

WALLACE RANCH
GROUP A WATER SYSTEM
Well Construction and Testing Report
Prepared for: Wallace Ranch II, LLC

Project No. 190280 • July 18, 2022 DRAFT



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Executive Summary

Aspect Consulting, LLC (Aspect) prepared this report to document the construction and testing of a Group A water supply well for Wallace Ranch II, LLC (Wallace Ranch). Wallace Ranch is in the process of obtaining a new mitigated water right from the Washington State Department of Ecology (Ecology) to provide municipal water supply for a proposed housing development located near Bristol, Washington.

Well No. 1 is constructed to a depth of 354 feet below ground surface (bgs), with the primary water-bearing zone located between 175 and 354 feet bgs. An extended surface seal, to a total depth of 60 feet bgs, provides an additional measure of water quality protection for this new public water supply source.

The well is completed with an 8-inch telescoping 20-slot prepacked stainless steel screen from 334 to 354 feet bgs. The well screen is open to the formation between depths of 336 to 354 feet bgs. The well is flowing artesian with a February 2022 static shut-in pressure of approximately 6.6 (pounds per square inch) psi (or approximately 15 feet above ground surface). Therefore, there is currently 351 feet of available drawdown above the top of the well screen.

Well No. 1 was tested during a step-rate test at 31, 50, 81, and 106 (gallons per minute) gpm. The 24-hour constant rate pumping test was conducted at 106-gpm flow rate, which resulted in approximately 118 feet of drawdown at the end of the test. Based on the pumping test data and observed aquifer response, we conclude that the aquifer transmissivity is approximately 9,700 square feet per day (ft^2/d).

Based on the constant rate pumping test data and observed aquifer response, we conclude that Well No. 1, with an approximate specific capacity of 1 gallon per minute per foot of drawdown (gpm/ft), can provide a safe yield of 100 gpm of continuous pumping with an appropriate pump set above the top of the well screen.

1 Introduction

Aspect Consulting, LLC (Aspect) prepared this report to document the installation and testing of Wallace Ranch Well No. 1 (Well No. 1), a new Group A water supply well for Wallace Ranch. Well No. 1 is located south of Cle Elum, Washington in Kittitas County, SE¼ NE¼ of Section 14, Township 19 North, Range 16 East Willamette Meridian (W.M.) as shown on Figure 1. The proposed project development is split into two geographically separated properties. The first is located on a flood plain (riverfront) directly north of the Yakima River and the second is located south of the Yakima River on a plateau (approximately 300 feet higher than the lower property).

The proposed project development will occur over three individual phases or clusters. The initial cluster consists of development of the riverfront property, followed by two additional development clusters at the upper properties resulting in full build-out of 50 residential lots. Well No. 1 will supply the lower property and a separate well(s) will supply the upper property.

Well No. 1 is located on the lower property which is situated between Lookout Mountain to the northeast and Indian John Hill to the southwest. The elevation of the property is approximately 1,790 to 1,810 feet above mean sea level (amsl) and is relatively flat but slopes gently to the west. Well No. 1 is approximately 354 feet deep and is completed in an unconsolidated sand and gravel aquifer believed to be of fluvial origin.

Aspect Consulting, LLC (Aspect) provided hydrogeologic consulting services associated with installation and testing of Well No. 1, under contract to Wallace Ranch.

1.1 Project Background

As part of the initial development and source approval phase, the installation and testing of Well No. 1 was completed between November 2021 and March 2022.

Technical specifications for the drilling, installation, and aquifer testing of Well No. 1 were completed by Aspect under contract to Wallace Ranch. The drilling was completed by Holt Services Inc. (Holt) of Edgewood, Washington, in accordance with the technical specifications and minimum standards for well construction (WAC 173-160). The driller was contracted directly to Wallace Ranch.

1.2 Geologic Setting

The riverfront property is located on the Yakima River flood plain approximately 2 miles south of the Teanaway River – Yakima River confluence. Both upstream and downstream of the property, the river corridor is confined by basalt bedrock which serves as the basement geologic unit underlying Lookout Mountain to the northeast and Indian John Hill to the southwest.

The property is within the terminus of recent Pleistocene glaciations and as a result, erosional and depositional sequences associated with these recent glaciations and interglacial periods dominate the geology of Wallace Ranch.

Samples collected during drilling of Well No. 1 indicate that the primary geologic units encountered from 20 to 175 feet (below ground surface) bgs are of glacial origin while geologic units encountered from 175 to 354 feet bgs are fluvial in origin.

2 Well Drilling and Installation

The following sections summarize the drilling and construction of Well No. 1, including the subsurface conditions encountered.

2.1 Well Drilling

Drilling of Well No. 1 was completed by Holt using reverse circulation drilling techniques on January 18, 2022. The well boring was drilled to a total depth of 354 feet bgs into the formation. A summary of the well construction and generalized stratigraphy is provided on Figure 2 (Well No. 1 As-Built); Appendix A provides a detailed hydrogeologic log as observed by Aspect; and Appendix B is the official Water Well Report provided by the driller to the State Department of Ecology (Ecology).

Drill cuttings were collected at a minimum of every 5 feet to document changes in lithology. A hydrogeologist from Aspect was on-site during drilling of the water-bearing zone to collect samples and document both drilling and subsurface conditions.

2.1.1 Stratigraphy

Four distinct geologic units were encountered from ground surface to the total depth of 354 feet bgs. These units are discussed in detail below.

Recent Yakima River Alluvium (Qy) – The recent alluvium consists of poorly sorted, subrounded gravel with silt. Water was encountered in this unit but determined to be un-suitable for municipal purposes due to water quality concerns associated with the high hydraulic continuity with the surface and adjacent reach of the Yakima River. This unit was encountered from near ground surface to approximately 20 feet bgs.

Glacial Lacustrine Deposit (Qkil) – The glacial lacustrine deposits consist of blue/gray, medium to high plasticity clay. During the drilling of Well No. 1 this lacustrine deposit was encountered from 20 to 80 feet bgs. Additionally, this clay layer is documented in nearby wells to depths of 245 feet bgs.

This same lacustrine deposit is also documented in past scientific literature, specifically Porter, 1976. Porter describes this layer as “bluish lacustrine silt, clay, and sand...” and uses numerous boreholes drilled by Northern Pacific Railroad between Ronald, Washington and the mouth of the Teanaway River to map the vertical and lateral extent of this unit. Porter (1976) writes that the formation of this clay layer (labeled “Qkil”) happened during a glacial retreat when till and outwash choked the gorge of the Yakima River south of Lookout Mountain. The choked Yakima River gorge resulted in the formation of a glacial lake, estimated to be approximately 15 km long and 3 to 5 km wide.

Fluvial Sand and Gravel – Located directly beneath the glacial lacustrine deposit is a fluvial layer of sand and gravel that are likely lake filling deposits of the Kittitas Drift. The entire fluvial layer is fully saturated and under artesian pressure with static water level up to 15 feet above ground surface (ags). The sand and gravel layer generally becomes coarser with depth and consists of predominately fine, well sorted, mafic sand from 80 to 175 feet bgs and clean sand and subrounded gravel from 175 to 354 feet bgs.

2.1.2 Groundwater Occurrence

Water was first encountered beneath the clay layer at 80 feet bgs where artesian (15 feet ags) conditions existed. The final screen location (334 to 354 feet bgs) was selected based on an observed increase in coarse gravel and borehole stability. Due to the absence of confining units, it is believed that the screen is in direct hydraulic continuity with the overlying sand layer that extends from 80 feet bgs.

During drilling of the water bearing units (80 – 354 feet bgs) an abundance of dissolved gas was observed. Based on the smell and flammability characteristics it is likely that the dissolved includes but not limited to hydrogen sulfide and methane.

Following well completion, the static shut-in pressure was 6.5 psi (15 feet ags).

2.2 Well Construction

Drilling of Well No. 1 began with installation of a 12-inch-diameter conductor casing to a depth of 60 feet bgs. The 12-inch-diameter casing was sealed within a 16-inch borehole, with neat cement consistent with the minimum well construction requirements defined in Chapter 173-160 WAC. Following the installation of the surface seal, the borehole was drilled to a depth of 345 feet bgs. During drilling, a 10-inch well casing was advanced with the drill bit to keep the formation from caving.

A sieve analysis of drill cutting samples collected during previous drilling efforts was performed by PQ Products of Spokane, Washington, to inform screen design (included as Appendix C). Based on the sieve analysis, the sand and gravel unit located between 175-354 feet bgs was the most suitable (coarsest) to install the screen. The well screen assembly consists of an 8-inch-diameter, prepacked 20-slot, stainless steel screen exposed to the formation between 336 to 354 feet bgs.

2.3 Well Development

The well was developed via airlifting for approximately 7.5 hours, until turbidity of the water was less than 2 Nephelometric Turbidity Units (NTU). During the pumping tests turbidity of the well water was less than 1 NTU.

3 Well Yield and Aquifer Testing

Well testing, using a temporary test pump, consisted of a step-rate and a 24-hour constant rate pumping test. A test pump was provided and installed by a Holt. The pump intake

was set at 148 feet bgs and the pump rate was controlled using a gate valve and flow meter.

Groundwater levels were monitored in the pumping well using both a manual water level indicator and a 100 pounds per square inch (psi) Instrumentation Northwest Inc. PT2X non-vented pressure transducer. A Van Essen TD BaroDiver was deployed in the surface casing of the pumping well to record atmospheric barometric pressure during the pumping tests for barometric compensation. Review of the pressure transducer data found the pressure readings adequate for analyzing groundwater level trends and aquifer parameters.

3.1 Step-Rate Pumping Test

A step-rate pumping test was conducted on March 16, 2022. The well was pumped at an average flow rate of 31, 50, 81, and 106 gpm for 1 hour at each step. Test data was analyzed according to the Hantush-Bierschenk method (Kruseman and deRidder, 2000). A hydrograph displaying the drawdown across each step is presented on Figure 3. The resulting drawdown, specific capacity, and well efficiency are provided in Table 1.

Table 1. Step Rate Pumping Test Results

Step #	Pumping Rate (gpm)	Drawdown (feet)	Specific Capacity (gpm/ft)	Well Efficiency (%)
1	31	15	2.1	52%
2	50	24	2.1	41%
3	81	69	1.2	30%
4	106	99	1.1	24%

3.2 Constant Rate Pumping Test

A 24-hour constant rate test was initiated on March 16, 2022; however, the test was terminated after 18 hours due to a failure of the generator. A full 24-hour constant-rate test was conducted on March 18 through 19, 2022. Well No. 1 was pumped at a time-weighted mean of 101 gpm continuously for 24 hours.

Figure 4 presents the constant rate pumping test drawdown curve hydrograph, manual water level, and discharge measurements. There was a maximum of 117.9 feet of total drawdown in Well No. 1. (specific capacity of 0.89 gpm/foot drawdown) at the conclusion of the 24-hour constant rate pumping test.

