any questions concerning this report,
please contact your client manager: James Hibbs

Date Report Printed: 9/15/2021 7:23:06 A

Analytical Laboratories, Inc.

1804 N. 33rd Street
Boise, Idaho 83703
Phone (208) 342-5515

Date Report Printed: 9/8/2021 10:31:07 AM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 2142003

Attn: JASON THOMPSON
S P F WATER ENGINEERING, LLC
300 E MALLARD DR STE 350
BOISE, ID 83706

Collected By: P. KELLY
Submitted By: P. KELLY

Source of Sample:
AVIMOR WELL

Time of Collection: 9:37
Date of Collection: 8/13/2021
Date Received: 8/13/2021
Report Date: 9/8/2021

Field pH:
Field Temp:
Lab pH:
Temp Rcvd in Lab: 13 °C

PWS#:
PWS Name:

Radiological testing was performed by Summit Environmental (SUM).

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Gross Alpha	15	<3	pCi/L	3	EPA 900.0	8/25/2021	SUM
Gross Beta	50	<4	pCi/L	4	EPA 900.0	8/25/2021	SUM
Radium 226	5	<1	pCi/L	1	EPA 903.0	9/7/2021	SUM
Radium 228	5	1.60+/-0.9	pCi/L	1	EPA 904.0	9/3/2021	SUM

Email: jthompson@spfwater.com

Thank you for choosing Analytical Laboratories for your testing needs.
If you have any questions about this report, or any future analytical needs, please contact your client manager:
James Hibbs

MCL = Maximum Contamination Level
MDL = Method/Minimum Detection Limit
UR = Unregulated

Analytical Laboratories, Inc.

1804 N. 33rd Street
Boise, Idaho 83703
Phone (208) 342-5515

Date Report Printed 1/26/2022 7 26 05 AM
http://www analyticallaboratories com
These test results relate only to the items tested

Laboratory Analysis Report

Sample Number: 2203277

Attn: PETER VIDMAR
SPF WATER ENGINEERING, LLC
300 E MALLARD DR
STE 350
BOISE, ID 83706

Collected By:
Submitted By:

Source of Sample:
AVIMOR WELL #1

Time of Collection: 11:30
Date of Collection: 1/21/2022
Date Received: 1/21/2022
Report Date: 1/26/2022

Field pH: Lab pH
Field Temp: Temp Rcvd in Lab:

PWS#:
PWS Name:

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Arsenic Low	0.01	0.0078	mg/L	0.0020	EPA 200.8	1/24/2022	JH

Email: shannula@spfwater.com

CC: pvidmar@spfwater.com

MCL = Maximum Contamination Level
MDL = Method/Minimum Detection Limit
UR = Unregulated

Thank you for choosing Analytical Laboratories for your testing needs

If you have any questions about this report, or any future analytical needs, please contact your client manager

James Hibbs

APPENDIX H

Avimor Irrigation Water Rights

IDAHO DEPARTMENT OF WATER RESOURCES

WATER RIGHT REPORT

8/26/2021

IDAHO DEPARTMENT OF WATER RESOURCES

Water Right Report

WATER RIGHT NO. 63-5386

Owner Type	Name and Address
Current Owner	AVIMOR PARTNERS LLC 18454 N MCLEOD WAY BOISE, ID 83714 2089390343
Original Owner	SPRING VALLEY LIVESTOCK CO INC PO BOX 9 STAR, ID 83669 2082867975

Priority Date: 03/15/1894

Basis: Decreed

Status: Active

Source	Tributary
SPRING VALLEY CREEK	BOISE RIVER

Beneficial Use	From	To	Diversion Rate	Volume
IRRIGATION	03/15	11/15	1.86 CFS	
STOCKWATER	02/01	12/01	0.02 CFS	
Total Diversion			1.88 CFS	

Location of Point(s) of Diversion:

SPRING VALLEY CREEK	SESESE	Sec. 07	Township 05N	Range 02E	ADA County
SPRING VALLEY CREEK	NENWNE	Sec. 18	Township 05N	Range 02E	ADA County

IRRIGATION Use:

Acre Limit: 93

STOCKWATER Use:

Number of stock: 400

Place(s) of use:

Place of Use Legal Description: IRRIGATION ADA County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	02E	7		NWNE	5		SWNE	5.5						
				NWSE	8		SWSE	9						
		17		SWNW	3									
				NWSW	0.5									
		18		NENE	0.5		NWNE	17.5		SWNE	13		SENE	6
				NENW	3		SENW	7.5						
				NESW	5		SESW	5.5						
				NWSE	3		SWSE	1						

