

Revised Hydrogeologic Assessment Report

8900 Lakeside Dr.
Reno, Nevada 89511

Prepared for:

Thomas Creek Development, LLC
2100 Manzanita Ln
Reno, Nevada 89509

Prepared by:



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Reno, Nevada 89511
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October 1, 2022



BROADBENT

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Creating Solutions. Building Trust.

October 1, 2022

Project No. 22-02-169

Adam Giordano and Roger Davidson
Project Directors
Thomas Creek Development LLC
2100 Manzanita Ln
Reno, Nevada 89509

Re: **Revised Hydrogeologic Assessment Report**
8900 Lakeside Dr.
Reno, Nevada 89511

Dear Mr. Giordano and Mr. Davidson:

Broadbent & Associates, Inc. (Broadbent) is pleased to submit the enclosed *Revised Hydrogeologic Assessment Report* for the property located on 8900 Lakeside Dr. Reno, Nevada 89511. Please do not hesitate to contact us if you should have any questions or require additional information.

Sincerely,

BROADBENT & ASSOCIATES, INC.

Morgan Sawyer
Senior Staff Geologist

Matt Herrick, CHG, PG, CEM
Principal Hydrogeologist/Division Manager

cc: Matt Setty, Nevada Environmental Consulting, LLC

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LIST OF ACRONYMS/ABBREVIATIONS

Broadbent:	Broadbent & Associates, Inc.	MW:	Monitoring Well
bls:	below land surface	“:	Inch
Gpm:	Gallons per minute	°C:	Degrees Celsius
PW1:	Production Well 1	%:	Percent
PW2:	Production Well 2	TMWA	Truckee Meadows Water Authority

1.0 INTRODUCTION

Thomas Creek Development LLC is pursuing development of 24 single-family residence on 72 acres of land located at 8900 Lakeside Drive in Reno, Nevada (Property). Truckee Meadows Water Authority (TMWA) does not currently service this portion of town and the water supply for the proposed residence may come from domestic wells that would be installed as a part of the development. Broadbent has completed hydrogeologic assessment services including well installation, aquifer testing, and modeling to further understand and evaluate impact to existing domestic wells nearby. An initial Hydrogeologic Assessment Report dated September 19, 2022 was previously issued. A couple changes (detailed below) have been made to models to better represent the project. It is important to note that recommendations have not changed from those provided in the September 19, 2022 Report.

2.0 DRILLING AND WELL INSTALLATION

2.1 PERMITTING

The Nevada State Engineers office issued exploration well waivers for two wells installed to conduct aquifer testing and one waiver for a observation/monitoring well in accordance with NRS 534. The wells are required to be either permitted as a domestic well or abandoned within one year of drilling, or a waiver extension is required. At the conclusion of use, the monitoring well is required to be abandoned per the procedures listed in NRS 534.

The Washoe County District Health Department issued domestic well permits for the two domestic wells. An additional permit was issued for the monitoring well. Included in Appendix A are permits issued by the Nevada State Engineers office and the Washoe County District Health Department.

2.2 DRILLING

From July 13 to the 26, 2022 a Broadbent geologist observed drilling, well construction, and development of three wells. Drilling was completed by Bruce MacKay Pump and Well Service using a mud rotary drill rig. Two production wells (PW1 and PW2) and one monitor well (MW) were installed to better understand the geologic material in the subsurface and complete aquifer testing. Soil cuttings were continuously logged by Broadbent. Well locations are included in Figure 1.

Drilling of the first well (PW1) proceeded to a total depth of 420 feet below land surface (bls). Once the geology was understood including the location of water bearing zones, the second and third wells (PW2 and MW) were completed to 240 and 260 feet bls, respectively. The wells are in close proximity and similar material was encountered in each borehole. Multiple shallow water bearing zones were noted in the alluvium at depths ranging from 40 to 120 feet bls. A deeper alluvial water bearing zone was noted at depths ranging from 130 to 250 feet bls. Here we define the multiple shallow water bearing zones as the shallow alluvial aquifer and the deeper zone as the deep alluvial aquifer. A third aquifer was noted at 345 feet bls consisting of fractured volcanic rock. The third aquifer was observed to

the total depth drilled (420 feet bls) and likely extends to much greater depths. Lithologic and well construction logs are provided in Appendix B.

2.3 WELL CONSTRUCTION

Both production wells were installed with an 11" drill bit and completed with 6" diameter casing. The two inch diameter monitor well was installed with a $7\frac{7}{8}$ drill bit. Well screen for all three wells was set in the deeper alluvial aquifer - 140 to 240 feet bls for PW1 and PW2 and 140 to 230 feet bls for MW. Gravel filter pack material was placed in the annular space between the screen interval and the borehole wall. Bentonite and/or neat cement was placed in the annular space above the gravel pack to the surface. A sounding tube was positioned in both the production wells to approximately 140 feet bls. A locking cap was installed on the monitor well. Lithologic and well construction logs are provided in Appendix B.

2.4 WELL DEVELOPMENT

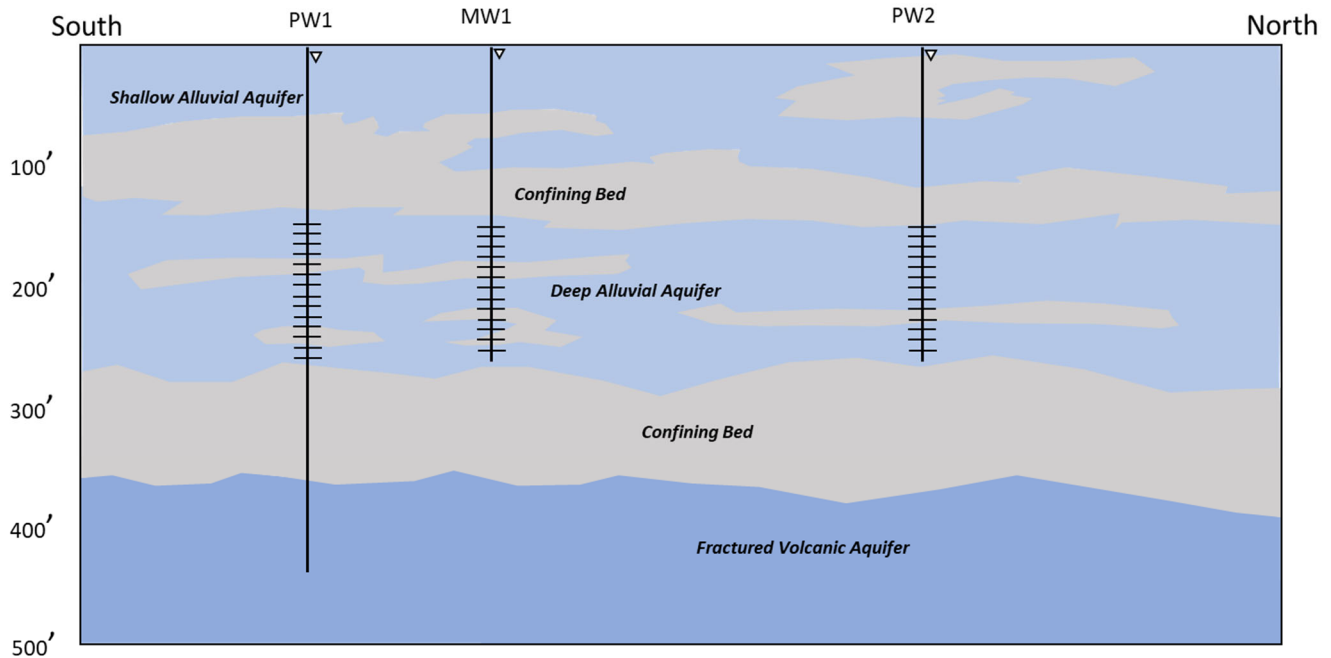
Wells were developed by Bruce MacKay Pump and Well Service using an airlift technique. Prior to well development static water levels were observed at 16, 17, and 10 feet bls from PW1, PW2, and MW, respectively. Both production wells produced over 300 gallons per minute (gpm), and the smaller diameter monitoring well produced 20 to 30 gallons per minute. Wells were developed for thirty minutes to clean out the perforated interval of sand and silt prior to obtaining stabilization parameters including temperature, pH, and conductivity.

The stabilization parameters were gathered every 15 minutes. Stabilization of parameters was determined when the temperature, pH, and conductivity were within 0.2°C, 0.1, and 3%, respectively from the previous readings. PW1 reached stability after 90 minutes of development at a temperature of 19.68 °C, pH 7.75, and conductivity of 0.226 mS/cm. PW2 reached stability after 180 minutes of development at a temperature of 21.70°C, pH 7.72, and conductivity of 0.251 mS/cm. MW reached stability after 105 minutes of development at a temperature of 26.60°C, pH 7.74, and conductivity of 0.216 mS/cm.

2.5 GEOLOGY AND HYDROGEOLOGY

The drilling completed during the hydrogeologic assessment provided valuable insight regarding the subsurface geology. The Property consists of alluvial deposits on top of volcanic stratigraphy. Alluvium consists of clay, silt, sand, and gravel that has been deposited by running water. The material encountered was characterized and logged continuously to a maximum depth of 420 feet bls. Multiple shallow water bearing zones were observed from 40 to 120 feet bls and are defined here as the shallow alluvial aquifer. A deeper zone was encountered from 130 to 250 feet bls and is considered the deeper alluvial aquifer. The alluvial aquifer material is primarily composed of course grained materials including sands and gravels. The aquifers are separated by impermeable to semi-impermeable fine grained material consisting of silts and clays. The silts and clays separating the aquifers act as a confining bed and the deeper alluvial aquifer is confined. Significant clay was encountered from approximately 250 to

350 feet bls. Intermittent volcanic material (likely basaltic or andesitic boulders) were observed at various depths. Fractured volcanic rock (rhyolite) was noted from 345 feet bls to total depth (420 feet bls) in PW1. The fractures in the volcanic rock can permit the movement of water and therefore this material should also be considered an aquifer. Presented below is a simplified cross section depicting the geology from the three wells and the three distinct aquifers.



A review of available well driller reports from domestic wells in close proximity to the Property indicate wells completed in all three aquifers mentioned above. Some of the older wells are completed in the shallow alluvial aquifer. Other wells, typically those installed more recently, have been completed in the deeper alluvial aquifer or the fractured volcanic material. Many wells in the surrounding area were completed in the fractured volcanic material and are located along ridges and hills and were often the only option as alluvium was not present in the subsurface. Generally speaking, alluvial aquifers provide better water quality and quantity in Northern Nevada compared to fractured volcanic bedrock aquifers. It is important to note that the three aquifers (shallow alluvial, deep alluvial, and fractured volcanic) are distinct and separated by fine grained material (silts and clays) that greatly restrict the movement of water between the aquifers.

3.0 AQUIFER TESTING

Step discharge and constant discharge tests were conducted on August 15 and August 18, 2022. The step test was completed to determine the maximum allowable pumping rate for the constant discharge test that would prevent excessive drawdown and premature test termination due to low water levels in the pumping well. The constant discharge test was completed to determine

representative aquifer hydraulic parameters (i.e., hydraulic conductivity and storativity). These parameters were then used to develop groundwater models.

3.1 EQUIPMENT AND METHODS

Bruce MacKay Pump and Well Service installed pumps and 5 hp 3 phase motors in both PW1 and PW2. A portable generator was brought on site to provide power to the pump and motor. Pump discharge rates were monitored continuously during both the step and constant discharge tests using a flowmec digital flow meter. Pump performance was very stable, and discharge rates varied by less than four gallons per minute (gpm) during the tests.

Water levels were measured using an electric water level tape and by means of three pressure transducers (In-Situ, Inc. Level Trolls 700™) installed in the three wells.

3.2 WATER MANAGEMENT

Water was discharged through a two-inch diameter PVC pipe onto the ground. About 7,300 gallons of water was generated during the step test and approximately 37,000 gallons were generated during the constant discharge test.

3.3 STEP DISCHARGE TEST

A step discharge aquifer test was completed using PW1 to assess the aquifer response to a range of pumping rates. This test was necessary to determine the ideal pumping rate for the subsequent constant discharge test. Two steps were run at pumping rates of 38 and 93 gpm. Water levels were measured in the pumping well during both the pumping and recovery phase after pumping stopped. Water levels in the pumping well were measured manually at five-minute intervals as well as once a minute with the pressure transducers.

Prior to commencement of testing, the depth to water in PW1 was measured at 15.87 feet bls. The first step of the test was conducted at a pumping rate of 38 gpm. Within approximately 60 minutes, water levels stabilized at 20.61 feet bls. Pumping was then increased to 93 gpm which was the maximum output of the pump and motor. After an additional 45 minutes the test was terminated. At the end of the test, drawdown of water level in the well was measured at approximately six feet. A pumping rate of 93 gpm was chosen for the subsequent constant discharge test.

3.4 CONSTANT DISCHARGE TEST

A constant discharge aquifer test was completed on PW1 to determine aquifer hydraulic parameters (i.e., conductivity and storativity). The pumping well had recovered to static water levels prior to initiation of the constant discharge test. Static water levels were recorded at 15.86, 14.31, and 10.63 feet bls from PW1, PW2, and MW. The test was run for approximately seven hours at a pumping rate of 92 gpm. PW1 and observations wells MW and PW2 were monitored manually during the seven hours of pumping and the first hour of recovery at set time intervals and via the pressure transducers

both during pumping and for 14 hours following completion of pumping. Figure 2 presents water level drawdown observed in the three wells during the testing and recovery phases. Drawdown data from the aquifer test is included in Appendix C.

As presented in Figure 2, drawdown in the pumping well (PW1) and observation wells MW and PW2 stabilized near the end of the test. Total drawdown in the pumping well was measured at 13.7 feet. MW is approximately 70 feet from the pumping well and 5.4 feet of drawdown was noted. PW2 is approximately 300 feet from the pumping well and 3.4 feet of drawdown was observed.