3.2.1 Recovery

The water level recovered to ground surface (87 percent of the drawdown) following the first (incomplete) and second (complete) constant rate pumping tests within 6.3 and 7 minutes, respectively. The recovery hydrographs from the two constant rate pumping test's and step-rate test are presented on Figure 5. Because Well No. 1 is flowing artesian and discharged to atmosphere, full aquifer recovery was not able to be measured with the pump installed.

3.2.2 Aquifer Parameter Estimates

Using the Cooper-Jacob Straight Line method (Cooper-Jacob method) the aquifer transmissivity (quantitative measure of an aquifer's ability to transmit water) can be calculated in the vicinity of Well No. 1 based on the following equation (Fetter, 2001):

$$T = 264Q/\Delta s$$

Where:

T = Aquifer transmissivity (gpd/foot)

Q = Well discharge (gpm)

Δs = Change in drawdown over one log cycle during pumping (feet)

As shown on Figure 6, a late period of the drawdown curve between 83 and 388 minutes was selected for calculating the aquifer transmissivity using the Cooper-Jacob method for non-equilibrium flow in a confined aquifer.

Using the Cooper-Jacob method, we estimate an aquifer transmissivity of 72,900 gallons per day per foot (gpd/ft), or approximately 9,753 square feet per day (ft²/d) from the drawdown portion of the constant rate test.

Because the well is flowing artesian, full recovery of the water levels could not be monitored and thus, the recovery portion of the constant rate test was not used to inform aquifer parameters.

3.3 Predicted Drawdown at Longer Pumping Times

The Hantusch-Bierschenk method (Kruseman, and deRidder, 2000) was used to predict drawdown. The calculated drawdown due to pumping at the maximum instantaneous flow rate (Qi) of 125 gpm is approximately 76 feet and 78 feet over a 1-day to 3-month period, respectively. Figure 7 presents predicted pumping levels over a 100-day period of continuous pumping at 50, 75, and 100 gpm.

The total available drawdown within Well No. 1 is approximately 349 feet (the difference between the static groundwater level (15 feet ags) and above the top of the screen interval (334 feet bgs). Recommended pump setting will be developed in coordination with the water system design engineer to meet peak and average water system demands.

Aspect recommends that Wallace Ranch regularly monitor static and pumping water levels.

3.4 Well Performance

Well performance (well efficiency and production zones) was evaluated via analyzing pumping test data.

3.4.1 Well Efficiency

Well efficiency is estimated as the theoretical versus the actual drawdown in Well No. 1. The theoretical drawdown is estimated from the distance drawdown graph presented above in Table 1, which uses the Hantush-Bierschenk solution to calculate well

efficiency at variable pumping rates. The calculated well efficiency is relatively low (24 to 51 percent) and is believed to be directly correlated with the fine-grained aquifer combined with the relatively small sized (20 slot) well screen and conservative filter pack design. Although the well has relatively low efficiency, the well can adequately serve the intended population.

3.4.2 Production Zones

As seen in the attached boring log (Attachment B) the primary production zone for this well is located between 320 feet bgs and the bottom of the well screen (354 feet bgs). The water-bearing zone is comprised of Quaternary-age, fine- to coarse-grained sand and gravel believed to be part of the geologic unit known as the Kittitas Drift (Porter, 1976).

4 Groundwater Susceptibility and Water Quality

A completed DOH Groundwater Susceptibility Assessment form and water quality laboratory results are included in Appendix D and E, respectively.

4.1 Groundwater Susceptibility

The time of travel was determined using the calculated fixed radius method. Results from the assessment found that the pesticide application is likely to occur within the 1-year time of travel due to proximity to pasture/ hay fields (Figure D-1). However, the planned housing development and associated septic drain field is located outside the 10-year time of travel.

4.2 Water Quality

Water quality samples, and general water quality parameters, were collected on March 17, 2022.

4.2.1 General Water Quality Parameters

A calibrated water quality multimeter with a flow-cell was used to collect water quality parameters between the two 24-hour constant rate pumping tests from an inline sampling port. General water quality parameters are summarized in Table 2. These parameters are normal and within the expected range of drinking water.

Table 2. General Water Quality Results

Parameter	Value	Unit
Temperature	16.6	°C
Specific Conductance	277	uS/cm
pH	8.31	SU
Dissolved Oxygen	22	%
Oxidation-Reduction Potential	61	mV

As discussed above in Section 2.1.2., an abundance of dissolved gas was observed in the water bearing units including but not limited to hydrogen sulfide and methane. It is recommended that treatment alternatives to remove dissolved gasses be evaluated during water system design.

4.3 Water Quality Results

Water quality samples were collected in clean, laboratory-supplied bottles. Samples were collected following general standard operating procedures for collection of bacteria; inorganic, volatile organic compounds; and synthetic organic chemicals. Samples were labeled, placed on ice in a cooler, and hand-delivered to AM Test Labs in Kirkland, Washington. All samples arrived in good condition. A copy of the laboratory results is included as Appendix E.

The sample results (Appendix E) did not exceed regulatory standards for all tested water quality parameters: bacteria, inorganic compounds (IOCs), volatile organic compounds (VOCs), synthetic organic compounds (SOCs) - pesticides (525.2) and herbicides (515.1).

5 References

Fetter, C. W., 2001, Applied Hydrogeology (4th Edition), Prentice-Hall Inc., Upper Saddle River, NJ.

Kruseman, G.P. and N.A. de Ridder, 2000, Analysis and Evaluation of Pumping Test Data, Second Edition, International Institute for Land Reclamation and Improvement, The Netherlands.

Porter, S. C., 1976, Pleistocene Glaciation in the Southern Part of the North Cascade Range, Washington, *Geological Society of America Bulletin* 87: 61-75.

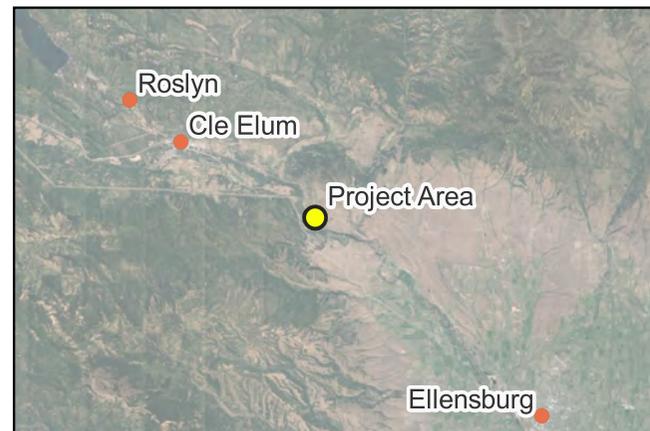
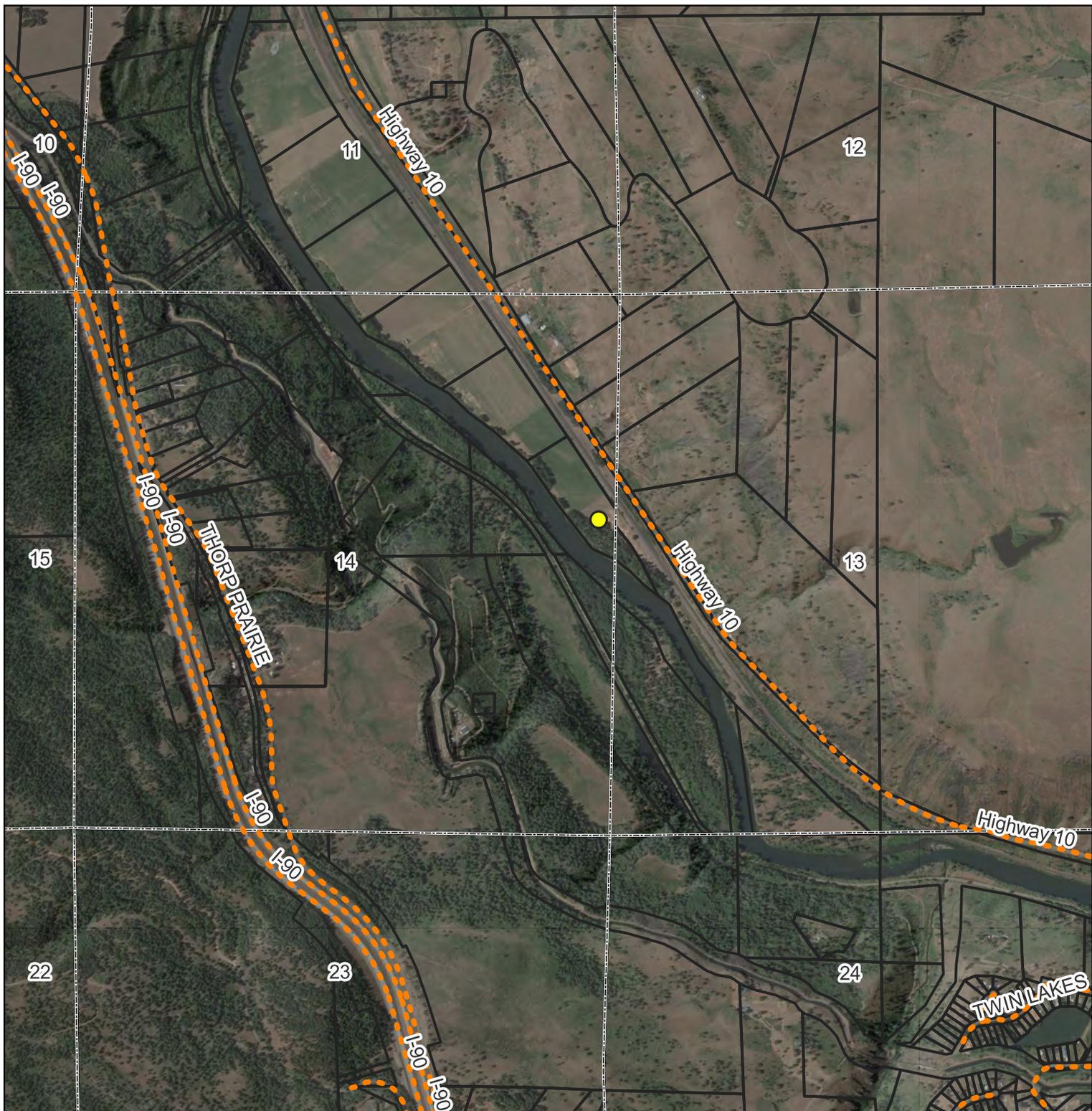
6 Limitations

Work for this project was performed for Wallace Ranch II, LLC (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect Consulting. Aspect Consulting's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

FIGURES

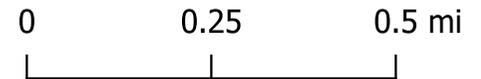
QGIS Path: L:\GIS\Stepper (QGIS)\Projects\Wallace Ranch\Wallace Ranch.qgz (Well No. 1 Site Map) | Coordinate System: EPSG:3857 | Date Printed: 2022-04-10 11:02



Comments: Well No. 1 is located within Section 14, Township 19 North, Range 16 EWM on Kittitas County Parcel No. 18584.