Place of Use Legal Description: STOCKWATER ADA County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	02E	7		NWNE			SWNE							
				SESW										
				NWSE			SWSE							
		17		SWNW										
				NWSW										
		18		NENE			NWNE			SWNE			SENE	
				NENW			SENW							
				NESW			SESW							
				NWSE			SWSE							

Total Acres: 93

Conditions of Approval:

1.	X27	This right is limited to the irrigation of 93 acres within the place of use described above in a single irrigation season.
2.	206	This right is limited to the irrigation of a specific 93 acres within the 207 acre place of use authorized by this right in a single irrigation season. The specific 93 acres to be irrigated by the right holder shall be identified prior to use by submittal of a land list and a representative electronic shape file or by submittal of a land list and a map sufficiently detailed to allow creation of an electronic shape file to be associated with this right in the geographic information system component of the water rights database maintained by the department. Before changing the 93 acres to be irrigated within the 207 acre place of use, the right holder shall submit a new land list and representative electronic shape file or map to the Department prior to the irrigation season in which the change will occur.
3.	R65	This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 4.5 afa per acre at the field headgate for irrigation of the lands above.

4.	R05	Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 63.
5.	R43	The right holder shall maintain a measuring device and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversions.
6.	N05	The quantity of water under this right for stockwater use shall not exceed 13,000 gallons per day.
7.	N08	The quantity of water decreed for this water right for stockwater use is not a determination of historical beneficial use.
8.	T07	The right holder shall accomplish the change authorized by this transfer within one year of the date of this approval.
9.	T08	Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
10.	T19	Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

Dates:

Licensed Date:

Decreed Date: 05/03/2007

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Water Supply Bank Enrollment Date Accepted:

Water Supply Bank Enrollment Date Removed:

Application Received Date:

Protest Deadline Date:

Number of Protests: 0

Other Information:

State or Federal: S

Owner Name Connector:

Water District Number: 63

Generic Max Rate per Acre: 0.02

Generic Max Volume per Acre: 4.5

Civil Case Number:

Old Case Number:

Decree Plantiff:

Decree Defendant:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

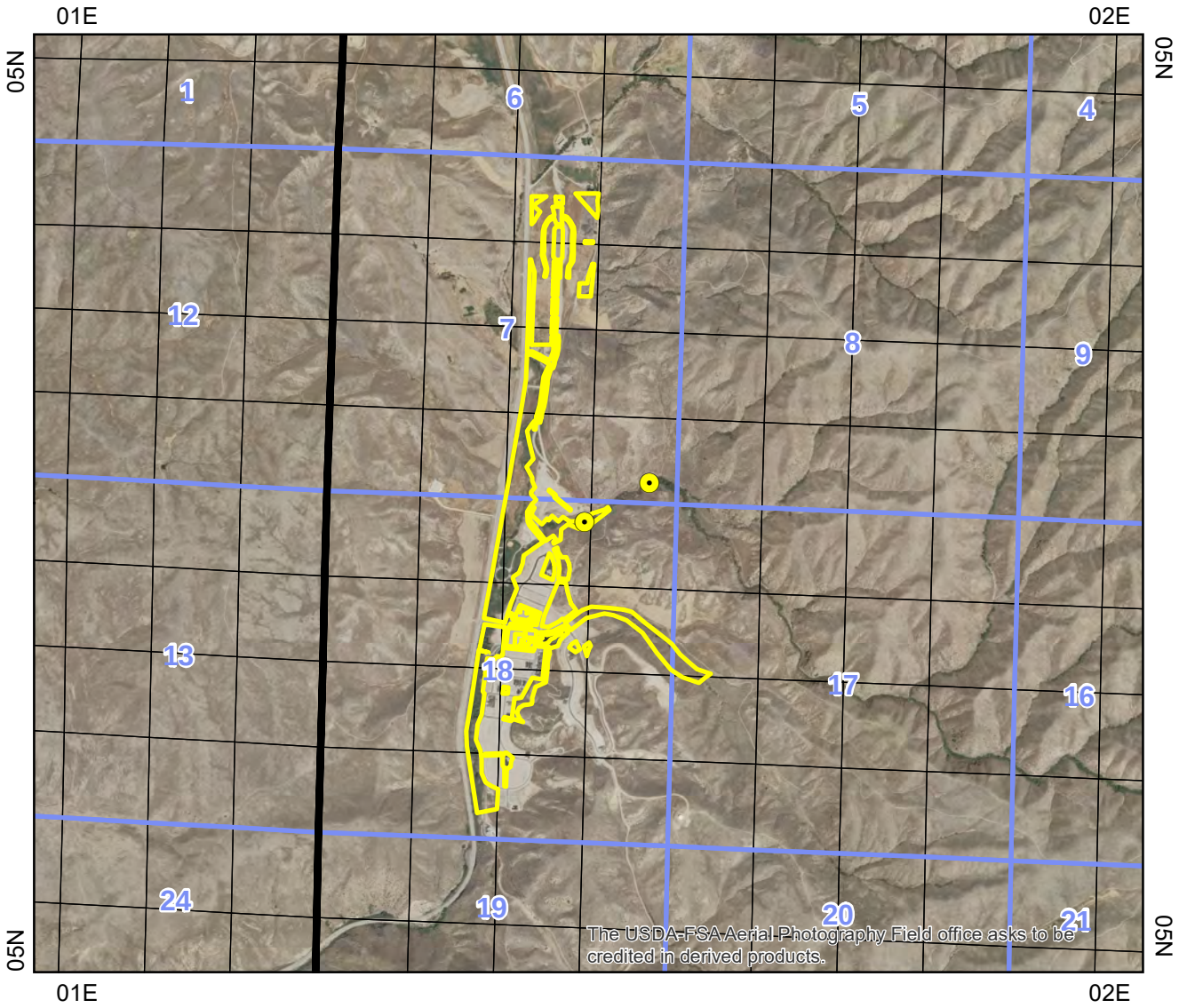
State of Idaho
Department of Water Resources