3.5 AQUIFER TEST ANALYSIS

The Theis (1935) type curve analysis method, within the graphical software package Aquifer Test Pro v. 11.0, was used to analyze the drawdown and recovery data from the constant discharge test. The Theis solution within Aquifer Test Pro assumes that the aquifer system has the following properties:

- Homogenous and isotropic
- The aquifer is confined and has an apparent infinite extent
- Uniform thickness
- Water is released from storage contemporaneously with decrease in hydraulic head

Figures 3 and 4 depicts the Theis (1935) type curve analysis and summarize results for the drawdown and recovery portions of the test. The data fit the curve analysis very well. Based on the analysis, the average hydraulic conductivity of the water bearing zone for both pumping and recovery at the site (based on an aquifer thickness of 100 feet) was calculated to be 19 ft/day. Hydraulic conductivity is a property of porous material that describes the ease with which a fluid can move through the pore space. The average storativity (storage coefficient) was calculated to be 1.73×10^{-4} . The storativity is the volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head. The hydraulic conductivity is consistent with literature values for medium to coarse grained sands (Domenico and Schwartz, 1990). The value for storativity further confirms that the deeper alluvial aquifer is under confining conditions. Both the hydraulic conductivity and confining nature of the aquifer are in agreement with the material that was encountered while drilling. We believe the hydraulic conductivity and storativity values calculated here are representative hydraulic parameters for the deep alluvial aquifer within the proposed extent of the development which is bounded by the north and middle (main) branches of Dry Creek.

4.0 GROUNDWATER DRAWDOWN MODEL

Using the hydraulic parameters from the aquifer test analysis, steady-state groundwater drawdown models were generated to simulate 24 single-family residential domestic wells and determine the potential impact these wells may have on neighboring properties. An additional well, which could be used as back-up to water common area landscape when steamboat ditch is dry, has been added to the model simulations. A total of 25 domestic wells are included in the model simulations.

The volume of water required per residence per day needed to be estimated to generate the models. Nevada Revised Statutes (NRS) 534.315 provides regulations for domestic wells. The regulation states a well may be drilled for domestic use if not more than 1,800 gallons of water per day (gpd) are diverted from the well for use by a single-family household, including a residence with a lawn, garden and domestic animals. The use of 1,800 gpd for a single family residence is considered very high and is likely only realized under unique circumstances.

Analysis of the water consumption data published by the Truckee Meadows Water Authority (TMWA) in 2020-2040 Water Resources Plan indicates the average household consumption in the Truckee Meadows is 150 gpd per person. This is slightly higher than other communities in the western US and is calculated based on total consumption divided by the service population. This value includes residential irrigation usage. The Washoe County Planning department uses a household density value of 2.46 people per dwelling (2016-2020 average). Referencing these data, the average per household water consumption in the Truckee Meadows is 369 gpd (150 gallons per persons x 2.46 persons per household). The use of the 414 gpd reflects the slightly higher household use when high density housing units like apartment are not included in the average use statistics. Therefore the 414 gpd is a conservative estimate of the average per household daily water demand in the Truckee Meadows.

Although 414 gallons per day is believed to be the more realistic usage rate for the proposed residence, steady state groundwater models were generated for both 414 and 1,800 gpd. The model was generated with 25 simulated well extraction points. Each well was located in relation to the proposed subdivision parcel lines to demonstrate the future spatial distribution of the proposed wells. Steady state groundwater drawdown models for both daily usage rates are included in Figures 5 and 6. A summary of results are provided below.

25 Wells Each Using 414 gallons per day

- 414 gpd per residence is equivalent to a continuous pumping rate of 0.287 gallons per minute per household or 7.2 gallons per minute for all 25 wells (24 proposed households plus one additional well for common area landscaping when steamboat ditch water is not available).
- The maximum drawdown of groundwater in the center of the proposed subdivision is 0.26 feet (3 inches).
- Near the edge of the subdivision, drawdown ranges from 0.18 to 0.20 feet (~2 inches).

25 Wells Each Using 1,800 gallons per day

- 1,800 gpd per residence is equivalent to a continuous pumping rate of 1.25 gallons per minute per household or 31.3 gallons per minute for all 25 wells (24 proposed households plus one additional well for common area landscaping when steamboat ditch water is not available).
- The maximum drawdown of groundwater in the center of the proposed subdivision is 1.05 feet (12 inches).
- Near the edge of the subdivision, drawdown is approximately 0.85 feet (10 inches).

The groundwater drawdown models assume steady-state groundwater conditions and pumping from the deeper alluvial aquifer. The groundwater drawdown estimated at the edge of the proposed subdivision reflects the cumulative effect of the 25 wells spaced across the development and pumping

at a continuous steady state. The model does not assume/(account for) contributions from local or regional hydrologic influences such as the Steamboat Ditch, neighboring septic systems or Dry Creek ephemeral drainages.

5.0 DISCUSSION AND RECOMMENDATIONS

Domestic water supply for the proposed 24 single-family residential properties on 72 acres of land may come from wells. Concerns have been raised regarding possible impact to existing neighboring domestic well owners in the near vicinity of the proposed development. Drilling, well construction, aquifer testing, and modeling has been completed to better understand and evaluate potential impact.

Drilling activities provided valuable information regarding the subsurface geology and hydrogeology. Three aquifers have been defined in the immediate vicinity of the Property (shallow alluvial, deep alluvial, and fractured volcanic). These three aquifers are distinct and separated by fined grained materials (silts and clays) that greatly restrict the movement of water between the aquifers. The wells installed for this scope of work were completed in the deeper alluvial aquifer. It is recommended that additional domestic wells installed on the Property be completed in this same aquifer.

The property is traversed by Steamboat Ditch and there are 184.5 acre feet of surface water rights attached to the parcel. The developer plans to convey water rights to future owners with practical access to the ditch. Continued use of the surface water for irrigation will help recharge the shallow aquifer. Benefits from surface water recharge would likely be limited to the shallow alluvial aquifer, and not the deeper aquifer where the proposed domestic wells would be screened.

Using the hydraulic parameters calculated from the aquifer tests, groundwater drawdown models were generated to simulate 25 residential domestic wells (24 proposed households plus one additional well for common area landscaping when steamboat ditch water is not available). Models were generated for two daily usage rates – 414 gpd and 1,800 gpd per household. The 414 gpd is considered more representative; however, 1,800 gpd has also been included to be conservative and present worst case scenario (high usage) model results. The 414 gpd consumption from each of the 25 wells results in drawdown of groundwater in the aquifer of 0.20 feet (~2 inches) at the edge of the proposed subdivision. At 1,800 gpd consumption from each of the 25 wells, a drawdown of 0.85 feet (10 inches) is observed at the edge of the proposed subdivision. It is important to note that these modeled drawdowns would only be realized in wells located at the edge of the proposed subdivision and screened in the same deep alluvial aquifer as the subdivision wells. Any effects at greater distances are further diminished with distance from the subdivision.

Local groundwater elevations typically fluctuate on the order of many feet per year as a result of seasonal variations in precipitation, snowmelt, runoff, and infiltration. The data collected and models generate show minimal to no impact from the 25 proposed domestic wells relative to groundwater levels in neighboring wells screened in the deeper alluvial aquifer. As discussed in Section 2.5 above, the three aquifers (shallow alluvial, deep alluvial, and fractured volcanic aquifer) are separated by thick confining beds that greatly restrict the flow of water between the aquifers. The 25 proposed domestic wells should have no impact on existing wells screened in the shallow alluvial or deeper fractured volcanic aquifers.

6.0 LIMITATIONS

The findings presented in this report are based upon information provided by observations of field personnel and activities reported by Broadbent. Our services were performed in accordance with the generally accepted standard or practice at the time this report was written. No other warranty expressed or implied was made. This report has been prepared for the exclusive use of Thomas Creek Development, LLC. It is possible that variations in the subsurface could exist beyond the points explored in this investigation.

7.0 REFERENCES

Broadbent & Associates, Inc. September 19, 2022, Hydrogeologic Assessment, 8900 Lakeside Dr, Reno, NV 89511.

Nevada Revised Statutes Chapter 534 – Underground Water and Wells,
<https://www.leg.state.nv.us/NRS/NRS-534.html>

P.A Domenico and F.W. Schwartz, Physical and Chemical Hydrogeology, Copyright 1990 John Wiley & Sons, Inc.

2020-2040 Water Resource Plan - Truckee Meadows Water Authority (tmwa.com)

U.S. Census Bureau QuickFacts: Washoe County, Nevada



Legend:

Well

Nevada

N

Scale: 1:2,400

100 50 0 100

Feet

Figure 1

Well Locations

BROADBENT

5450 Louie Lane, Suite 101
Reno, NV, 89511
(775) 322-7969 (P) * (775) 322-7956 (F)

Job # 22-02-169 Date: 8/20/2022

Notes:

1. Imagery Source: Esri World Imagery (Maxar, Microsoft)
2. Datum: WGS 1984 UTM Zone 11N

Thomas Creek Development Hydrogeologic Assessment	
Designed	
Drawn	JCM
Approved	

Figure 2: Constant Discharge Aquifer
TestPumping and Recovery
Thomas Creek Development

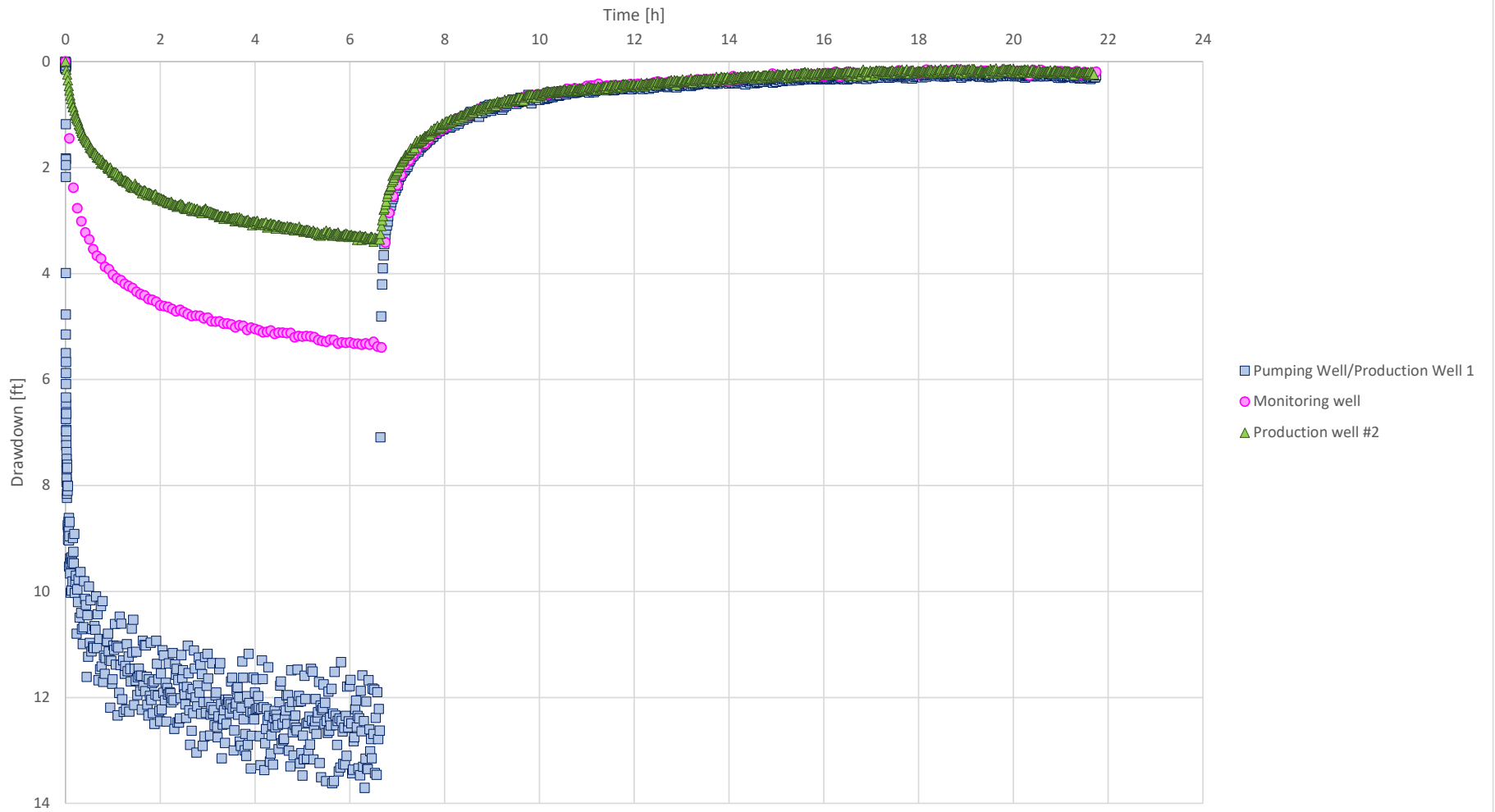
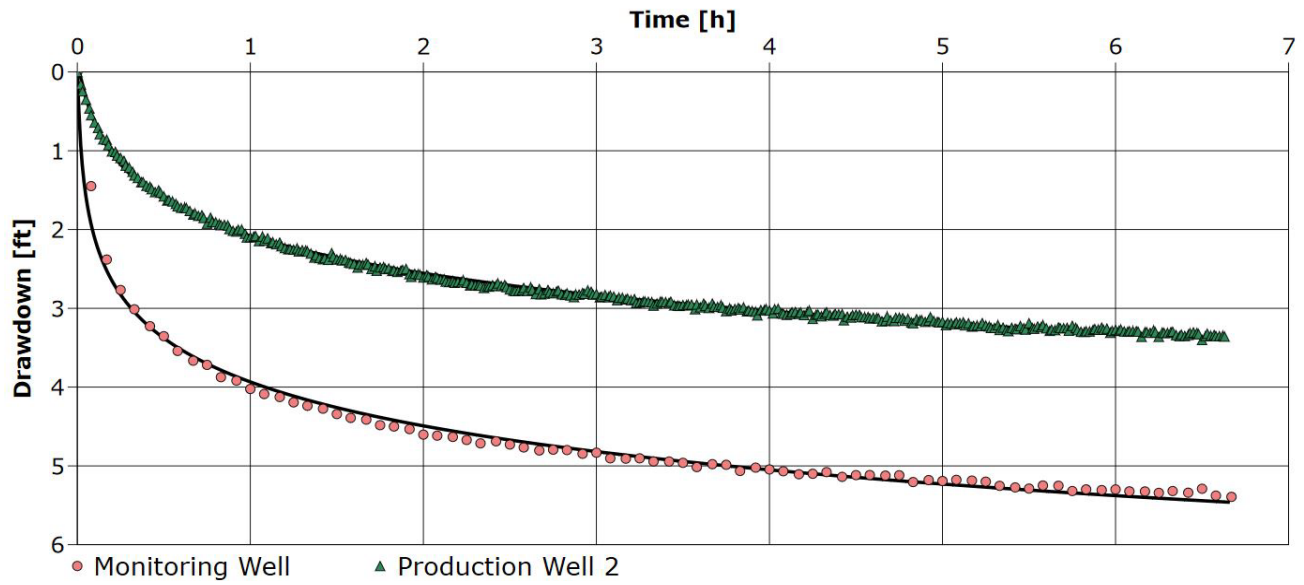