LEGEND:

-  Wallace Ranch Well No. 1
-  Roads
-  Sections
-  Kittitas County Tax Parcels



Project Vicinity Map

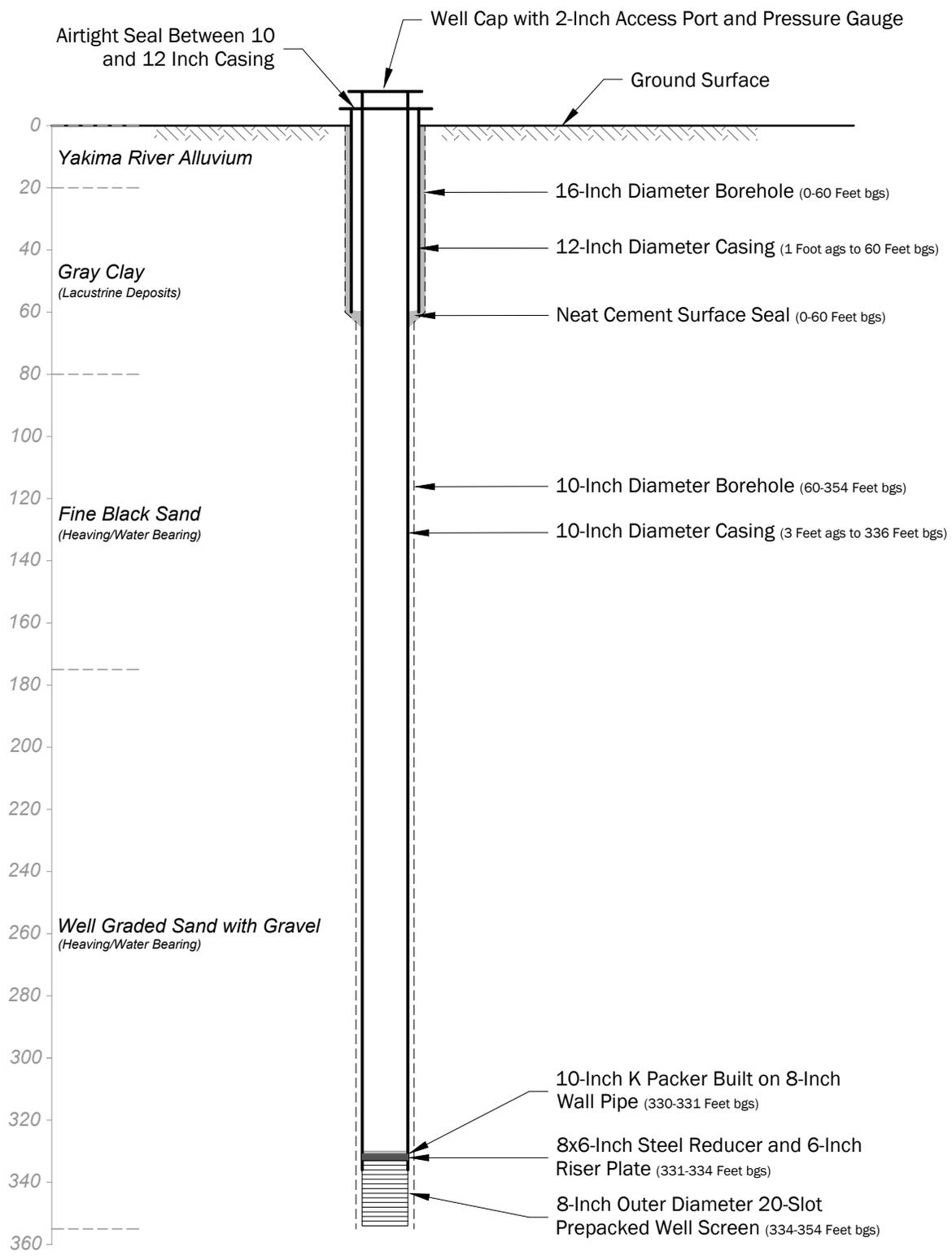
Group A Water System Well Completion Report
Wallace Ranch, Bristol, Washington



April-2022
PROJ NO.
190540

BY: SSS / ---
REV BY: --- / ---

FIG NO.
1



Vertical Scale
 Above Ground = Not to Scale
 Below Ground: 1" = 50'

ags = Above Ground Surface
 bgs = Below Ground Surface

Well Construction Summary			
Wallace Ranch			
Group A Water System Well Completion Report			
Kittitas County, Washington			
	Mar-2022	BY: SS/SCC	FIGURE NO.
	PROJECT NO. 190280	REV BY: -	2