Water Right

63-5386

IRRIGATION

The map depicts the place of use for the water use listed above and point(s) of diversion of this right as currently derived from interpretations of the paper records and is used solely for illustrative purposes. Discrepancies between the computer representation and the permanent document file will be resolved in favor of the actual water right documents in the water right file.



Map produced on August 26, 2021

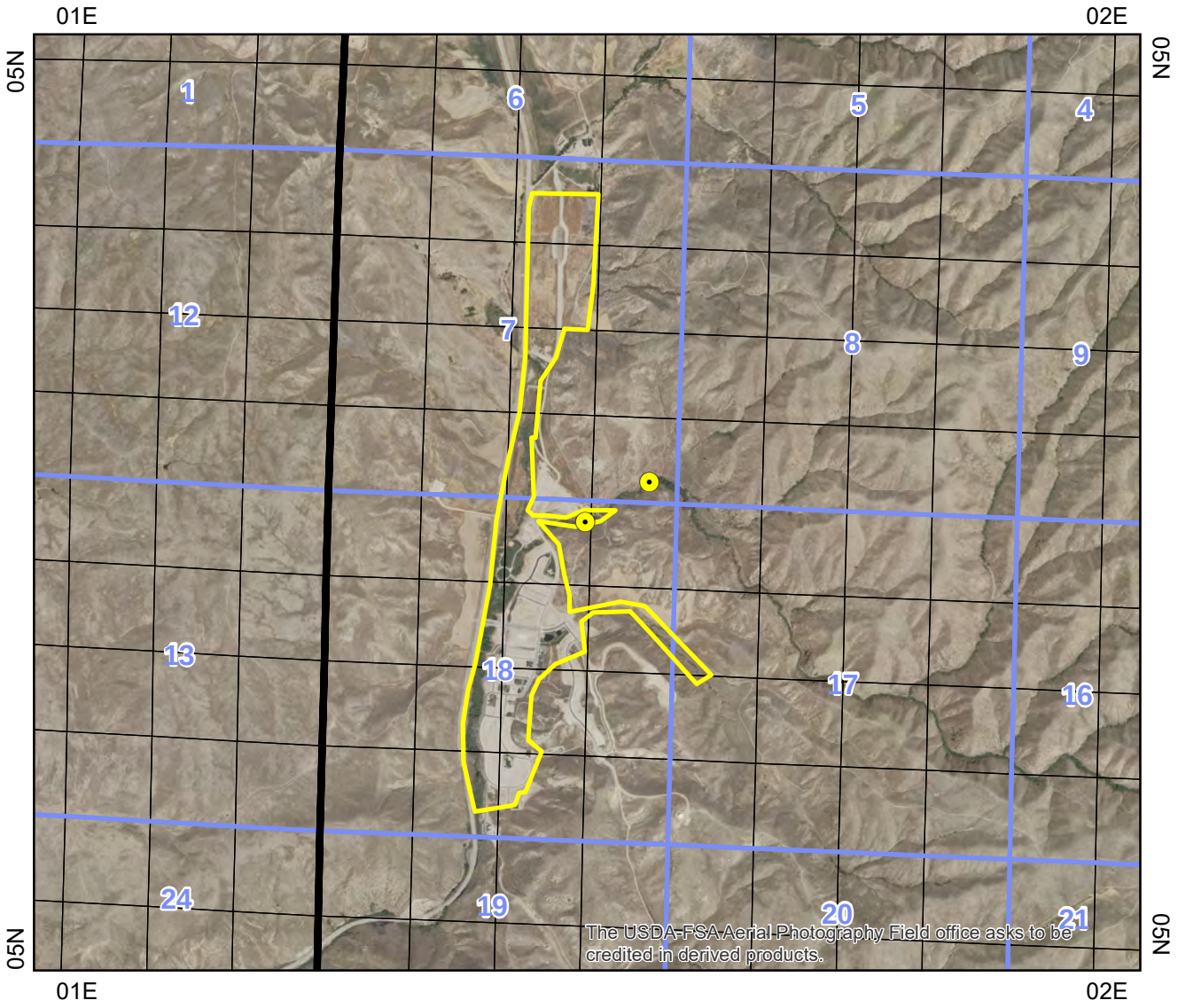
State of Idaho
Department of Water Resources