Figure 3: Aquifer Test Analysis Report - Pumping

Location: 8900 Lakeside Dr	Pumping Test: Constant Rate	Pumping Well: Production Well 1	
Test Conducted by: M. Sawyer; E. Robtoy		Test Date: 8/18/2022	
Analysis Performed by: M. Sawyer		Analysis Date: 8/26/2022	
Aquifer Thickness: 100 ft	Discharge: variable, average rate 91.2 [U.S. gpm]		

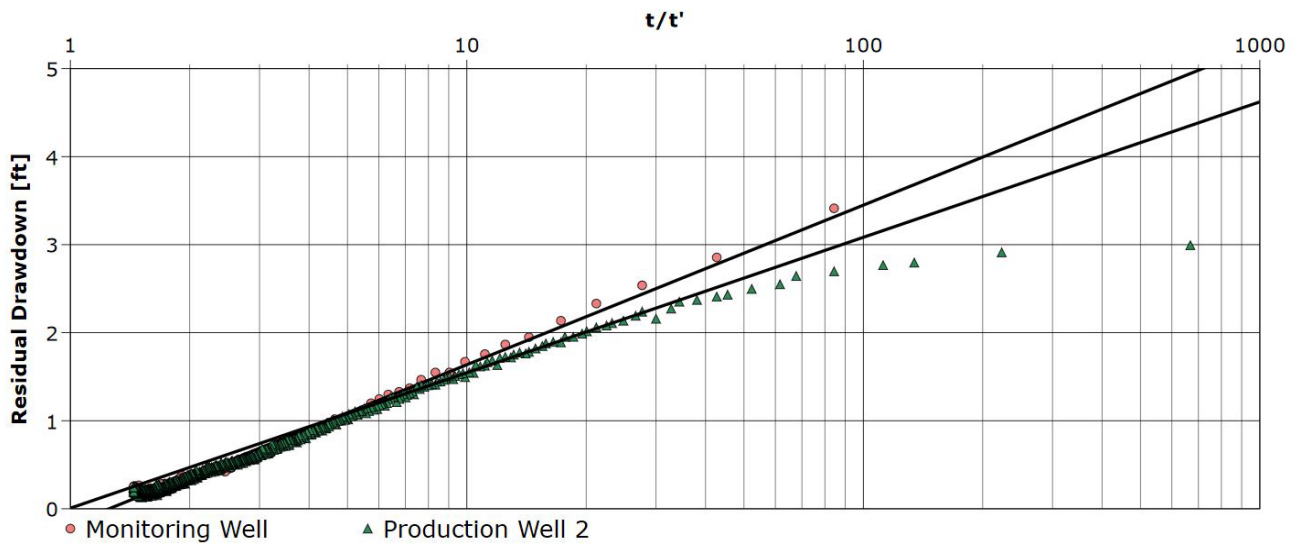


Calculation using Theis

Observation Well	Transmissivity [ft ² /d]	Hydraulic Conductivity [ft/d]	Storage coefficient	Radial Distance to PW [ft]
Monitoring Well	1.72×10^3	1.73×10^1	2.35×10^{-4}	72.8
Production Well 2	2.00×10^3	2.00×10^1	1.11×10^{-4}	297.32
Average	1.87×10^3	1.87×10^1	1.73×10^{-4}	

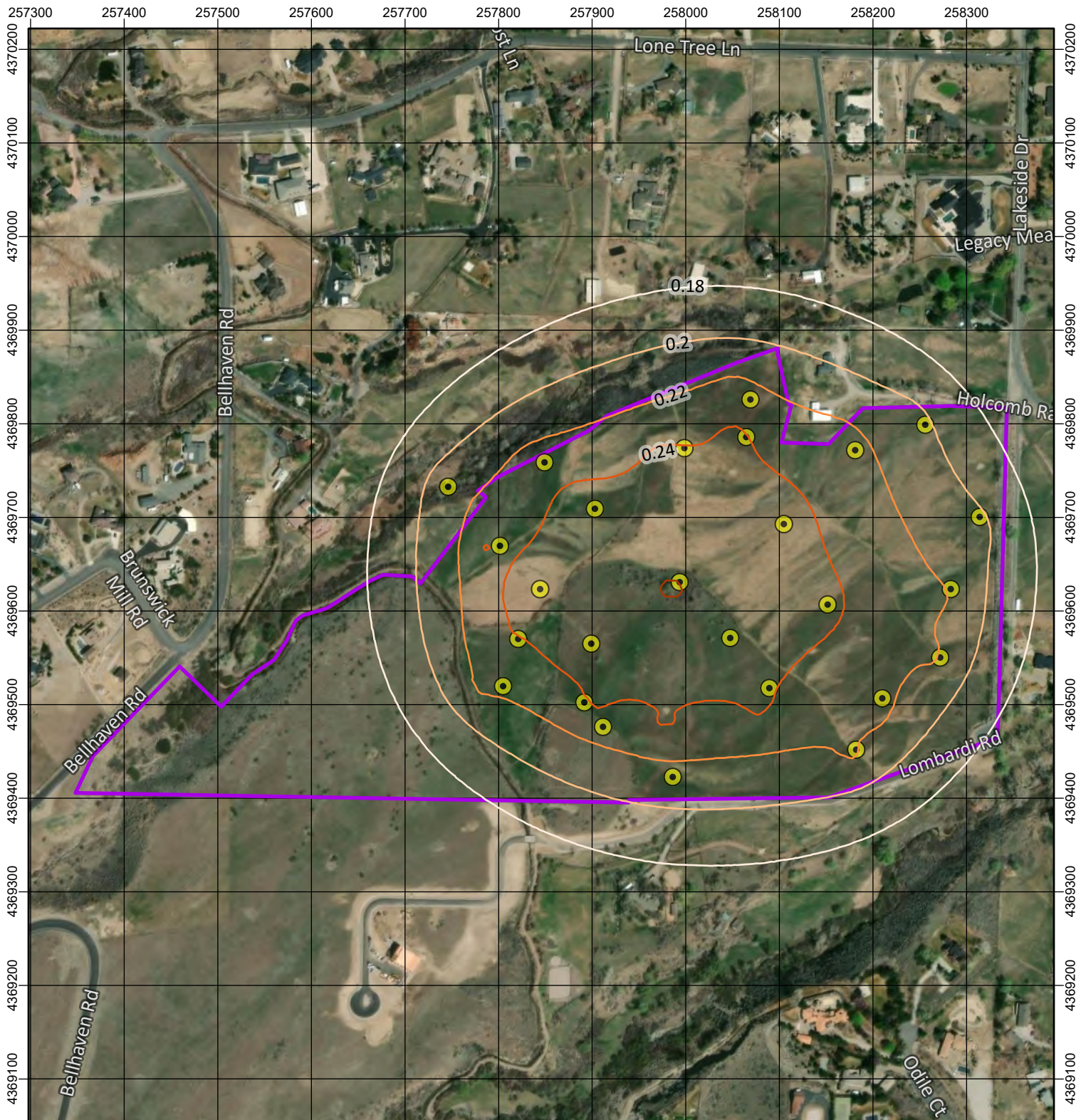
Figure 4: Aquifer Test Analysis Report - Recovery

Location: 8900 Lakeside Dr	Pumping Test: Constant Rate	Pumping Well: Production Well 1	
Test Conducted by: M. Sawyer; E. Robtoy		Test Date: 8/18/2022	
Analysis Performed by: M. Sawyer		Analysis Date: 8/26/2022	
Aquifer Thickness: 100 ft	Discharge: variable, average rate 91.2 [U.S. gpm]		



Calculation using Theis

Observation Well	Transmissivity [ft ² /d]	Hydraulic Conductivity [ft/d]	Radial Distance to PW [ft]	
Monitoring Well	1.77×10^3	1.77×10^1	72.8	
Production Well 2	2.09×10^3	2.09×10^1	297.32	
Average	1.93×10^3	1.93×10^1		



Legend:	
	Project Area Parcel
	Proposed Well Locations
	Drawdown_ft
	0.1800
	0.1801 - 0.2000
	0.2001 - 0.2200
	0.2201 - 0.2400
	0.2401 - 0.2600

Nevada

Scale: 1:5,751

200 100 0 200 Feet

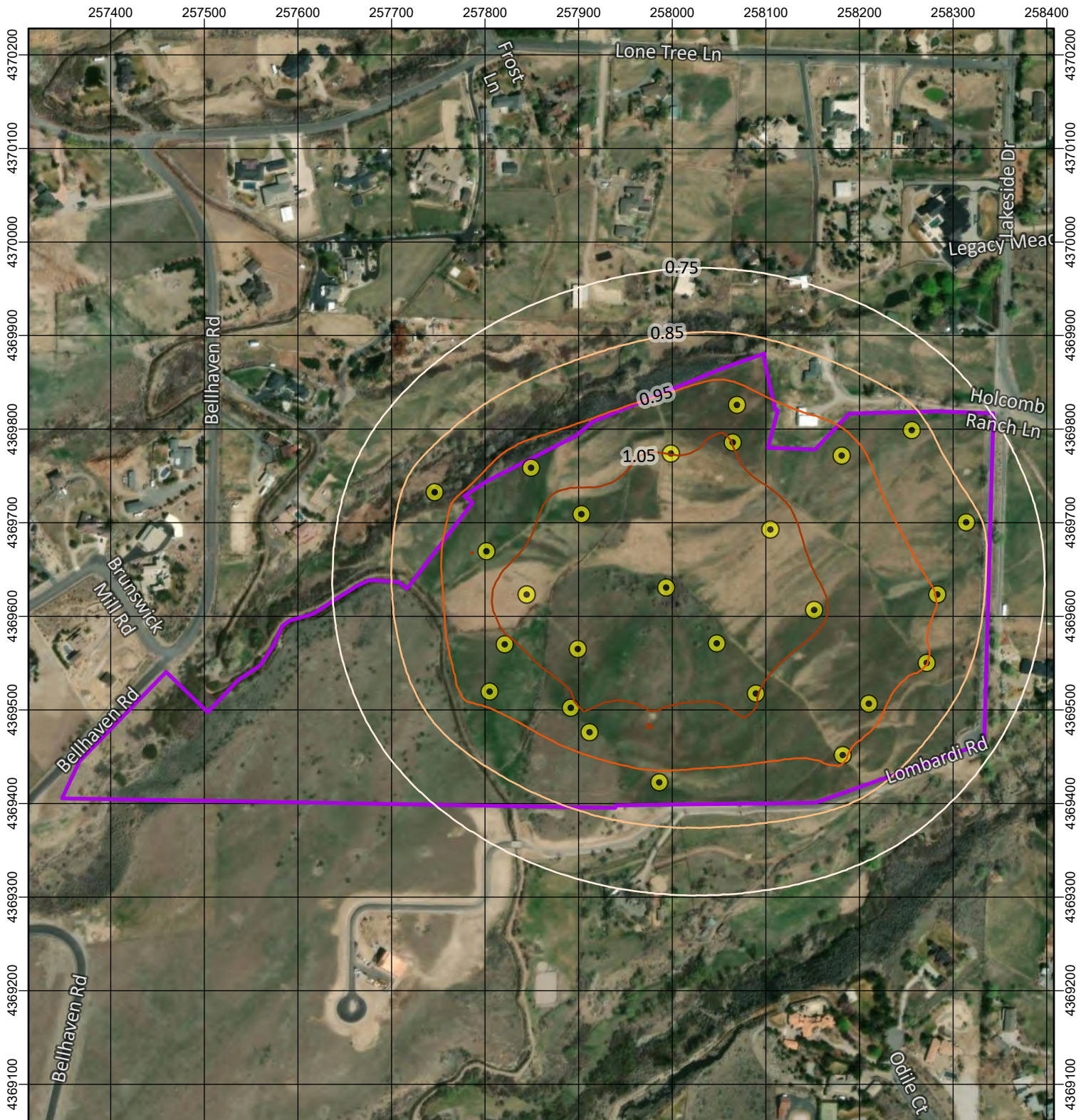
Figure 5
Groundwater Drawdown
Model – 414 gpd

BROADBENT
 5450 Louie Lane, Suite 101
 Reno, NV, 89511
 (775) 322-7969 (P) * (775) 322-7956 (F)
 Job # 22-02-169 Date: 10/1/2022

Notes:

1. Imagery Source: Esri World Imagery (Maxar)
2. Datum: WGS 1984 UTM Zone 11N

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Drawn	JCM
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Legend:	
	Project Area Parcel
	Proposed Well Locations
	Drawdown_ft
	0.750000
	0.750001 - 0.850000
	0.850001 - 0.950000
	0.950001 - 1.050000

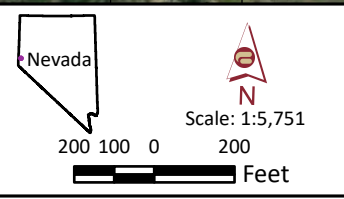


Figure 6
Groundwater Drawdown Model – 1800 gpd

BROADBENT
 5450 Louie Lane, Suite 101
 Reno, NV, 89511
 (775) 322-7969 (P) * (775) 322-7956 (F)
 Job # 22-02-169 Date: 10/1/2022

Notes:
 1. Imagery Source: Esri World Imagery (Maxar)
 2. Datum: WGS 1984 UTM Zone 11N

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Designed	
Drawn	JCM
Approved	

Appendix A

Permits

WASHOE COUNTY HEALTH DISTRICT
ENVIRONMENTAL HEALTH SERVICES
1001 E Ninth Street
Reno, NV 89512
(775) 328-2434

POST IN A CONSPICUOUS PLACE

WELL CONSTRUCTION PERMIT

Permit # H22-0081WELL

Issued By: Matt Simpson Date Issued: 6/23/2022

Owner: Gordon Real Estate Llc

Driller: BRUCE MACKAY PUMP & WELL SERVICE
INC

Location at Site: 8900 LAKESIDE DR
WASHOE COUNTY, NV 89511

Parcel: 041-130-58

Expiration Date: 12/23/2023

100' Seal Required:

Yes No

Type of Well: New
Commercial
Monitoring

Comments/Conditions:

Start 7/12/2022 EL
Seal 7/15/22 JB

H22-0081 WELL

APPROVED
Washoe County Health District

JUN 23 2022




1. Well must be installed a minimum of 25' from any drainage channel, watercourse or flood irrigation.
2. A 100' seal is required.
3. An approved septic plan does not exist for this parcel.