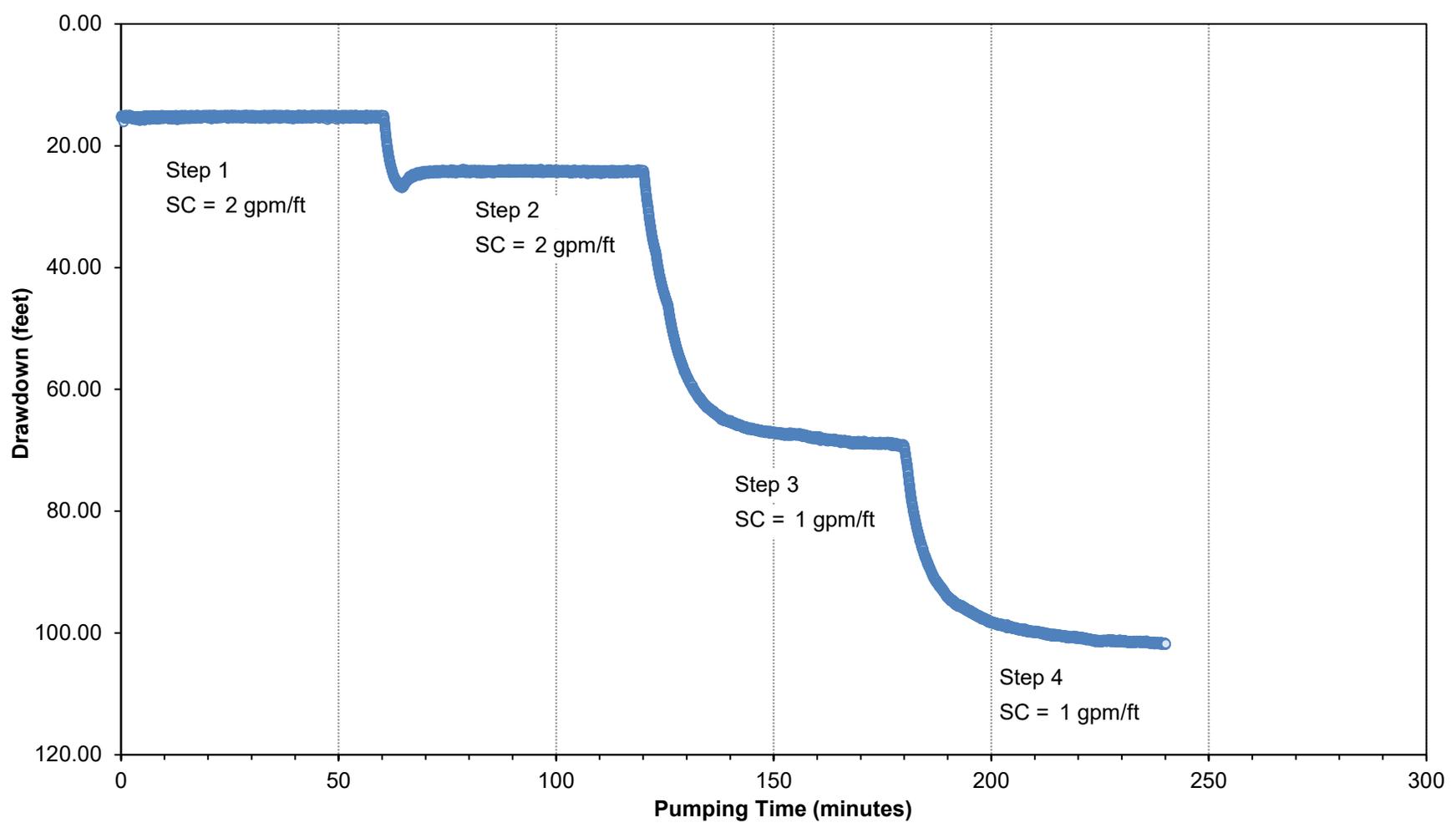


Figure 3
Step Test Hydrograph

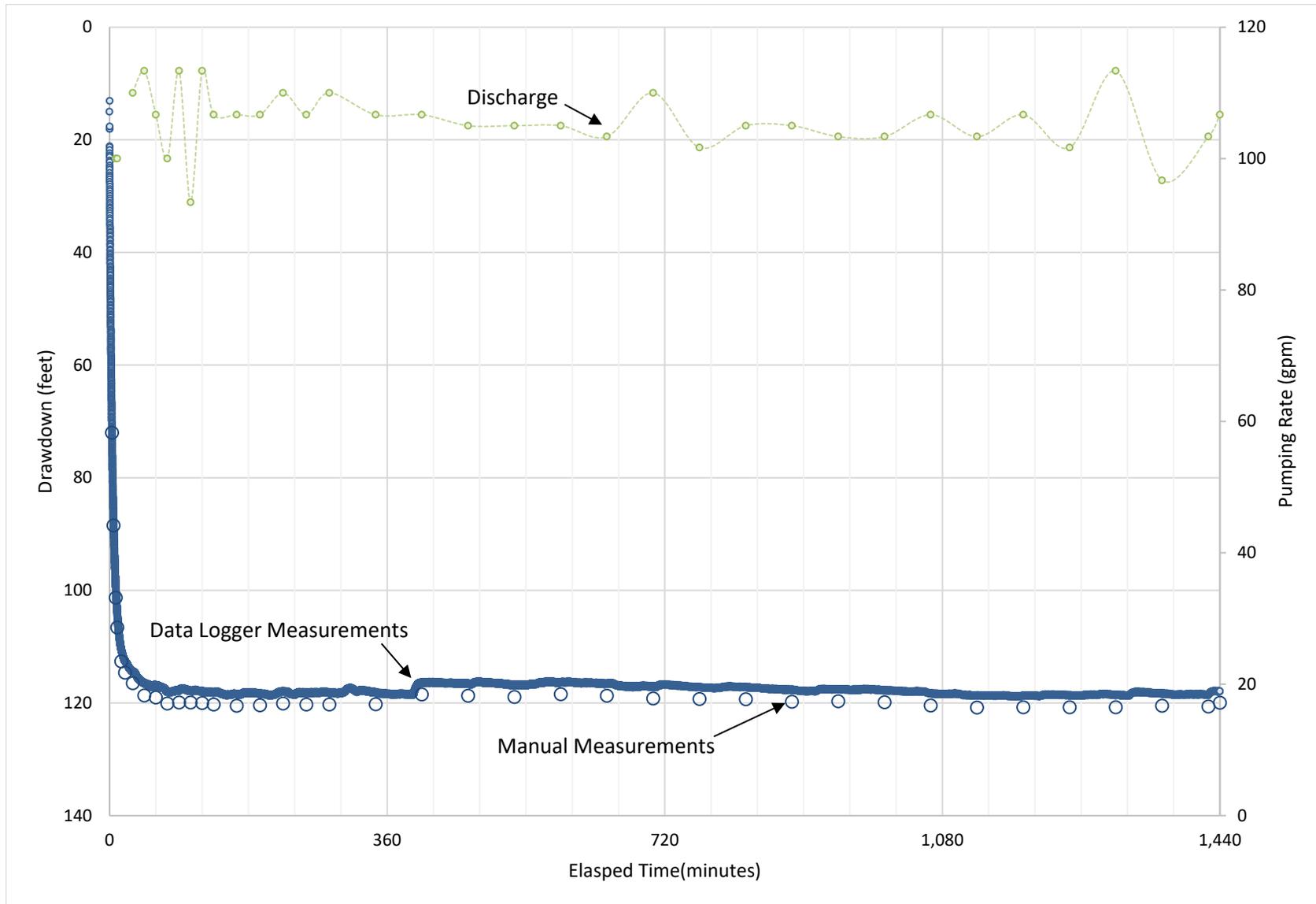


Figure 4
Constant Rate Hydrograph

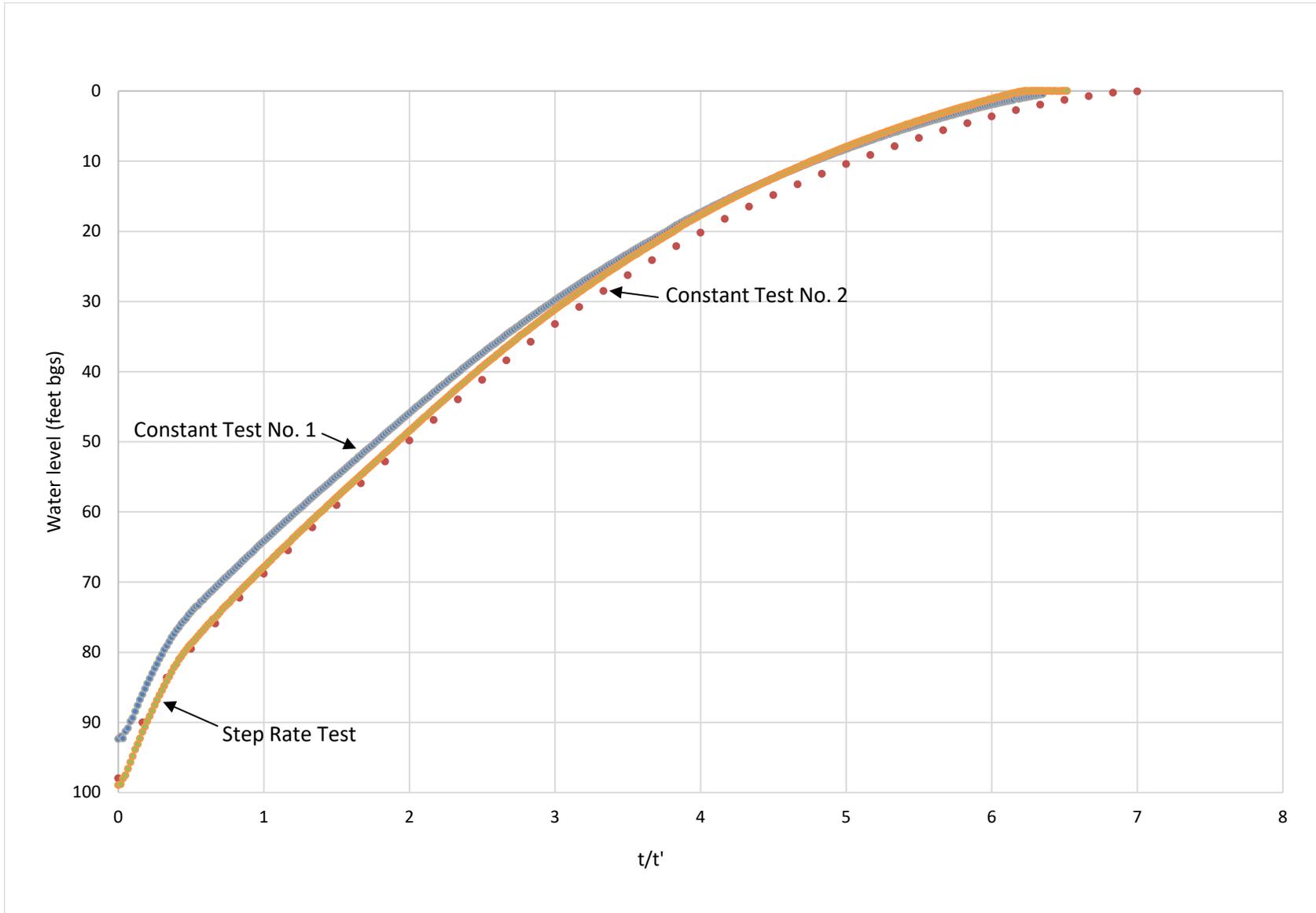
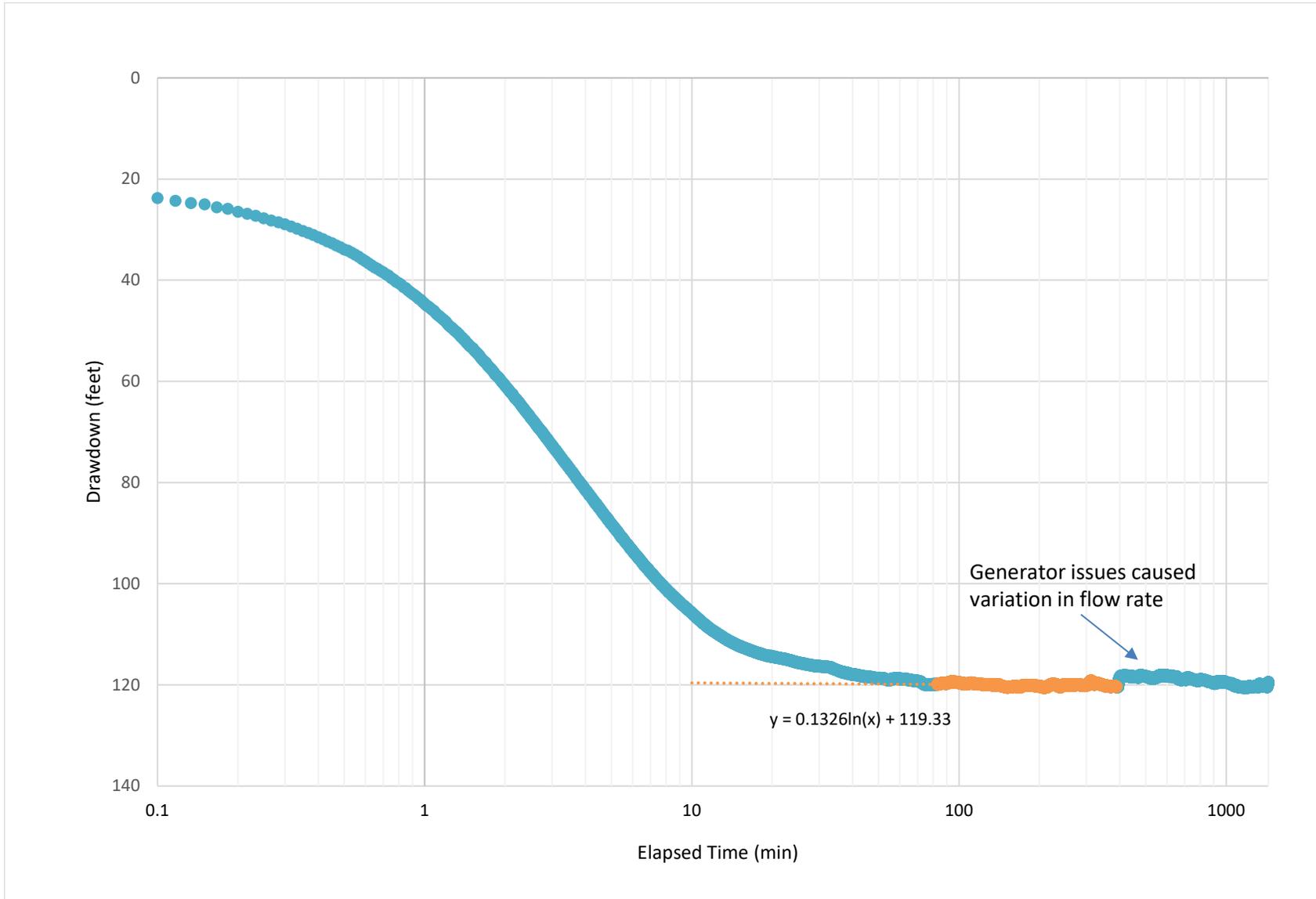
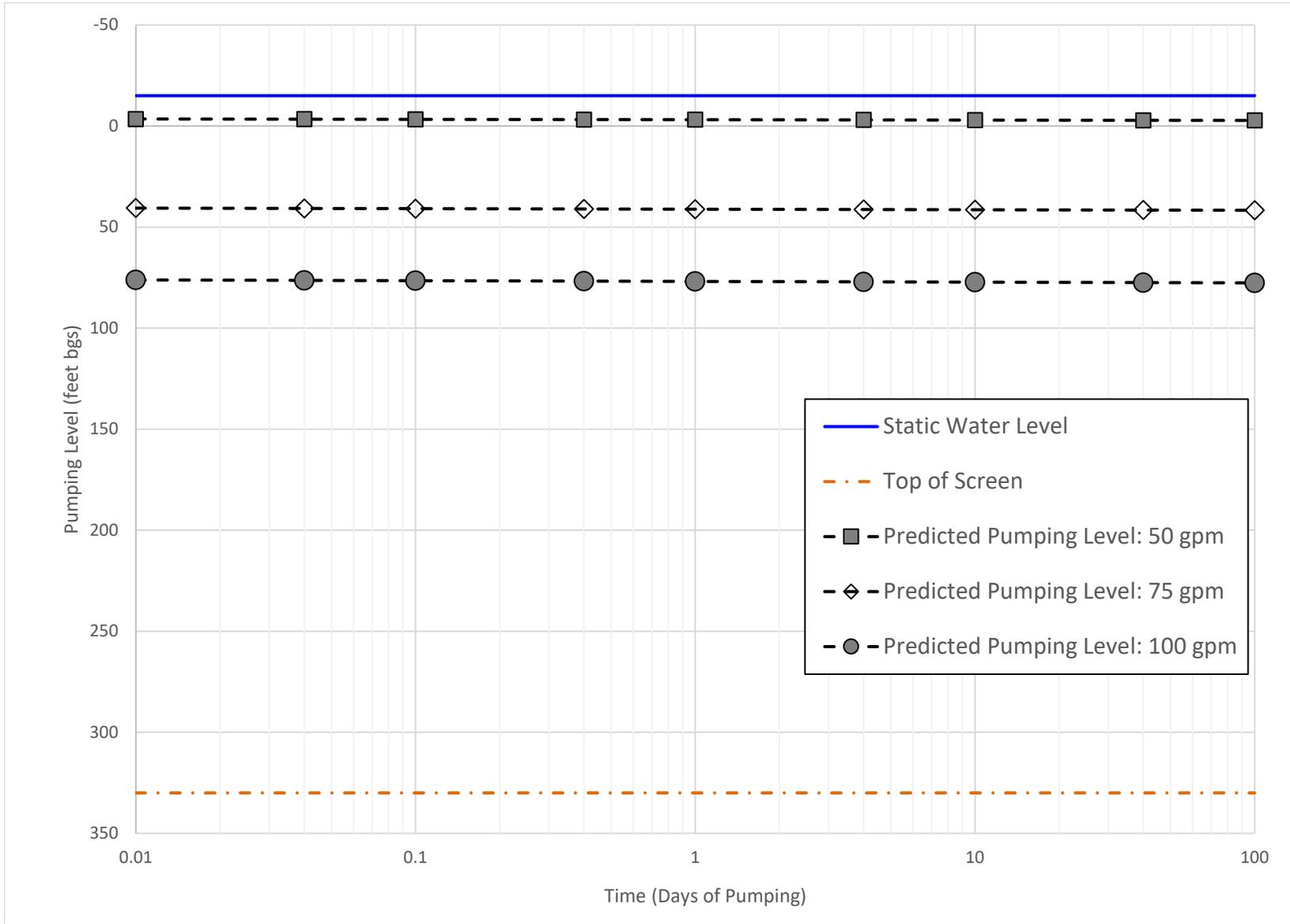