Water Right

63-5386

STOCKWATER

The map depicts the place of use for the water use listed above and point(s) of diversion of this right as currently derived from interpretations of the paper records and is used solely for illustrative purposes. Discrepancies between the computer representation and the permanent document file will be resolved in favor of the actual water right documents in the water right file.



Map produced on August 26, 2021

IDAHO DEPARTMENT OF WATER RESOURCES

WATER RIGHT REPORT

8/26/2021

IDAHO DEPARTMENT OF WATER RESOURCES

Water Right Report

WATER RIGHT NO. 63-5387

Owner Type	Name and Address
Current Owner	FIRST AMERICAN TITLE INSURANCE CO TRUST N0 8562 FOR THE BENEFIT OF AVIMOR PARTNERS LLC 18454 N MCLEOD AVE BOISE, ID 83714 2089390343
Directors Report Owner	SPRING VALLEY LIVESTOCK CO INC PO BOX 9 STAR, ID 83669 2082867975
Original Owner	SPRING VALLEY LIVESTOCK CO INC C/O COLEN MC LEOD JR 2005 S 10TH AVE CALDWELL, ID 83605

Priority Date: 11/15/1890

Basis: Decreed

Status: Active

Water Supply Bank Status: Active

Source	Tributary
WILLOW CREEK	BOISE RIVER

Beneficial Use	From	To	Diversion Rate	Volume
IRRIGATION	03/15	11/15	1 CFS	
STOCKWATER	02/01	12/01	0.01 CFS	
Total Diversion			1.01 CFS	

Location of Point(s) of Diversion:

WILLOW CREEK	NESE	Sec. 31	Township 06N	Range 02E	BOISE County

STOCKWATER Use:

Number of stock: 400

Place(s) of use:

Place of Use Legal Description: IRRIGATION BOISE County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	02E	6		NESW	3									
				NWSE	2		SWSE	31						

Place of Use Legal Description: STOCKWATER BOISE County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	02E	6		NESW										
				NWSE			SWSE							

Total Acres: 36

Conditions of Approval:

1. C18 This partial decree is subject to such general provisions necessary for the definition of the rights or for the efficient administration of the water rights as may be ultimately determined by the Court at a point in time no later than the entry of a final unified decree. Section 42-1412(6), Idaho Code.
2. X02 Stockwater use is for 400 range cattle.

Dates:

Licensed Date:

Decreed Date: 03/13/2007

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Water Supply Bank Enrollment Date Accepted:

Water Supply Bank Enrollment Date Removed:

Application Received Date:

Protest Deadline Date:

Number of Protests: 0

Other Information:

State or Federal: S

Owner Name Connector:

Water District Number: 63

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Civil Case Number:

Old Case Number:

Decree Plantiff:

Decree Defendant:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

Water Supply Bank:

Lessor Name(s): FIRST AMERICAN TITLE INSURANCE CO TRUST N0 8562

Lease Status: Active

Lease Amount: 1.01

Rental Availability: 1.01

Date Received: 1/13/2014

Lease Begin Date: 1/1/2014

Expiration Date: 12/31/2018

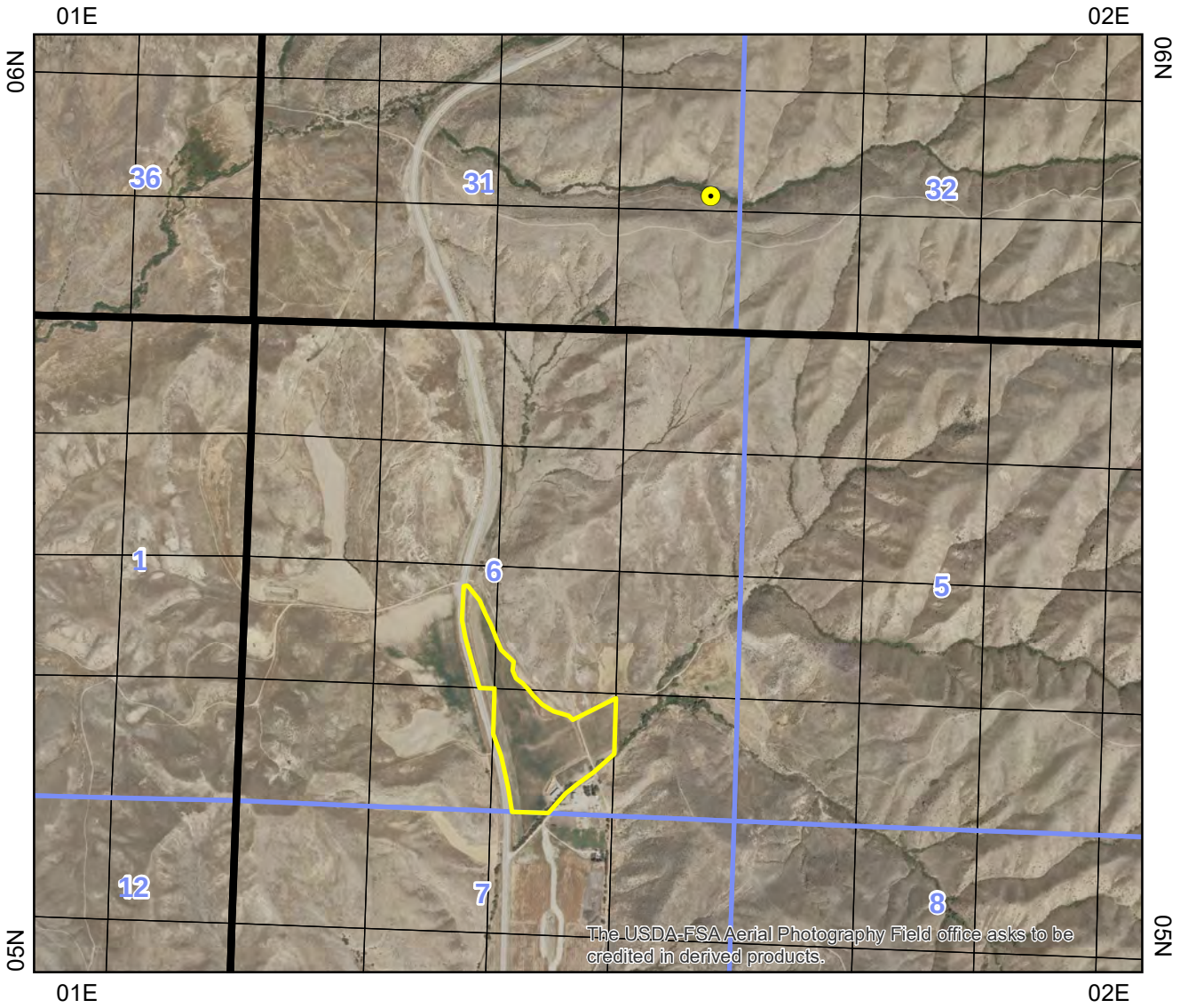
State of Idaho
Department of Water Resources

Water Right

63-5387

IRRIGATION

The map depicts the place of use for the water use listed above and point(s) of diversion of this right as currently derived from interpretations of the paper records and is used solely for illustrative purposes. Discrepancies between the computer representation and the permanent document file will be resolved in favor of the actual water right documents in the water right file.