By: Matthew Simpson
 Print Name: Matthew Simpson

RECEIVED
 JUN 17 2022
 Washoe County Health District
 Environmental Health



X:\PROJECTS\21087.01\DWG\SURFV-SURFACE-8900 LAKESIDE.DWG <CHECKED> 5/18/2022 10:17 AM

SHEET 1 OF 1	JOB NO. 21087.02 DRAWN BY CBH CHECKED BY JJ	EXHIBIT MAP FOR PROPOSED WELL POSITIONS 8900 LAKESIDE DR. WASHOE COUNTY NEVADA	 CFA, INC. LAND SURVEYORS CIVIL ENGINEERS LANDUSE PLANNERS 1150 CORPORATE BOULEVARD • RENO, NEVADA 89502 775-856-1150 MAIN • 775-856-1160 FAX • CFARENO.COM
	RENO	WASHOE COUNTY	NEVADA

FORM 4011



Nevada Division of WATER RESOURCES

STATE OF NEVADA Department of Conservation and Natural Resources Steve Sisolak, Governor Bradley Crowell, Director Adam Sullivan, P.E. State Engineer

NOTICE OF INTENT TO DRILL

Today's Date: 6/21/2022 Intended Start Date: 6/24/2022
Type of Work: [X] Drilling Deepening Rehabilitation Plugging
Is this a replacement well? [] Yes [X] No Please indicate the existing well log number (if applicable):
Proposed use of well: Exploration [X] Diameter of well: 6 inches Number of wells: 1
If domestic well, is location in water purveyor's service area? [] Yes [X] No Well ID:
For monitor well required by another government agency, provide facility ID number: Agency:
If well is being completed under a waiver, please provide corresponding waiver number: w-809 [X]
If a water right is associated with the well, please provide the permit number:
Location of well by Public Land Survey: SE [X] 1/4 NE [X] 1/4 Sec: 11 [X] T 18 [X] N/S R 19 [X] E
Latitude: 39.4424011 UTM E: [] NAD 27
Longitude: 119.80927061 UTM N: [X] NAD83/WGS 84
Address at well location: 8900 Lakeside Drive Reno NV 89511
Assessor Parcel Number: 041-130-58 [X] Parcel size: 72.8 acres
County: Washoe [X] Subdivision name:
Name of client: Adam Giordano- Thomas Creek Development
Address of client: 2100 Manzanita Ln Reno, NV 89509
Company name and address: Bruce MacKay Pump & Well Service, Inc. 8175 S. Virginia St. STE850PMB407 Reno NV 89
Contact phone number: 775-851-1600 Ext 3 Company email address: celina@brucemackay.com
Contractor license number: 23096 [X] Driller license number: 2547 [X] Driller Signature: [Signature]

For Division Use Only
NAD27 Lat: 39.44250
NAD27 Long: 119.80826
Basin: 087

RECEIVED
2022 JUN 21 PM 4:27

\$25 FILING FEE MUST ACCOMPANY THIS REQUEST

For Division Use Only
NOI #: N2022-606
Status: Approved [X] Denied [] Expiration Date: 8/24/22
Details:
Reviewer: Trevor Price
Date Reviewed: 6/22/22

WASHOE COUNTY HEALTH DISTRICT
ENVIRONMENTAL HEALTH SERVICES
1001 E Ninth Street
Reno, NV 89512
(775) 328-2434

WASHOE COUNTY HEALTH DISTRICT
ENVIRONMENTAL HEALTH SERVICES
1001 E Ninth Street
Reno, NV 89512
(775) 328-2434

POST IN A CONSPICUOUS PLACE

POST IN A CONSPICUOUS PLACE

WELL CONSTRUCTION PERMIT

Permit # H22-0079WELL

Issued By: Matt Simpson Date Issued: 6/23/2022

Owner: Gordon Real Estate Llc

Driller: BRUCE MACKAY PUMP & WELL SERVICE
INC

Location at Site: 8900 LAKESIDE DR
WASHOE COUNTY, NV 89511

Parcel: 041-130-58

Expiration Date: 12/23/2023

100' Seal Required:

Yes No

Type of Well: New
Commercial
Monitoring

Comments/Conditions:

WELL CONSTRUCTION PERMIT

Permit # H22-0079WELL

Issued By: Matt Simpson Date Issued: 6/23/2022

Owner: Gordon Real Estate Llc

Driller: BRUCE MACKAY PUMP & WELL SERVICE
INC

Location at Site: 8900 LAKESIDE DR
WASHOE COUNTY, NV 89511

Parcel: 041-130-58

Expiration Date: 12/23/2023

100' Seal Required:

Yes No

Type of Well: New
Commercial
Monitoring

Comments/Conditions:

Start: D. Kelly 7/18/22
Seal: D. Kelly 7/20/22

ALL - CURBWORK

APPROVED
Washoe County Health District

JUN 23 2022

By: *Matthew Simpson*
Print Name: Matthew Simpson

1. Well must be installed a minimum of 25' from any drainage channel, watercourse, or flood irrigation.
2. A 100' seal is required.
3. An Approved septic plan does not exist for this parcel.



RECEIVED
JUN 17 2022
Washoe County Health District
Environmental Health

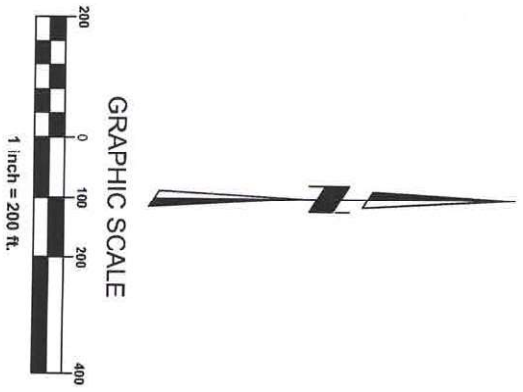
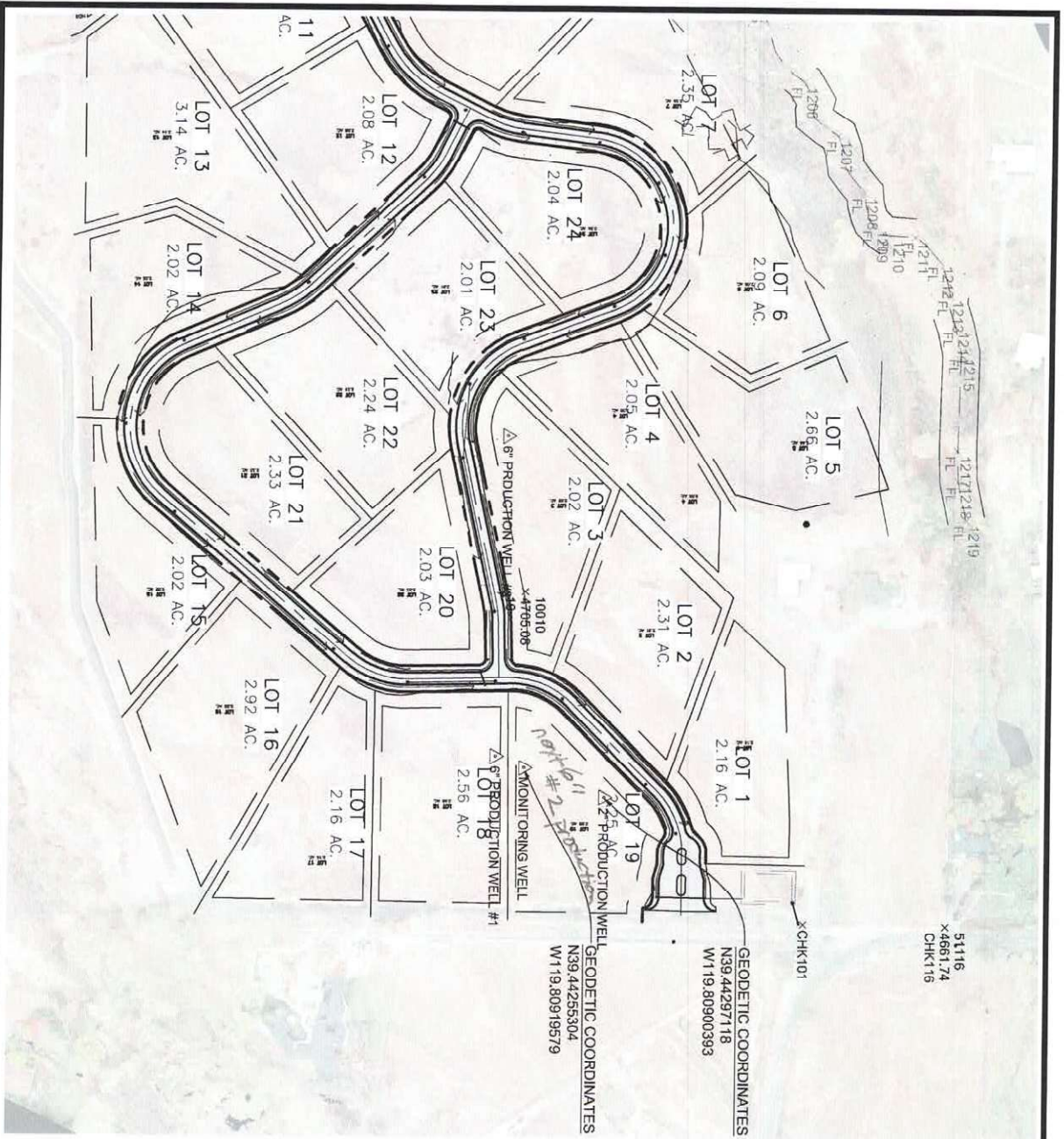


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JOB NO. 21087.02
DRAWN BY CBH
CHECKED BY JJ
SHEET 1 OF 1

EXHIBIT MAP FOR
PROPOSED WELL POSITIONS
8900 LAKESIDE DR.
RENO WASHOE COUNTY NEVADA

cfa CFA, INC.
LAND SURVEYORS
CIVIL ENGINEERS
LAND USE PLANNERS
1150 CORPORATE BOULEVARD • RENO, NEVADA 89502
775-858-1150 MAIN • 775-858-1160 FAX • CFARENO.COM



X:\PROJECTS\21087.01\DWG\SURF.V\--SURFACE--8900 LAKESIDE.DWG <GERRMAN> 7/14/2022 3:35 PM

JOB NO. 21087.02
 DRAWN BY CBH
 CHECKED BY JJ
 SHEET 1 OF 1

EXHIBIT MAP
 FOR
PROPOSED WELL POSITIONS
 8900 LAKESIDE DR.
 WASHOE COUNTY
 NEVADA

cfa CFA, INC.
 LAND SURVEYORS
 CIVIL ENGINEERS
 LAND USE PLANNERS
 1150 CORPORATE BOULEVARD • RENO, NEVADA 89502
 775-856-1150 MAIN • 775-856-1160 FAX • CFARENO.COM

FORM 4011



Nevada Division of WATER RESOURCES

STATE OF NEVADA Department of Conservation and Natural Resources Steve Sisolak, Governor Bradley Crowell, Director Adam Sullivan, P.E., State Engineer

NOTICE OF INTENT TO DRILL

Today's Date: 6/21/2022 Intended Start Date: 6/24/2022
Type of Work: [X] Drilling Deepening Rehabilitation Plugging
Is this a replacement well? [] Yes [X] No Please indicate the existing well log number (if applicable):
Proposed use of well: Exploration Diameter of well: 6 inches Number of wells: 1
If domestic well, is location in water purveyor's service area? [] Yes [X] No Well ID:
For monitor well required by another government agency, provide facility ID number: Agency:
If well is being completed under a waiver, please provide corresponding waiver number: W-809 [X]
If a water right is associated with the well, please provide the permit number:
Location of well by Public Land Survey: SW [X] 1/4 NE [X] 1/4 Sec: 11 [X] T 18 [X] N/S R 19 [X] E
Latitude: 39.4424307 UTM E: [] NAD 27
Longitude: 119.8114259 UTM N: [X] NAD83/WGS 84
Address at well location: 8900 Lakeside Road Reno NV 89511
Assessor Parcel Number: 041-130-58 [X] Parcel size: 72.8 acres
County: Washoe [X] Subdivision name:
Name of client: Adam Giordano- Thomas Creek Development
Address of client: 2100 Manzanita Ln Reno, NV 89509
Company name and address: Bruce MacKay Pump & Well Service, Inc. 8175 S. Virginia St. STE850PMB407 Reno NV 89
Contact phone number: 775-851-1600 Ext 3 Company email address: celina@brucemackay.com
Contractor license number: 23096 [X] Driller license number: 2547 [X] Driller Signature: [Signature]

For Division Use Only
NAD27 Lat: 39.44253
NAD27 Long: 119.81042
Basin: 087

2022 JUN 21 PM 4:20

\$25 FILING FEE MUST ACCOMPANY THIS REQUEST

For Division Use Only
NOI #: N2-22-601 Status: Approved [X] Denied [] Expiration Date: 8/24/22
Details:
Reviewer: Trevor Price Date Reviewed: 6/22/22

FORM 4013

STATE OF NEVADA DIVISION OF WATER RESOURCES WELL DRILLER'S REPORT

OFFICE USE ONLY

Log No. _____
Permit No. _____
Basin No. _____

PRINT OR TYPE IN BLACK INK ONLY
DO NOT WRITE ON BACK

Please complete this form in its entirety in accordance with NRS 534.170 and NAC 534.340

NOTICE OF INTENT NO. N2022-604
WELL NAME (if applicable): Well 3

1. OWNER/CLIENT NAME Thomas Creek Development
MAILING ADDRESS 2100 Manzanita Ln.
Reno, Nv 89509

DETAILED ADDRESS AT WELL LOCATION _____
8900 Lakeside Drive Reno, Nv 89509
Subdivision Name: _____ County: Washoe

2. PLS LOCATION SE ¼ NE ¼ 11 Sec 18 N/S 19 E
PERMIT/WAIVER NO. MO-2408 041-130-58
Issued by Water Resources Current Parcel No.