Figure 5
Recovery Hydrographs





APPENDIX A

Geologic Log

Coarse-Grained Soils - More than 50% ¹ Retained on No. 200 Sieve	Gravels - More than 50% ¹ of Coarse Fraction Retained on No. 4 Sieve	≤ 5% Fines	GW	Well-graded GRAVEL Well-graded GRAVEL WITH SAND
		≥ 15% Fines	GP	Poorly-graded GRAVEL Poorly-graded GRAVEL WITH SAND
	Sands - 50% ¹ or More of Coarse Fraction Passes No. 4 Sieve	≤ 5% Fines	GM	SILTY GRAVEL SILTY GRAVEL WITH SAND
		≥ 15% Fines	GC	CLAYEY GRAVEL CLAYEY GRAVEL WITH SAND
Fine-Grained Soils - 50% ¹ or More Passes No. 200 Sieve	Sands - 50% ¹ or More of Coarse Fraction Passes No. 4 Sieve	≤ 5% Fines	SW	Well-graded SAND Well-graded SAND WITH GRAVEL
		≥ 15% Fines	SP	Poorly-graded SAND Poorly-graded SAND WITH GRAVEL
	Silt and Clays Liquid Limit Less than 50%	≤ 5% Fines	SM	SILTY SAND SILTY SAND WITH GRAVEL
		≥ 15% Fines	SC	CLAYEY SAND CLAYEY SAND WITH GRAVEL
Highly Organic Soils	Silt and Clays Liquid Limit 50% or More	≤ 5% Fines	ML	SILT SANDY or GRAVELLY SILT SILT WITH SAND SILT WITH GRAVEL
		≥ 15% Fines	CL	LEAN CLAY SANDY or GRAVELLY LEAN CLAY LEAN CLAY WITH SAND LEAN CLAY WITH GRAVEL
	Silt and Clays Liquid Limit 50% or More	≤ 5% Fines	OL	ORGANIC SILT SANDY or GRAVELLY ORGANIC SILT ORGANIC SILT WITH SAND ORGANIC SILT WITH GRAVEL
		≥ 15% Fines	MH	ELASTIC SILT SANDY or GRAVELLY ELASTIC SILT ELASTIC SILT WITH SAND ELASTIC SILT WITH GRAVEL
Highly Organic Soils	Silt and Clays Liquid Limit 50% or More	≤ 5% Fines	CH	FAT CLAY SANDY or GRAVELLY FAT CLAY FAT CLAY WITH SAND FAT CLAY WITH GRAVEL
		≥ 15% Fines	OH	ORGANIC CLAY SANDY or GRAVELLY ORGANIC CLAY ORGANIC CLAY WITH SAND ORGANIC CLAY WITH GRAVEL
Highly Organic Soils			PT	PEAT and other mostly organic soils

"WITH SILT" or "WITH CLAY" means 5 to 15% silt and clay, denoted by a "-" in the group name; e.g., SP-SM • "SILTY" or "CLAYEY" means >15% silt and clay • "WITH SAND" or "WITH GRAVEL" means 15 to 30% sand and gravel. • "SANDY" or "GRAVELLY" means >30% sand and gravel. • "Well-graded" means approximately equal amounts of fine to coarse grain sizes • "Poorly graded" means unequal amounts of grain sizes • Group names separated by "/" means soil contains layers of the two soil types; e.g., SM/ML.

Soils were described and identified in the field in general accordance with the methods described in ASTM D2488. Where indicated in the log, soils were classified using ASTM D2487 or other laboratory tests as appropriate. Refer to the report accompanying these exploration logs for details.

1. Estimated or measured percentage by dry weight
2. (SPT) Standard Penetration Test (ASTM D1586)
3. Determined by SPT, DCPT (ASTM STP399) or other field methods. See report text for details.

MC = Natural Moisture Content	GEOTECHNICAL LAB TESTS	
PS = Particle Size Distribution		
FC = Fines Content (% < 0.075 mm)		
GH = Hydrometer Test		
AL = Atterberg Limits		
C = Consolidation Test		
Str = Strength Test		
OC = Organic Content (% Loss by Ignition)		
Comp = Proctor Test		
K = Hydraulic Conductivity Test		
SG = Specific Gravity Test		
Organic Chemicals		CHEMICAL LAB TESTS
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes		
TPH-Dx = Diesel and Oil-Range Petroleum Hydrocarbons		
TPH-G = Gasoline-Range Petroleum Hydrocarbons		
VOCs = Volatile Organic Compounds		
SVOCs = Semi-Volatile Organic Compounds		
PAHs = Polycyclic Aromatic Hydrocarbon Compounds		
PCBs = Polychlorinated Biphenyls		
Metals		
RCRA8 = As, Ba, Cd, Cr, Pb, Hg, Se, Ag, (d = dissolved, t = total)		
MTCAs = As, Cd, Cr, Hg, Pb (d = dissolved, t = total)		
PP-13 = Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, Zn (d=dissolved, t=total)		
PID = Photoionization Detector	FIELD TESTS	
Sheen = Oil Sheen Test		
SPT ² = Standard Penetration Test		
NSPT = Non-Standard Penetration Test		
DCPT = Dynamic Cone Penetration Test		
Descriptive Term		Size Range and Sieve Number
Boulders =	Larger than 12 inches	
Cobbles =	3 inches to 12 inches	
Coarse Gravel =	3 inches to 3/4 inches	
Fine Gravel =	3/4 inches to No. 4 (4.75 mm)	
Coarse Sand =	No. 4 (4.75 mm) to No. 10 (2.00 mm)	
Medium Sand =	No. 10 (2.00 mm) to No. 40 (0.425 mm)	
Fine Sand =	No. 40 (0.425 mm) to No. 200 (0.075 mm)	
Silt and Clay =	Smaller than No. 200 (0.075 mm)	
% by Weight	Modifier	% by Weight
<1 =	Subtrace	15 to 25 = Little
1 to <5 =	Trace	30 to 45 = Some
5 to 10 =	Few	>50 = Mostly
		ESTIMATED¹ PERCENTAGE
Dry =	Absence of moisture, dusty, dry to the touch	
Slightly Moist =	Perceptible moisture	
Moist =	Damp but no visible water	
Very Moist =	Water visible but not free draining	
Wet =	Visible free water, usually from below water table	
		MOISTURE CONTENT
Non-Cohesive or Coarse-Grained Soils		RELATIVE DENSITY
Density³	SPT² Blows/Foot	Penetration with 1/2" Diameter Rod
Very Loose =	0 to 4	≥ 2'
Loose =	5 to 10	1' to 2'
Medium Dense =	11 to 30	3" to 1'
Dense =	31 to 50	1" to 3"
Very Dense =	> 50	< 1"
Cohesive or Fine-Grained Soils		CONSISTENCY
Consistency³	SPT² Blows/Foot	Manual Test
Very Soft =	0 to 1	Penetrated >1" easily by thumb. Extrudes between thumb & fingers.
Soft =	2 to 4	Penetrated 1/4" to 1" easily by thumb. Easily molded.
Medium Stiff =	5 to 8	Penetrated >1/4" with effort by thumb. Molded with strong pressure.
Stiff =	9 to 15	Indented ~1/4" with effort by thumb.
Very Stiff =	16 to 30	Indented easily by thumbnail.
Hard =	> 30	Indented with difficulty by thumbnail.
GEOLOGIC CONTACTS		
Observed and Distinct	Observed and Gradual	Inferred
		Exploration Log Key



Wallace Ranch - 190280

Project Address & Site Specific Location

Kittitas County, WA, Parcel No. 19-16-14000-0009

Water Well Log

Coordinates (Lat, Lon WGS84)

47.1398, -120.7947 (est)

Exploration Number

AW-01

Ecology Well Tag No.
BKL153

Contractor 3/16/2022

Equipment

Sampling Method

Ground Surface Elev. (MSL)

Holt Drilling

Dual Rotary Drill Rig

Grab

1778' (est)

Operator

Exploration Method(s)

Work Start/Completion Dates

Top of Casing Elev. (MSL)

Depth to Water (Below GS)

Mike Hiatt

Reverse Circulation

11/17/2021 to 1/20/2022

1781' (est)