Map produced on August 26, 2021

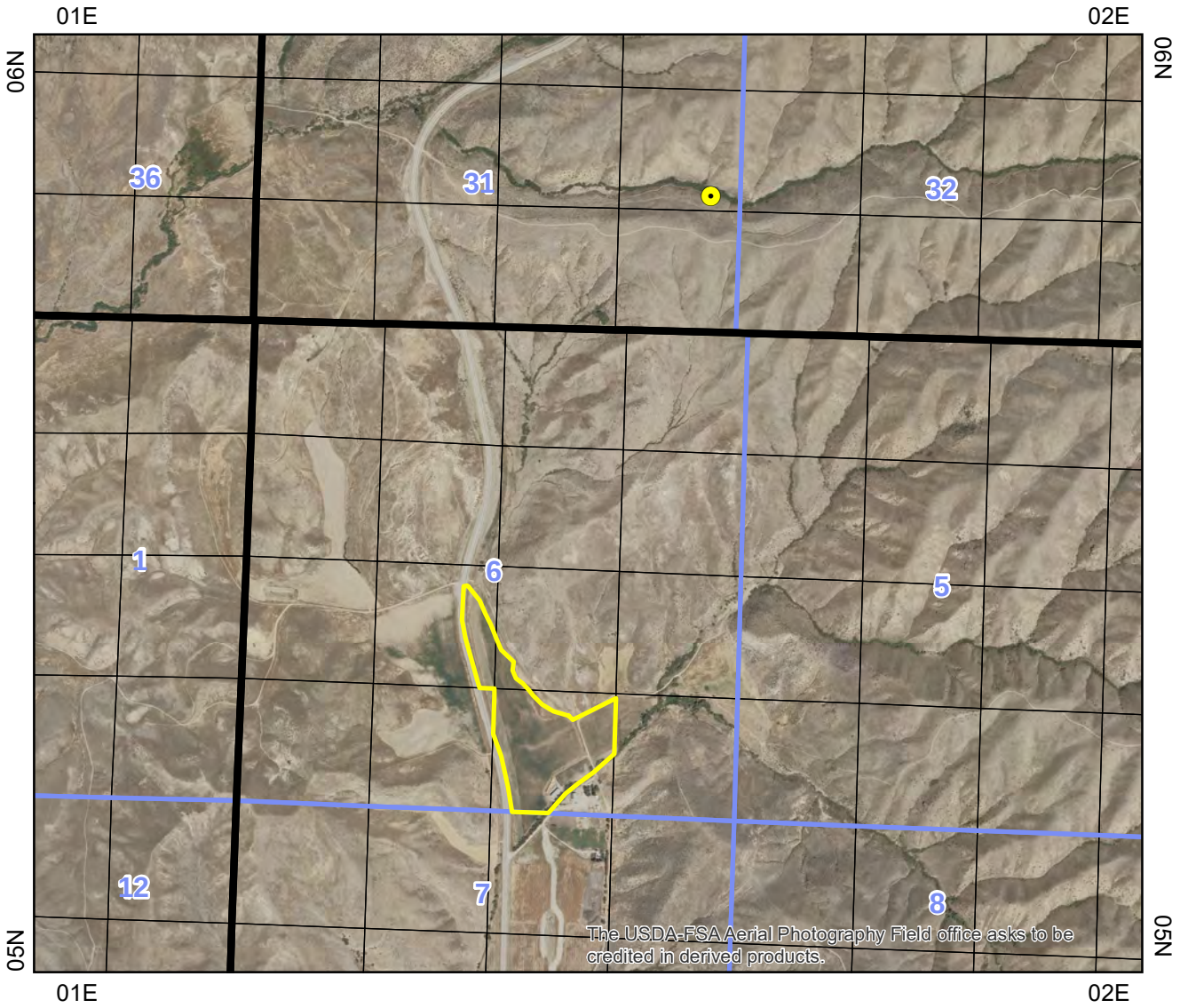
State of Idaho
Department of Water Resources

Water Right

63-5387

STOCKWATER

The map depicts the place of use for the water use listed above and point(s) of diversion of this right as currently derived from interpretations of the paper records and is used solely for illustrative purposes. Discrepancies between the computer representation and the permanent document file will be resolved in favor of the actual water right documents in the water right file.



Map produced on August 26, 2021

IDAHO DEPARTMENT OF WATER RESOURCES

WATER RIGHT REPORT

8/26/2021

IDAHO DEPARTMENT OF WATER RESOURCES

Water Right Report

WATER RIGHT NO. 63-18974

Owner Type	Name and Address
Current Owner	FIRST AMERICAN TITLE INSURANCE CO TRUST N0 8562 FOR THE BENEFIT OF AVIMOR PARTNERS LLC 18454 N MCLEOD AVE BOISE, ID 83714 2089390343
Directors Report Owner	SPRING VALLEY LIVESTOCK CO INC PO BOX 9 STAR, ID 83669 2082867975

Priority Date: 03/15/1958

Basis: Decreed

Status: Active

Source	Tributary
GROUND WATER	

Beneficial Use	From	To	Diversion Rate	Volume
IRRIGATION	03/15	11/15	1.14 CFS	256.5 AFA
Total Diversion			1.14 CFS	256.5 AFA

Location of Point(s) of Diversion:

GROUND WATER	NWNWNE	Sec. 07	Township 05N	Range 02E	ADA County

Place(s) of use:

Place of Use Legal Description: IRRIGATION ADA County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	02E	7		NWNE	27		SWNE	24						
				NWSE	6									

Total Acres: 57

Conditions of Approval:

1. C18 This partial decree is subject to such general provisions necessary for the definition of the rights or for the efficient administration of the water rights as may be ultimately determined by the Court at a point in time no later than the entry of a final unified decree. Section 42-1412(6), Idaho Code.