Latitude 39.44254135 UTM E NAD 27
Longitude -119.810379 UTM N NAD 83/WGS 84

3. WORKED PERFORMED
 New Well Deepen: Orig WL# _____
 Replacement: Original well log # _____
 Recondition: Original well log # _____

4. PROPOSED USE
 Domestic Irrigation Monitor
 Mining / Dewater Com / Ind Stock
 Test / Other Mun / QM Rec

5. WELL TYPE
 Auger Rotary RVC
 Air Mud Sonic
 Other

6. LITHOLOGIC LOG				
Material Encountered	Lost Circ.	Water Strata	From	To
Volcanic Boulders w/ Brown Clay			0	5
Sand and Clay Layers			5	115
Sand, Gravels w/ Brown Clay			115	220
Brown Clay			220	229
Harder Volcanic Layer			229	240

9. WELL CONSTRUCTION
Depth Drilled: 240 Feet Depth Cased: 240 Feet

HOLE DIAMETER (BIT SIZE)

From	To
<u>7.875</u> Inches	<u>0</u> Feet <u>240</u> Feet
_____ Inches	_____ Feet _____ Feet
_____ Inches	_____ Feet _____ Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
<u>2"</u>	<u>0.95</u>	<u>0.218</u>	<u>0</u>	<u>240</u>

ANNULAR MATERIALS

Sanitary Seal Yes No

<input checked="" type="checkbox"/> Neat Cement	<u>0</u> to <u>110</u>	<input checked="" type="checkbox"/> Pumped	<input type="checkbox"/> Poured
<input type="checkbox"/> Cement Grout	_____ to _____	<input type="checkbox"/> Pumped	<input type="checkbox"/> Poured
<input type="checkbox"/> Concrete Grout	_____ to _____	<input type="checkbox"/> Pumped	<input type="checkbox"/> Poured
<input checked="" type="checkbox"/> Bentonite Chips	<u>110</u> to <u>138</u>	<input type="checkbox"/> Pumped	<input checked="" type="checkbox"/> Poured
<input checked="" type="checkbox"/> Gravel Pack [> 0.2 in.]	<u>138</u> to <u>240</u>	<input type="checkbox"/> Pumped	<input checked="" type="checkbox"/> Poured
<input type="checkbox"/> Sand Pack [< 0.2 in.]	_____ to _____	<input type="checkbox"/> Pumped	<input type="checkbox"/> Poured
<input type="checkbox"/> Other, explain: _____	_____ to _____	<input type="checkbox"/> Pumped	<input type="checkbox"/> Poured

Washoe County Permit # H22-0080WELL
Date started: 22-Jul, 2022
Date completed: 25-Jul, 2022

PERFORATIONS:

Type of perforation: Milled Slot
Size of perforation: 0.02

From <u>140</u> Feet	To <u>230</u> Feet
From _____ Feet	To _____ Feet
From _____ Feet	To _____ Feet
From _____ Feet	To _____ Feet

7. WATER QUALITIES
Static water level: 16 Feet below land surface
Artesian Flow: _____ G.P.M. _____ P.S.I.
Water Temperature: Cold ° Fahrenheit
Water Quality: Not Tested

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision. This report is true to the best of my knowledge.

Name Bruce MacKay Pump & Well Service, Inc.
Contractor

Address 8175 S. Virginia St. Suite 850 PMB # 407 Reno, Nv 89511
Contractor

Phone 775-851-1600 Ext 3
Nevada contractor's license number as issued by the State Contractors Board: 23096
Nevada well driller's license number as issued by the Nevada Division of Water Resources (on-site driller): 2547

Signed: _____
By driller performing actual drilling on site or contractor

Date: 7/27/2022

8. WELL TEST DATA

Test Method:	G.P.M.	Draw Down (Feet Below Static)	Recorded Time (Hours)
<input type="checkbox"/> Bailer <input type="checkbox"/> Pump <input checked="" type="checkbox"/> Air Lift	<u>20+</u>	<u>20+</u>	<u>4</u>

WASHOE COUNTY HEALTH DISTRICT
ENVIRONMENTAL HEALTH SERVICES
1001 E Ninth Street
Reno, NV 89512
(775) 328-2434

POST IN A CONSPICUOUS PLACE

WELL CONSTRUCTION PERMIT

Permit # H22-0080WELL

Issued By: Matt Simpson Date Issued: 6/23/2022

Owner: Gordon Real Estate Llc

Driller: BRUCE MACKAY PUMP & WELL SERVICE
INC

Location at Site: 8900 LAKESIDE DR
WASHOE COUNTY, NV 89511

Parcel: 041-130-58

Expiration Date: 12/23/2023

100' Seal Required:

Yes No

Type of Well: New
Commercial
Monitoring

Comments/Conditions:

START 7/22/2022 M. SIMPSON
Seal 7/25/2022 ~~hmm~~ 719

H22-0079WELL

APPROVED
Washoe County Health District

JUN 23 2022

By: Matthew Simpson
Print Name: Matthew Simpson

1. Well must be installed a minimum of 25' from any drainage channel, watercourse or flood irrigation.
2. A 100' Seal is required
3. An approved septic plan does not exist for this parcel

RECEIVED
JUN 17 2022
Washoe County Health District
Environmental Health



X:\PROJECTS\21087.02\DWG\SURVIV-SURFACE-8900 LAKESIDE.DWG <SHEETS> 5/18/2022 10:17 AM

JOB NO. 21087.02
DRAWN BY CBH
CHECKED BY JJ
SHEET 1 OF 1

EXHIBIT MAP FOR
PROPOSED WELL POSITIONS
8900 LAKESIDE DR.

RENO WASHOE COUNTY NEVADA

cfa CFA, INC.
LAND SURVEYORS
CIVIL ENGINEERS
LAND USE PLANNERS

1150 CORPORATE BOULEVARD = RENO, NEVADA 89502
775-856-1150 MAIN = 775-856-1160 FAX = CFARENO.COM

FORM
4011



Nevada Division of
WATER RESOURCES

STATE OF NEVADA
Department of Conservation and Natural Resources
Steve Sisolak, Governor
Bradley Crowell, Director
Adam Sullivan, P.E. State Engineer

NOTICE OF INTENT TO DRILL

Today's Date: 6/21/2022 Intended Start Date: 6/24/2022

Type of Work: Drilling Deepening Rehabilitation Plugging

Is this a replacement well? Yes No Please indicate the existing well log number (if applicable): _____

Proposed use of well: Monitoring Diameter of well: 2 inches Number of wells: 1

If domestic well, is location in water purveyor's service area? Yes No Well ID: _____

For monitor well required by another government agency, provide facility ID number: _____ Agency: _____

If well is being completed under a waiver, please provide corresponding waiver number: MO-2408

If a water right is associated with the well, please provide the permit number: _____

Location of well by Public Land Survey: SE 1/4 NE 1/4 Sec: 11 T 18 N/S R 19 E

Latitude: 39.44254135 UTM E: _____ NAD 27

Longitude: 119.810379 UTM N: _____ NAD83/WGS 84

Address at well location: 8900 Lakeside Drive Reno NV 89509

Assessor Parcel Number: 041-130-58 Parcel size: 72.8 acres

County: Washoe Subdivision name: _____

Name of client: Adam Giordano- Thomas Creek Development

Address of client: 2100 Manzanita Ln Reno, NV 89509

Company name and address: Bruce MacKay Pump & Well Service, Inc. 8175 S. Virginia St. STE850PMB407 Reno NV 89

Contact phone number: 775-851-1600 Ext 3 Company email address: celina@brucemackay.com

Contractor license number: 23096 Driller license number: 2547 Driller Signature: [Signature]

For Division Use Only
NAD27 Lat: 39.44264
NAD27 Long: 119.80937
Basin: 087

2022 JUN 21 PM 4:28
STATE ENGINEER
RECEIVED

\$25 FILING FEE MUST ACCOMPANY THIS REQUEST

For Division Use Only

NOI #: N2022-604 Status: Approved Denied Expiration Date: 8/14/22

Details: _____

Reviewer: Trevor Price Date Reviewed: 6/22/22

Appendix B

Lithologic and Well Construction Logs



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
0	Cap						
1	Concrete Well Box	Moist	Gray/Brown	Non-Plastic		GW	0-10': Well-graded gravel; 5% fines; gravel is subangular with pebbles up to 12 mm Alluvium
2							
3							
4							
5							
6							
7							
8							
9							
10							
11		Moist	Gray/Brown	Non-Plastic		GW	10'-20': Well-graded gravel; <5% fines; 80% cobbles up to 100 mm in size; 20% pebbles up to 64 mm Alluvium
12	Neat Cement						
13							
14							
15							
16							
17							
18							
19							
20							
21		Moist	Brown	Plastic Fines		SC	20'-30': Clayey sand with gravel; <15% fines; more sand is present than gravel; gravel pebbles up to 12 mm in size Alluvium
22							
23							
24							
25							
26							
27							
28							
29							
30							
31		Moist	Brown	Plastic Fines		SC	30'-40': Clayey sand with gravel; <15% fines; more sand is present than gravel; gravel ranges in size from 2 mm granules to 72 mm cobbles Alluvium
32							
33							
34							
35							
36							
37							
38							
39							
40							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

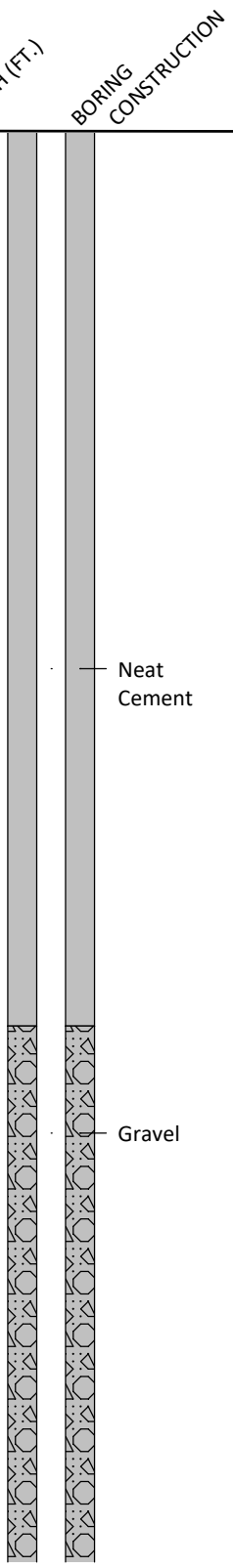
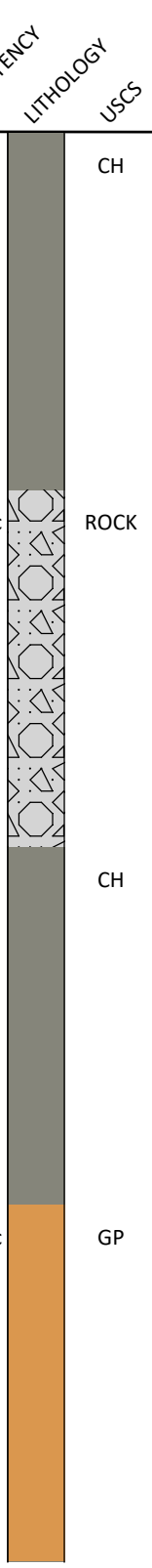
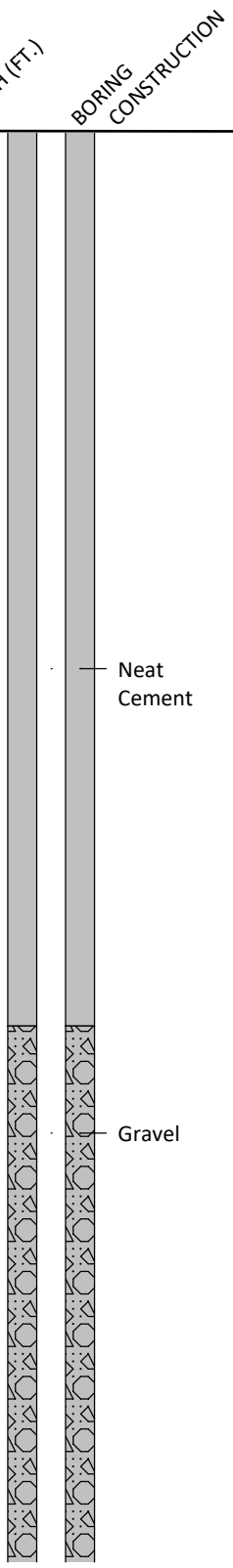
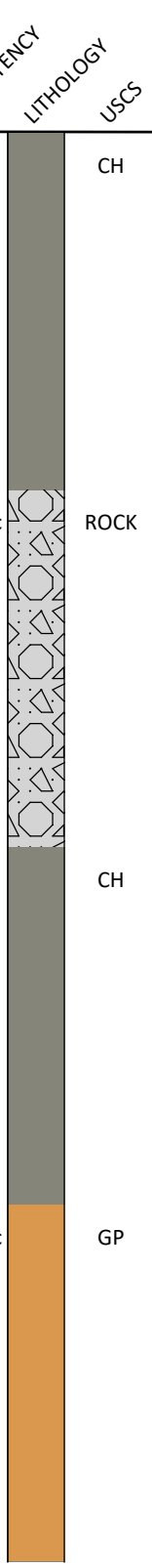
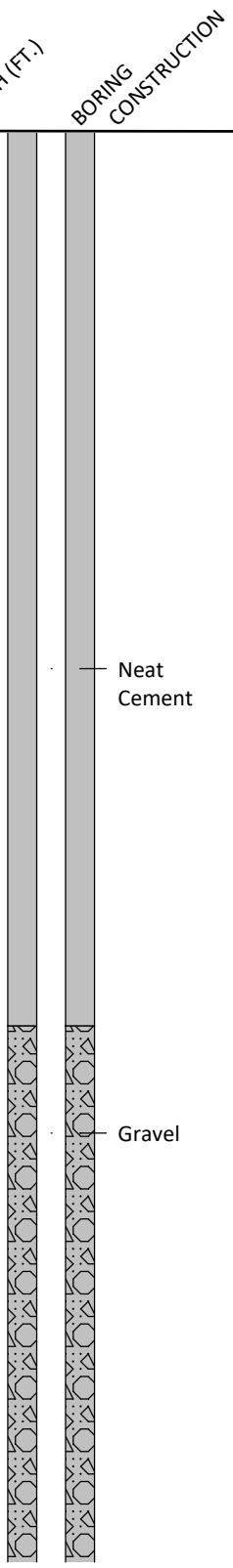
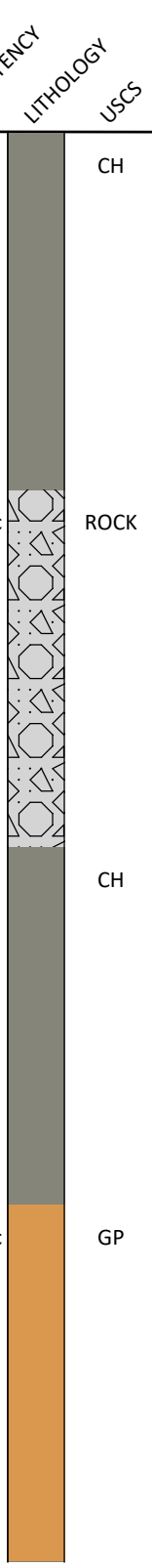
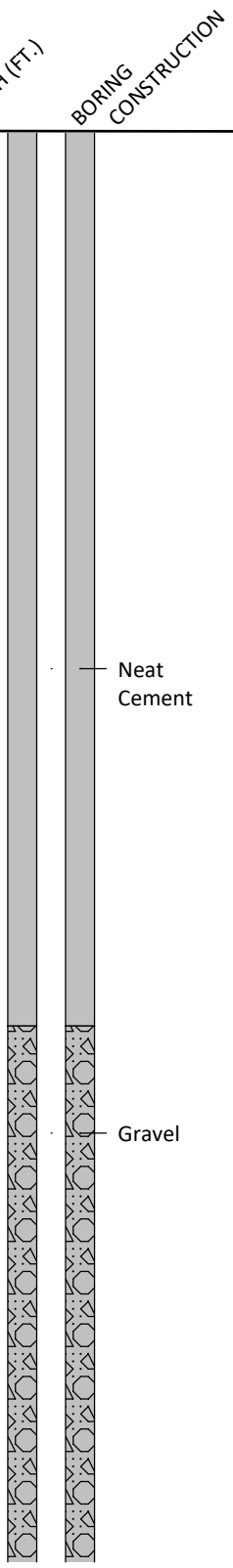
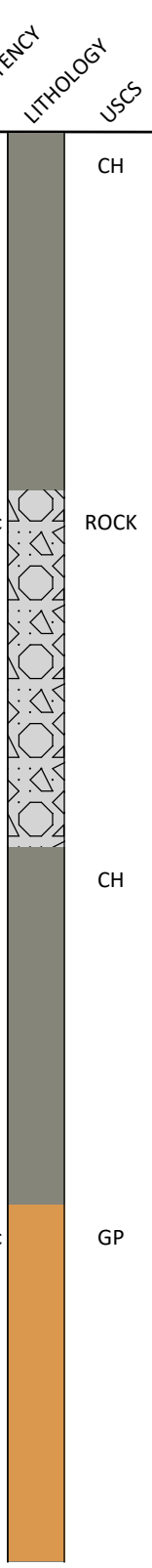
DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION	
40	Neat Cement	Moist	Gray	Plastic Fines	Orange	GC	40'-50': Clayey gravel with sand; poorly graded; <15% fines; gravel is angular and ranges in size from 2 mm granules to 13 mm pebbles; more gravel is present than sand Alluvium	
41								
42		Moist	Gray/Tan	Non-Plastic	Orange	GP	50'-60': Poorly graded gravel; 3% sand; gravel is sub-rounded and ranges in size from 2 mm granules to 13 mm pebbles Alluvium	
43								
44		Moist	Brown	Non-Plastic	Orange	GW	60'-70': Well-graded gravel with sand; 70% sand; gravel is rounded cobbles up to 4 mm Alluvium	
45								
46		Moist	Brown	High Plasticity	Gray	CH	70'-80': Gravelly fat clay with sand; 40% coarse-grained material; 15% of the material is gravel; angular cobbles up to 4 mm Alluvium	
47								
48								
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PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
80		Moist	Brown	High Plasticity		CH	80'-90': Fat clay; 15% coarse-grained sand; minimal gravel; subangular; 2 mm granules in size Alluvium
81							
82							
83							
84							
85							
86							
87							
88							
89							
90		Moist	White/Black	Non-Plastic		ROCK	90'-100': Volcanic rock
91							
92							
93							
94							
95							
96							
97							
98							
99							
100		Moist	Brown	High Plasticity		CH	100'-110': Gravelly fat clay; 30% gravel; gravel is subangular with pebbles up to 14 mm in size Alluvium
101							
102							
103							
104							
105							
106							
107							
108							
109							
110		Moist	Black	Non-Plastic		GP	110'-120': Poorly graded gravel; 1-2% fines; gravel is sub-rounded, ranging in size from 4 mm to 8 mm pebbles; first potential water-bearing zone Alluvium
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
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 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
120		Moist	Brown	High Plasticity		CH	120'-130': Fat clay; 5% coarse-grained material; mostly sub-rounded sand Alluvium
121							
122							
123							
124							
125							
126							
127							
128							
129							
130		Moist	Brown/Red	Non-Plastic		GP	130'-140': Poorly graded gravel with silt and sand; ~10% fines; gravel is sub-rounded and ranges in size from 2 mm to 4 mm granules; possibly water-bearing Alluvium
131							
132							
133							
134							
135							
136							
137							
138							
139							
140		Moist	Brown/Black	Non-Plastic		GW	140'-150': Well-graded gravel; 1% fines; 5% sand; gravel is subangular and ranges in size from 2 mm granules to 9 mm pebbles; possibly water-bearing Alluvium
141							
142							
143							
144							
145							
146							
147							
148							
149							
150		Moist	Brown/Black	Non-Plastic		GW	150'-160': Well-graded gravel; 3% sand; gravel ranges in size from 2 mm granules to 21 mm pebbles; possibly water-bearing Alluvium
151							
152							
153							
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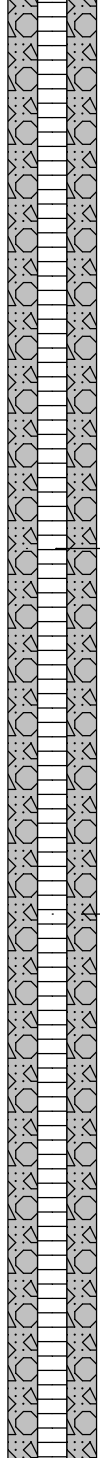