-15' (Static)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
0	1780	10-inch casing sticks up 3 feet ags and 12-inch casing sticks up 1.5 feet ags. Static shut-in pressure is 6.5 PSI.					TOPSOIL	0
5	1775		S1				SILT WITH GRAVEL (ML); slightly moist, brown; non-plastic silt; fine to coarse, subrounded to rounded gravel; some cobbles.	5
10	1770		S2				RECENT YAKIMA RIVER ALLUVIUM	10
15	1765		S3				GRAVEL WITH SILT (GW-GM); moist, brown; non-plastic silt, multicolored, subrounded to subangular, <1" in diameter, well graded gravel; minor amounts of water observed.	15
20	1760		S4				KITTITAS DRIFT - INDIAN JOHN SUBDRIFT (Qkii)	20
25	1755		S5				CLAY (CL); medium stiff; moist, gray to blue gray; medium to high plasticity; non-swelling; trace fine to medium sand; trace, subrounded to rounded, fine to medium gravel.	25
30	1750		S6					30
35	1745		S7					35
40	1740		S8					40
45	1735		S9					45
50	1730		S10					50
55	1725		S11					55
60	1720	12-inch casing sealed from 0 to 60 feet bgs with neat cement.	S12					60
65	1715	10-inch casing exposed to formation from 60-336 feet bgs.	S13					65
70	1710		S14					70
75	1705		S15					75
80	1700		S16					80
85	1695		S17				FLUVIAL DEPOSITS	85
90	1690		S18				SAND (SP); wet, dark gray to black; very fine to fine, heaving, flowing, sand; water bearing.	90
95	1685		S19					95

Legend

Sample Type

Water Level

▼ Static Water Level

See Exploration Log Key for explanation of symbols

Logged by: Silas Sleeper
Approved by:

Exploration Log AW-01

Sheet 1 of 4

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\PROJECTS\190280-WALLACE RANCH (RIVERFRONT WELL).GPJ July 11, 2022

Review Stage: DRAFT Rev.0



Wallace Ranch - 190280

Water Well Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

Kittitas County, WA, Parcel No. 19-16-14000-0009

47.1398, -120.7947 (est)

AW-01

Contractor

Equipment

Sampling Method

Ground Surface Elev. (MSL)

Ecology Well Tag No.
BKL153

Holt Drilling

Dual Rotary Drill Rig

Grab

1778' (est)

Operator

Exploration Method(s)

Work Start/Completion Dates

Top of Casing Elev. (MSL)

Depth to Water (Below GS)

Mike Hiatt

Reverse Circulation

11/17/2021 to 1/20/2022

1781' (est)

-15' (Static)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)			
100	1680	10-inch casing exposed to formation from 60-336 feet bgs.	S20				FLUVIAL DEPOSITS SAND (SP); wet, dark gray to black; very fine to fine, heaving, flowing, sand; water bearing. (continued)	100			
105	1675		S21					105			
110	1670		S22					110			
115	1665		S23					115			
120	1660		S24					120			
125	1655		S25					125			
130	1650		S26					130			
135	1645		S27					135			
140	1640		S28					140			
145	1635		S29					145			
150	1630		S30					150			
155	1625		S31					155			
160	1620		S32					160			
165	1615		S33					165			
170	1610		S34					170			
175	1605		S35					175			
180	1600		S36					180			
185	1595		S37					185			
190	1590		S38					190			
195	1585		S39					195			
										SAND WITH GRAVEL (SW); wet; fine to coarse sand; multicolored, fine to coarse, subrounded to rounded, gravel; formation subject to heave; water bearing.	

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\PROJECTS\190280-WALLACE RANCH (RIVERFRONT WELL).GPJ July 11, 2022

Legend

Sample Type

Water Level

▼ Static Water Level

See Exploration Log Key for explanation of symbols

Logged by: Silas Sleeper
Approved by:

Exploration Log AW-01

Sheet 2 of 4

Review Stage: DRAFT Rev.0



Wallace Ranch - 190280

Water Well Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

Kittitas County, WA, Parcel No. 19-16-14000-0009

47.1398, -120.7947 (est)

AW-01

Contractor

Equipment

Sampling Method

Ground Surface Elev. (MSL)

Ecology Well Tag No.
BKL153

Holt Drilling

Dual Rotary Drill Rig

Grab

1778' (est)

Operator

Exploration Method(s)

Work Start/Completion Dates

Top of Casing Elev. (MSL)

Depth to Water (Below GS)

Mike Hiatt

Reverse Circulation

11/17/2021 to 1/20/2022

1781' (est)

-15' (Static)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
200	1580	10-inch casing exposed to formation from 60-336 feet bgs.	S40			SAND WITH GRAVEL (SW); wet; fine to coarse sand; multicolored, fine to coarse, subrounded to rounded, gravel; formation subject to heave; water bearing. (continued)	200	
205	1575		S41				205	
210	1570		S42				210	
215	1565		S43				215	
220	1560		S44				220	
225	1555		S45				225	
230	1550		S46				230	
235	1545		S47				235	
240	1540		S48				240	
245	1535		S49				245	
250	1530		S50				250	
255	1525		S51				255	
260	1520		S52				260	
265	1515		S53				265	
270	1510		S54				270	
275	1505		S55				275	
280	1500		S56				280	
285	1495		S57				285	
290	1490		S58				290	
295	1485	S59			295			

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\PROJECTS\190280-WALLACE RANCH (RIVERFRONT WELL).GPJ July 11, 2022

Legend

Sample Type

Water Level

▼ Static Water Level

See Exploration Log Key for explanation of symbols

Logged by: Silas Sleeper
Approved by:

Exploration Log AW-01

Sheet 3 of 4

Review Stage: DRAFT Rev.0



Wallace Ranch - 190280

Water Well Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

Kittitas County, WA, Parcel No. 19-16-14000-0009

47.1398, -120.7947 (est)

AW-01

Contractor

Equipment

Sampling Method

Ground Surface Elev. (MSL)

Ecology Well Tag No.
BKL153

Holt Drilling

Dual Rotary Drill Rig

Grab

1778' (est)

Operator

Exploration Method(s)

Work Start/Completion Dates

Top of Casing Elev. (MSL)

Depth to Water (Below GS)

Mike Hiatt

Reverse Circulation

11/17/2021 to 1/20/2022

1781' (est)

-15' (Static)

Depth (feet)	Elev. (feet)	Exploration Notes and Completion Details	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
300	1480	10-inch casing exposed to formation from 60-336 feet bgs.	S60			SAND WITH GRAVEL (SW); wet; fine to coarse sand; multicolored, fine to coarse, subrounded to rounded, gravel; formation subject to heave; water bearing. (continued)		300
305	1475		S61					305
310	1470	At 320 feet bgs, casing advancement becomes more difficult due to increase in gravel size.	S62			SAND WITH GRAVEL (SW); wet; fine to coarse sand; multicolored, fine to coarse, subrounded to rounded, gravel; few cobbles; formation less subject to heave than above; casing advancement became more difficult due to increase in coarse fraction; water bearing.		310
315	1465		S63					315
320	1460		S64					320
325	1455		S65					325
330	1450	A 20 foot long by 8-inch diameter, pre-packed, 20-slot, stainless steel screen is set from 354 to 334 feet bgs. Screen is exposed to formation from 354 to 336 feet bgs.	S66					330
335	1445		S67					335
340	1440		S68					340
345	1435		S69					345
350	1430		S70					350
355	1425	S71					355	
360	1420					Bottom of exploration at 354 ft. bgs.		360
365	1415							365
370	1410							370
375	1405							375
380	1400							380
385	1395							385
390	1390							390
395	1385							395

Legend

Sample Type

Water Level

▼ Static Water Level

See Exploration Log Key for explanation of symbols

Logged by: Silas Sleeper
Approved by:

Exploration Log
AW-01

Sheet 4 of 4

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\PROJECTS\190280-WALLACE RANCH (RIVERFRONT WELL).GPJ July 11, 2022

Review Stage: DRAFT Rev.0

APPENDIX B

Driller's Water Well Report (Well No. 1)

APPENDIX C

Screen Specifics

800-577-9658

ALLOY MACHINE WORKS, INC.

Self Cleaning Wedge Wire Screen

304 316 GALV 309

Job #

1139 S/N 109151

www.alloymachineworks.com

Houston, TX USA

SLOT SIZE

020

PQ PRODUCTS, INC.

923 E FARWELL ROAD
SPOKANE, WA 99208-9577



PHONE 509-624-6820 FAX 509-467-4515
Email: INFO@PQProducts.com

DATE 3/30/2021
ORDER #: 00004001
PO NO. MIKE

SOLD TO:

ROBINSON DRILLING & DEV, INC.
4902 VIEWLAND DRIVE
YAKIMA, WA 98908

Ship To:

ROBINSON DRILLING & DEV, INC.
717 EAST VIOLA AVE
YAKIMA, WA 98901

ORDER CONFIRMATION THANK YOU!

PHONE / FAX #		SHIP VIA	SHIP DATE	TERMS: PLEASE PAY FROM INVOICE			
509-972-5460 / 509-972-5457		Best Way	4/12/2021	2% 10 Net 30 Days			
QTY.	ITEM NO.	DESCRIPTION	PRICE	UNIT	DISC	EXTENDED	TAX
1	KPKR10X8PSWO12	10" K-PACKER BUILT ON 8" 280 WALL PIPE	\$250.00	EA		\$250.00	
1	8X6STLWELDREDU	8X6 STEEL CONCENTRIC STEEL REDUCER	\$50.00	EA		\$50.00	
1	JETSTERILENE	STERILENE 8.5# JUG	\$95.95	8.5#		\$95.95	
1	FREIGHT	FREIGHT / HANDLING FOR CONE AND PACKER	\$50.00	EA		\$50.00	
1	SCRPP8X6SS	PREPACK WELL SCREEN 8PS X 6PS 20 FT 304L SS 6PS WELD RING TOP PLATE BOTTOM 20 SLOT WITH 12/18 CARBOLITE OVERALL LENGTH OF 249 INCHES, INCLUDING FITTINGS. TOP IS 6" SS PIPE, PROTRUDING 6" ABOVE DONUT SHIPPING DIRECT FROM ALLOY	\$4,018.00	EA		\$4,018.00	
1	NON-STOCK /EA	304SS PLATE BOTTOM FULLY WELDED TO BOTTOM OF PREPACK AS QUOTED	\$50.00	EA		\$50.00	
1	FREIGHT	FREIGHT / HANDLING ON SCREEN TO BE ADDED WHEN KNOWN		EA			
EST 4/12 SHIP DATE				SALE AMOUNT		\$4,513.95	
				SHIPPING		\$0.00	
				SALES TAX		\$0.00	
				TOTAL		\$4,513.95	
				PAID TODAY		\$0.00	
1 1/2 % CHARGE PER MONTH IF NOT PAID WITHIN 30 DAYS				BALANCE DUE		\$4,513.95	

APPENDIX D

DOH Susceptibility Assessment Form



Ground Water Contamination Susceptibility Assessment Survey Form

Complete **one** form for **each** ground water source (well, wellfield, spring) used in your water system (photocopy as necessary).