Dates:

Licensed Date:

Decreed Date: 03/13/2007

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Water Supply Bank Enrollment Date Accepted:

Water Supply Bank Enrollment Date Removed:

Application Received Date:

Protest Deadline Date:

Number of Protests: 0

Other Information:

State or Federal: S

Owner Name Connector:

Water District Number: TBD

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Civil Case Number:

Old Case Number:

Decree Plantiff:

Decree Defendant:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

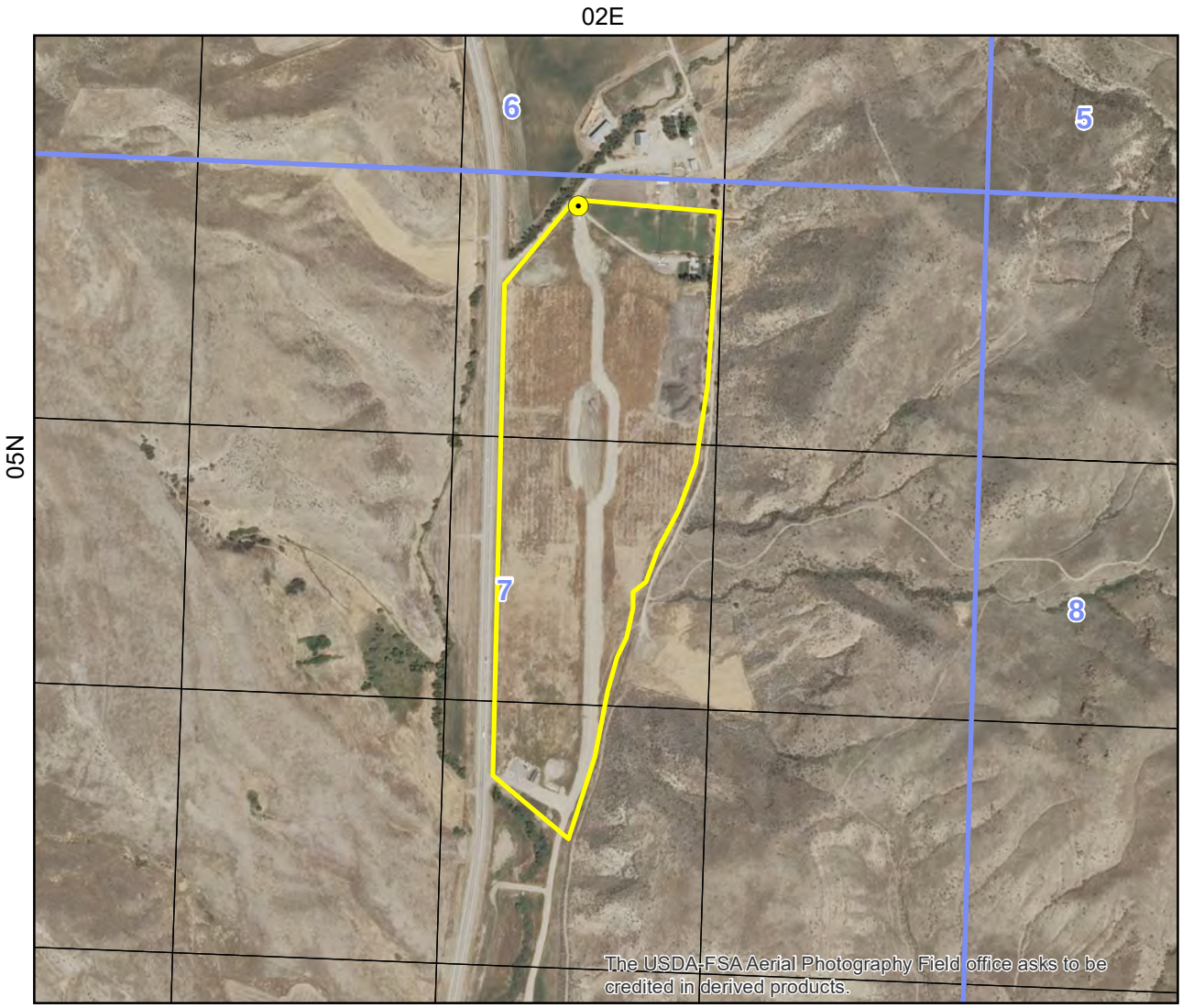
State of Idaho
Department of Water Resources

Water Right

63-18974

IRRIGATION

The map depicts the place of use for the water use listed above and point(s) of diversion of this right as currently derived from interpretations of the paper records and is used solely for illustrative purposes. Discrepancies between the computer representation and the permanent document file will be resolved in favor of the actual water right documents in the water right file.



Point of Diversion
Place Of Use Boundary
Townships
PLS Sections
Quarter Quarters

0 0.1 0.2 0.4 Miles

N

Map produced on August 26, 2021

IDAHO DEPARTMENT OF WATER RESOURCES

WATER RIGHT REPORT

8/26/2021

IDAHO DEPARTMENT OF WATER RESOURCES

Water Application Report

WATER RIGHT NO. 63-34946

Owner Type	Name and Address
Current Owner	AVIMOR PARTNERS LLC 18454 N MCLEOD WAY BOISE, ID 83714 2089390343
Representative	MOUNTAIN WATERWORKS INC C/O MICHAEL WOODWORTH PO BOX 9906 BOISE, ID 83707 2087803982

Priority Date: 08/03/2020

Status: Active

Source	Tributary
GROUND WATER	

Beneficial Use	From	To	Diversion Rate	Volume
IRRIGATION	03/15	11/15	4.06 CFS	
FIRE PROTECTION	01/01	12/31	0.96 CFS	
Total Diversion			5 CFS	

Location of Point(s) of Diversion:

GROUND WATER	SESW	Sec. 01	Township 05N	Range 01E	ADA County
GROUND WATER	SESE	Sec. 01	Township 05N	Range 01E	ADA County
GROUND WATER	NWSW Lt 6	Sec. 06	Township 05N	Range 02E	ADA County
GROUND WATER	SWSW Lt 7	Sec. 06	Township 05N	Range 02E	ADA County

Place(s) of use:

Place of Use Legal Description: IRRIGATION ADA County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	02E	5	4	NWNW	2		SWNW	2						
				NWSW	2		SWSW	2						
		6	1	NENE	5	2	NWNE	5		SWNE	5		SENE	5
			3	NENW	2	4	NWNW	2	5	SWNW	5		SENW	5
				NESW	5	6	NWSW	5	7	SWSW	2		SESW	5
				NESE	10		NWSE	10		SWSE	10		SESE	10
		7		NENE	5		NWNE	5		SENE	5			
				NENW	5	1	NWNW	5	2	SWNW	5		SENW	5
				NESW	5	3	NWSW	5	4	SWSW	5		SESW	5
				NWSE	5		SWSE	5						
		18		NWNE	5		SWNE	4						
				NENW	4		SENW	2						
06N		31		NESW	2		SESW	2						
				NESE	5		NWSE	5		SWSE	5		SESE	5

Place of Use Legal Description: FIRE PROTECTION ADA County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	02E	5	4	NWNW			SWNW							
				NWSW			SWSW							
		6	1	NENE		2	NWNE			SWNE			SENE	
			3	NENW		4	NWNW		5	SWNW			SENW	
				NESW		6	NWSW		7	SWSW			SESW	
				NESE			NWSE			SWSE			SESE	
		7		NENE			NWNE			SENE				
				NENW		1	NWNW		2	SWNW			SENW	
				NESW		3	NWSW		4	SWSW			SESW	
				NWSE			SWSE							
		18		NWNE			SWNE							
				NENW			SENW							
06N		31		NESW			SESW							
				NESE			NWSE			SWSE			SESE	

Total Acres: 203

Dates:

Date Application Received: 08/03/2020

Date Application Denied:

Last Date of Beneficial Use:

Extension End Date:

Protest Deadline Date:

Number of Protests: 0

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Other Information:

State or Federal:

Owner Name Connector:

Water District Number: TBD

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Application Type: New Appropriation

Applicant Remarks: The Avimor development is proposing to expand their current community, which includes 203 acres of irrigated land. The aquifer targeted for this permit is planned to be recharged with recycled water from the community's infiltration basins (supply). The irrigation demand was determined based on 0.02 CFS per irrigated acre.

Other Water Rights:

Time to Complete Works: 5

Transfer Affected Description:

Transfer Affected Contracts:

Old Transfer Number:

Transfer Reason:

Transfer Return Flows:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False