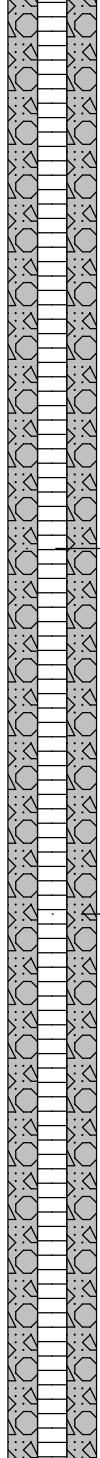

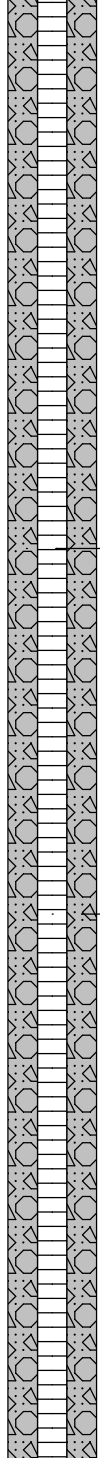

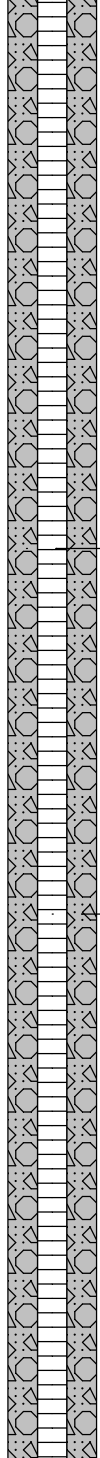



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
160		Moist	Brown	High Plasticity		CH	160'-170': Gravelly fat clay with sand; 20% sand; gravel is sub-rounded and ranges in size from 2 mm granules to 6 mm pebbles Alluvium
161							
162							
163							
164							
165							
166							
167							
168							
169							
170		Moist	Brown	Non-Plastic		GM	170'-180': Well-graded gravel with silt and sand; sand made up the bottom 5'; gravel is sub-rounded, ranging in size from 2 mm granules to 23 mm pebbles; potentially water-bearing Alluvium
171							
172							
173							
174							
175							
176							
177							
178							
179							
180		Moist	Black	Non-Plastic		GP	180'-190': Poorly graded gravel with sand; ~5% fines; gravel is sub-rounded, ranging in size from 2 mm granules to 18 mm pebbles; potentially water-bearing Alluvium
181							
182							
183							
184							
185							
186							
187							
188							
189							
190		Moist	Brown	Non-Plastic		GP	190'-200': Poorly graded gravel with silt; gravel is sub-rounded and ranges in size from 2 mm granules to 9 mm pebbles; potentially water-bearing Alluvium
191							
192							
193							
194							
195							
196							
197							
198							
199							
200							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
200	Gravel	Moist	Brown	Non-Plastic	Orange	GP	200'-210': Poorly graded gravel; 5% fines; <20% sand; gravel is sub-rounded and ranges from 2 mm granules to 6 mm pebbles in size; potentially water-bearing Alluvium
201							
202							
203							
204							
205							
206							
207							
208							
209							
210	Well Screen	Moist	Brown	Non-Plastic	Orange	GP	210'-220': Poorly graded gravel with sand; 25% fines; 35% sand; gravel is sub-rounded, ranging in size from 2 mm to 4 mm granules; potentially water-bearing Alluvium
211							
212							
213							
214							
215							
216							
217							
218							
219							
220	Well Screen	Moist	Brown	High Plasticity	Grey	CH	220'-230': Gravelly fat clay with sand; 60% fines, 25% gravel; 15% sand; gravel is sub-rounded, ranging in size from 2 mm granules to 17 mm pebbles; boulder present at 220'-225' Alluvium
221							
222							
223							
224							
225							
226							
227							
228							
229							
230	Well Screen	Moist	Brown	Low Plasticity	Light Orange	SC	230'-240': Clayey sand with gravel; 40% fines, 30% gravel; 30% sand; gravel is mostly 2 mm granules Alluvium
231							
232							
233							
234							
235							
236							
237							
238							
239							
240							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
240		Moist	Brown	Non-Plastic		GM	240'-250': Silty gravel; 20% fines, 5% sand; gravel is subangular, ranging in size from 2 mm granules to 14 mm pebbles Alluvium
241							
242							
243							
244							
245							
246							
247							
248							
249							
250		Moist	Purple	Non-Plastic		ROCK	250'-260': Volcanic rock
251							
252							
253							
254							
255							
256							
257							
258							
259							
260		Moist	Purple	Non-Plastic		ROCK	260'-270': Volcanic rock
261							
262							
263							
264							
265							
266							
267							
268							
269							
270		Moist	Gray	Medium Plasticity		CL	270'-280': Lean clay; minor gravel; <10% sand Alluvium
271							
272							
273							
274							
275							
276							
277							
278							
279							
280							

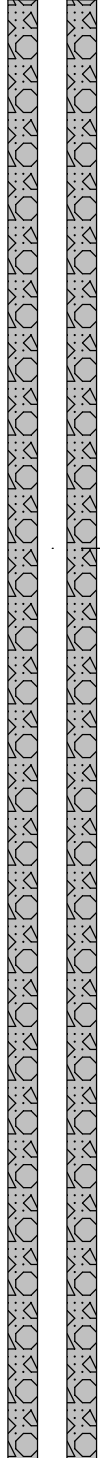

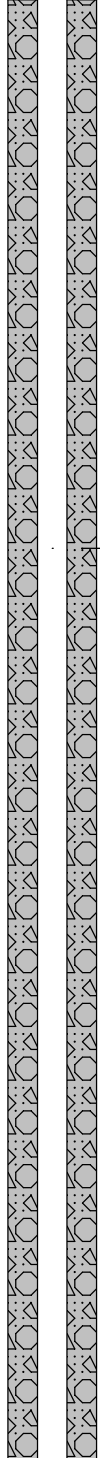

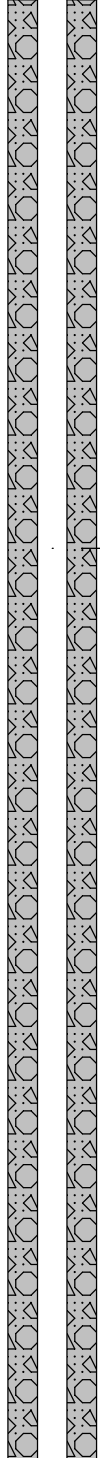

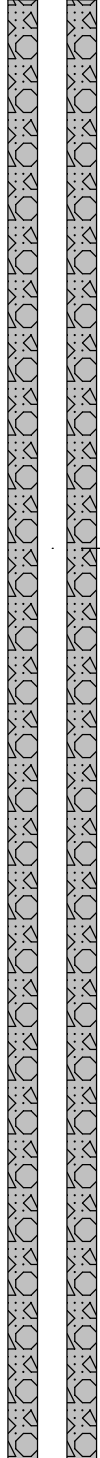



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
280		Moist	Gray	Medium Plasticity		CL	280'-290': Sandy lean clay; 45% coarse-grained material Alluvium
281							
282							
283							
284							
285							
286							
287							
288							
289							
290		Moist	Gray	Medium Plasticity		CL	290'-300': Gravelly lean clay; 45% coarse-grained material; minimal sand; gravel is sub-rounded; 2 mm to 4 mm granules Alluvium
291							
292							
293							
294							
295							
296							
297							
298							
299							
300		Moist	Gray	Medium Plasticity		CL	300'-310': Lean clay; 5% sand and gravel Alluvium
301							
302							
303							
304							
305							
306							
307							
308							
309							
310		Moist	Gray	Medium Plasticity		CL	310'-320': Sandy lean clay with minor gravel; sand is sub-rounded; gravel is mostly 2 mm granules Alluvium
311							
312							
313							
314							
315							
316							
317							
318							
319							
320							

Gravel



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
320		Moist	Brown	High Plasticity		CH	320'-330': Sandy fat clay; 10% gravel; gravel is sub-rounded and ranges in size from 2 mm to 4 mm granules Alluvium
321							
322							
323							
324							
325							
326							
327							
328							
329							
330		Moist	Gray	Medium Plasticity		CL	330'-340': Sandy lean clay; 45% coarse-grained sand; 2% gravel; sand is subangular Alluvium
331							
332							
333							
334							
335							
336							
337							
338							
339							
340		Moist	Gray	Medium Plasticity		CL	340'-350': Sandy lean clay; 40% coarse-grained sand; 2% gravel; boulder present at approximately 345' Alluvium
341							
342							
343							
344							
345							
346							
347							
348							
349							
350		Moist	Non-Plastic			ROCK	350'-360': Volcanic rock Bedrock
351							
352							
353							
354							
355							
356							
357							
358							
359							
360							

Gravel



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
360		Moist		Non-Plastic		ROCK	360'-370': Volcanic rock Bedrock
361							
362							
363							
364							
365							
366							
367							
368							
369							
370		Moist		Non-Plastic		ROCK	370'-380': Volcanic rock Bedrock
371							
372							
373							
374							
375							
376							
377							
378							
379							
380		Moist		Non-Plastic		ROCK	380'-390': Volcanic rock; hard drilling Bedrock
381							
382							
383							
384							
385							
386							
387							
388							
389							
390		Moist		Non-Plastic		ROCK	390'-420': Volcanic rock Bedrock
391							
392							
393							
394							
395							
396							
397							
398							
399							
400							

Gravel



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
400							
401							
402							
403							
404							
405							
406							
407							
408							
409							
410	Gravel						
411							
412							
413							
414							
415							
416							
417							
418							
419							
420	Cap						
421							
422							
423							
424							
425							
426							
427							
428							
429							
430							
431							
432							
433							
434							
435							
436							
437							
438							
439							
440							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #1
 START: 0920
 STOP: 1700

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/13/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)

BORING
CONSTRUCTION

MOISTURE

COLOR

CONSISTENCY

LITHOLOGY

USCS

SOIL DESCRIPTION



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #2
 START: 1105
 STOP: 1348

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/19/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
0	Cap						
1	Concrete Well Box	Moist	Brown	Non-Plastic		ROCK	0-10': Volcanic rock Float
2							
3							
4							
5							
6							
7							
8							
9							
10		Moist	Brown/Black	Medium Plasticity		CL	10'-20': Lean clay with gravel; 30% gravel; gravel is sub-rounded and ranges in size from 2 mm granules to 6 mm pebbles Alluvium
11							
12							
13							
14							
15	Neat Cement						
16							
17							
18							
19							
20		Moist	Brown/Black	Medium Plasticity		CL	20'-30': Lean clay with gravel; 30% gravel; gravel is sub-rounded and ranges in size from 2 mm granules to 6 mm pebbles Alluvium
21							
22							
23							
24							
25							
26							
27							
28							
29							
30		Moist	Brown/Black	Medium Plasticity		CL	30'-40': Lean clay; 5% gravel; gravel is sub-rounded, 2 mm granules Alluvium
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #2
 START: 1105
 STOP: 1348

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/19/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
40	Neat Cement	Moist	Brown/Black	Medium Plasticity	[Greenish-brown soil]	CL	40'-50': Lean clay; 5% gravel; gravel is sub-rounded and ranges in size from 2 mm to 4 mm granules Alluvium
41							
42							
43							
44							
45							
46							
47							
48							
49							
50	Neat Cement	Moist	Brown/Black	Medium Plasticity	[Greenish-brown soil]	CL	50'-60': Lean clay with gravel; 30% gravel; gravel is sub-rounded and ranges in size from 2 mm to 4 mm granules; small boulder possibly present Alluvium
51							
52							
53							
54							
55							
56							
57							
58							
59							
60	Neat Cement	Moist	Brown/Black	Medium Plasticity	[Greenish-brown soil]	CL	60'-70': Lean clay with gravel; 30% gravel; gravel is sub-rounded and ranges in size from 2 mm to 4 mm granules Alluvium
61							
62							
63							
64							
65							
66							
67							
68							
69							
70	Neat Cement	Moist	Brown/Black	Plastic Fines	[Orange soil]	GP	70'-80': Poorly graded gravel; <2% fines; 5% sand; gravel is sub-rounded and ranges in size from 2 mm granules to 8 mm pebbles Alluvium
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #2
 START: 1105
 STOP: 1348

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/19/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
80	Neat Cement	Moist	Brown/Black	Medium Plasticity	[Greenish-brown soil]	CL	80'-90': Lean clay with gravel; 20% gravel ranging in size from 2 mm to 4 mm granules; sub-rounded Alluvium
81							
82							
83							
84							
85							
86							
87							
88							
89							
90	Gravel	Moist	Brown/Black	Plastic Fines	[Orange-brown soil]	GP	90'-100': Poorly graded gravel; 2% sand; gravel is sub-rounded, ranging in size from 2 mm to 4 mm granules Alluvium
91							
92							
93							
94							
95							
96							
97							
98							
99							
100	Gravel	Moist	Brown/Black	Non-Plastic	[Dark orange soil]	GW	100'-110': Well-graded gravel; 10% sand; gravel size ranges from 2 mm granules to 12 mm pebbles Alluvium
101							
102							
103							
104							
105							
106							
107							
108							
109							
110	Gravel	Moist	Brown/Black	Medium Plasticity	[Greenish-brown soil]	CL	110'-120': Lean clay with gravel; 15% gravel is subangular, primarily 2 mm granules Alluvium
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							

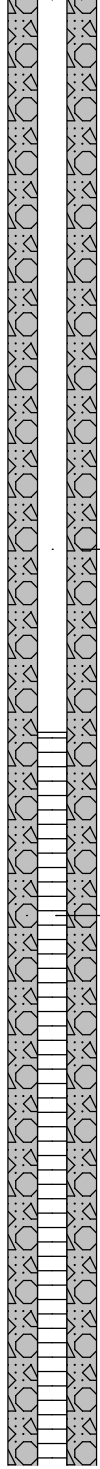

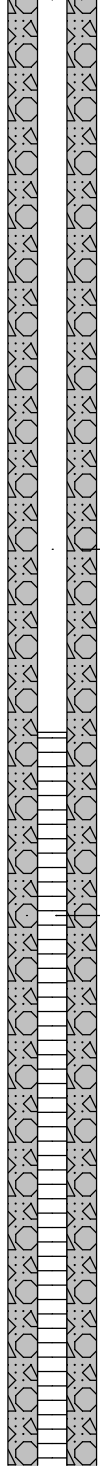

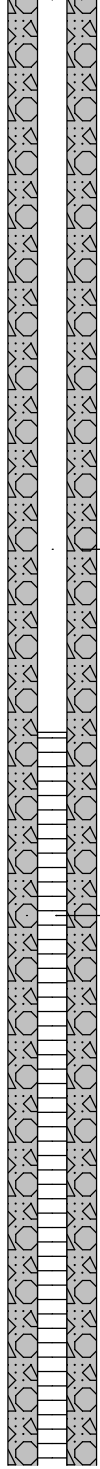

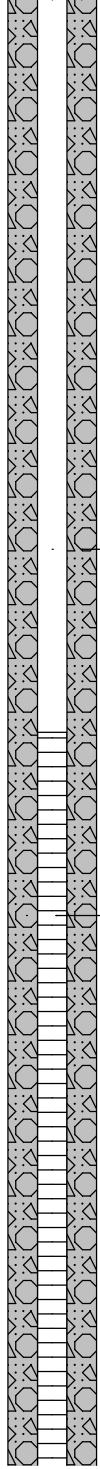



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #2
 START: 1105
 STOP: 1348

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/19/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
120		Moist	Black/Brown	Medium Plasticity		CL	120'-130': Sandy lean clay with minor gravel; 30% sand, 5% gravel Alluvium
121							
122							
123							
124							
125							
126							
127							
128							
129							
130		Moist	Black/Brown	Non-Plastic		GW	130'-140': Well-graded gravel; 20% sand, 2% fines; gravel is subangular and ranges in size from 2 mm granules to 12 mm pebbles Alluvium
131							
132							
133							
134							
135							
136							
137							
138							
139							
140		Moist	Black/Brown	Non-Plastic		GW	140'-150': Well-graded gravel; 10% sand; 2% fines; gravel is subangular, ranging in size from 2 mm granules to 6 mm pebbles Alluvium
141							
142							
143							
144							
145							
146							
147							
148							
149							
150		Moist	Black/Brown	Non-Plastic		GW	150'-160': Well graded gravel; 5% sand; gravel is subangular, ranging in size from 2 mm granules to 14 mm pebbles Alluvium
151							
152							
153							
154							
155							
156							
157							
158							
159							
160							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #2
 START: 1105
 STOP: 1348

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/19/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
160		Moist	Black/Brown	Non-Plastic		GW	160'-170': Well-graded gravel; 10% sand; gravel is subangular, ranging in size from 2 mm granules to 22 mm pebbles Alluvium
161							
162							
163							
164							
165							
166							
167							
168							
169							
170		Moist	Black/Brown	Non-Plastic		GW	170'-180': Well-graded gravel with sand; 25% sand; gravel is subangular, ranging in size from 2 mm granules to 20 mm pebbles Alluvium
171							
172							
173							
174							
175							
176							
177							
178							
179							
180		Moist	Black/Brown	Medium Plasticity		CL	180'-190': Sandy lean clay with gravel; 50% fines, 35% sand, 15% gravel; gravel is subangular and ranges in size from 2 mm granules to 6 mm pebbles Alluvium
181							
182							
183							
184							
185							
186							
187							
188							
189							
190		Moist	Black/Brown	Non-Plastic		GM	190'-200': Poorly graded gravel with silt and sand; 10% silt, 25% sand; gravel ranges in size from 2 mm to 4 mm granules Alluvium
191							
192							
193							
194							
195							
196							
197							
198							
199							
200							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
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PROJECT NUMBER: 22-02-169
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DATE: 7/19/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
200	Gravel	Moist	Black/ Brown	Medium Plasticity	[Greenish-brown soil column]	CL	200'-210': Sandy lean clay with gravel; 35% sand; 15% gravel; gravel is sub-rounded and ranges in size from 2 mm granules to 6 mm pebbles Alluvium
201							
202							
203							
204							
205							
206							
207							
208							
209							
210	Well Screen	Moist	Black/ Brown	Plastic Fines	[Orange soil column]	GC	210'-220': Clayey gravel with sand; 15% fines, 50% gravel, 35% sand; gravel is subangular, ranging in size from 2 mm graules to 13 mm pebbles Alluvium
211							
212							
213							
214							
215							
216							
217							
218							
219							
220	Well Screen	Moist	Black/ Brown	Plastic Fines	[Orange soil column]	GC	220'-230': Clayey gravel with sand; 20% fines, 50% gravel, 35% sand; gravel is subangular, ranging in size from 2 mm granules to 13 mm pebbles Alluvium
221							
222							
223							
224							
225							
226							
227							
228							
229							
230	Well Screen	Moist	Black/ Brown	[Greenish-brown soil column]	[Greenish-brown soil column]	CL	230'-240': Clayey gravel with sand; 10% sand, 30% gravel; gravel is subangular and ranges in size from 2 mm granules to 17 mm pebbles Alluvium
231							
232							
233							
234							
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236							
237							
238							
239							
240							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Production Well #2
 START: 1105
 STOP: 1348

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 6"
 SCREEN SLOT SIZE: 0.060

DATE: 7/19/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY USCS	SOIL DESCRIPTION
240	 Gravel	Moist	Purple	Plastic Fines	GC	240'-250': Clayey gravel with sand; 20% fines; 15% sand; gravel is sub-rounded, ranging in size from 2 mm granules to 6 mm pebbles; rock at 285' Alluvium
241						
242						
243						
244						
245						
246						
247						
248						
249						
250	 Cap	Moist	Purple	Plastic Fines	ROCK	250'-260': Volcanic rock Volcanic layer
251						
252						
253						
254						
255						
256						
257						
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260						
261						
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280						

LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Monitoring Well
 START: 1140
 STOP: 1349

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 2"
 SCREEN SLOT SIZE: 0.020

DATE: 6/22/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
0	Cap						
1	Concrete Well Box	Moist	Black/Brown	Low Plasticity		ML	0-10': Sandy silt with gravel; 30% sand; 30% gravel. Sand and gravel are subangular; gravel is primarily 2 mm granules Alluvium
2							
3							
4							
5							
6							
7							
8							
9							
10		Moist	Brown	Medium Plasticity		CL	10'-20': Sandy lean clay; 30% sand; 15% gravel. Sand and gravel are subangular; gravel ranges in size from 2 mm granules to 6 mm pebbles Alluvium
11							
12	Neat Cement						
13							
14							
15							
16							
17							
18							
19							
20		Moist	Black	Non-Plastic		GW	20'-30': Well graded gravel; 2% fines; 5% sand. Gravel is subangular; gravel ranges in size from 2 mm granules to 12 mm pebbles Alluvium
21							
22							
23							
24							
25							
26							
27							
28							
29							
30		Moist	Brown	Plastic Fines		SM	30'-40': Silty sand; 30% fines; 65% sand; sand is coarse-grained and sub-rounded; minimum gravel is sub-rounded; 2 mm granules Alluvium
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Monitoring Well
 START: 1140
 STOP: 1349

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 2"
 SCREEN SLOT SIZE: 0.020

DATE: 6/22/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
40		Moist	Brown/Black	Plastic Fines		GC	40'-50': Well-graded gravel with clay and sand; 10% fines; 20% sand; sand and gravel are sub-rounded; sand is coarse-grained; gravel ranges in size from 2 mm granules to 11 mm pebbles Alluvium
41							
42							
43							
44							
45							
46							
47							
48							
49							
50	Neat Cement	Moist	Purple/Black	Non-Plastic		ROCK	50'-60': Volcanic rock; hard drilling; potential boulder; possibly basaltic andesite Boulder
51							
52							
53							
54							
55							
56							
57							
58							
59							
60		Moist	Brown	Medium Plasticity		CL	60'-70': Sandy lean clay with gravel; 25% sand; 20% gravel; gravel and sand are subangular; gravel ranges in size from 2 mm granules to 8 mm pebbles Alluvium
61							
62							
63							
64							
65							
66							
67							
68							
69							
70		Moist	Brown	Plastic Fines		SC	70'-80': Clayey sand with gravel; sand and gravel are sub-rounded; gravel ranges in size from 2 mm granules to 14 mm pebbles; 70% sand, 25% gravel, 5% fines Alluvium
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Monitoring Well
 START: 1140
 STOP: 1349

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 2"
 SCREEN SLOT SIZE: 0.020

DATE: 6/22/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
80		Moist	Brown	Plastic Fines		SC	80'-90': Clayey sand with gravel; 40% gravel, 35% sand, 25% fines; gravel is subangular, ranging in size from 2 mm granules to 13 mm pebbles Alluvium
81							
82							
83							
84							
85							
86							
87							
88							
89							
90	Neat Cement	Moist	Purple	Non-Plastic		ROCK	90'-100': Volcanic rock (possibly basaltic andesite) Boulder
91							
92							
93							
94							
95							
96							
97							
98							
99							
100		Moist	Brown	Low Plasticity		ML	100'-110': Sandy silt with gravel; 20% gravel; sand is ultra fine; gravel is subangular and ranges in size from 11 mm to 22 mm pebbles Alluvium
101							
102							
103							
104							
105							
106							
107							
108							
109							
110	Bentonite	Moist	Brown	Non-Plastic		GW	110'-120': Well graded gravel with sand; 30% sand; gravel ranges in size from 2 mm granules to 22 mm pebbles Alluvium
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Monitoring Well
 START: 1140
 STOP: 1349

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 2"
 SCREEN SLOT SIZE: 0.020

DATE: 6/22/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
121	Bentonite	Moist	Black/Brown	Plastic Fines	[Orange]	GC	120'-130': Clayey gravel with sand; 40% sand, 35% gravel, 15% fat clay; gravel is sub-rounded and ranges in size from 2 mm granules to 14 mm pebbles Alluvium
122							
123							
124							
125							
126							
127							
128							
129							
130							
131	Gravel	Moist	Brown	Low Plasticity	[Green]	ML	130'-140': Silt with sand and gravel; 80% fines, 10% sand, 5% gravel; very fine to coarse-grained sand; gravel ranges in size from 2 mm granules to 6 mm pebbles Alluvium
132							
133							
134							
135							
136							
137							
138							
139							
140							
141	Well Screen	Moist	Brown	Non-Plastic	[Orange]	GP	140'-150': Poorly graded gravel with sand; 40% sand is coarse-grained; gravel and sand are subangular; minimal fat clay; gravel ranges in size from 2 mm granules to 12 mm pebbles Alluvium
142							
143							
144							
145							
146							
147							
148							
149							
150							
151		Moist	Black	Non-Plastic	[Dark Orange]	GW	150'-170': Well-graded gravel with sand; 40% sand is coarse-grained and subangular; gravel ranges in size from 2 mm granules to 16 mm pebbles Alluvium
152							
153							
154							
155							
156							
157							
158							
159							
160							
161							



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Monitoring Well
 START: 1140
 STOP: 1349

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 2"
 SCREEN SLOT SIZE: 0.020

DATE: 6/22/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION	
161								
162								
163								
164								
165								
166								
167								
168								
169								
170			Moist	Brown	Medium Plasticity		ML	170'-180': Sandy silt with gravel; 35% sand, 15% gravel; sand is coarse-grained; gravel is subangular and ranges in size from 2 mm granules to 25 mm pebbles; hard drilling (rock at 175') Alluvium
171								
172								
173								
174								
175		Well Screen						
176								
177								
178								
179								
180			Moist	Brown	Plastic Fines		GC	180'-190': Clayey gravel with sand; 50% gravel, 30% fines, 20% sand; sand is coarse-grained; gravel is subangular and ranges in size from 2 mm granules to 18 mm pebbles Alluvium
181								
182								
183								
184								
185								
186								
187								
188								
189		Gravel						
190			Moist	Gray	Non-Plastic		GP	190'-200': Poorly graded gravel; 2% coarse-grained sand; gravel is 2 mm granules Alluvium
191								
192								
193								
194								
195								
196								
197								
198								
199								
200								
201								

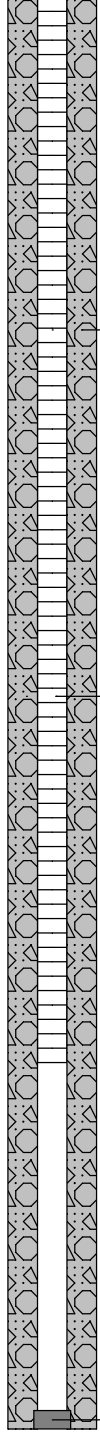



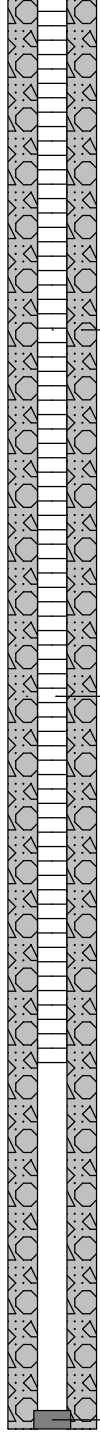



LITHOLOGIC LOG

PROJECT NAME: Thomas Creek Development
 SITE ADDRESS: 8900 Lakeside Dr., Reno, NV
 WELL ID: Monitoring Well
 START: 1140
 STOP: 1349

PROJECT NUMBER: 22-02-169
 DRILLING COMPANY: MacKay
 DRILLING METHOD: Mud Rotary
 WELL CASING DIAMETER: 2"
 SCREEN SLOT SIZE: 0.020

DATE: 6/22/2022
 SAMPLE METHOD:
 DRILLER: Chris
 LOGGED BY: M. Sawyer
 SAND SIZE: N/A

DEPTH (FT.)	BORING CONSTRUCTION	MOISTURE	COLOR	CONSISTENCY	LITHOLOGY	USCS	SOIL DESCRIPTION
201		Moist	Brown	Plastic Fines		SC	200'-210': Clayey sand; 60% sand is fine to coarse-grained; gravel is sub-rounded and ranges in size from 2 mm to 4 mm granules Alluvium
202							
203							
204							
205							
206							
207							
208							
209							
210							
211	Gravel	Moist	Black	Non-Plastic		GP	210'-220': Poorly graded gravel with sand; 40% sand is coarse-grained; gravel ranges in size from 2 mm granules to 12 mm pebbles Alluvium
212							
213							
214							
215							
216							
217							
218							
219							
220							
221	Well Screen	Moist	Dark Brown/Red	Low Plasticity		ML	220'-230': Sandy silt; 45% sand, 5% gravel; sand is coarse-grained; gravel size is up to 4 mm granules Alluvium
222							
223							
224							
225							
226							
227							
228							
229							
230							
231		Moist	Purple	Non-Plastic		ROCK	230'-240': Fractured volcanic; hard drilling at 229'; possibly basaltic andesite
232							
233							
234							
235							
236							
237							
238							
239							
240							
	Cap						

Appendix C

Drawdown Data from Aquifer Test

Production Well One

Time [h]	Level Depth to Water [ft bls]	Drawdown [ft]
0.001	15.918	0.041
0.002	15.985	0.108
0.004	15.886	0.009
0.007	18.057	2.180
0.013	22.214	6.337
0.024	23.806	7.929
0.042	23.877	8.000
0.075	24.911	9.034
0.132	25.232	9.355
0.235	26.674	10.797
0.397	25.685	9.808
0.563	26.587	10.710
0.730	27.349	11.472
0.897	26.674	10.797
1.063	27.257	11.380
1.230	28.148	12.271
1.397	26.575	10.698
1.563	27.464	11.587
1.730	28.014	12.137
1.897	27.823	11.946
2.063	27.788	11.911
2.230	27.967	12.090
2.397	28.349	12.472
2.563	27.676	11.799
2.730	27.332	11.455
2.897	28.791	12.914
3.063	28.201	12.324
3.230	28.237	12.360
3.397	28.375	12.498
3.563	28.499	12.622
3.730	27.196	11.319
3.897	28.144	12.267
4.063	27.852	11.975
4.230	28.468	12.591
4.397	28.262	12.385
4.563	28.741	12.864
4.730	28.062	12.185
4.897	27.353	11.476
5.063	27.907	12.030
5.230	29.043	13.166
5.397	29.383	13.506
5.563	28.507	12.630
5.730	28.772	12.895
5.897	29.145	13.268
6.063	29.239	13.362
6.230	27.754	11.877

Production Well One

Time [h]	Level Depth to Water [ft bls]	Drawdown [ft]
6.730	19.323	3.446
6.897	18.469	2.592
7.063	18.036	2.159
7.230	17.822	1.945
7.397	17.578	1.701
7.563	17.437	1.560
7.730	17.297	1.420
7.897	17.186	1.309
8.063	17.087	1.210
8.230	17.024	1.147
8.397	16.975	1.098
8.563	16.914	1.037
8.730	16.919	1.042
8.897	16.786	0.909
9.063	16.715	0.838
9.230	16.740	0.863
9.397	16.664	0.787
9.563	16.649	0.772
9.730	16.582	0.705
9.897	16.561	0.684
10.063	16.527	0.650
10.230	16.514	0.637
10.397	16.453	0.576
10.563	16.498	0.621
10.730	16.457	0.580
10.897	16.409	0.532
11.063	16.404	0.527
11.230	16.372	0.495
11.397	16.406	0.529
11.563	16.424	0.547
11.730	16.391	0.514
11.897	16.352	0.475
12.063	16.342	0.465
12.230	16.369	0.492
12.397	16.368	0.491
12.563	16.322	0.445
12.730	16.335	0.458
12.897	16.365	0.488
13.063	16.314	0.437
13.230	16.315	0.438
13.397	16.240	0.363
13.563	16.289	0.412
13.730	16.273	0.396
13.897	16.248	0.371
14.063	16.280	0.403

Production Well One

Time [h]	Level Depth to Water [ft bls]	Drawdown [ft]
14.563	16.245	0.368
14.730	16.258	0.381
14.897	16.235	0.358
15.063	16.204	0.327
15.230	16.212	0.335
15.397	16.211	0.334
15.563	16.201	0.324
15.730	16.175	0.298
15.897	16.204	0.327
16.063	16.175	0.298
16.230	16.157	0.280
16.397	16.150	0.273
16.563	16.178	0.301
16.730	16.149	0.272
16.897	16.206	0.329
17.063	16.149	0.272
17.230	16.177	0.300
17.397	16.174	0.297
17.563	16.139	0.262
17.730	16.191	0.314
17.897	16.117	0.240
18.063	16.124	0.247
18.230	16.134	0.257
18.397	16.115	0.238
18.563	16.131	0.254
18.730	16.153	0.276
18.897	16.180	0.303
19.063	16.098	0.221
19.230	16.076	0.199
19.397	16.104	0.227
19.563	16.142	0.265
19.730	16.124	0.247
19.897	16.101	0.224
20.063	16.144	0.267
20.230	16.118	0.241
20.397	16.130	0.253
20.563	16.141	0.264
20.730	16.091	0.214
20.897	16.107	0.230
21.063	16.159	0.282
21.230	16.107	0.230
21.397	16.196	0.319
21.563	16.144	0.267
21.730	16.171	0.294

Monitoring Well

Time [hr]	Level Depth to Water [ft bls]	Drawdown [ft]
1.667	20.973	4.413
2.500	21.289	4.729
3.333	21.503	4.943
4.167	21.666	5.106
5.000	21.752	5.192
5.833	21.858	5.298
6.667	21.953	5.393
7.500	18.108	1.548
8.333	17.614	1.054
9.167	17.372	0.812
10.000	17.193	0.633
10.833	17.083	0.523
11.667	17.047	0.487
12.500	16.937	0.377
13.333	16.898	0.338
14.167	16.908	0.348
15.000	16.851	0.291
15.833	16.808	0.248
16.667	16.774	0.214
17.500	16.784	0.224
18.333	16.781	0.221
19.167	16.754	0.194
20.000	16.751	0.191
20.833	16.774	0.214
21.667	16.812	0.252

Production Well #2

Time [hr]	Level Depth to Water [ft bls]	Drawdown [ft]
0.333	11.640	1.314
0.500	11.906	1.580
0.667	12.137	1.811
0.833	12.271	1.945
1.000	12.426	2.100
1.167	12.491	2.165
1.333	12.606	2.280
1.500	12.706	2.380
1.667	12.751	2.425
1.833	12.845	2.519
2.000	12.935	2.609
2.167	12.981	2.655
2.333	13.039	2.713
2.500	13.086	2.760
2.667	13.083	2.757
2.833	13.136	2.810
3.000	13.145	2.819
3.167	13.213	2.887
3.333	13.292	2.966
3.500	13.285	2.959
3.667	13.266	2.940
3.833	13.341	3.015
4.000	13.355	3.029
4.167	13.397	3.071
4.333	13.376	3.050
4.500	13.407	3.081
4.667	13.485	3.159
4.833	13.515	3.189
5.000	13.498	3.172
5.167	13.558	3.232
5.333	13.601	3.275
5.500	13.515	3.189
5.667	13.568	3.242
5.833	13.617	3.291
6.000	13.601	3.275
6.167	13.629	3.303
6.333	13.623	3.297
6.500	13.728	3.402
6.667	13.426	3.100
6.833	12.736	2.410
7.000	12.387	2.061
7.167	12.108	1.782
7.333	11.951	1.625
7.500	11.830	1.504

Production Well #2

Time [hr]	Level Depth to Water [ft bls]	Drawdown [ft]
8.000	11.500	1.174
8.167	11.440	1.114
8.333	11.341	1.015
8.500	11.288	0.962
8.667	11.244	0.918
8.833	11.215	0.889
9.000	11.163	0.837
9.167	11.093	0.767
9.333	11.059	0.733
9.500	11.051	0.725
9.667	11.061	0.735
9.833	10.953	0.627
10.000	10.953	0.627
10.167	10.885	0.559
10.333	10.893	0.567
10.500	10.872	0.546
10.667	10.862	0.536
10.833	10.829	0.503
11.000	10.857	0.531
11.167	10.836	0.510
11.333	10.800	0.474
11.500	10.765	0.439
11.667	10.822	0.496
11.833	10.786	0.460
12.000	10.751	0.425
12.167	10.764	0.438
12.333	10.756	0.430
12.500	10.708	0.382
12.667	10.736	0.410
12.833	10.726	0.400
13.000	10.694	0.368
13.167	10.694	0.368
13.333	10.696	0.370
13.500	10.701	0.375
13.667	10.662	0.336
13.833	10.613	0.287
14.000	10.661	0.335
14.167	10.640	0.314
14.333	10.602	0.276
14.500	10.622	0.296
14.667	10.618	0.292
14.833	10.589	0.263
15.000	10.584	0.258
15.167	10.582	0.256

Production Well #2

Time [hr]	Level Depth to Water [ft bls]	Drawdown [ft]
15.667	10.534	0.208
15.833	10.581	0.255
16.000	10.543	0.217
16.167	10.542	0.216
16.333	10.535	0.209
16.500	10.548	0.222
16.667	10.574	0.248
16.833	10.479	0.153
17.000	10.535	0.209
17.167	10.496	0.170
17.333	10.559	0.233
17.500	10.545	0.219
17.667	10.514	0.188
17.833	10.510	0.184
18.000	10.508	0.182
18.167	10.530	0.204
18.333	10.513	0.187
18.500	10.536	0.210
18.667	10.496	0.170
18.833	10.501	0.175
19.000	10.510	0.184
19.167	10.464	0.138
19.333	10.521	0.195
19.500	10.549	0.223
19.667	10.534	0.208
19.833	10.519	0.193
20.000	10.461	0.135
20.167	10.491	0.165
20.333	10.525	0.199
20.500	10.538	0.212
20.667	10.508	0.182
20.833	10.527	0.201
21.000	10.532	0.206
21.167	10.509	0.183
21.333	10.532	0.206
21.500	10.554	0.228
21.667	10.519	0.193
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000