PART I: System Information

Well owner/manager: Wallace Ranch II, LLC

Water system name: Wallace Ranch II, LLC

County: Kittitas

Water system ID number: TBD Source number: 01

Well depth: 354 feet

Source name: Well No. 1

WA well identification tag number: BKL-153

Well not tagged

Number of connections: TBD Population served: TBD

Township: 19N Range: 16E

Section: 14 ¼ ¼ Section: SE¼, NE¼

Latitude/longitude (if available): 47.139839° , -120.794690°

How was latitude/longitude determined? Google Earth

_____ Global positioning device _____ survey _____ topographical map

other:

*Please refer the instructions for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 1/18/2022

last reconstruction:

Information unavailable

2) Well driller: Holt Services Inc. (HOLTSSI898JG)

Well driller unknown

3) Type of well: Drilled: rotary bored cable (percussion) Dug

other: spring(s) lateral collector (Ranney)

driven jetted other:

4) Well report available Yes (attach copy to form) No

5) Average pumping rate: 106 gallons per minute

Source of information Pumping Test

If not documented, how was pumping rate determined?

Pumping rate unknown

6) Is this source treated? No, treatment and filtration not required

If so, what type of treatment:

disinfection filtration carbon filter air stripper other

Purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained: Yes No

Residual level: NA (At the point closest to the source.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

<20 ft 20-50ft 50-100ft 100-200ft >200ft

information unavailable

2) Depth to ground water (static water level):

<20ft 20-50ft 50-100ft >100ft

flowing well/spring (artesian)

How was water level determined?

well log other measured with e-tape

depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

6.6 psi (pounds per square inch) or

15 feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: Yes No

5) Wellhead elevation (height above mean sea level): 1,781 feet

How was elevation determined? topographic map Drilling/Well Log altimeter

other: Google Earth

information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

Yes evidence of a confining layer in well log

no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? Yes No

information unavailable

7) Sanitary setback:

< 100ft* 100-120ft 120-200 ft >200ft

* If less than 100ft, describe the site conditions:

8) Wellhead construction:

- wellhead enclosed in a wellhouse
- controlled access (describe): well is located locked wellhouse
- other uses for wellhouse (describe):
- no wellhead control

9) Surface seal:

- 60 ft
- <18 ft (no Department of Ecology approval)
- <18 ft (Approved by Ecology, include documentation)
- depth of seal unknown
- no surface seal

10) Annual rainfall (inches per year):

- <10 in/yr 10-25 in/yr >25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 10 acre-feet per year

How was this determined?

meter

estimated: pumping rate (_____)

pump capacity (_____)

other: preliminary water system design

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6-month ground water travel time: 126 feet

1-year ground water travel time: 178 feet

5-year ground water travel time: 397 feet

10-year ground water travel time: 561 feet

Information available on length of screened/open interval?

Yes No

Length of screened/open interval: 18 feet

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6- month time of travel boundary?

Yes No (mark and identify on map)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6-month time of travel boundary?

Yes No (mark and identify on map)

Comments: Planned housing development and associated septic drain field is located outside the 10-year TOT. However, pesticide application associated with pasture / hay fields are within the 1-year TOT.

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five-year ground water travel time. If you do not know if one of the following is present, mark the “unknown” space.

	<u>6-month</u>	<u>1-year</u>	<u>5-year</u>	<u>unknown</u>
• likely pesticide application	None	Yes	Yes	
• stormwater injection wells	None	None	None	
• other injection wells	None	None	None	
• abandoned ground water well	None	None	None	
• landfills, dumps, disposal areas	None	None	None	
• known hazardous materials clean-up site	None	None	None	
• water system(s) with known quality problems	None	None	None	
• population density >1 house/acre	None	None	None	
• residences commonly have septic tanks	None	None	None	
• Wastewater treatment lagoons	None	None	None	
• sites used for land application of waste	None	None	None	

Mark and identify on map any of the risks listed above which are located within the 6-month time of travel boundary. (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources of ground water contamination exist within the ten-year time of travel circular zone around your water supply, please describe:

The 10-year time of travel extends into agricultural area (hay / pasture). Pesticide application is likely in these areas.

2) **Source-specific water quality records:** For each type of test below, mark the row that applies to the sample results for this source. Consider all the sample results from the past 12 years. (MCLs are noted next to the specific test or listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)

- Results greater than MCL No
- <2 mg/liter nitrate No
- 2-5 mg/liter nitrate No
- <5 mg/liter nitrate No
- Nitrate sampling records unavailable No

B. VOCs: (VOC detection level is 0.5 ug/l or 0.0005 mg/l)

- Results greater than MCL or SAL No
- VOCs detected at least once Yes (Toluene detected at 2.76 ug/l)
- VOCs never detected No
- VOC sampling records unavailable No

C. EDB/DBCP:

(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

- EDB/DBCP detected below MCL at least once No
- EDB/DBCP detected above MCL at least once No
- EDB/DBCP never detected Yes
- EDB/DBCP tests required but not yet completed No
- EDB/DBCP tests not required No

D. Other SOCs (Pesticides):

- Other SOCs detected
 - (pesticides and other synthetic organic chemicals) No
- Other SOC tests performed but none detected
 - (list test methods in comments) No
- Other SOC tests not performed NA

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

E. Bacterial contamination:

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records)? No

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source? NA

Source sampling records for bacteria unavailable No

PART VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10-year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

Yes No

Describe with references to map produced in Part IV:

The Yakima River is located approximately 280 feet to the southwest. The beginning of a basalt ridge (Lookout mountain) is located approximately 460 feet to the northeast.

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

Yes No

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

Yes No

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

Yes No

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
<6-month travel time	--	X	--
6 month—1 year travel time	--	X	--
1—5 year travel time	--	X	--
5—10 year travel time	--	X	--

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
<1-year travel time	--	X	--
1—5 year travel time	--	X	--
5—10 year travel time	--	X	--

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

There is a confining clay layer located from 20 to 80 feet below ground surface that is regionally extensive within the project area. This clay layer is believed to restrict downward flow of groundwater and thus, decrease the susceptibility of the well.

The Yakima River is also disconnected from the source aquifer via the 60 foot-thick clay layer. An extended surface seal down to 60 feet below ground surface was installed to (1) control artesian flows and (2) provide extra protection against possible surface contamination.

FORM COMPLETED BY:

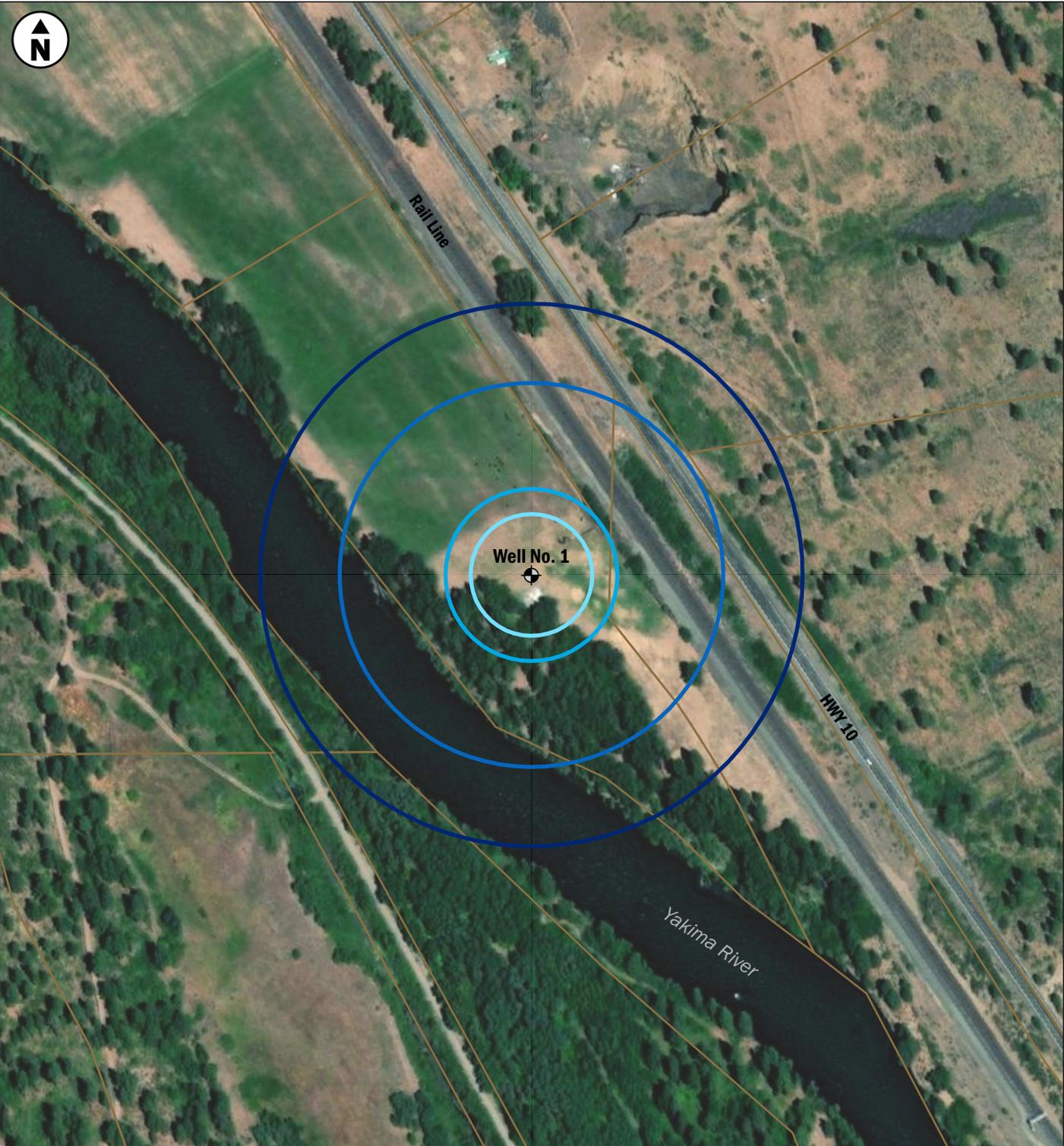
Tyson Carlson, LHG

Print Name

Date

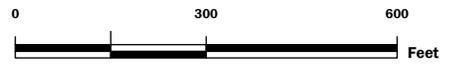
Signature

ACDSS Proj. Q:\Wallace Ranch\190280 Well Design and Drilling Support\2022 of Group A Water System Well Completion Report (GIS)\01 Calculated Fixed Radius\Map\11 No Projected Coordinate System | Date Saved: 7/12/2022 | Exported 7/12/2022 10:58:59 sculd



LEGEND:

-  Well No. 1
-  126 Foot Well Buffer
-  178 Foot Well Buffer
-  397 Foot Well Buffer
-  561 Foot Well Buffer
-  Tax Parcel



Calculated Fixed Radius

Group A Water System
Well Completion Report
Wallace Ranch
Bristol, Washington

	JUL-2022	BY: SSS / SCC	FIGURE NO. D-1
	PROJECT NO. 190280	REVISED BY: --- / ---	

APPENDIX E

Water Quality Laboratory Results

Am Test Inc.
 13600 NE 126TH PL
 Suite C
 Kirkland, WA 98034
 (425) 885-1664
 www.amtestlab.com



Professional
 Analytical
 Services

Complete Inorganic Chemistry Report of Analysis

Date Collected: 03/17/22	System Group Type: <input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> Other:
Water System ID Number: TBD	System Name: TBD
Lab--Sample No: 066--03850	County: KITTITAS
Sample Location: WALLACE RANCH WELL HEAD	Source Number(s): S01
Sample Purpose: (Check Appropriate Box) <input type="checkbox"/> Routine/Compliance (satisfies monitoring requirements) <input type="checkbox"/> Confirmation (confirmation of chemical result) <input checked="" type="checkbox"/> Investigative (does not satisfy monitoring requirements) <input type="checkbox"/> Other (specify)	Date Received: 3/17/22 Date Analyzed: 3/18/22 Nitrates Date Reported: 4/11/22 Comments:
Sample Composition: (Check Appropriate Box) <input checked="" type="checkbox"/> Single Source <input type="checkbox"/> Blended (List Multiple Source Numbers in Source Nos. field) <input type="checkbox"/> Composite (Specify in Comments Field) <input type="checkbox"/> Distribution Sample	Sample Type: (Check One) <input checked="" type="checkbox"/> Pre-Treatment/Raw <input type="checkbox"/> Post-Treatment/Finished <input type="checkbox"/> Unknown Sample Collected by: SILAS SLEEPER Phone Number: 518-526-3319
Send Report To: ASPECT CONSULTING Attention: SILAS SLEEPER 710 2ND AVE SEATTLE, WA 98104	Bill To: SILAS SLEEPER #440 SEATTLE, WA 98104

ANALYTICAL RESULTS

DOH#	ANALYTE	DATA QUALIFIER	RESULTS	SDRL	TRIGGER	MCL	UNITS	EXCEEDS MCL (X if Yes)	DATE ANALYZED	METHOD /INITIALS
0004	Arsenic		0.00041	0.0001	0.01	0.01	mg/l		3/21/22	EPA 200.8 /AY
0005	Barium		0.015	0.0003	2	2	mg/l		3/21/22	EPA 200.8 /AY
0006	Cadmium		ND	0.0001	0.005	0.005	mg/l		3/21/22	EPA 200.8 /AY
0007	Chromium		ND	0.0005	0.1	0.1	mg/l		3/21/22	EPA 200.8 /AY
0011	Mercury		0.00013	0.0001	0.002	0.002	mg/l		3/22/22	EPA 245.1 /MD
0012	Selenium		ND	0.001	0.05	0.05	mg/l		3/21/22	EPA 200.8 /AY
0110	Beryllium		ND	0.0003	0.004	0.004	mg/l		3/21/22	EPA 200.8 /AY
0112	Antimony		ND	0.0003	0.006	0.006	mg/l		3/21/22	EPA 200.8 /AY
0113	Thallium		ND	0.0002	0.002	0.002	mg/l		3/21/22	EPA 200.8 /AY
0116	Total Cyanide		ND	0.005	0.2	0.2	mg/l		3/23/22	SM 4500CN-E99 /AW
0019	Fluoride		0.27	0.2	2	4	mg/l		3/18/22	EPA 300.0 /AY
0114	Nitrite		ND	0.1	0.5	1	mg/l		3/18/22	EPA 300.0 /AY
0020	Nitrate		ND	0.5	5	10	mg/l		3/18/22	EPA 300.0 /AY
0161	Total Nitrate + Nitrite		ND	0.5	5	10	mg/l			EPA 300.0 /
0008	Iron		0.048	0.03	--	0.3 ¹	mg/l		3/28/22	EPA 200.7 /KF

DOH#	ANALYTE	DATA QUALIFIER	RESULTS	SDRL	TRIGGER	MCL	UNITS	EXCEEDS MCL (X if Yes)	DATE ANALYZED	METHOD /INITIALS
0010	Manganese		0.042	0.0003	--	0.05 ¹	mg/l		3/21/22	EPA 200.8 /AY
0013	Silver		ND	0.0002	--	0.1 ¹	mg/l		3/21/22	EPA 200.8 /AY
0021	Chloride		42.	2	--	250 ¹	mg/l		3/23/22	EPA 300.0 /KS
0022	Sulfate		10.	2	--	250 ¹	mg/l		3/18/22	EPA 300.0 /AY
0024	Zinc		0.12	0.0005	--	5 ¹	mg/l		3/21/22	EPA 200.8 /AY
0014	Sodium		72.	0.2	--	--	mg/l		3/28/22	EPA 200.7 /KF
0015	Hardness (CaCO3)		40.	10	--	--	mg/l		3/28/22	EPA 200.7 calc /KF
0016	Conductivity		400	70	--	700 ¹	umhos/cm		3/23/22	SM 2510B /KF
0017	Turbidity		0.36	0.1	--	--	NTU		3/23/22	EPA 180.1 /KF
0018	Color		ND	15	--	15 ¹	unit		3/23/22	SM 2120 B /KF
0026	Total Dissolved Solids		240	100	--	500 ¹	mg/l		3/23/22	SM 2540C /MD
0111	Nickel		ND	0.0003	--	--	mg/l		3/21/22	EPA 200.8 /AY
0009	Lead		ND	0.0005	--	--	mg/l		3/21/22	EPA 200.8 /AY
0023	Copper		ND	0.0005	--	--	mg/l		3/21/22	EPA 200.8 /AY
0409	pH	*	7.7		--	--	unit		3/23/22	SM 4500H B /KF
0405	Calcium		11.	0.2	--	--	mg/l		3/28/22	EPA 200.7 /KF
0404	Magnesium		3.1	0.05	--	--	mg/l		3/28/22	EPA 200.7 /KF

NOTES:

***Confirmation:** Include the original lab number, sample number, and collection date of original sample in either comment section.

-; -No existing trigger or MCL.

¹Secondary MCL (Established for aesthetic purposes, not health based).

ANALYTE: The name of the analyte being tested for.

DATA QUALIFIER A symbol or letter to denote additional information about the result.

DOH#: Department assigned analyte number.

EXCEEDS MCL (Maximum Contaminant Level): Marked if the contaminant amount exceeds the MCL under chapters 246-290 and 246-291

WAC. Please contact the department's drinking water regional office in your area to determine follow-up actions.

METHOD/INITIALS: Analytical method used. /Initials of the analyst that performed the analysis.

mg/L: milligrams per liter or parts per million.

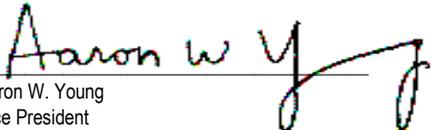
NTU: milligrams per liter or parts per million.

RESULT: The laboratory reported result.

SDRL (State Detection Reporting Level): The minimum reportable detection of an analyte as established by the department.

TRIGGER: The department's drinking water response level. Systems with contaminations detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact the department's drinking water regional office in your area for further information.

ND (Not Detected): In the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SDRL.


 Aaron W. Young
 Vice President

Anatek Labs, Inc.

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504 E Sprague Ste. D - Spokane, WA 99202 - (509) 838-3999 - fax (509) 838-4433 - email spokane@anateklabs.com

Client: AmTest Washington

Work Order: MCC0682

Address: 13600 NE 126th PI, Suite C
Kirkland, WA 98034

Project: 3850 / 3851

Reported: 4/8/2022 12:45

Attn: Aaron Young

L5 The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample

M1 Matrix spike recovery was high; the associated blank spike recovery was acceptable. Potential matrix effect

M12 Matrix spike recovery was low. Potential matrix effect.

R7 LFB/LFBD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.

LRL Lab Reporting Limit

SDRL State Detection Reporting Limit

ND Not Detected

MCL EPA's Maximum Contaminant Level

Dry Sample results reported on a dry weight basis

SAL State Action Level

* Not a certified analyte

RPD Relative Percent Difference

%REC Percent Recovery

Source Sample that was spiked or duplicated.

This report shall not be reproduced except in full, without the written approval of the laboratory
The results reported related only to the samples indicated.

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Certifications

Code	Description	Facility	Number
DOE WA	Washington Department of Ecology	Anatek-Moscow, ID	C595



COLIFORM BACTERIA ANALYSIS

Date Sample Collected 03/17/2022 Month Day Year	Time Sample Collected 1:55 <input type="checkbox"/> AM <input checked="" type="checkbox"/> PM	County: KITTITAS
Type of Water System (check only one box) <input checked="" type="checkbox"/> Group A Public <input type="checkbox"/> Private Household <input type="checkbox"/> Group B Public <input type="checkbox"/> Other: _____		
Group A and Group B Systems Provide from Water Facilities Inventory (WFI): ID# N/A		
System Name: TBD		
Contact Person:		
Day Phone:	Cell Phone: 518 526 3319	
Eve. Phone:	FAX:	
Send results to: (Print full name, address and zip code) SILAS SLEEPER		
SAMPLE INFORMATION		
Sample collected by (name): SILAS SLEEPER		
Specific location where sample collected: WALLACE RANCH WELL		
Project Name or Comments: WALLACE		
Type of Sample (select only one type of sample from types 1 through 5 below)		
1. <input checked="" type="checkbox"/> Routine Distribution Sample Chlorinated: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Chlorine Residual: Total ___ Free ___	2. <input type="checkbox"/> Repeat Sample (after unsat. routine) <input type="checkbox"/> Distribution System <input type="checkbox"/> Source Groundwater Rule (GWR) (Population of 1,000 or less)	
3. Ground Water Rule Source Sample ___S___ <input type="checkbox"/> Triggered (A/P) <input type="checkbox"/> Assessment (A/P)	Unsatisfactory routine lab number: _____ Unsatisfactory routine collect date: _____ Chlorinated: Yes ___ No ___ Chlorine Resid: Total ___ Free ___	
4. Surface or GWI Raw Water Sample (Enumeration) <input type="checkbox"/> E. coli <input type="checkbox"/> Fecal Filtered Yes ___ No ___ ___S___		
5. <input type="checkbox"/> Sample Collected for Information Only <input type="checkbox"/> Construction <input type="checkbox"/> Repairs <input type="checkbox"/> Private Residence <input type="checkbox"/> Other		
LAB USE ONLY DRINKING WATER RESULTS LAB USE ONLY		
<input type="checkbox"/> Unsatisfactory Total Coliform Present and <input type="checkbox"/> E. coli present <input type="checkbox"/> E. coli absent		<input checked="" type="checkbox"/> Satisfactory
<input type="checkbox"/> Replacement Sample Required Sample not tested because <input type="checkbox"/> Sample too old (>30 hours) <input type="checkbox"/> TNTC <input type="checkbox"/> Improper Container <input type="checkbox"/> Turbid Culture <input type="checkbox"/> _____ <input type="checkbox"/> _____		
Bacterial Density Results: Plate Count / ml. E.coli /100 ml. Total Coliform < 1 /100 ml. Fecal Coliform /100 ml.		
Method Code: SM 9222B		Date Received: 3/18/2022
Date Analyzed: 3/18/2022, 14:15		Date Reported: 3/19/22
066-01639 Sample Number (DOH number plus five digits)		Lab Use Only: