Yakima River Basin Integrated Water Resource Management Plan

Technical Memorandum: Field Investigation of Shallow Groundwater Recharge – Eastern Kittitas Valley, WA

U.S. Bureau of Reclamation
Contract No. R08PC10677

Prepared by

Golder Associates, Inc.

U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia-Cascades Area Office

State of Washington
Department of Ecology
Office of Columbia River

September 2013

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Executive Summary

Golder Associates Inc. (Golder) performed a field investigation to evaluate the potential of using surface infiltration to store water in ground water aquifers of the Kittitas Valley in Kittitas County, Washington. The work was conducted as part of the Yakima River Basin Integrated Water Resource Management Plan (Integrated Plan) for the U.S. Department of the Interior Bureau of Reclamation (Reclamation) and Washington State Department of Ecology (Ecology). Previous reports identified the eastern Kittitas Valley for evaluation. Reclamation and Ecology selected this area for the study after considering it along with other candidate sites in the Moxee Valley and Wapato Irrigation Project area in Yakima County, Washington.

Field observations indicate that conditions in the eastern Kittitas Valley are not favorable for large-scale surface infiltration. These observations include surface water present in many places throughout the winter, such as springs, running water in ditches, perennial flow in streams and irrigation laterals, and standing water across this portion of the valley. Golder observed flowing artesian conditions in in the Boylston Embayment close to the Parke Creek fan, and around the upper reaches of Badger Creek on the valley floor. Field observations did not corroborate data previously compiled by the United States Geological Survey (USGS), indicating depth to water as being 20 to 80 feet below ground surface (bgs), which had been used to identify the eastern Kittitas Valley as a prospective infiltration site. Because of these observations, the study was adjusted to gather shallow groundwater data to validate the observations of surface conditions rather than designing a pilot project for surface infiltration.

Golder established a groundwater level monitoring network to improve the understanding of shallow groundwater conditions between Caribou and Parke Creeks. The groundwater-monitoring network used 20 existing private wells to monitor shallow groundwater levels. The data collected will help define groundwater dynamics in the area.

The wells are completed in unconsolidated alluvial sediments, Thorp Gravel/Ellensburg Formation, and basalt, and include several nests of wells that withdraw groundwater from different elevations in the same location. The hydrogeology is more complex than previously recognized. Vertical gradients are variable across the domain and include both downward recharge and upward flowing artesian conditions. Perched layers may be present. The degree of hydraulic continuity between groundwater and surface water is variable. The response of water levels in different wells to the same events, such as the start of the irrigation season, precipitation, or freshets, is variable. Geologic structural controls such as faults and folds are speculated to influence groundwater flow.

Water temperature data was also collected, and in conjunction with water level data, might be useful in estimating the residence and travel times of shallow groundwater.

Identification in earlier reports of the eastern Kittitas Valley as a prospective shallow groundwater recharge site was based on United States Geological Survey (USGS) data indicating the presence of a vadose zone, or depth to groundwater, as being between 20 feet and 80 feet bgs. The USGS data likely was obtained from deeper wells.

The data collected and presented in this report was focused on shallow wells. Wells shallower than 50 feet deep, and most wells shallower than 150 feet deep, had groundwater levels

shallower than 20 feet bgs, and wells are known in the area that have groundwater levels above ground surface and are flowing artesian.

Pumping tests on shallow wells (e.g., <65 feet deep) completed in the alluvial and Upper Ellensburg Formations recorded aquifer transmissivities ranging from 4 feet squared/day (feet^2/day) to 500 feet^2/day.

Water quality samples from groundwater wells, the Yakima River, and a well in close hydraulic continuity with the Yakima River indicated largely compatible water quality for a surface infiltration project. One significant difference was the high measured pH of 8.6 of the river water, which corroborates a prior measurement of 8.2 by the USGS (1987). The potential for calcite precipitation during recharge of river water to groundwater should be evaluated with geochemical modeling.

The monitoring network remains in place, and currently is collecting data. Water level data from the monitoring network is presented in this report. However, at the direction of Reclamation and Ecology, synthesis and interpretation of the water level data was not performed because the information acquired suggests the area studied is not well suited to large-scale, shallow groundwater infiltration. Golder recommends that Reclamation download the data from the network toward the end of 2013, or early 2014, to capture a full year of hydrographic data, including the response of groundwater levels to the end of the irrigation season. The full data set should be compiled and reviewed for consideration of further analysis.

Although conditions in the eastern Kittitas Valley do not appear favorable for large-scale shallow groundwater recharge, limited or localized shallow groundwater recharge still may be possible under the right conditions. While reviewing the potential for surface infiltration across the eastern Kittitas Valley, a brief reconnaissance did not identify favorable conditions for shallow groundwater recharge in the Dry Creek drainage in the northwestern part of the Kittitas Valley. However, shallow groundwater recharge to the glacial terminal moraine and outwash deposits along Interstate 90 between Thorp and Cle Elum could be considered.

Favorable conditions for large-scale shallow groundwater recharge may be present elsewhere in the Yakima River basin. A second location recommended by the Groundwater Infiltration Appraisal-Level Study (Golder and HDR, 2011) for shallow groundwater recharge field testing within the Wapato Irrigation Project (WIP) area, remains to be tested. The potential for direct injection recharge into deeper Upper Ellensburg Formation, basalt aquifers, or both, in the Kittitas Valley and elsewhere in the Yakima Basin, remains to be further evaluated.

1.0 Introduction

This report describes the results of a field investigation of shallow groundwater in the eastern portion of the Kittitas Valley in Kittitas County, Washington, to evaluate the potential of large-scale groundwater storage through surface infiltration. The work was conducted as part of the Yakima River Basin Integrated Water Resource Management Plan (Integrated Plan) for the U.S. Department of Interior Bureau of Reclamation and Washington State Department of Ecology (Ecology).

The goals of the Integrated Plan are to protect, mitigate and enhance fish and wildlife habitat; provide increased operational flexibility to manage instream flows to meet ecological objectives; and improve the reliability of the water supply for irrigation, municipal supply and domestic uses (Reclamation and Ecology, 2012).

Previous assessments of groundwater storage alternatives in the Yakima River basin identified return flows induced by surface water recharge to groundwater as having potential to enhance Total Water Supply Available (TWSA) and flows in the Yakima River and tributaries (Golder 2009; Golder and HDR 2011). These studies considered the use of groundwater storage in the Yakima River basin through both direct injection and surface recharge. The studies identified candidate sites for further evaluation, in part on the basis of where available canals and ditches could be used to deliver water to potential recharge sites. Hydrogeologic uncertainties in these areas indicated a need for field investigation to verify which sites would be suitable for pilot testing.

Previous reports identified the eastern Kittitas Valley and the Wapato Irrigation Project (WIP) in Yakima County, Washington for field investigation based on existing and available canals and ditches, and indications of favorable ground conditions (e.g., depth to groundwater based on United States Geological Survey [USGS] data; Golder and HDR 2011).

This report describes activities performed, and observations and information obtained from a field investigation of potential surface recharge sites in the eastern Kittitas Valley. Data is presented without analysis. Data collection by a groundwater monitoring network established for this project is on-going. The WIP remains an option for future investigation of shallow groundwater recharge.

1.1 Project Scoping and Development

During initial scoping for the field investigation, Golder and other study participants gave additional consideration to evaluating the Moxee Valley for the following reasons:

- It was lower in elevation than the Kittitas Valley, and therefore less subject to freezing conditions that could complicate execution of field work and interpretation of data collected during the winter.
- The hydrogeologic regime was less complicated than the WIP. The WIP has drains cutting across the domain that could complicate interpretation of data.

Golder conducted a field reconnaissance of the Moxee Valley on August 21, 2012, which indicated fine-grained soils at the surface would impede infiltration, and no sites were recognized

as having high infiltration potential. Therefore, further investigation of infiltration potential in the Moxee Valley was deferred, and the effort focused on the eastern Kittitas Valley.

The eastern Kittitas Valley was previously identified as a prospective groundwater recharge site (Golder and HDR 2011) based on the following:

- Existing canals and ditches owned by the the Kittitas Reclamation District (KRD) are available to deliver water to prospective recharge sites.
- There is an appropriate distance between the identified potential recharge sites and the Yakima River that may provide an appropriate lag time between infiltration to groundwater and return flow to the river.
- It was understood there was an unsaturated zone of 20-80 feet below land surface that is able to receive recharged water, as indicated by USGS data.

As work progressed, Golder recognized that field conditions differed significantly from what was understood previously. The original understanding based on USGS data was that there was a pervasive 20- to 80-foot-thick vadose zone across the area. The vadose zone is the unsaturated ground extending from ground surface to the water table. Actual conditions are much more variable, including flowing artesian conditions in some areas. Upon consultation with Reclamation and Ecology the scope of work was adjusted in response to the information acquired.

Golder established a network of monitoring wells, starting in November 2012, using both manual measurements and water level monitoring devices (transducers). Based on observations from November 2012 through March 2013, the feasibility of large-scale surface infiltration was considered unfavorable because of the pervasive presence of surface water across this portion of the valley, and the complexity of the groundwater flow system. Reclamation decided in March 2013 to stop further work in the eastern Kittitas Valley and to compile the collected data into a report without analysis for future consideration. The groundwater monitoring network was kept intact and continues to collect data during fall 2013.

2.0 Activities Performed

The activities Golder performed during this investigation were intended to provide information for designing a large-scale pilot test of surface water recharge to groundwater. The following sections detail the activities Golder performed throughout the eastern Kittitas Valley field reconnaissance and initial plan of action.

2.1 Field Reconnaissance

Site reconnaissance of the Kittitas Valley took place November 7-8, 2012, concentrating along the KRD North Branch Canal (canal). The canal had been shut down for the winter season at the time of the reconnaissance. Representatives from Golder, KRD, Yakama Nation, and Ecology attended all or portions of the reconnaissance.

Golder compiled preparatory materials, including detailed maps of geology, shaded relief and topography, soils, hydrology and aerial photography, and well logs for use in the field. Golder also arranged access to private property with landowners, including borrow pits. The irrigation season had stopped the previous month (October), and minor precipitation had occurred recently.

Golder observed standing water in most places across the valley, and water was flowing in most channels (e.g., creeks and drainage ditches). Springs were observed at the north end of the surface expression of the Boylston Anticline approximately 300 feet south of the Vantage Highway and Falcon Ridge Road, and in a field approximately 200 feet east of Naneum Creek Road halfway between the Vantage Highway and the canal. Caliche layers (carbonate-cemented horizons) up to a foot thick were seen within the upper 10 feet of the soil horizon exposed in road cuts.

Golder also visited a borrow pit (Schnebly pit) on the Schnebly fan, approximately half a mile east of the Coleman Creek crossing of the canal. Groundwater seeps were present on the upslope side of the pit. Amphibians and wetland vegetation also were observed. Anecdotal information from Mr. Schnebly indicates that irrigation on the upslope side of the canal resulted in seeps day-lighting in the field approximately 300 feet downslope on the opposite side of the canal. This suggests a short residence time for recharged water, high horizontal velocities, barriers to downward infiltration or shallow groundwater, or both. Mr. Schnebly also reported that flowing groundwater was visible in a housing foundation excavation in the fan materials in the same downslope field. This indicates very high permeability materials.

Key geomorphological features along the canal (with associated perennial streams indicated in parentheses) include the following:

- Naneum Fan (Naneum and Wilson Creeks)
- Schnebly Fan (Schnebly, Cook, Coleman and Caribou Creeks)
- Parke Creek Fan (Parke Creek)

The topography of these features is consistent with alluvial fans that are interpreted to consist of coarse sediments deposited by streams. Perennial streams cross all of these fans, and there was standing water in the KRD canal where it traverses the fans. On the east side of the Naneum Fan, the canal had iron-strained groundwater seeps on the upslope (north) side, and the water appeared to re-infiltrate on the south side, i.e., groundwater was flowing south, perpendicular to the canal. Stretches of the canal between the fans mostly were dry, particularly the reach between the Schnebly and Parke Fans.

Golder considered the influence of known geological structures on groundwater (Figure 1). There is a perennial spring flowing at approximately 6 cubic feet per second (cfs) from the north end of the Boylston anticline, approximately one mile east of Caribou Creek and 600 feet south of the Vantage Highway. The presence of this spring is believed to be directly related to the structural geology. Another feature is the string of Thorp Gravels outcrops in a line extending from where Caribou Creek crosses the Boylston anticline, west to the north end of the City of Ellensburg city limits (orange outcrops in Figure 1). Golder believes these outcrops to have been raised by the normal fault immediately to the north. Such elevation changes in the bedrock underlying the alluvial aquifer will affect the thickness of the alluvial aquifer, groundwater flow rates, and the potential for groundwater storage.

While reviewing the potential for surface infiltration across the eastern Kittitas Valley, a brief reconnaissance did not identify favorable conditions for surface infiltration in the Dry Creek drainage in the northwest part of the Kittitas Valley. Surficial sediments along Interstate 90 between the communities of Thorp and Cle Elum are mapped as glacial terminal moraine and

outwash deposits (Figure 1). Because outwash sediments often are very permeable, this area could be considered for surface infiltration in the future.

2.2 Groundwater Monitoring Network

Golder used existing private wells as a cost-efficient means of establishing the ground water monitoring network, as opposed to installing new dedicated wells. Ecology provided the transducers and data loggers.

Golder reviewed Ecology online well logs to identify candidate wells for monitoring groundwater response to the planned infiltration test. Beginning on December 7, 2012, Golder was accompanied by KRD employees (ditch riders) to obtain permission from landowners to monitor water levels in private wells. An informational flyer was prepared and distributed to private landowners explaining the purpose of the groundwater study in the context of the Integrated Plan. Twelve groundwater monitoring stations were established by December 14, 2012, eight of which were instrumented with pressure transducers provided by Ecology. An initial evaluation of water level data in January 2013 led to the relocation of some transducers to areas identified as higher priority. Golder requested additional transducers from Ecology to instrument the remaining and additional wells.

Golder further expanded the groundwater-monitoring network, beginning on February 19, 2013, upon receipt of 10 additional transducers from Ecology. The locations of the monitoring stations are shown in Figure 2, details are listed in Table 1, and Table 2 shows the period of record for each monitoring station. Four locations were established with nested wells having continuous water level measurements. Well logs, where available, are contained in Appendix A, and individual hydrographs are contained in Appendix B. A compilation of information on each well, including contact information, well site plans, well logs, water level measurements, photo-documentation, and other information, has been retained in Golder's files.

2.3 Pumping Tests

Golder conducted pumping tests to measure the transmissivity of the shallow subsurface to develop a conceptual model of the valley hydrogeology for use in determining the feasibility of surface recharge to groundwater. Monitoring stations 3, 13, and 14 were selected for testing because they were available, had relatively shallow completions (i.e., maximum of 64 feet bgs), a pump could be installed in them, and the water level could be measured. No well logs are available for these wells; logs of wells in proximity to these stations are included as Appendix A. Two wells were interpreted to be completed in the Upper Ellensburg Formation, and one well was completed in alluvium.

The pumping tests were conducted on February 20 and 21, 2013 with a 4-inch-diameter Grundfos submersible pump. Pumping rates were recorded using an in-line totalizing flow meter and water levels were recorded using an electric sounding tape and pressure transducer. Flow from each well was discharged 150 feet away using a lay-flat hose connected to a 2-inch-diameter PVC drop-pipe. Field water quality parameters (i.e., pH, conductivity, temperature, turbidity, redox potential, and dissolved oxygen) were continuously recorded during the pumping tests using a multi-meter probe with a data-logger (YSI multi-meter).

Golder analyzed the pumping test results using the Cooper-Jacob straight-line method for late-time recovery response to determine the transmissivity of the near-well aquifer. The results of the pumping tests are summarized below and contained in Appendix C.

2.3.1 Station 3 Well

Golder conducted a constant-rate pumping test the Station 3 well on February 20, 2013. The construction of the Station 3 well is unknown and no well log exists. The total depth of the well was measured at 64 feet bgs. Based on the well log for the Easterling well, which is located approximately 700 feet to the west, the Station 3 well is presumably completed in the Upper Ellensburg Formation.

The pumping test averaged 5.9 gallons per minute (gpm) for 88 minutes. Static water level prior to testing was 7.55 feet bgs. The total drawdown at the end of the test was 12.8 feet. Transmissivity was estimated to be 20 feet^2/day (Appendix C). Golder collected a water quality sample at the end of the pumping test after more than three well-casing volumes were purged.

2.3.2 Station 13 Well

The construction of the Station 13 well is unknown and no well log exists. The total of depth of the well was measured at 42 feet bgs. The well was presumably completed in a clayey gravel deposit based on the well log for Station 3, which is located approximately 30 feet away, and was completed to a depth of 250 feet bgs on September 17, 2001.

Golder attempted a constant-rate pumping test of the Station 13 well on February 21, 2013 at an average pumping rate of 3.5 gpm for 35 minutes. However, due to the limited production of the well, the test was ended early because pumping could not be sustained below 2 gpm. Static water level prior to testing was 17.7 feet bgs. The total drawdown at the end of the test was 22.9 feet. Transmissivity was estimated to be 4 feet^2/day based on the recovery data (Appendix C). A water quality sample was not collected at the end of the pumping test, because less than one well-casing volume was purged prior to the shutdown of the pump.

2.3.3 Station 14 Well

The Station 14 well is a hand-dug well approximately 3 feet in diameter and lined with bricks to at least the depth of the top of the water table. The total well depth was measured at 17 feet bgs. The construction details are unknown and no well log exists, but the well was presumably completed in alluvium deposit, based on well logs from surrounding wells.

Golder conducted a constant-rate pumping test in the Station 14 well on February 21, 2013 at an average pumping rate of 15.1 gpm for 70 minutes. Static water level prior to testing was 9.9 feet bgs. The total drawdown at the end of the test was 2 feet. Transmissivity was estimated to be 460 feet^2/day (Appendix B). A water quality sample was collected at the end of the pumping test after more than three well-casing volumes were purged.

3.0 Water Quality

Golder arranged for water quality analysis to evaluate the compatibility of water that may be recharged with native groundwater. Three groundwater samples and one sample from the Yakima River were collected and analyzed for inorganic compounds and general chemistry.

Groundwater samples were collected at the end of pumping tests at Stations 3 and 14 (Figure 2), and at the Ellensburg City Wells located approximately five miles northwest of the City of Ellensburg. The City Wells withdraws groundwater under the influence of surface water, is in close hydraulic continuity with the Yakima River, and draws water partly from the induced infiltration from the Yakima River and partly from groundwater. The sampling point of the City Wells source is downstream of the point of drinking water fluoridation, which is reflected in the relatively high fluoride concentration in the sample. The Yakima River sample was collected near the City Wells site.

Samples were stored in coolers at 4 degrees Celsius (39 degrees Fahrenheit) until submitted to the On-site Environmental Laboratory in Redmond, Washington on February 22, 2013. Analytical results are included as Appendix D, and summarized in Table 3. The following field parameters were measured during sampling (Table 3):

- pH
- Conductivity
- Temperature
- Turbidity
- Oxidation/Reduction Potential
- Dissolved Oxygen

For reasons noted previously, interpretations of water quality results have not been developed. However, the following preliminary observations are provided.

- The Station 14 well has a similar chemistry to the Station 3 well, but exhibits a much lower iron concentration, and no detectable manganese or nitrate.
- pH in the wells ranges from 6.31 to 6.60, while the Yakima River is two orders of magnitude higher at 8.6.
- Fluoride concentration in the City Wells is higher than the other sampling locations by two orders of magnitude because the sample was collected after fluoridation by the city.
- Nitrate is present only in the City Wells and Station 14 wells, at concentrations of 0.18 and 0.61 milligrams/Liter (mg/L), respectively.

The high pH of river water, corroborated by a measurement of 8.2 by the USGS (1987), may be of concern because calcite tends to precipitate under higher pH conditions. Simple geochemical modeling will indicate whether recharge of river water to the shallow aquifer might result in the precipitation of calcite. A closer review of trace elements may provide indications of groundwater flow paths.

4.0 Initial Data Review and Current Project Status

The groundwater monitoring network with 16 wells instrumented with transducers continues to collect data at 15-minute intervals as of September 2013. A barometric logger is stationed in KRD's offices.

The conceptual model developed initially by Golder in consultation with hydrogeologists from the Yakama Nation and Ecology was that the recharge along the edge of the valley floor might be feasible because of the following:

- Depth to groundwater was indicated by USGS data generally to be 20-80 feet bgs.
- Alluvial fans would have coarse-grained materials with high permeability to support rapid infiltration.

However, actual depth to groundwater in the wells measured varies between 1 foot and approximately 80 feet bgs (Figure 4). (Appendix B). Figure 4 shows close to fully saturated strata with a downward vertical hydraulic gradient, indicating general recharge conditions. Water levels decrease with depth. Groundwater fluctuations varied between 2 feet and 14 feet.

The USGS data used in earlier reports to represent depth to groundwater in the eastern Kittitas Valley as being between 20 feet and 80 feet bgs likely was based on deeper wells (e.g., deeper than 50 feet bgs).

The data collected and presented in this report was focused on data from wells. Wells shallower than 50 feet deep, and most of the wells shallower than 150 feet deep, had groundwater levels shallower than 20 feet bgs. Additional wells in the vicinity produce flowing artesian water, indicating groundwater levels above ground surface.

Hydrographs are plotted in Appendix B and are summarized on Figure 3 to allow comparison between stations. The rapid vertical oscillations reflect pumping cycles in those wells used for private domestic water supply. The groundwater response to seasonal and irrigation influences varies significantly between wells and is complex. For example (Figure 3, Appendix B):

- Station 2: No response to irrigation.
- Station 3: Groundwater levels respond quickly to apparent irrigation cycles, including quick decay of water level rises in response to the end of irrigation cycles (e.g., 3 feet), indicating short (~2 week) residence time.
- Stations 7 and 14: Show response to apparent seasonal variables but not to irrigation.
- Stations 11, 17, 18 and 20 (all basalt wells): Quick and sustained response to irrigation (e.g., 14 feet over one month).

Final data download, and retrieval and return of the transducers to Dave Nazy of Ecology should be scheduled after the end of the 2013 irrigation season (e.g., December 2013 or January 2014).

Reclamation and Ecology may consider further synthesis and interpretation after collection of a full year data set (e.g., in January 2014). This could include the following items:

- Barometric efficiency calculations to estimate aquifer storativity

- Comparison of hydrographs from vertically nested wells to determine the response lag times and, accordingly, vertical hydraulic conductivity
- Integrating interpretation of groundwater temperature and water level data
- Mapping of water level changes before and after the irrigation season to determine the location and magnitude of available subsurface storage
- Analysis of recovery curves in domestic wells from regular production pumping cycles to estimate hydraulic conductivity
- Estimating return travel times to the Yakima River based on updated hydrogeologic information

5.0 References

Golder 2008	Golder Associates, Inc. 2008. *Technical Report on Groundwater Storage Alternatives for Yakima River Basin Storage Assessment*. Ecology Publication Number 07-11-044.
Golder and HDR 2011	Golder Associates, Inc. and HDR Engineering, Inc. (HDR). 2011. *Yakima River Basin Study: Groundwater Infiltration Appraisal-Level Study*. Technical Memorandum to the U.S. Bureau of Reclamation. Contract No. 08CA10677A ID/IQ, Task 4.13, March 2011.
Reclamation and Ecology 2012	Bureau of Reclamation and Washington State Department of Ecology, 2012, *Yakima River Basin Integrated Water Resource Management Plan, Final Programmatic Environmental Impact Statement*, March 2012. Prepared by HDR Engineering, ESA, et al.
USGS 1987	United States Geological Survey (USGS). 1987. USGS SITE: 12482780, Yakima River At Evergreen Farm near Ellensburg, WA. National Water Information System: Web Interface. Accessed 19 Aug. 2013. http://nwis.waterdata.usgs.gov/nwis/qwdata.

6.0 List of Preparers and Acknowledgements

NAME	BACKGROUND	RESPONSIBILITY
Golder Associates, Inc.		
Chris Pitre, L.Hg	Hydrogeologist	Lead Author
Andrew Austreng	Hydrogeologist	Co-Author
Robert Anderson, L.Hg.	Hydrogeologist	Reviewer
HDR Engineering		
Andrew Graham	Water Resources Planner	Overall Project Manager (Prime Contractor)

The assistance of the following are gratefully acknowledged, though the list is not comprehensive.

- Walt Larrick, Activities Manager, Bureau of Reclamation
- Urban Eberhart, Board Member and Ken Hasbrouck, Manager, Kittitas Reclamation District
- Tom Ring, Hydrogeologist, Yakama Nation
- Dave Nazy, Water Resources, Washington State Department of Ecology
- Brent Renfrow, District Habitat Biologist and Paul LaRiviere, Habitat Science Team, Washington State Department of Fish and Wildlife
- Eastern Kittitas Valley landowners who graciously provided access to their wells.

Tables

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Table 1. Monitoring Station Details

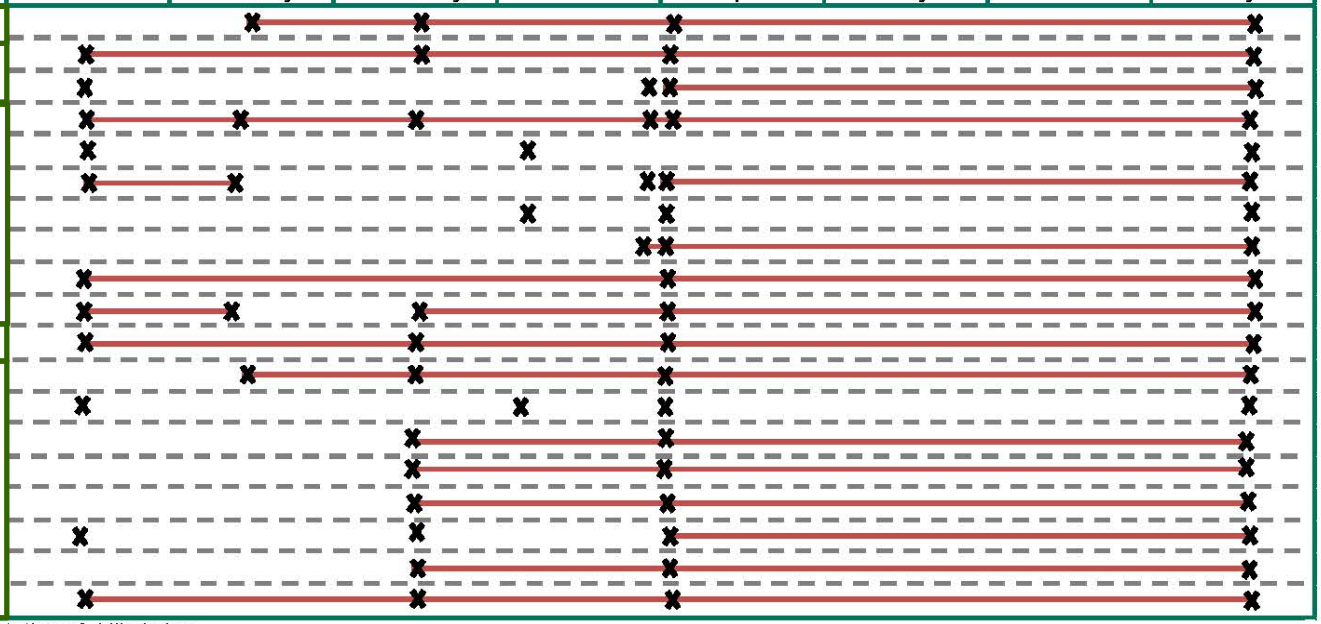
Station ID‡	Transducer Serial Number	Well Depth	Casing Stickup (feet above ground)	Method	Date Established	Depth To Water (ft below casing)	Latitude	Longitude	Land Surface Elevation (ft)	Casing Elevation (ft)	Water Level Elevation (at establishment)	Well Log ID
1	D8052	77	1	Transducer	12/13/2012	10	47.023803	-120.39651	1870.83	1871.83	1861	115953†
2	C9845	250	4			77	47.044482	-120.402454	2013.06	2017.06	1940	316764
3	D8030	65	1.1			7	47.057275	-120.471077	1968.65	1969.75	1912	--
4	F3986	99	1.9			48	47.009613	-120.383617	1857.87	1859.77	1962	530532
5	G3355	239	1.6			83	47.008929	-120.383487	1877.05	1878.65	1812	530531
6	D8048	65	1			16	46.999885	-120.463999	1649.00	1650.00	1796	114687†
7	G3353	200	0.8		12/14/2012	25	47.045839	-120.427659	1935.94	1936.74	1634	115881†
8	F3988	117	2.4			14	46.985435	-120.515973	1548.20	1550.60	1536	114054
9	n/a	70	2	Manual		24	46.977122	-120.35463	1805.30	1807.30	1783	116355
10	n/a	80	0.6			43	46.983811	-120.331124	1939.19	1939.79	1897	302903
11	D8062	182	1.75	Transducer		73	46.996151	-120.31075	2055.70	2057.45	1984	302920
12	n/a	178	2.5	Manual		86	47.005184	-120.364784	1927.33	1929.83	1844	363898
13	F3982	41	-1.33	Transducer	1/15/2013	18	47.044415	-120.402389	2012.67	2011.34	1993	--
14	D8018	17	0		1/16/2013	12	47.046091	-120.427896	1936.57	1936.57	1924	--
17	D8055	160	1.95		2/19/2013	30	47.023715	-120.347585	1982.52	1984.47	1954	375922
18	D8038	220	3.3			58	47.015914	-120.33331	2044.22	2047.52	1990	434957
19	D8042	125	1			18	47.012612	-120.347314	1972.91	1973.91	1956	--
20	G3364	145	2.21		2/20/2013	27	47.018576	-120.347946	1970.27	1972.48	1945	116404†
21	n/a	120	1	Manual	3/6/2013	46	47.010801	-120.358458	1965.66	1966.66	1920	120289
22	G3333	192	3.5	Transducer	3/28/2013	35			1649.00	1652.50	1618	624795
Station ID	**S/N**	**Alternate ID**	**Location Description**	**--**								
Baro1	D0162	KRD Barologger	KRD office: 307 Water Street N, Ellensburg: Ken Hasbrouck's desk.	Transducer	12/13/2012	- -	46.995081	-120.550314	1527.00	--		

Notes:
‡ Station ID is consecutive based on the date of establishment. Stations 15 and 16 were established as surface water stations. *NaneumWeir*, and *Caribou Weir*, respectively and were abandoned in March 2013.
† Well log cannot be confirmed
--- No well log available, or not applicable.

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Table 2: Groundwater Monitoring Period of Records

Station No.	Completed Depth	Screened Geologic Unit[1]	Period of Record (December 2012 - July 2013)
14	17	Alluvium	
3	65	Alluvium/Upper Ellensburg	
1	77		
6	65	Upper Ellensburg	
9	70		
8	117		
21	120		
22	192		
2	250		
7	200[2]		
4	99	Basalt (Tel[3])	
13	41	Basalt	
10	80		
19	125[2]		
20	145		
17	160		
11	182		
18	220		
5	239		



Notes:
1. Geologic units are based on interpretation of driller's log
2. No well log available, depth estimated by well owner; geologic unit based on interpretation of nearby well logs
3. *Tel* is lower Ellensburg Formation (interpreted from driller's log)

** Stations with transducers installed as of July 2013 are still operational

✖ Manual measurement

— Continuous measurement

Golder Associates

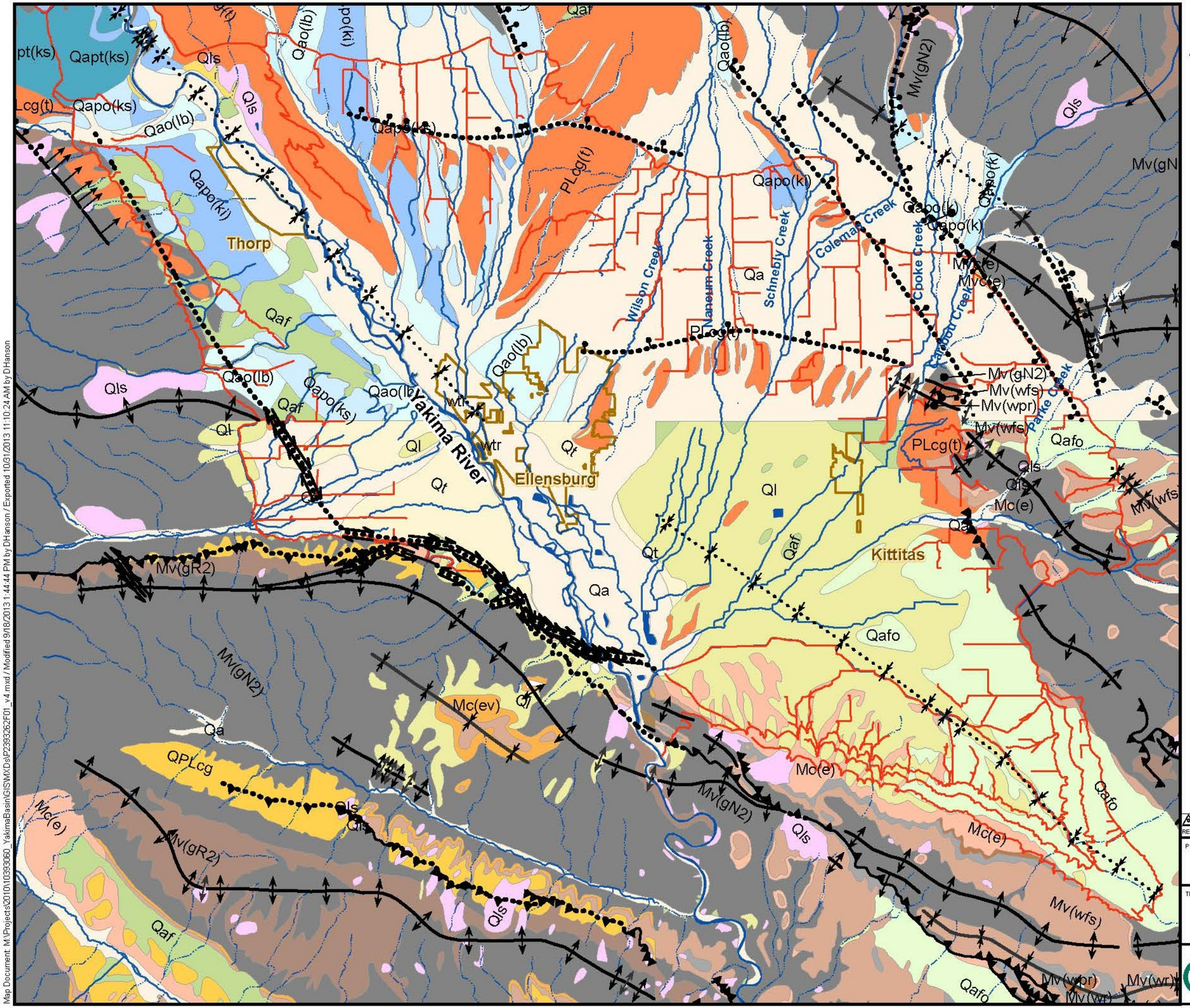
Table 3. Water Quality

Parameter	Units	PQL	Station 3 Well	Station 14 Well	City Wells	Yakima River
Field Parameters						
pH	s.u.	--	6.38	6.31	6.60	8.58
Temperature	Celsius		10.6	11.1	6.8	3.3
Conductivity	mS/cm		0.14	0.14	0.10	0.10
Dissolved Oxygen	mg/L		0.55	4.5	13.4	13.4
Oxidation/Reduction Potential	mV		-12.0	87	NR	NR
Turbidity	NTU		2.30	4.60	0.7	1.6
Laboratory Analysis						
Inorganics						
Bicarbonate Alkalinity	mg/L as $CaCO_3$	2	70	66	44	38
Carbonate Alkalinity		2	--	--	--	8.0
Total Alkalinity		2	70	66	44	46
Hardness (calculated)		2	60	64	43	42
Dissolved Organic Carbon	mg/L	1	1.8	--	1.2	1.2
Total Organic Carbon		1	1.8		1	1.1
Chloride		2	3.6	3.2	4.9	4.5
Fluoride		0.02	0.077	0.071	1.700	0.074
Ammonia as N		0.05	--	0.13	0.32	0.32
Nitrate as NO_3		0.05		0.61	--	--
Silica as SiO_2		2.4	36	36	11	9.7
TDS		13	91	89	25	35
Total Orthophosphate as PO_4		0.01	0.022	0.030	--	--
Total Phosphorus as P		0.01	0.018	0.021		
Metals						
Calcium	mg/L	1.1	14	14	10	11
Magnesium		1.1	5.9	6.6	4.2	3.6
Potassium		1.1	1.7	1.9	--	--
Sodium		1.1	5.0	4.0	5.2	4.2
Iron		0.056	1.2	0.096	--	--
Manganese		0.011	0.12	--		
Strontium		0.011	0.069	0.062	0.057	0.057

Notes:
PQL = Practical Quantification Limit
NR = Not reported.
-- Constituent concentrations reported at PQL.
The following constituents were not detected: aluminum, antimony, arsenic, beryllium, boron, bromide, cadmium, chromium, cobalt, copper, lead, mercury, nickel, nitrite, selenium, silver, sulfate, thallium, vanadium, and zinc.
Complete results are contained in Appendix D.

Figures

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LEGEND

- KRD Canal System
- City/Town

see figure 4a for geologic explanation

NOTES

1.) Spatial data not field-verified

REFERENCES

1.) WA DNR
2.) US DOI Bureau of Reclamation
3.) COORDINATE SYSTEM: NAD 1983 StatePlane Washington South FIPS 4602 Feet

N

10,000 0 10,000 Feet

REV.	DATE	DES	REVISION DESCRIPTION	GIS	CHK	RVW

PROJECT

YAKIMA BASIN INTEGRATED PLAN

TITLE

SURFICIAL AND STUCTURAL GEOLOGY OF THE KITTITAS BASIN

Golder Associates

PROJECT NO. 1039306001			FILE No. P2393262F01_v4.mxd
DESIGN	AA	10 Aug. 2013	SCALE: AS SHOWN REV. 0
GIS	AA	18 Sep. 2013	
CHECK	CP	14 Aug. 2013	FIGURE: 1
REVIEW	XXX	13 Nov. 2012	

Map Document: M:\Projects\2010\10393060_YakimaBasin\GIS\MXDs\P2393262F01_v4.mxd / Modified 9/18/2013 1:44:44 PM by DHanson / Exported 10/31/2013 11:10:24 AM by DHanson

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GEOLOGIC UNIT

Sedimentary Deposits

Quaternary

QPLcg	continental sedimentary deposits or rocks, conglomerate
Qa	alluvium
Qaf	alluvial fan deposits
Qafo	alluvial fan deposits, older
Qao(lb)	alpine glacial outwash, Fraser-age (LAKEDALE DRIFT, BULLFROG SUBDRIFT))
Qapo(k)	alpine glacial outwash, pre-Fraser (KITTITAS DRIFT, UNDIFFERENTIATED))
Qapo(ki)	alpine glacial outwash, pre-Fraser (KITTITAS DRIFT, INDIAN JOHN SUBDRIFT))
Qapo(ks)	alpine glacial outwash, pre-Fraser (KITTITAS DRIFT, SWUAK PRARIE SUBDRIFT))
Qapt(ks)	alpine glacial till, pre-Fraser (KITTITAS DRIFT, SWUAK PRARIE SUBDRIFT))
Ql	loess (PALOUSE FORMATION)
Qls	mass wasting deposits, mostly landslides
Qt	terraced deposits
Qap(l)	alpine glacial drift, pre-Fraser

Pliocene

PLcg(t)	continental sedimentary deposits or rocks, conglomerate (THORP GRAVEL)

Miocene

Mc(e)	continental sedimentary deposits or rocks (ELLENSBURG FORMATION)
Mc(ev)	continental sedimentary deposits or rocks (ELLENSBURG FORMATION, Vantage Member)
Mvc(e)	volcaniclastic deposits or rocks (ELLENSBURG FORMATION)

Basalt Flows

Mv(wpr)	basalt flows (Priest Rapids Member [CRB, WB])
Mv(wr)	basalt flows (Roza Member [CRB, WB])
Mv(wfs)	basalt flows (Frenchman Springs Member [CRB, WB])
Mv(w)	basalt flows (Wanapum Basalt, undivided [CRB])
Mv(gN2)	basalt flows (GRAND RONDE, N2 [CRB])
Mv(gR2)	basalt flows (GRAND RONDE, R2 [CRB])
Mvi(gR2o)	basalt flows, invasive (Grande Ronde Basalt, R2 [CRB])

FOLDS

- Anticline - Identity and existence certain, location accurate
- Anticline - Identity and existence certain, location concealed
- Syncline - Identity and existence certain, location accurate
- Syncline - Identity and existence certain, location concealed
- Monocline, anticlinal bend - Identity and existence certain, location accurate
- Monocline, anticlinal bend - Identity and existence certain, location concealed
- Monocline, synclinal bend - Identity and existence certain, location accurate

FAULTS

Dip-Slip Movement

Normal Fault

- Identity and existence certain, location accurate. Bar and ball on downthrown Block
- Identity and existence certain, location inferred. Bar and ball on downthrown Block
- Identity and existence certain, location concealed. Bar and ball on downthrown Block

Thrust Fault

- Identity and existence certain, location accurate. Sawteeth on upper plate
- Identity and existence certain, location concealed. Sawteeth on upper plate

Strike-Slip Movement

Right-lateral Strike-slip Fault

- Identity and existence certain, location accurate. Arrows show relative motion
- Identity and existence certain, location concealed. Arrows show relative motion

Left-lateral Strike-slip Fault

- Identity and existence certain, location accurate. Arrows show relative motion
- Identity and existence certain, location concealed. Arrows show relative motion

Movement Unknown

- Identity and existence certain, location accurate
- Identity and existence certain, location inferred
- Identity and existence certain, location concealed

PROJECT

YAKIMA BASIN INTEGRATED PLAN

TITLE

GEOLOGY LEGEND

REFERENCES

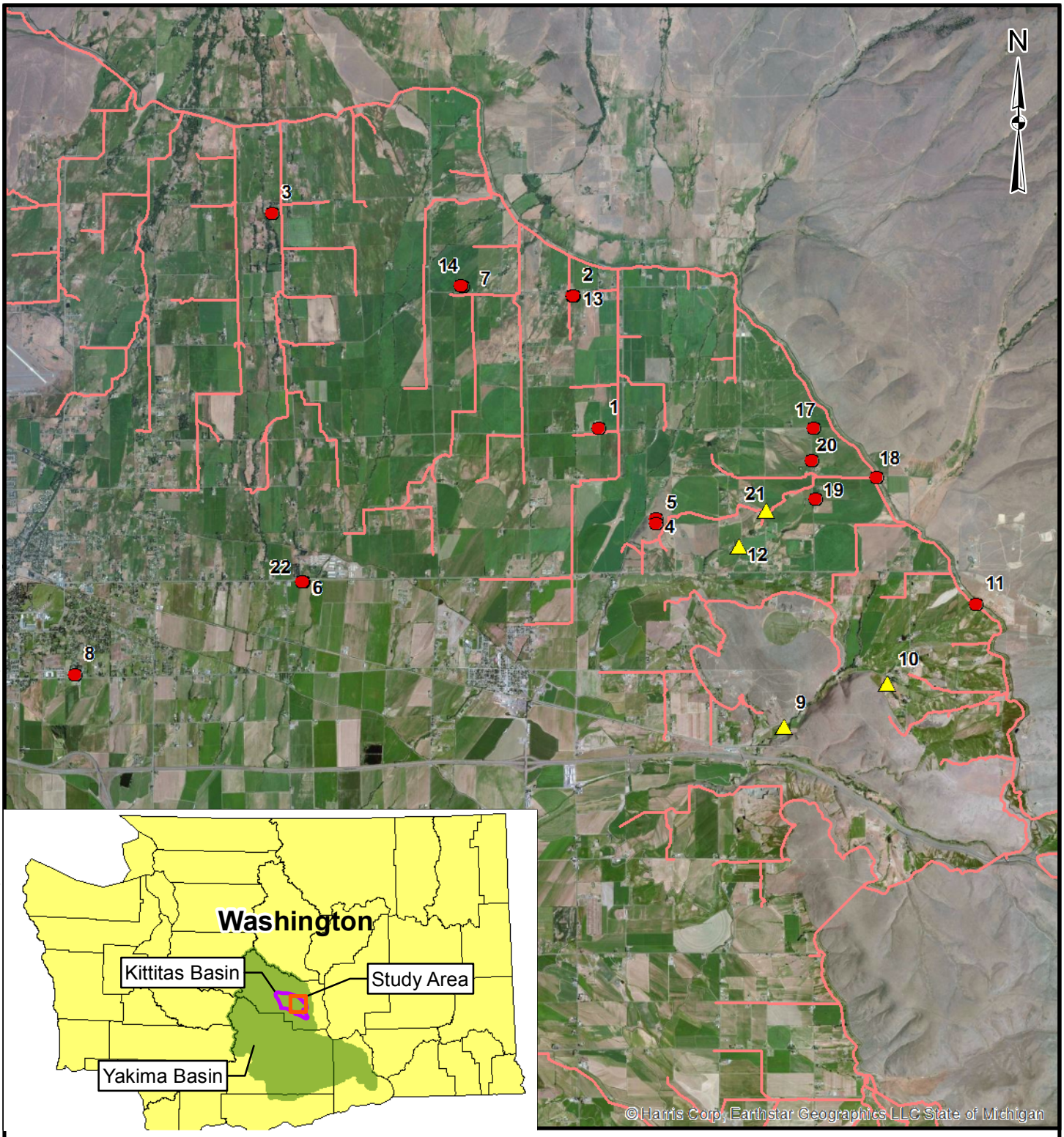
1.) WDNR (geology legend)

Golder Associates

PROJECT NO. 1039306001			1039306001F03_GeologyLegend.mxd
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GIS	BVJ	18 Sep. 2013	
CHECK	AA	19 Aug. 2013	FIGURE: 1a
REVIEW	CP	19 Aug. 2013	

Map Document: M:\Projects\2010\10393060_YakimaBasin\GIS\MXDs\1039306001F03_GeologyLegend.mxd / Modified 9/18/2013 1:21:47 PM by DHanson / Exported 10/31/2013 11:11:28 AM by DHanson

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LEGEND

Monitoring Method

- Manual
- Transducer
- KRD Canal System

**All loctions are approximate*

REFERENCES

1.) Bing Maps (Aerial Imagery)
2.) WDNR & WSDOE (WRIA)
3.) Yakima County (canals)
4.) WSDOT (counties)
5.) COORDINATE SYSTEM: NAD 1983 StatePlane Washington South FIPS 4602 Feet

8,000 0 8,000 Feet

PROJECT

YAKIMA BASIN INTEGRATED PLAN

TITLE

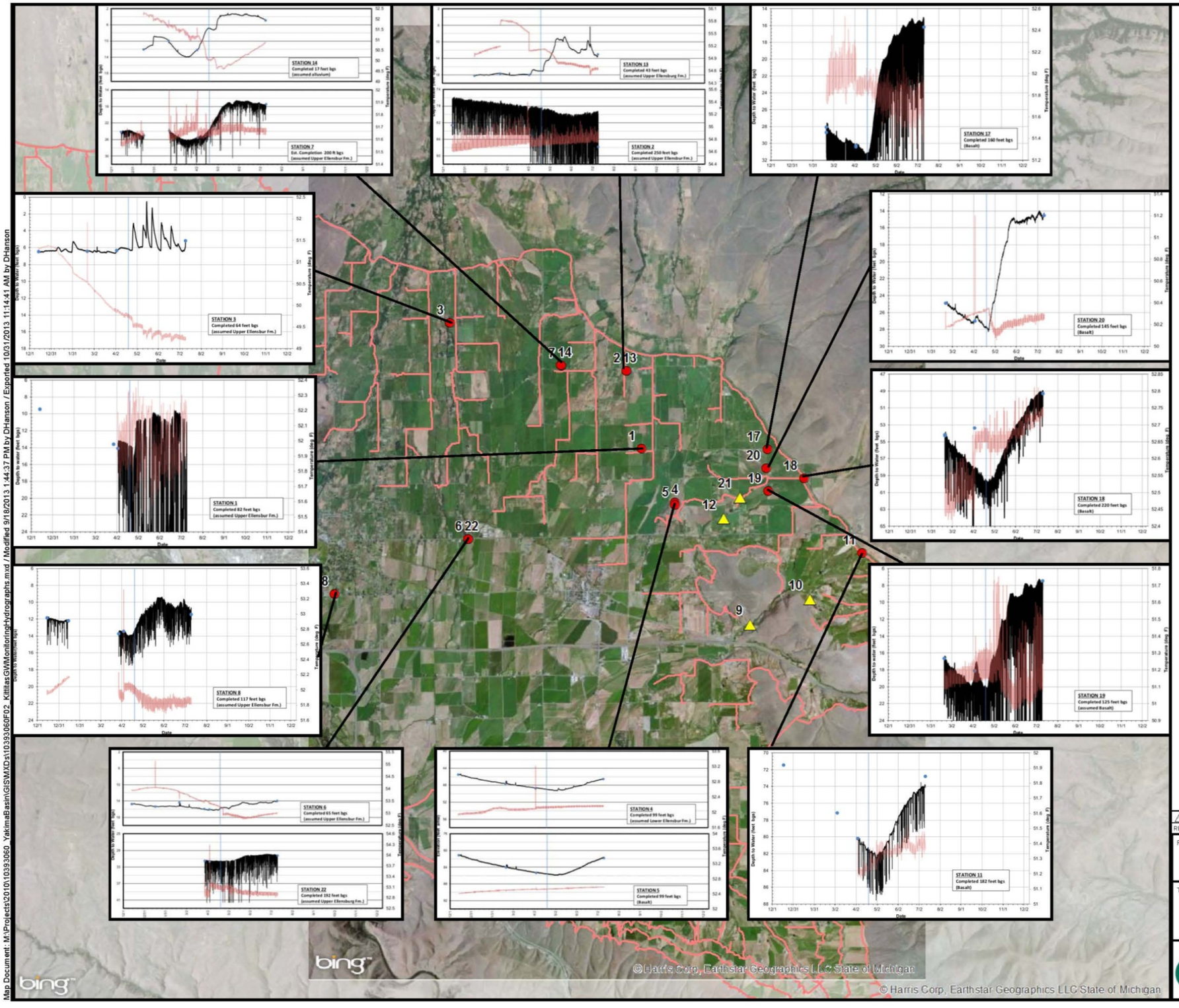
SITE MAP

Golder Associates

PROJECT NO. 1039306001			10393060F01R01_KittitasGWMonitoring.mxd
DESIGN	-	-	SCALE: AS SHOWN REV. 0
GIS	BVJ	18 Sep. 2013	**FIGURE: 2**
CHECK	AA	19 Aug. 2013	
REVIEW	CP	19 Aug. 2013	

Map Document: M:\Projects\2010\10393060_YakimaBasin\GIS\MXDs\R01\10393060F01R01_KittitasGWMonitoring.mxd / Modified 9/18/2013 1:30:20 PM by DHanson / Exported 10/31/2013 11:13:14 AM by DHanson

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LEGEND

- KRD Canal System

Monitoring Method

- Manual
- Transducer

Hydrograph Data

- Depth to Water (automated)
- Depth to Water (munaual measurement)
- Water Temperature
- KRD Canal Filled - Start of Irrigation Season

N

NOTES

1.) High frequency water level oscillations reflect pumping cycles in domestic wells used for water supply.
2.) Hydrographs are presented here for comparison purposes. Full hydrographs are available in Appendix B.

REFERENCES

1.) US DOI Bureau of Reclamation
2.) Bing Maps
3.) COORDINATE SYSTEM: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

9,200 0 9,200 Feet

REV	DATE	DES	REVISION DESCRIPTION	GIS	CHK	RVW

PROJECT

YAKIMA BASIN INTEGRATED PLAN

TITLE

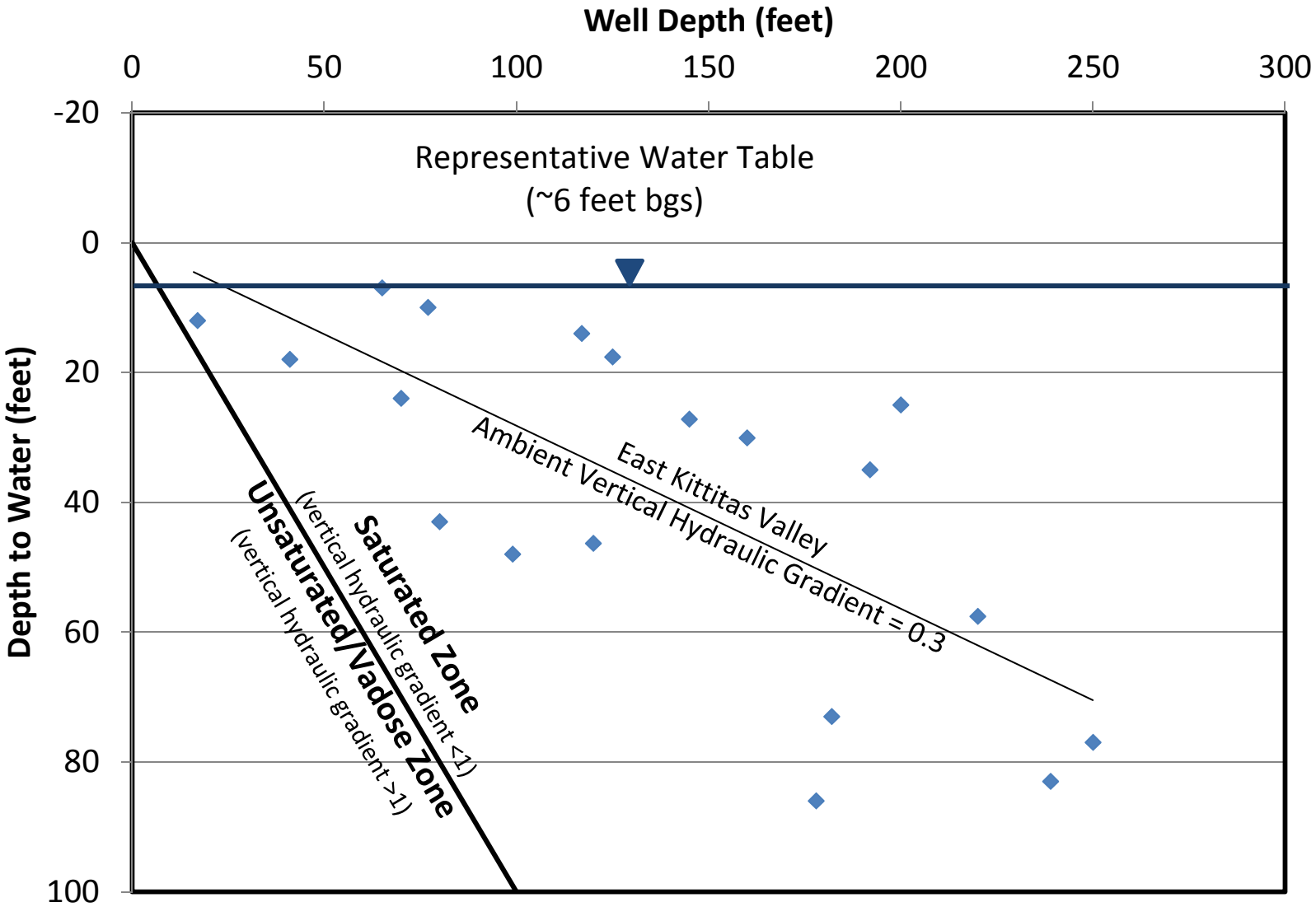
GROUNDWATER HYDROGRAPHS

Golder Associates

PROJECT NO. 001-1001		10393060F02_KittitasGWMonitoringHydrographs.mxd		
DESIGN	CP	1 Aug. 2012	SCALE: AS SHOWN	REV: 0
GIS	AA	18 Sep. 2013		
CHECK	AA	19 Aug. 2013	**FIGURE: 3**	
REVIEW	CP	19 Aug 2013		

Map Document: M:\Projects\2010\10393060_YakimaBasin\GIS\MXDs\10393060F02_KittitasGWMonitoringHydrographs.mxd / Modified 9/18/2013 1:44:37 PM by DHanson / Exported 10/31/2013 11:14:41 AM by DHanson

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Golder Associates

Preliminary data from groundwater monitoring stations established as part of the East Kittitas groundwater storage evaluation.

Water levels measured at time the monitoring stations were established.

FIGURE **4**

VERTICAL HYDRAULIC GRADIENT

HDR/Yakima Basin Storage/Washington

103-93060-01.6

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APPENDIX A

WELL LOGS FOR MONITORING STATIONS

Table of Contents

Well Log Label
Station 1
Near Station 1
Station 2
Near Station 3
Station 4
Station 5
Station 6
Near Stations 7 & 14
Near Stations 7 & 14
Near Stations 7 & 14
Station 8
Station 9
Station 10
Station 11
Station 12
Station 17
Station 18
Near Station 19 (a)
Near Station 19 (b)
Station 20
Station 21
Station 22

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Station 1

4002

Start Card No. 052404

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Water Right Permit No. G

(1) OWNER: Name John Randal Address Lyon's Rd Ellensburg Wa.

(2) LOCATION OF WELL: County Kittitas SW ¼ NE ¼ Sec. 25 T. 18 N., R. 19 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Lyon's Rd

(3) PROPOSED USE: [X] Domestic [ ] Industrial [ ] Municipal [ ] Irrigation [ ] Test Well [ ] Other [ ] DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) _____

Abandoned [ ] New well [ ] Method: Dug [ ] Bored [ ] Deepened [ ] Cable [ ] Driven [ ] Reconditioned [ ] Rotary [ ] Jetted [ ]

(5) DIMENSIONS: Diameter of well _____ inches.

Drilled _____ feet. Depth of completed well _____ ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 77 ft.

Welded [X] Liner installed [ ] Threaded [ ] _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes [ ] No [X]

Type of perforator used _____

SIZE of perforations _____ in. by _____ in.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

Screens: Yes [ ] No [X]

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes [ ] No [X] Size of gravel _____

Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes [X] No [ ] To what depth? 18 ft.

Material used in seal Bentonite

Did any strata contain unusable water? Yes [ ] No [ ]

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

(7) PUMP: Manufacturer's Name Berkley

Type: Sub H.P. 3/4

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level 8 ft. below top of well Date Oct 28

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? Yes [ ] No [X] If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

" " " "

" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test Oct 28-90

Bailer test 18 gal./min. with 30 ft. drawdown after 1 hrs.

Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Top Soil	0	3
@ Tightly Cemented gravel	3	9
Yellow Clay gravel	9	24
Brown Clay & Sand	24	48
gravel & Clay	48	74
Sand & gravel & Water	74	77

RECEIVED NOV 1 1990 DEPT OF ECOLOGY

ENTERED

Work started Oct 20, 19. Completed Oct 30, 1990

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Mathews Drilling & Const. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address Rt 1 Box 84 Royal City Wa.

(Signed) Mark Mathews (WELL DRILLER) License No. 1267

Contractor's Registration No. MATHEDC117K Date Oct. 30, 1990

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- 3

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Near Station 1

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

Construction/Decommission *("x" in circle)*

○ Construction 312858

○ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

CURRENT

Notice of Intent No. W-256235

Unique Ecology Well ID Tag No. BAN-937

Water Right Permit No. _____

Property Owner Name DENNIS SHELTON

Well Street Address 8411 LYONS RD

City E-BURG County KITTITAS

Location SW 1/4-1/4 NW 1/4 Sec 30 Twn 18 R 20 EWM or WWM (circle one)

Lat/Long (s, t, r Still **REQUIRED**) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec E

Tax Parcel No. 18203000-0006

PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☒ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6" inches, drilled 153 ft. Depth of completed well 153 ft.

CONSTRUCTION DETAILS

Casing Installed: ☒ Welded 6" Diam. from +2 ft. to 100 ft.

☒ Liner installed 4½" Diam. from 87 ft. to 153 ft.

☐ Threaded _____" Diam. from _____ ft. to _____ ft.

Perforations: ☒ Yes ☐ No

Type of perforator used SKILSAW

SIZE of perfs 6 in. by ¼ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☒ No ☐ Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 18 ft.

Material used in seal BENTONITE

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level 20 ft. below top of well Date 3/20/08

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 30+ gal./min. with stem set at 140 ft. for 1 hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☒ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
DIRT	0	2
LARGE COBBLES & BROWN CLAY	2	16
BROWN CLAY & GRAVEL	16	36
BROWN CLAY	36	41
BROWN CLAY & GRAVEL	41	68
BROWN CLAY & BROKEN BASALT	68	102
BROKEN BLACK BASALT	102	124
BROKEN BLACK BASALT GRAVEL & WATER	124	153

RECEIVED

SEP 11 2008

DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

Start Date 3/18/0 Completed Date 3/20/08

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☐ Driller ☐ Engineer ☐ Trainee Name (Print) JUSTIN WAMSLEY

Driller/Engineer/Trainee Signature _____

Driller or trainee License No. T-2900

If TRAINEE, Driller's Licensed No. _____

Driller's Signature _____

Drilling Company HIDDEN RIVERS DRILLING IN

Address P.O. BOX 891

City, State, Zip SELAH, WA 98942

Contractor's Registration No. HIDDERS90CK Date 3/20/08

Ecology is an Equal Opportunity Employer.

ECY 050-1-20 (Rev 3/05) **The Department of Ecology does NOT warranty the Data and/or Information on this Well Report.**

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 2

File Original with Department of Ecology
Second Copy - Owner's Copy
Third Copy - Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Notice of Intent W149413
UNIQUE WELL I.D # AGM161
Water Right Permit No. 98926

102820

(1) OWNER: Name Marion & Maryanna Henson Address 9100 Brick Mill Rd E Ellensburg Wa.

(2) LOCATION OF WELL: County Kittitas NE 1/4 NW 1/4 Sec 24 T 18 N.R 19E WM

(2a) STREET ADDRESS OF WELL: (or nearest address) 9100 Brick mill Rd C

TAX PARCEL NO. 18-19-24020-004

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) ____
☒ New Well ☐ Deepened ☐ Reconditioned ☐ Decommission
Method: ☐ Dug ☐ Bored ☐ Cable ☐ Driven ☒ Rotary ☐ Jetted

(5) DIMENSIONS: Diameter of well 6 inches
Drilled 250 feet. Depth of completed well 230 ft

(6) CONSTRUCTION DETAILS
Casing Installed:
☒ Welded 6" Diam from +2 ft. to 178 ft
☒ Liner installed 4" Diam from -6 ft. to 225 ft.
☐ Threaded ____" Diam. from ____ ft to ____ ft

Perforations: ☐ Yes ☒ No
Type of perforator used ____
SIZE of perforations ____ in by ____ in
____ perforations from ____ ft to ____ ft

Screens: ☐ Yes ☒ No ☐ K-Pac Location ____
Manufacturer's Name ____
Type ____ Model No ____
Diam. ____ Slot Size ____ from ____ ft to ____ ft.
Diam ____ Slot Size ____ from ____ ft to ____ ft

Gravel/Filter packed: ☐ Yes ☒ No ☐ Size of gravel/sand ____
Material placed from ____ ft. to ____ ft

Surface seal: ☒ Yes ☐ No To what depth? 18 ft
Material used in seal Bentonite
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

(7) PUMP: Manufacturer's Name ____
Type ____ H P ____

(8) WATER LEVELS: Land-surface elevation above mean sea level ____ ft
Static level 95 ft below top of well Date 9/17/01
Artesian pressure ____ lbs per square inch Date ____
Artesian water is controlled by ____ (Cap, valve, etc)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom? ____
Yield. ____ gal./min with ____ ft drawdown after ____ hrs
Yield. ____ gal /min with ____ ft drawdown after ____ hrs
Yield: ____ gal /min with ____ ft. drawdown after ____ hrs
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ____
Bailer test ____ gal /min with ____ ft. drawdown after ____ hrs
Airtest 10 gal /min with — ft drawdown after 2 hrs
Artesian flow ____ g p m Date ____
Temperature of water ____ Was a chemical analysis made? ☐ Yes ☒ No

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information Indicate all water encountered

MATERIAL	FROM	TO
Top Soil	0	2
Brown Clay & gravel	2	75
Tightly Cemented gravel Brown Sticky Clay	75	178
gravel & water	178	202
Fractured Basalt	202	207
gravel & Clay	207	231
gravel (loose) caving	231	247
	247	250

DEPT OF ECOLOGY Received OCT 15 2001 CENTRAL REGION OFFICE

Work Started 9/14/01 Completed 9/17/01

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

Type or Print Name Mitch Mathews License No 1267
(Licensed Driller/Engineer)

Trainee Name ____ License No ____
Drilling Company Mathews Drilling
(Signed) Mitch Mathews License No 1267
(Licensed Driller/Engineer)
Address 2317 Rd 10.2 NE Moses Lake Wa.
Contractor's Registration No MATHEDC117BK Date 10/1/01

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer For special accommodation needs, contact the Water Resources Program at (360) 407-6600 The TDD number is (360) 407-6006

ECY 050-1-20 (11/98)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Near Station 3

4642

WATER WELL REPORT

STATE OF WASHINGTON

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Start Card No. 33405

Water Right Permit No. D

OWNER: Name Mike Easterling Address Rader Rd.

(2) LOCATION OF WELL: County Kittitas NW ¼ NW ¼ Sec 16 T. 18 N., R. 19 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address)

(3) PROPOSED USE: [X] Domestic [ ] Industrial [ ] Municipal [ ] Irrigation [ ] Test Well [ ] Other [ ] DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned [ ] New well [X] Method: Dug [ ] Bored [ ] Deepened [ ] Cable [ ] Driven [ ] Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well inches.
Drilled 300 feet. Depth of completed well 300 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 140 ft.
Welded [X] Liner installed [X] Threaded [ ] 4 " Diam. from 0 ft. to 300 ft.
" Diam. from ft. to ft.

Perforations: Yes [X] No [ ]
Type of perforator used SKIL SAW
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes [ ] No [ ]
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes [ ] No [ ] Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [ ] To what depth? 20 ft.
Material used in seal
Did any strata contain unusable water? Yes [ ] No [ ]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 50 ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [ ] If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test

Bailer test gal./min. with ft. drawdown after hrs.
Airtest 8 gal./min. with stem set at 295 ft. for 4 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
LARGE COBBLES + SILT	0	4
SILT + BOULDERS	4	30
CEMENTED SAND + GRAVEL	30	90
SAND-COBBLES + CLAY	90	120
LAYERS OF BASALT	120	130
SOFT BASALT	130	160
BLACK BASALT WITH INNER BEDS	160	280
SAND STONE + CLAY	280	300

RECEIVED
DEC 2
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Work started 11-14 19 90 Completed 11-20 19 90

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Bach Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address Rt 5 - Box 1010, Ellensburg, WA.
(Signed) Mike Bach (WELL DRILLER) License No. 22
Contractor's Registration No. MIKEBAC133N4 Date 11-25 19 90

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 060-1-20 (10/87) -1329-

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 4

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

Construction/Decommission *("x" in circle)*

☒ Construction 297846

☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

CURRENT

Notice of Intent No. W 261108

Unique Ecology Well ID Tag No. BAF 977

Water Right Permit No. _____

Property Owner Name Knudson, Del

Well Street Address Caribou Rd. (Lower) f

City Ellensburg County Kittitas

Location SE 1/4-1/4 NW 1/4 Sec 31 Twn 18 R 20 EWM or WWM ☑ check one

(Lat/Long (s, t, r Still **REQUIRED**) Lat Deg N 47 Lat Min/Sec 00.574 Long Deg W 120 Long Min/Sec 22.999

Tax Parcel No. 18-20-31000-0032

PROPOSED USE: ☑ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☑ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☑ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 99 ft.

Depth of completed well 98 1/2 ft.

CONSTRUCTION DETAILS

Casing Installed: ☑ Welded 6 " Diam. from +2 ft. to 98 1/2 ft.

☐ Liner installed _____ " Diam. from _____ ft. to _____ ft.

☐ Threaded _____ " Diam. from _____ ft. to _____ ft.

Perforations: ☐ Yes ☑ No

Type of perforator used _____

SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☐ Yes ☑ No ☐ K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☑ No ☐ Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☑ Yes ☐ No To what depth? 36 ft.

Material used in seal Bentonite

Did any strata contain unusable water? ☐ Yes ☑ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level 1862 ft.

Static level 49 ft. below top of well Date 04-29-08

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☑ No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 32 gal./min. with stem set at 97 ft. for 1 1/2 hrs.

Artesian flow _____ g.p.m. Date 04-29-08

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☑ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Brown clay, rocks	0	6
Brown sandy clay, basalt pieces	6	39
Gray clay, broken basalt gravel	39	45
Brown clay, broken basalt gravel	45	65
Brown claystone	65	76
Brown clay, basalt gravel	76	84
Brown silt, fine sand (siltstone) WB	84	95
Gray cemented clay, basalt gravel	95	99

DEPT OF ECOLOGY Received MAY 06 2008 CENTRAL REGIONAL OFFICE

Start Date 04-28-08 Completed Date 04-29-08

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☑ Driller ☐ Engineer ☐ Trainee Name (Print) Brett Phythian

Driller/Engineer/Trainee Signature _____

Driller or trainee License No. 1249

Drilling Company Tumwater Drilling & Pump Inc. 509-548-5361

Address 9290 Hwy 2 / P.O.Box 777

City, State, Zip Dryden / Leavenworth, WA 98826

If TRAINEE,

Driller's Licensed No. _____

Driller's Signature _____

Contractor's Registration No. TUMWADP 011 LZ Date 04-30-2008

Ecology is an Equal Opportunity Employer.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 5

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

Construction/Decommission *("x" in circle)*

☉ Construction 29784 7

☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

CURRENT

Notice of Intent No. W 261107

Unique Ecology Well ID Tag No. BAF 976

Water Right Permit No. _____

Property Owner Name Knudson, Del

Well Street Address Caribou Rd. (Upper)

City Ellensburg County Kittitas L

Location NE 1/4-1/4 SW 1/4 Sec 31 Twn 18 R 20 EWM or WWM ☑ check one

(Lat/Long (s, t, r Still **REQUIRED**) Lat Deg N 47 Lat Min/Sec 00.480 Long Deg W 120 Long Min/Sec 23.011

Tax Parcel No. 18-20-31000 0005

PROPOSED USE: ☑ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☑ New well ☐ Reconditioned ☐ Deepened *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Cable ☑ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 239 ft.

Depth of completed well 239 ft.

CONSTRUCTION DETAILS

Casing Installed: ☑ Welded 6 " Diam. from +1 1/2 ft. to 199 ft.

☑ Liner installed 4 1/2 " Diam. from -189 ft. to 239 ft.

☐ Threaded _____ " Diam. from _____ ft. to _____ ft.

Perforations: ☑ Yes ☐ No

Type of perforator used Skill saw

SIZE of perfs 1/8 in. by 8 in. and no. of perfs 82 from 199 ft. to 239 ft.

Screens: ☐ Yes ☑ No ☐ K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☑ No ☐ Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☑ Yes ☐ No To what depth? 56 ft.

Material used in seal Bentonite

Did any strata contain unusable water? ☐ Yes ☑ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level 1901 ft.

Static level 89 1/2 ft. below top of well Date 04-28-08

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☑ No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 60 gal./min. with stem set at 238 ft. for 1 1/2 hrs.

Artesian flow _____ g.p.m. Date 04-28-08

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☑ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Brown clay / sandstone	0	44
Brown sand, kalichee	44	52
Brown clay, basalt gravels	52	103
Brown sandy clay, basalt gravels	103	128
Brown claystone w/ basalt pieces	128	133
Brown claystone	133	147
Brown claystone w/ broken basalt	147	165
Broken basalt WB (no static)	165	171
Gray clay, broken basalt	171	186
Broken basalt 4 - 6 gpm	186	190
Decayed basalt	190	194
Cemented broken basalt, brown clay	194	221
5+ gpm @ 215-221'		
Brown sandstone	221	229
Broken sandstone / basalt 50+ gpm	229	232
Brown sandstone	232	239

DEPT OF ECOLOGY Received MAY 06 2008 CENTRAL REGION OFFICE

Start Date 04-24-08 Completed Date 04-28-08

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☑ Driller ☐ Engineer ☐ Trainee Name (Print) Brett Phythian

Driller/Engineer/Trainee Signature _____

Driller or trainee License No. 1249

Drilling Company Tumwater Drilling & Pump Inc. 509-548-5361

Address 9290 Hwy 2 / P.O.Box 777

City, State, Zip Dryden / Leavenworth, WA 98826

If TRAINEE,

Driller's Licensed No. _____

Driller's Signature _____

Contractor's Registration No. TUMWADP 011 LZ Date 04-29-2008

Ecology is an Equal Opportunity Employer.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Station 6

WATER WELL REPORT

STATE OF WASHINGTON

2619

Start Card No. 010229

Water Right Permit No. _____

OWNER: Name Frank Phelps Address Vantage Hwy & Ferguson Rd.

(2) LOCATION OF WELL: County Kititas NE ¼ NW ¼ Sec 4 T 17 N., R 19 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Vantage Hwy & Ferguson Rd. Ellensburg, Wa/

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) _____

Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 65 feet. Depth of completed well 65 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 52 ft.
Welded ☒ Liner installed ☐ Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 10 ft. below top of well Date 10/24/88
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airlest 15 gal./min. with stem set at 65 ft. for 1 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Overburden, rock Boulders & water	0	16
Cemented gravel	16	36
Brown clay	36	52
Sand, gravel, & water	52	53
Brown clay	53	60
Brown clay, sandstone, & water	60	65

ENTERED

RECEIVED
JAN 4 1990
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Work started 10/24/88 19. Completed 10/24/88 19.

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Water Wells Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 5503 Ahtanum Rd. Yakima, Wa. 98903

(Signed) Vernon L. Rank (WELL DRILLER) License No. 0854

Contractor's Registration No. WATERW 131*N8 Date 10/24/88 19

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329-

Near Stations 7 & 14 (a)

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

Construction/Decommission *("x" in circle)*

(X) Construction 475777

( ) Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

CURRENT

Notice of Intent No. VK-256285

Unique Ecology Well ID Tag No. BAE-574

Water Right Permit No. _____

Property Owner Name BOB SNEBLY

Well Street Address 7370 BRICKMILL RD

City E-BURG County KITTITAS

Location NW/4-1/4/NE/4 Sec 23 Twn 18 R 19 (WM) or WWM circle one

Lat/Long (s, t, r Still REQUIRED) Lat Deg _____ Lat Min/Sec _____

Long Deg _____ Long Min/Sec _____

Tax Parcel No. 18192300-0027

PROPOSED USE: (X) Domestic ( ) Industrial ( ) Municipal ( ) DeWater ( ) Irrigation ( ) Test Well ( ) Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

(X) New well ( ) Reconditioned *Method:* ( ) Dug ( ) Bored ( ) Driven ( ) Deepened ( ) Cable (X) Rotary ( ) Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 380 ft. Depth of completed well 380 ft.

CONSTRUCTION DETAILS

Casing Installed: (X) Welded 6" Diam. from +2 ft. to 168 ft.

(X) Liner installed 4" Diam. from -10 ft. to 380 ft.

( ) Threaded _____" Diam. from _____ ft. to _____ ft.

Perforations: (X) Yes ( ) No

Type of perforator used SKILSAW

SIZE of perfs 6 in. by 1/4 in. and no. of perfs 100 from 170 ft. to 380 ft.

Screens: ( ) Yes (X) No ( ) K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ( ) Yes (X) No ( ) Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: (X) Yes ( ) No To what depth? 20 ft.

Material used in seal BENTONITE

Did any strata contain unusable water? ( ) Yes ( ) No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level 268 ft. below top of well Date 4/1/12

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ( ) Yes (X) No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 3cf gal./min. with stem set at 360 ft. for 1 hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? ( ) Yes (X) No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
DIRT	0	1
BROWN SANDSTONE GRAVEL	1	32
BROWN SANDSTONE	32	45
BROWN CLAY & GRAVEL	45	140
BROWN BASALT	140	152
BROWN BASALT & CLAY	152	169
BLACK BASALT & CLAY	169	248
BASALT & BROWN CLAY	248	352
BROWN BASALT GRAVEL WATER	352	380

DEPT OF ECOLOGY Received JAN 15 2013 CENTRAL REGION OFFICE

Start Date 3/25/12 Completed Date 4/1/12

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

(X) Driller ( ) Engineer ( ) Trainee Name (Print) CRAIG WARNECKE

Driller/Engineer/Trainee Signature _____

Driller or trainee License No. 2428

Drilling Company HIDDEN RIVERS DRILLING

Address P.O. BOX 891

City, State, Zip SEDRO WOOLLEY WA 98284

Contractor's Registration No. HIDDERS90K Date 4/1/12

If TRAINEE,

Driller's Licensed No. _____

Driller's Signature _____

Ecology is an Equal Opportunity Employer.

ECY 050-1-20 (Rev 3/05)

The Department of Ecology does NOT warranty the Data and/or Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original with Department of Ecology
Second Copy - Owner's Copy 75697
Third Copy - Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON
Near Stations 7 & 14 (b)

Notice of Intent W123705
UNIQUE WELL I.D. # AFH499
Water Right Permit No.

(1) OWNER: Name Dena Dinius Address 141 Schnebly Rd Ellensburg WA 98926

LOCATION OF WELL: County Kittitas SW 1/4 SE 1/4 Sec 14 T 18 N.R. 19 E WM

(2a) STREET ADDRESS OF WELL: (or nearest address) 141 Schnebly Rd Ellensburg WA 98926

TAX PARCEL NO.:

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one)
☒ New Well Method: ☐ Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐ Decommission

(5) DIMENSIONS: Diameter of well 6" inches
Drilled 360 feet. Depth of completed well 360 ft.

(6) CONSTRUCTION DETAILS
Casing Installed:
☒ Welded 6" Diam. from +2 ft. to 178 ft.
☒ Liner installed 4 1/2" Diam. from -3 ft. to 360 ft.
☐ Threaded " Diam. from ft. to ft.

Perforations: ☐ Yes ☒ No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location
Manufacturer's Name
Type Model No.
Diam. Slot Size from ft. to ft.
Diam. Slot Size from ft. to ft.

Gravel/Filter packed: ☐ Yes ☒ No ☐ Size of gravel/sand
Material placed from ft. to ft.

Surface seal: ☒ Yes ☐ No To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level. - ft.
Static level 122 ft. below top of well Date 7/27
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Yield: gal./min. with ft. drawdown after hrs.
Yield: gal./min. with ft. drawdown after hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest 22 gal./min. with 0 ft. drawdown after 2 hrs.
Artesian flow g.p.m. Date 7-27-00
Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered.

MATERIAL	FROM	TO
Top Soil	0	2
Brown clay + gravel	2	87
Sandy Red clay	87	135
Brown clay + gravel	135	210
Sticky Yellow clay	210	264
Sandy Brown clay	264	306
Yellow sticky clay	306	317
Sandy red clay	317	322
Soft sandstone + water	322	360

RECEIVED AUG 30 2000 DEPARTMENT OF ECOLOGY CENTRAL REGION

Work Started 7-25 00 Completed 7-27 00

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Type or Print Name mitch mathews License No. 1267
(Licensed Driller/Engineer)

Trainee Name License No.
Drilling Company Mathews Drilling + Constr.
(Signed) Mitch Mathews License No. 1267
(Licensed Driller/Engineer)
Address 2317 Rd 10.2 NE Moses Lake WA
Contractor's Registration No. MATHEDC 117BC Date 7-27 00

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (360) 407-6600. The TDD number is (360) 407-6006.

ECY 050-1-20 (11/98)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

338253

Near Stations 7 & 14 (c)

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. W50620
Unique Well I.D. # ABW770
Water Right Permit No.

(1) OWNER: Name LANGLEY, STEVE Address P.O. BOX 304 VANTAGE, WA 98950-

(2) LOCATION OF WELL: County KITTITAS - NW 1/4 SW 1/4 Sec 14 T 18 N., R 19E WM
(2a) STREET ADDRESS OF WELL (or nearest address) ,

(3) PROPOSED USE: DOMESTIC

(4) TYPE OF WORK: Owner's Number of well (If more than one)
NEW WELL Method: ROTARY

(5) DIMENSIONS: Diameter of well 6 inches
Drilled 398 ft. Depth of completed well 398 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Dia. from +2 ft. to 288 ft.
WELDED 4 " Dia. from -98 ft. to 398 ft.
" Dia. from ft. to ft.

Perforations: YES
Type of perforator used SKILL SAW
SIZE of perforations 1/8 in. by 6 in.
50 perforations from 378 ft. to 398 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: NO
Manufacturer's Name
Type Model No.
Diam. slot size from ft. to ft.
Diam. slot size from ft. to ft.

Gravel packed: NO Size of gravel
Gravel placed from ft. to ft.

Surface seal: YES To what depth? 20 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? YES
Type of water? WASTE Depth of strata 70 ft.
Method of sealing strata off OVERBURE

(7) PUMP: Manufacturer's Name
Type H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ... ft.
Static level 280 ft. below top of well Date 04/26/95
Artesian Pressure lbs. per square inch Date
Artesian water controlled by

(9) WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? NO If yes, by whom?
Yield: gal./min with ft. drawdown after hrs.

Recovery data
Time Water Level Time Water Level Time Water Level

Date of test / /
Bailer test gal/min. ft. drawdown after hrs.
Air test 20+ gal/min. w/ stem set at 398 ft. for 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? NO

(10) WELL LOG

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change in formation.

MATERIAL	FROM	TO
TOPSOIL	0	6
GRAVEL	6	40
GRAVEL BROWN CLAY	40	46
BROWN MEDIUM CLAY	46	55
TAN CLAY GRAVEL	55	63
CEMENTED GRAVEL	63	68
GRAVEL MEDIUM CLAY	68	74
SOFT BROWN CLAY	74	79
GRAVEL HARD CLAY	79	225
SANDSTONE GRAVEL	225	236
HARD CONGLOMERATE	236	285
FRACTURED BASALT	285	300
SOFT BROWN CLAY	300	310
BASALT GRAVEL CLAY	310	345
SANDSTONE	345	355
SANDSTONE BASALT	355	385
SANDSTONE AND WATER	385	396
HARD BASALT	396	398

RECEIVED
MAY 4 1995
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Work started 04/24/95 Completed 04/26/95

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME PONDEROSA DRILLING
(Person, firm, or corporation) (Type or print)

ADDRESS E 6010 BROADWAY

[SIGNED] _____ License No. 2227

Contractor's
Registration No. PO-ND-EI*240JE Date 05/02/95

Station 8

8121

WATER WELL REPORT

STATE OF WASHINGTON

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Start Card No. 083523

Water Right Permit No. N

(1) OWNER: Name Dirk & Dawn Varnum Address 312 W. 12th, Ellensburg, WA 98926

(2) LOCATION OF WELL: County Kittitas SW ¼ SW ¼ Sec 06 T 17 N., R 19 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address)

(3) PROPOSED USE: [X] Domestic [ ] Industrial [ ] Municipal [ ] Irrigation [ ] Test Well [ ] Other [ ] DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned [ ] New well [X] Method: Dug [ ] Bored [ ] Deepened [ ] Cable [ ] Driven [ ] Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 117 feet. Depth of completed well 117 ft.

(6) CONSTRUCTION DETAILS:
Casing Installed: 6 " Diam. from +2 ft. to 115 ft.
Welded [X] Liner installed [ ] Threaded [ ] " Diam. from ft. to ft.
" Diam. from ft. to ft.

Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes [ ] No [X]
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes [ ] No [X] Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [ ] To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes [ ] No [ ]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 12 ft. below top of well Date 12-31-92
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [X] If yes, by whom?
Yield: 30 gal./min. with ft. drawdown after hrs.
" ESTIMATED AIRLIFT " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)
Time Water Level Time Water Level Time Water Level
Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Top Soil, Brown, Medium	0	3
Cemented Gravel, Hard	3	9
Sand, Gravel, Medium	9	11
Cemented Gravel, Hard	11	18
Cemented Gravel, Very Hard	18	36
Clay, Tan, Medium	36	47
Cemented Gravel, Brown, Med. Hard	47	54
Sand, Brown, Soft	54	62
Clay, Yellow, Medium	62	88
Cemented Gravel, Clay, Brown, Medium Hard	88	114
Cemented Gravel, Black, Medium	114	117
6" Drive Shoe Utilized		

RECEIVED
JAN 15 1993
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Work started 12-30-92, 19. Completed 12-31-92, 19

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Ponderosa Drilling & Development, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address E. 6010 Broadway, Spokane, WA 99212
(Signed) (WELL DRILLER) License No. 1908
(Chris Hayes)
Contractor's Registration No. PO-NO-RI*248JE Date December 31, 19 92

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329-

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 9

7273

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 086874

Water Right Permit No. (K)

(1) OWNER: Name Larry Miller Address 2109 E. 17th St. Bremerton, WA 98310

(2) LOCATION OF WELL: County Kittitas ¼ S1/2 ¼ Sec. 8 T. 17 N., R. 20 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address)

(3) PROPOSED USE: [X] Domestic [ ] Irrigation [ ] DeWater [ ] Industrial [ ] Test Well [ ] Municipal [ ] Other

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned [ ] New well [X] Deepened [ ] Reconditioned [ ] Method: Dug [ ] Cable [ ] Rotary [X] Bored [ ] Driven [ ] Jetted [ ]

(5) DIMENSIONS: Diameter of well 10 x 6 inches. Drilled 82 feet. Depth of completed well 82 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from +2 ft. to 78 ft.
Welded [X] Liner installed [ ] Threaded [ ]
" Diam. from ft. to ft.
" Diam. from ft. to ft.
Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
Screens: Yes [ ] No [X]
Manufacturer's Name
Type Model No.
Diam Slot size from ft. to ft.
Diam Slot size from ft. to ft.
Gravel packed: Yes [ ] No [X] Size of gravel
Gravel placed from ft. to ft.
Surface seal: Yes [X] No [ ] To what depth? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 19 ft. below top of well Date 8-20-92
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [X] If yes, by whom?
Yield: 42 gal./min. with ft. drawdown after hrs.
" Estimated air lift 42 GPM "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Top soil	0	1
Basalt black brown w/clay brown hard	1	10
Clay brown soft	10	15
Sandstone brown w/gravel medium	15	32
Basalt brown black w/clay brown hard	32	37
Sandstone tan hard	37	55
Clay tan brown soft	55	74
Sandstone brown medium	74	79
Sandstone multi color soft	79	82
6" Drive shoe utilized		

RECEIVED AUG 31 DEPT. OF ECOLOGY REGION OFFICE

Work started 8-20-92, 19. Completed 8-20, 1992

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Ponderosa Drilling & Development, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address E. 6010 Broadway Spokane, WA 99212
(Signed) (WELL DRILLER) License No. 1908
Contractor's Registration No. PO-ND-EI*248JE Date 8-24, 19 92

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10-87) -1329

The Dep. The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 10

File Original with Department of Ecology 89960
Second Copy - Owner's Copy
Third Copy - Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Notice of Intent AH113440
UNIQUE WELL I D # AFH 952
Water Right Permit No

(1) OWNER Name George Verheul Address 7015 116th Ave SE Renton Wa

(2) LOCATION OF WELL County Kittitas NE 1/4 NE 1/4 Sec 09 T 17 N R 20 WM 98056

(2a) STREET ADDRESS OF WELL. (or nearest address)

TAX PARCEL NO

A

(3) PROPOSED USE
- [X] Domestic
- [ ] Irrigation
- [ ] DeWater
- [ ] Industrial
- [ ] Test Well
- [ ] Municipal
- [ ] Other

(4) TYPE OF WORK Owner's number of well (if more than one)
- [X] New Well
- [ ] Deepened
- [ ] Reconditioned
- [ ] Decommission

Method
- [ ] Dug
- [ ] Cable
- [X] Rotary
- [ ] Bored
- [ ] Driven
- [ ] Jetted

(5) DIMENSIONS Diameter of well 10X6 inches
Drilled 80 feet Depth of completed well 80 ft

(6) CONSTRUCTION DETAILS
Casing Installed
- [X] Welded PVC 6" Diam from +2 ft to -37 ft
- [X] Liner installed PVC 4" Diam from -10 ft to -80 ft
- [ ] Threaded ____" Diam from ____ ft to ____ ft

Perforations [X] Yes [ ] No
Type of perforator used SKILSAW
SIZE of perforations 7/16 in by 1/8 in
120 perforations from 40 ft to 80 ft

Screens [ ] Yes [X] No [ ] K-Pac Location
Manufacturer's Name
Type Model No
Diam Slot Size from ft to ft
Diam Slot Size from ft to ft

Gravel/Filter packed [ ] Yes [X] No [ ] Size of gravel/sand
Material placed from ft to ft

Surface seal [X] Yes [ ] No To what depth? 18 ft
Material used in seal Bentonite
Did any strata contain unusable water? [ ] Yes [X] No
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP Manufacturer's Name
Type H P

(8) WATER LEVELS Land-surface elevation above mean sea level ft
Static level 47 ft below top of well Date 1/9/01
Artesian pressure lbs per square inch Date
Artesian water is controlled by (Cap valve, etc)

(9) WELL TESTS Drawdown is amount water level is lowered below static level
Was a pump test made? [ ] Yes [X] No If yes, by whom?
Yield gal /min with ft drawdown after hrs
Yield gal /min with ft drawdown after hrs
Yield gal /min with ft drawdown after hrs
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	ESTIMATED AIRLIFT				

Date of test
Bailer test gal /min with ft drawdown after hrs
Airtest 35 gal /min with ft drawdown after hrs
Artesian flow g p m Date
Temperature of water Was a chemical analysis made? [ ] Yes [X] No

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information Indicate all water encountered

MATERIAL	FROM	TO
Cemented Gravel w/Sand	0	
Stone Bdr Blk MH		27
Fource Basalt w/Clay Brn Blk MH	27	51
Broken Basalt Brn Blk MH	51	80

DEPT. OF ECOLOGY Received FEB - 2 2001 CENTRAL REGION

Work Started 1/8/01 Completed 1/9/01

WELL CONSTRUCTION CERTIFICATION

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief.

Type or Print Name Chris Hayes License No 1908
(Licensed Driller/Engineer)

Trainee Name License No
Drilling Company Waterman Well Drill Inc
(Signed) License No 1908
(Licensed Driller/Engineer)
Address 106 Berriman in Selah Wa
Contractor's Registration No WATERWD0220B Date 1/10/01

(USE ADDITIONAL SHEETS IF NECESSARY)

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ECY 050-1-20 (11/98)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 11

98031

WATER WELL REPORT

STATE OF WASHINGTON

File Original with Department of Ecology
Second Copy - Owner's Copy
Third Copy - Driller's Copy

Notice of Intent W 113538
UNIQUE WELL I D # AFE 248
Water Right Permit No

(1) OWNER Name Mark Johnson Address 16730 Vantage Hwy Ell WA 98926

(2) LOCATION OF WELL County Kittitas NE 1/4 NE 1/4 Sec 03 T 17 N R 20 WM

(2a) STREET ADDRESS OF WELL (or nearest address)

TAX PARCEL NO

A

(3) PROPOSED USE
- [X] Domestic
- [ ] Irrigation
- [ ] DeWater
- [ ] Industrial
- [ ] Test Well
- [ ] Municipal
- [ ] Other

(4) TYPE OF WORK Owner's number of well (if more than one)
- [X] New Well
- [ ] Deepened
- [ ] Reconditioned
- [ ] Decommission

Method
- [ ] Dug
- [ ] Cable
- [ ] Rotary
- [ ] Bored
- [ ] Driven
- [ ] Jetted

(5) DIMENSIONS Diameter of well 10X6 inches
Drilled 182 feet Depth of completed well 182 ft

(6) CONSTRUCTION DETAILS
Casing Installed
- [X] Welded — PVC 6" Diam from +2 ft to -60 ft
- [X] Liner installed — 6" Diam from -7 ft to -182 ft
- [ ] Threaded — " Diam from ft to ft

Perforations [X] Yes [ ] No
Type of perforator used SKILSAW
SIZE of perforations 7/4 in by 1/8 in
140 104 perforations from 142 ft to 182 ft

Screens [ ] Yes [X] No [ ] K Pac Location
Manufacturer's Name
Type Model No
Diam Slot Size from ft to ft
Diam Slot Size from ft to ft

Gravel/Filter packed [ ] Yes [X] No [ ] Size of gravel/sand
Material placed from ft to ft

Surface seal [X] Yes [ ] No To what depth? 18 ft
Material used in seal Bentonite
Did any strata contain unusable water? [ ] Yes [X] No
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP Manufacturer's Name
Type H P

(8) WATER LEVELS Land-surface elevation above mean sea level ft
Static level 87 ft below top of well Date 4/16/01
Artesian pressure lbs per square inch Date
Artesian water is controlled by (Cap valve etc)

(9) WELL TESTS Drawdown is amount water level is lowered below static level
Was a pump test made? [ ] Yes [X] No If yes by whom?
Yield gal /min with ft drawdown after hrs
Yield gal /min with ft drawdown after hrs
Yield gal /min with ft drawdown after hrs
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	ESTIMATED AIRLIFT				

Date of test
Bailer test gal./min with ft drawdown after hrs
Airtest 30 gal./min with ft drawdown after hrs
Artesian flow g p m Date
Temperature of water Was a chemical analysis made? [ ] Yes [X] No

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation Describe by color character size of material and structure, and the kind and nature of the material in each stratum penetrated with at least one entry for each change of information Indicate all water encountered

MATERIAL	FROM	TO
Topsoil Brn M	0	2
Cemented Gravel Clay Sandstone Tan Brn Blk MH	2	47
BASALT Brn Blk H	47	158
Fracture BASALT Brn Gry H	158	182

Work Started 4/13/01 Completed 4/16/01

WELL CONSTRUCTION CERTIFICATION

I constructed and/or accept responsibility for construction of this well and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

Type or Print Name Chris Hayes License No 1908
(Licensed Driller/Engineer)

Trainee Name License No
Drilling Company Water Man Well Drilling
(Signed) License No 1908
(Licensed Driller/Engineer)
Address 106 Berriman In Selah Wa
Contractor's Registration No WATERWO022DB Date 4/18/01

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer For special accommodation needs contact the Water Resources Program at (360) 407-6600 The TDD number is (360) 407-6006

ECY 050-1-20 (11/98)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 12

WATER WELL REPORT

STATE OF WASHINGTON

Original Copy - Owner's Copy 134770 Driller's Copy

Unique Well ID # ACX-931

Well ID # W 113664

Start Card No.

PARCEL E

Owner: Name MAURICE McGRATH Address

Location of Well: County KITTITAS

NW 1/4 SW 1/4 Sec 32 T 18 N R 20 W M

Street Address of Well (or nearest address) TAKHOMA FARM LN

Tax Parcel No. 18-20-32000-0010-00

God Maurice McGrath
Bless 1520 260th St E
America Spanaway WA 98387 9410

(1) Proposed Use: ☒ Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐ Dewater

(2) Type of Work: Owner's number of well (if more than one)
☒ New Well ☐ Deepened ☐ Reconditioned ☐ Decommissioned
Method: ☐ Dug ☐ Cable ☒ Rotary ☐ Bored ☐ Driven ☐ Jetted

(3) Dimensions: Diameter of well 6 inches
Drilled 178 ft. Depth of completed well 178 ft.

(4) Construction Details:
Casing Installed: ☒ Welded 6 Diam. from +2 ft. to 176 ft.
☐ Liner Installed Diam. from ft. to ft.
☐ Threaded Diam. from ft. to ft.

Perforations: ☐ Yes ☒ No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.

Screens: ☐ Yes ☐ No ☐ K-Pac Location
Manufacturer's Name
Type Model No.
Diam. Slot Size from ft. to ft.
Diam. Slot Size from ft. to ft.

Gravel/filter packed: ☐ Yes ☒ No ☐ Size of gravel
Material placed from ft. to ft.

Surface seal: ☒ Yes ☐ No To what depth? 20 ft
Material used in seal CEMENT GROUT
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? Depth of strata
Method of sealing strata off

PUMP: Manufacturer's Name
Type: H.P.

WATER LEVELS: Land-surface elevation above mean sea level
Static level 161 ft. below top of well Date 12/24/99
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal/min. with ft. drawdown after hrs.
Yield: gal/min. with ft. drawdown after hrs.
Yield: gal/min. with ft. drawdown after hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal/min. with ft. drawdown after hrs.
Airlift 3 gal/min. with ft. drawdown after 2 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? ☐ Yes ☒ No

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered

MATERIAL	FROM	TO
DIRT	0	3
CEMENTED CONGLOMERATE	3	28
BOULDERS		
FRACTURED BASALT	28	60
BASALT LAVA ROCK	60	72
HARD TO DRILL	72	116
ALLUVIAL SAND & GRAVEL	116	162
GLACIAL SAND	162	172
BROKEN BASALT ROCK	172	178
WATER		

RECEIVED
DEPT OF ECOLOGY Received JUN 04 2003
MAY 30 2003
DEPARTMENT OF ECOLOGY
WELL DRILLING UNIT

Work Started 12/18/99 Completed 12/24/99

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Type or Print Name CRAIG WARNICK License No. 2428
(Licensed Driller/Engineer)

Trainee Name License No.

Drilling Company MADDOCK BROTHERS DRILLING

(Signed) (Licensed Driller/Engineer) License No. 2428

Address 251 CRESCENT ROAD KEA

Contractor's Registration No. MADDOCB0105 Date 12/24/99

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (360) 407-6600. The TDD number is (360) 407-6006

ECY 050-1-20 (11/96)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 17

File Original and First Copy with Department of Ecology
Second Copy — Owner s Copy
Third Copy — Driller s Copy 42995

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No W058320
UNIQUE WELL I D # ABL 772
Water Right Permit No

OWNER Name Robert Weber Address 3846 Del-Mar Ave Fair Oaks Calif 95628

(2) LOCATION OF WELL County Kittitas SW 1/4 NW 1/4 Sec 28 T 18 N R 20 E WM

(2a) STREET ADDRESS OF WELL (or nearest address) Corner of Fox and Lyons Rd Ellensburg

(3) PROPOSED USE [X] Domestic [X] Irrigation [ ] DeWater [ ] Industrial [ ] Test Well [ ] Municipal [ ] Other

(4) TYPE OF WORK Owner s number of well (If more than one)

Abandoned [ ] New well [X] Deepened [ ] Reconditioned [ ] Method Dug [ ] Cable [ ] Rotary [X] Bored [ ] Driven [ ] Jetted [ ]

(5) DIMENSIONS Diameter of well 6 inches
Drilled 160 feet Depth of completed well 160 ft

(6) CONSTRUCTION DETAILS

Casing installed 6" Diam from +2 ft to 115 ft
Welded [X] 4 1/2 Diam from -10 ft to 160 ft
Liner installed [X]
Threaded [ ] Diam from ft to ft

Perforations Yes [ ] No [X]
Type of perforator used
SIZE of perforations in by in
perforations from ft to ft
perforations from ft to ft
perforations from ft to ft

Screens Yes [ ] No [X]
Manufacturer s Name
Type Model No
Diam Slot size from ft to ft
Diam Slot size from ft to ft

Gravel packed Yes [ ] No [X] Size of gravel
Gravel placed from ft to ft

Surface seal Yes [X] No [ ] To what depth? 18 ft
Material used in seal Bentonite
Did any strata contain unusable water? Yes [ ] No [ ]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP Manufacturer s Name
Type H P

(8) WATER LEVELS Land surface elevation above mean sea level ft
Static level 37 ft below top of well Date 3-27-95
Artesian pressure lbs per square inch Date
Artesian water is controlled by (Cap valve etc)

(9) WELL TESTS Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [ ] If yes by whom?
Yield gal /min with ft drawdown after hrs

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal /min with ft drawdown after hrs
Airtest 16 gal /min with stem set at 155 ft for 1 hrs
Artesian flow g p m Date
Temperature of water Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation Describe by color character size of material and structure and show thickness of aquifers and the kind and nature of the material in each stratum penetrated with at least one entry for each change of information

MATERIAL	FROM	TO
Top Soil	0	3
Clay & gravel	3	36
Sandy Clay	36	53
gravel & Clay	53	67
Sandy Clay	67	81
Tightly Cemented gravel	81	94
gravel & Clay	94	114
Basalt	114	138
Fractured Basalt & Water	138	160

RECEIVED
MAY 31 1995
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Work Started 3-25 19 Completed 3-27 19 95

WELL CONSTRUCTOR CERTIFICATION

I constructed and/or accept responsibility for construction of this well and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

NAME MATHEWS Drilling (PERSON FIRM OR CORPORATION) (TYPE OR PRINT)
Address 9455 Stone Crest Rd. Mt.
(Signed) Mitch Mathews (WELL DRILLER) License No 1267
Contractor s Registration No MATHEDC117BC Date 19 95

(USE ADDITIONAL SHEETS IF NECESSARY)

ECL 050 1 20 (2/93) f

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 18

Please print, sign and return to the Department of Ecology

Water Well Report

Original – Ecology, 1st copy – owner, 2nd copy – driller

Construction/Decommission

☒ Construction
☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* W244255

192783

Current
Notice of Intent No. W244255
Unique Ecology Well ID Tag No. ALE 625
Water Right Permit No. B
Property Owner Name Ron S. Axtman
Well Street Address Christensen Rd
City Ellensburg County Kittitas 19
Location NW 1/4-1/4 NE 1/4 Sec 33 Twn 18 R 20 EWM or WWM ☒ circle one
Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Lat Min/Sec _____
Long Deg _____ Long Min/Sec _____
Tax Parcel No. 18-20-3300-0011

PROPOSED USE: ☐ DeWater ☒ Domestic ☐ Irrigation ☐ Industrial ☐ Test Well ☐ Municipal ☐ Other

TYPE OF WORK: Owner's number of well (if more than one) _____
☒ New well ☐ Reconditioned ☐ Deepened *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 220 ft.
Depth of completed well 220 ft.

CONSTRUCTION DETAILS
Casing Installed: ☒ Welded 6" Diam. from +2 ft. to 118 ft.
☒ Liner installed 4" Diam. from -5 ft. to 220 ft.
☐ Threaded _____" Diam. from _____ ft. to _____ ft.

Perforations: ☐ Yes ☒ No
Type of perforator used _____
SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location _____
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☒ No ☐ Size of gravel/sand _____
Materials placed from _____ ft. to _____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 84 ft. below top of well Date 3/11/06
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest 17 gal./min. with stem set at 215 ft. for 2 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? ☐ Yes ☒ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Top Soil	0	1
Cemented Gravel	1	11
Brown Clay & Gravel	11	116
Black Basalt	116	191
Black & Brown Basalt and Water	191	220

DEPT OF ECOLOGY Received MAR 21 2006 CENTRAL REGION OFFICE

Start Date 3/10/06 Completed Date 3/11/06

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Driller/Engineer/Trainee Name (Print) Mitch Mathews
Driller/Engineer/Trainee Signature Mitch Mathews
Driller or trainee License No. 1247

Drilling Company MATHEWS Drilling
Address 2317 Rd 10.2 NE
City, State, Zip Moses Lake, Wa 98837
Contractor's Registration No. MATHEDC117BS Date 3/11/06

If TRAINEE,
Driller's Licensed No. _____
Driller's Signature _____

Ecology is an Equal Opportunity Employer. ECY 050-1-20 (Rev 2/03)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original with Department of Ecology 72160
Second Copy - Owner's Copy
Third Copy - Driller's Copy

Near Station 19 (a)

WATER WELL REPORT

STATE OF WASHINGTON

Notice of Intent W113422
UNIQUE WELL I.D. # AET 609
Water Right Permit No.

(1) OWNER: Name Clyde Derting Address 9341 Park Creek rd Ell. Wa 98926

(2) LOCATION OF WELL: County Kittitas NW 1/4 NW 1/4 Sec 33 T 18 N.R. 20 WM

(2a) STREET ADDRESS OF WELL: (or nearest address)

TAX PARCEL NO.:

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one)
☒ New Well Method: ☐ Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐ Decommission

(5) DIMENSIONS: Diameter of well 10x6 inches
Drilled feet. Depth of completed well ft.

(6) CONSTRUCTION DETAILS
Casing Installed:
☒ Welded 6 " Diam. from 3 ft. to 111 ft.
☐ Liner installed " Diam. from ft. to ft.
☐ Threaded " Diam. from ft. to ft.

Perforations: ☐ Yes ☒ No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location
Manufacturer's Name
Type Model No.
Diam. Slot Size from ft. to ft.
Diam. Slot Size from ft. to ft.

Gravel/Filter packed: ☐ Yes ☒ No ☐ Size of gravel/sand
Material placed from ft. to ft.

Surface seal: ☒ Yes ☐ No To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 51 ft. below top of well Date 12/13/99
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: 50 gal./min. with Air lift ft. drawdown after hrs.
Yield: gal./min. with ft. drawdown after hrs.
Yield: gal./min. with ft. drawdown after hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m., Date
Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered.

MATERIAL	FROM	TO
Topsoil Br m	0	1
Cemt.gray w/cob.Brn m	1	55
Broken Basalt w/clay tan br MH	55	108
Ellis Basalt Bl MH	108	145

RECEIVED
DEC 29 1999
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work Started 12/9/99 Completed 12/13/99

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Type or Print Name Chris Hayes License No. 1908
(Licensed Driller/Engineer)

Trainee Name License No.
Drilling Company Waterman Well Drilling Inc
(Signed) License No. 1908
(Licensed Driller/Engineer)
Address 106 Berriman ln Selah Wa
Contractor's Registration No WATERWD022DB Date 12/14/99

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (360) 407-6600. The TDD number is (360) 407-6006.

ECY 050-1-20 (11/98)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Near Station 19 (b) 734

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No 083566

Water Right Permit No. 2

(1) OWNER: Name Sky Shelton Address 3130 W. Side Hiway Castle Rock, WA 98611

LOCATION OF WELL: County Kittitas SW ¼ SW ¼ Sec 33 T 18 N. R. 20 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address)

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 10" 8" 6" inches.
Drilled 142 feet. Depth of completed well 142 ft.

(6) CONSTRUCTION DETAILS:
Casing Installed: 6" Diam. from +2 ft. to 98 ft.
Welded ☒ Liner installed ☒ Threaded ☐ 4" Diam. from -82 ft. to 142 ft.
Diam. from ft. to ft.

Perforations: Yes ☒ No ☐
Type of perforator used Skill saw
SIZE of perforations 6" in. by 1/8" in.
93 perforations from -122 ft. to -142 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 80 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 12 ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: 60 gal./min. with ft. drawdown after hrs.
" Estimated air lift 60 GPM " " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Top soil brown medium	0	1
Cemented gravel cobbles black/ brown hard	1	15
Basalt gray hard	15	24
Pouris basalt black brown gray hard	24	83
Basalt gray hard	83	106
Pouris basalt gray hard	106	127
Pouris basalt gray medium/hard	127	142water
6" Drive shoe utilized		

SEP - 8 1992

Work started 8-24-92, 19. Completed 8-24, 19 92

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Ponderosa Drilling & Development, Inc.
(PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address E. 6010 Broadway Spokane, WA 99212

(Signed) Steve Mills (WELL DRILLER) (Steve Mills) License No. 1335

Contractor's Registration No. PO-ND-EI*248JE Date 8-26, 19 92

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) 1329

Station 20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. NP
Permit No.

(1) **OWNER:** Name LEE Orcutt Address

(2) **LOCATION OF WELL:** County — S ¼ SW ¼ Sec 28 T 18 N., R 20 W.M.
Bearing and distance from section or subdivision corner

(3) **PROPOSED USE:** Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one)
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☑ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 145 ft. Depth of completed well 145 ft.

(6) **CONSTRUCTION DETAILS:**
Casing installed: 6 " Diam. from 0 ft. to 60 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☑ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☑
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☑
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☑ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☑ No ☐ To what depth? 25 ft.
Material used in seal BENONITE
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level ft.
Static level 30 ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 20 gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) **WELL LOG:**
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
GRAVEL	0	15
CLAY	15	45
SOFT BASALT	45	60
MED. BASALT	60	130
SOFT BASALT WITH WATER	130	145

RECEIVED
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFC.

Work started 4-4 19 87 Completed 4-5 19 87

WELL DRILLER'S STATEMENT:

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

NAME Bach Drilling Co.
(Person, firm, or corporation) (Type or print)
Address Rt 5, Box 1010, Ellensburg
[Signed] Mike Bach
(Well Driller)
License No. 22 Date 4 19

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY-050-1-20

3

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 21

File Original and First Copy with Department of Ecology
Second Copy — Owner s Copy
Third Copy — Driller s Copy 42995

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No W058320
UNIQUE WELL I D # ABL 772
Water Right Permit No

OWNER Name Robert Weber Address 3846 Del-Mar Ave Fair Oaks Calif 95650

(2) LOCATION OF WELL County Kittitas SW 1/4 NW 1/4 Sec 28 T 18 N R 20 E WM

(2a) STREET ADDRESS OF WELL (or nearest address) Corner of Fox and Lyons Rd Ellensburg

(3) PROPOSED USE [X] Domestic [X] Irrigation [ ] DeWater [ ] Industrial [ ] Test Well [ ] Municipal [ ] Other

(4) TYPE OF WORK Owner s number of well (If more than one)
Abandoned [ ] New well [X] Deepened [ ] Reconditioned [ ] Method Dug [ ] Cable [ ] Rotary [X] Bored [ ] Driven [ ] Jetted [ ]

(5) DIMENSIONS Diameter of well 6 inches
Drilled 160 feet Depth of completed well 160 ft

(6) CONSTRUCTION DETAILS
Casing installed 6" Diam from +2 ft to 115 ft
Welded [X] Liner installed [X] Threaded [ ] 4 1/2 Diam from -10 ft to 160 ft
Diam from ft to ft

Perforations Yes [ ] No [X]
Type of perforator used
SIZE of perforations in by in
perforations from ft to ft
perforations from ft to ft
perforations from ft to ft

Screens Yes [ ] No [X]
Manufacturer s Name
Type Model No
Diam Slot size from ft to ft
Diam Slot size from ft to ft

Gravel packed Yes [ ] No [X] Size of gravel
Gravel placed from ft to ft

Surface seal Yes [X] No [ ] To what depth? 18 ft
Material used in seal Bentonite
Did any strata contain unusable water? Yes [ ] No [ ]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP Manufacturer s Name
Type H P

(8) WATER LEVELS Land surface elevation above mean sea level ft
Static level 37 ft below top of well Date 3-27-95
Artesian pressure lbs per square inch Date
Artesian water is controlled by (Cap valve etc)

(9) WELL TESTS Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [ ] If yes by whom?
Yield gal /min with ft drawdown after hrs

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal /min with ft drawdown after hrs
Airtest 16 gal /min with stem set at 155 ft for 1 hrs
Artesian flow g p m Date
Temperature of water Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation Describe by color character size of material and structure and show thickness of aquifers and the kind and nature of the material in each stratum penetrated with at least one entry for each change of information

MATERIAL	FROM	TO
Top Soil	0	3
Clay & gravel	3	36
Sandy Clay	36	53
gravel & Clay	53	67
Sandy Clay	67	81
Tightly Cemented gravel	81	94
gravel & Clay	94	114
Basalt	114	138
Fractured Basalt & Water	138	160

RECEIVED
MAY 31 1995
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Work Started 3-25 19 Completed 3-27 19 95

WELL CONSTRUCTOR CERTIFICATION

I constructed and/or accept responsibility for construction of this well and its compliance with all Washington well construction standards Materials used and the information reported above are true to my best knowledge and belief

NAME MATHEWS Drilling (PERSON FIRM OR CORPORATION) (TYPE OR PRINT)
Address 9455 Stone Crest Rd. Mt.
(Signed) Mitch Mathews (WELL DRILLER) License No 1267
Contractor s Registration No MATHEDC117BC Date 19 95

(USE ADDITIONAL SHEETS IF NECESSARY)

ECL 050 1 20 (2/93) f

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Station 22

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

Construction/Decommission ("x" in circle) 361714

☒ Construction

○ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

CURRENT

Notice of Intent No. W-212001

Unique Ecology Well ID Tag No. ALC-828

Water Right Permit No. _____

Property Owner Name JEFF RAPP

Well Street Address KITTITAS HWY

City E-BURG County KITTITAS

Location NE 1/4-1/4/NW 1/4 Sec 04 Twn 17 R 19 (EWM or WWM) circle one

Lat/Long (s, t, r Still **REQUIRED**) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____

Tax Parcel No. 17190401O-00002

PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☒ New well ☐ Reconditioned ☐ Deepened *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 192 ft. Depth of completed well 192 ft.

CONSTRUCTION DETAILS

Casing Installed: ☒ Welded 6" Diam. from +2 ft. to 138 ft.

☒ Liner installed 4½" Diam. from 130 ft. to 192 ft.

☐ Threaded _____" Diam. from _____ ft. to _____ ft.

Perforations: ☒ Yes ☐ No

Type of perforator used SKILSAW

SIZE of perfs 9 in. by ¼ in. and no. of perfs 30 from 140 ft. to 192 ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☒ No ☐ Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 20 ft.

Material used in seal BENTONITE

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level 46 ft. below top of well Date 11/10/05

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level.

Was a pump test made? ☐ Yes ☒ No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level).

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 20 gal./min. with stem set at 180 ft. for 2 hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☒ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
DIRT	0	2
BOULDERS & GRAVEL	2	18
GRAVEL	18	31
BROWN CLAY & GRAVEL	31	44
BROWN CLAY	44	161
BROWN SANDSTONE	161	184
BROWN SANDSTONE	184	192
GRAVEL & WATER		

RECEIVED

NOV 17 2009

DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

Start Date 11/8/05 Completed Date 11/10/05

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☐ Driller ☐ Engineer ☐ Trainee Name (Print) CRAIG WAMSLEY

Driller/Engineer/Trainee Signature _____

Driller or trainee License No. 2428

Drilling Company HIDDEN RIVERS DRILLING INC

Address P.O. BOX 891

City, State, Zip SELAH, WA 98942

Contractor's Registration No. HIDDER9590K Date 11/10/05

If TRAINEE, Driller's Licensed No. _____

Driller's Signature _____

Ecology is an Equal Opportunity Employer.

The Department of Ecology does NOT warranty the Data and/or Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Appendix B
Water Level Plots

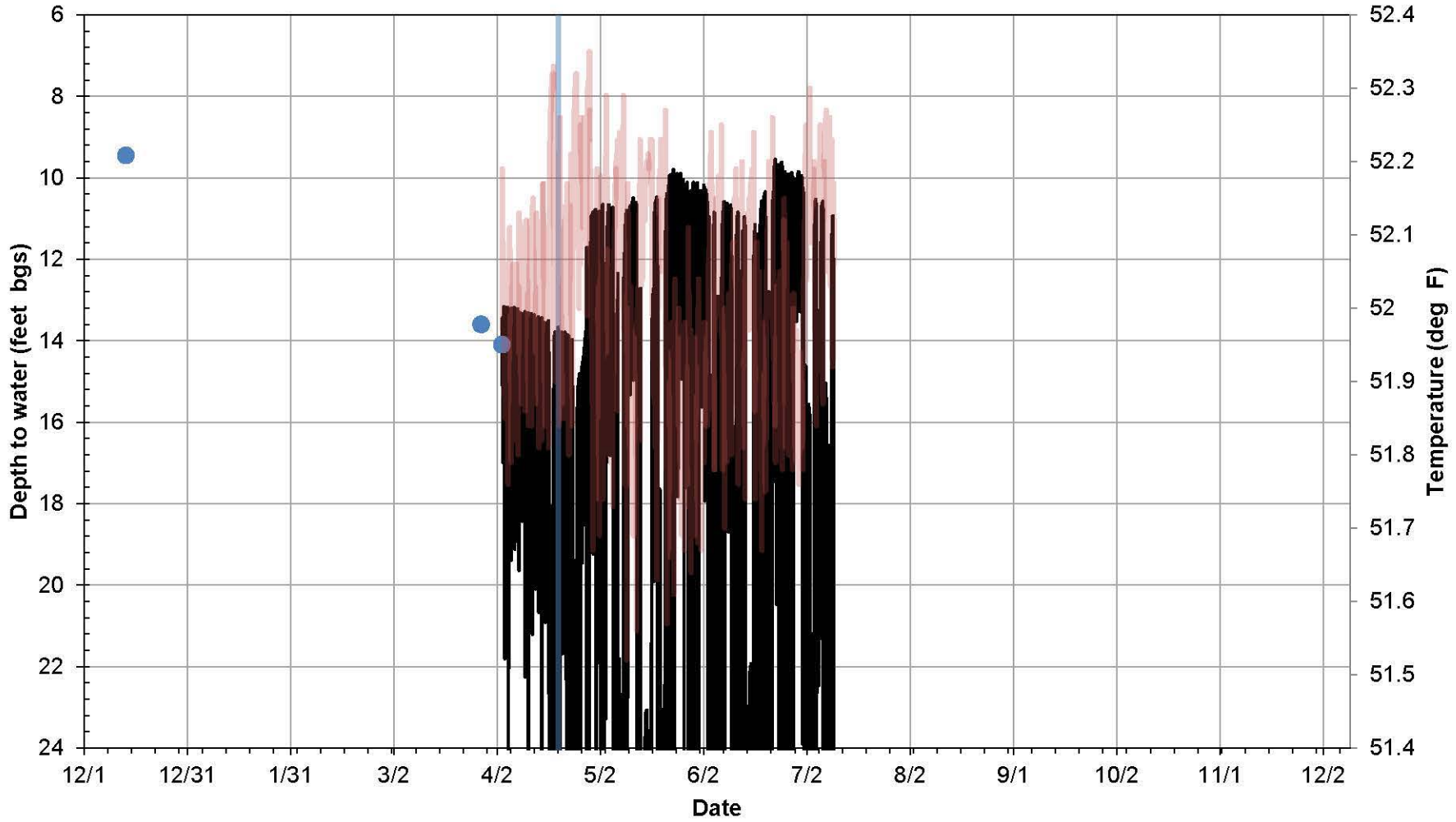
Table of Contents

Figure B-1	Station 1 Well Hydrograph
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Figure B-5	Station 5 Well Hydrograph
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Figure B-7	Station 7 Well Hydrograph
Figure B-8	Station 8 Well Hydrograph
Figure B-9	Station 9 Well Hydrograph
Figure B-10	Station 10 Well Hydrograph
Figure B-11	Station 11 Well Hydrograph
Figure B-12	Station 13 Well Hydrograph
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Figure B-15	Station 18 Well Hydrograph
Figure B-16	Station 19 Well Hydrograph
Figure B-17	Station 20 Well Hydrograph
Figure B-18	Station 21 Well Hydrograph
Figure B-19	Station 22 Well Hydrograph
Figure B-20	Nested Wells (Stations 7 & 14)
Figure B-21	Nested Wells (Stations 2 & 13)
Figure B-22	Nested Wells (Stations 6 & 22)
Figure B-23	Nested Wells (Stations 4 & 5)

No hydrograph was plotted for Station 12 because only one water level measurement was collected (Table 1).

Stations 15 and 16 were temporary weir installations.

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**Completed 82 feet bgs , open boring 78 to 82 feet bgs (assumed Upper Ellensburg Formation)

Golder Associates

LEGEND

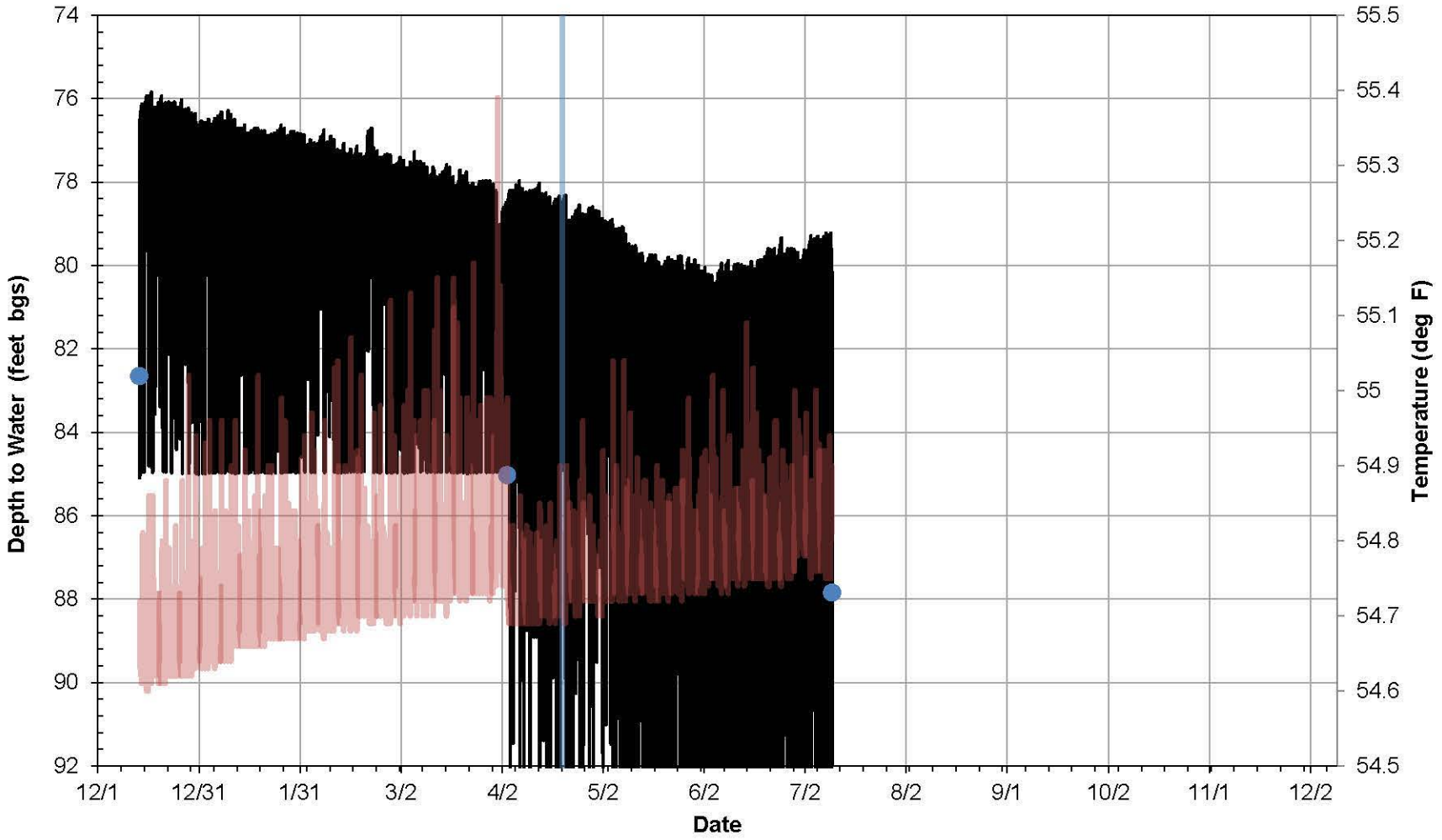
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-1**

STATION 1 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 250 feet bgs , open boring 231 to 250 feet bgs (assumed Upper Ellensburg Formation; fractured Basalt from 207 to 231 feet bgs)

Golder Associates

LEGEND

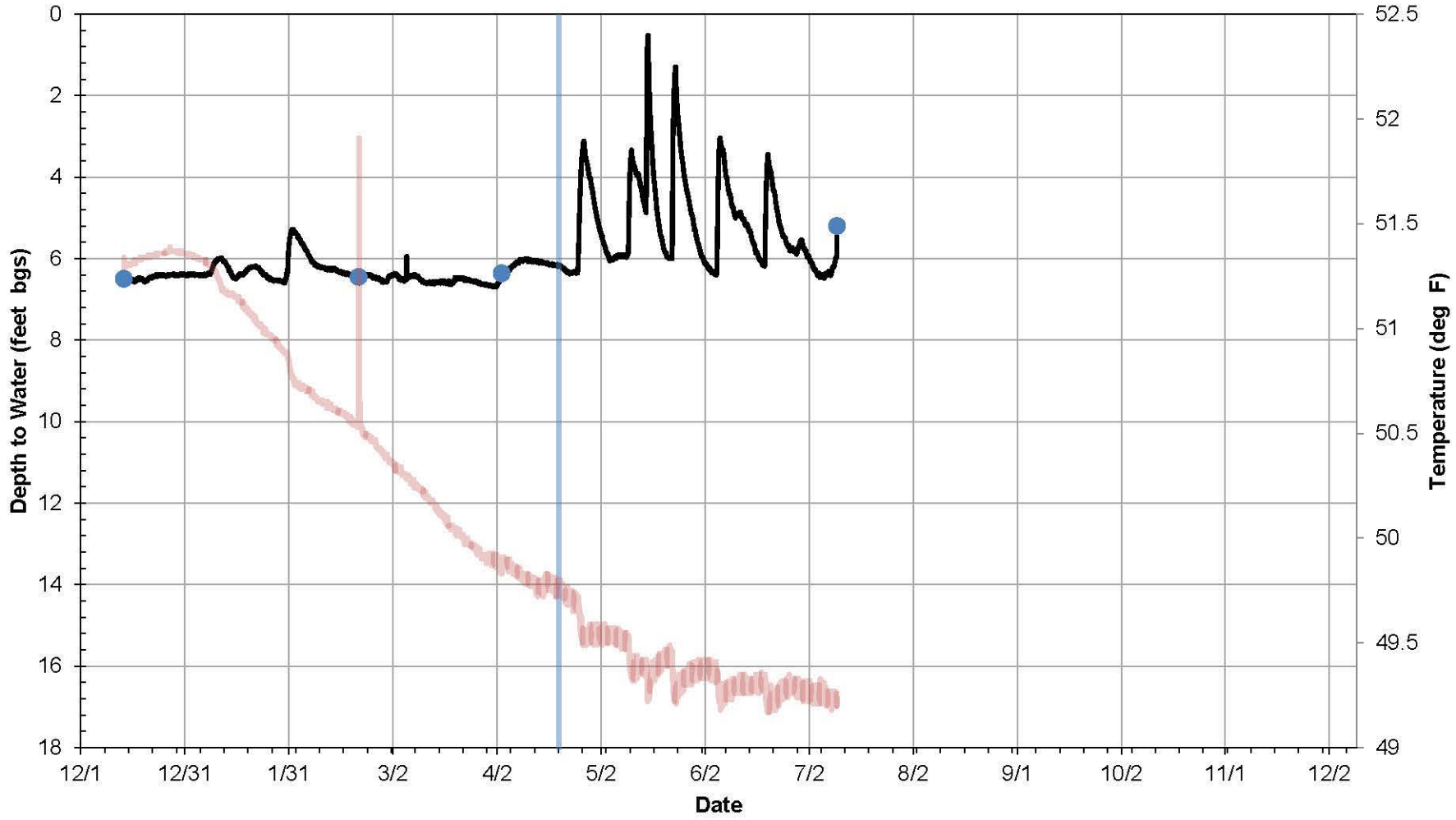
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-2**

STATION 2 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 64 feet bgs (assumed alluvium/ Upper Ellensburg Formation)

Golder Associates

LEGEND

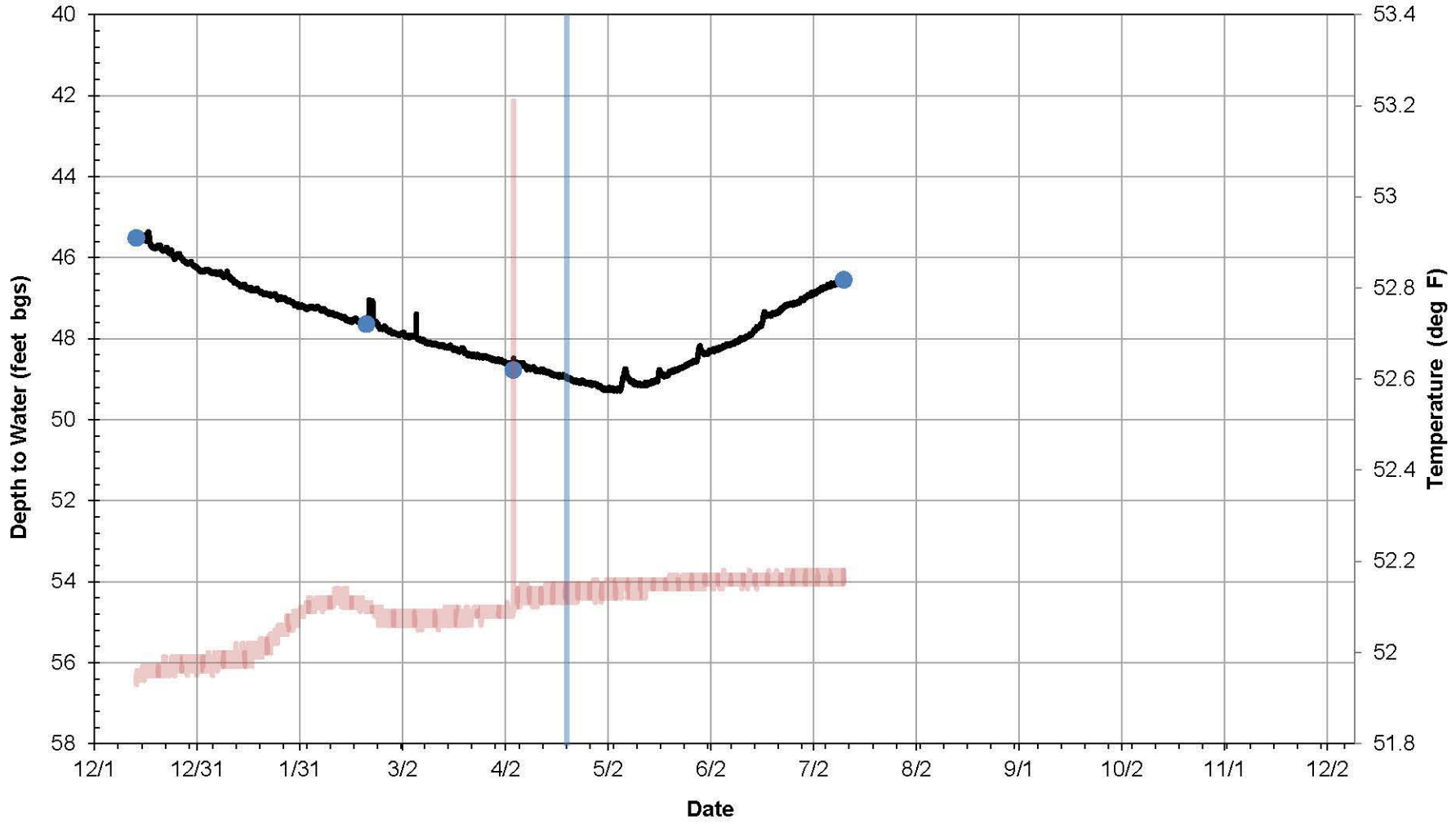
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-3**

STATION 3 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 99 feet bgs (assumed fractured basalt /Ellensburg Formation interbed)

Golder Associates

LEGEND

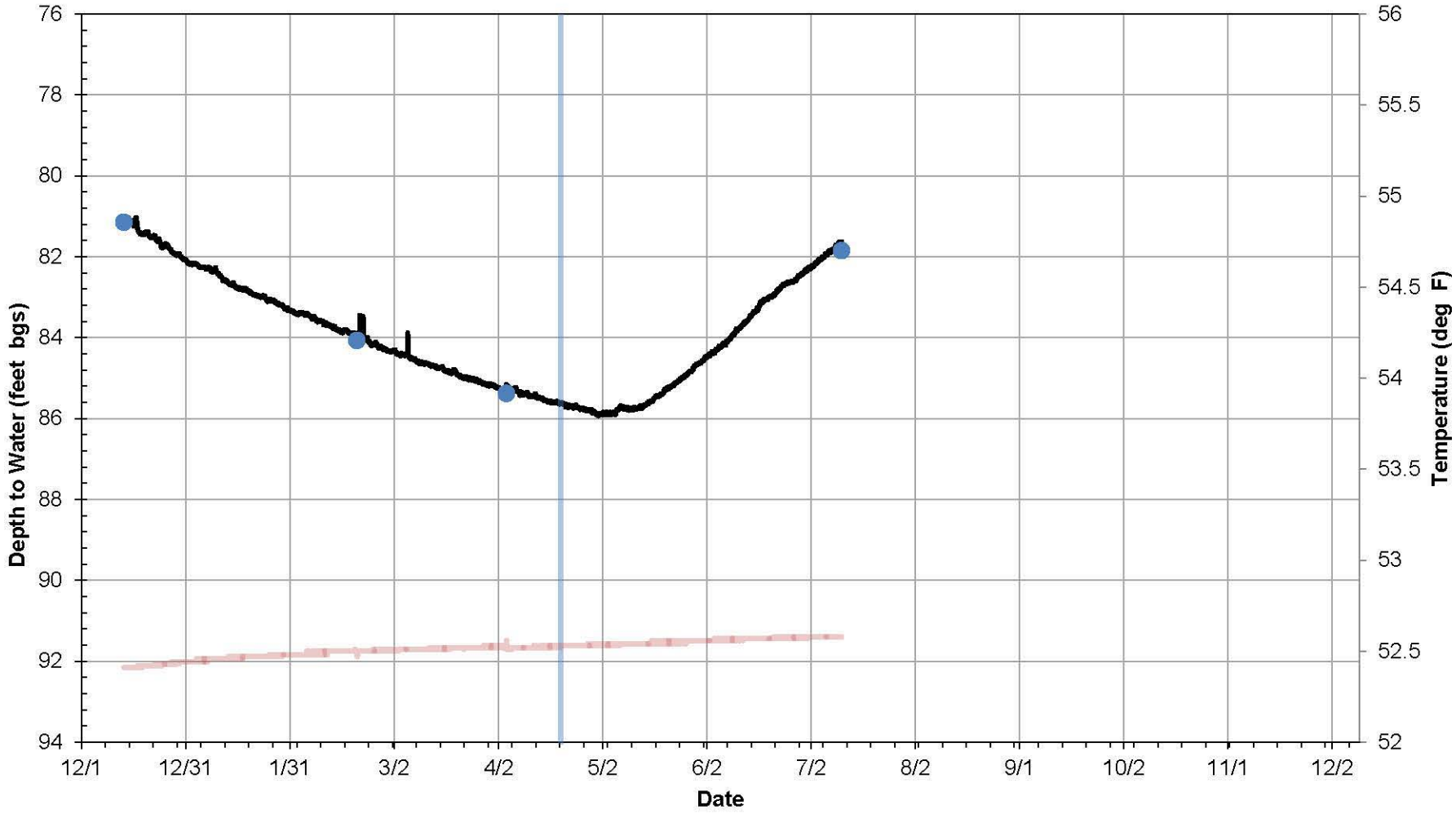
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-4**

STATION 4 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 239 feet bgs , screened 199 - 239 feet bgs (assumed fractured basalt /Ellensburg Formation interbed)

Golder Associates

LEGEND

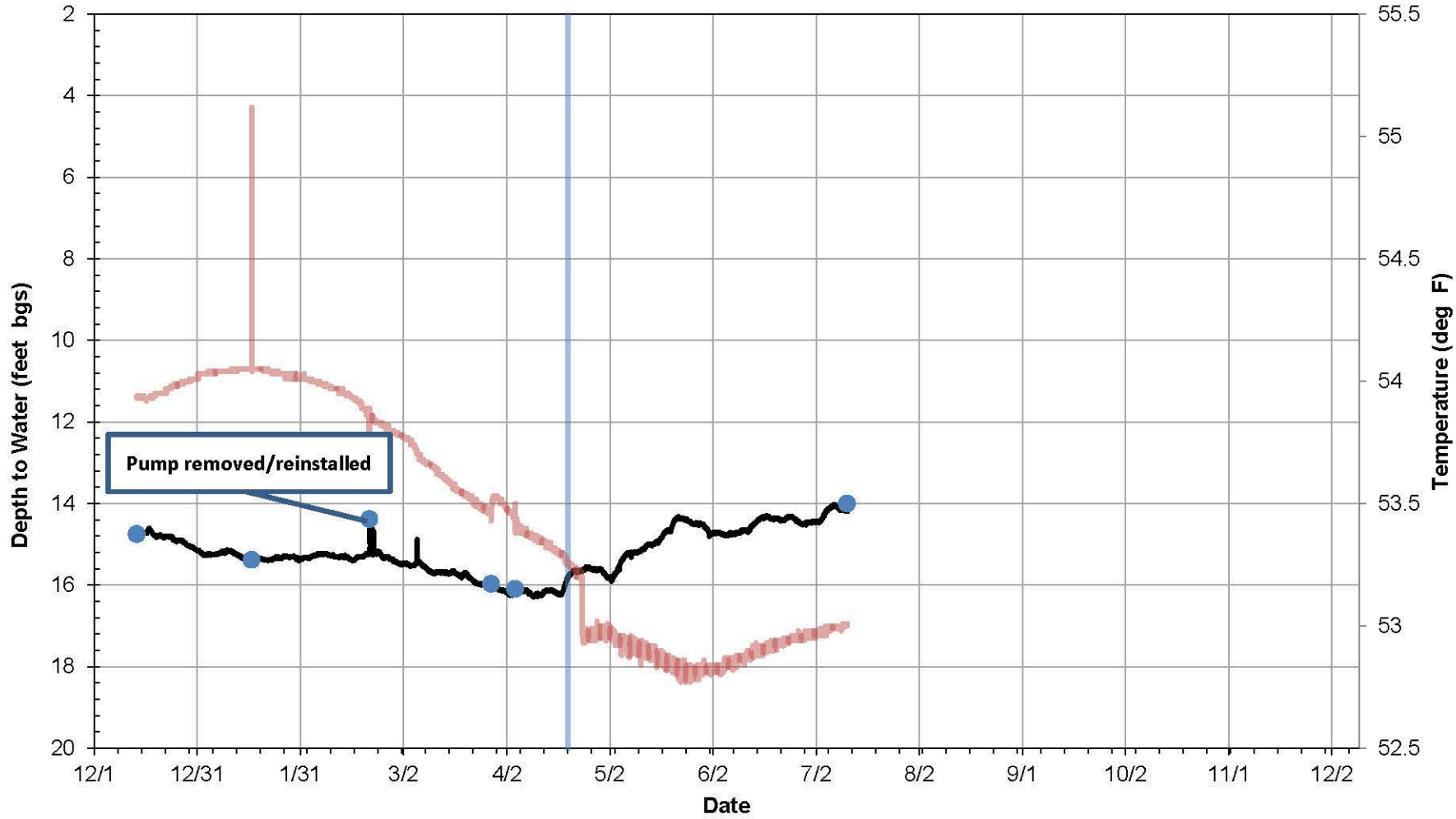
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-5**

STATION 5 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 65 feet bgs , open boring 52 to 65 feet bgs (assumed Upper Ellensburg Formation)

Golder Associates

LEGEND

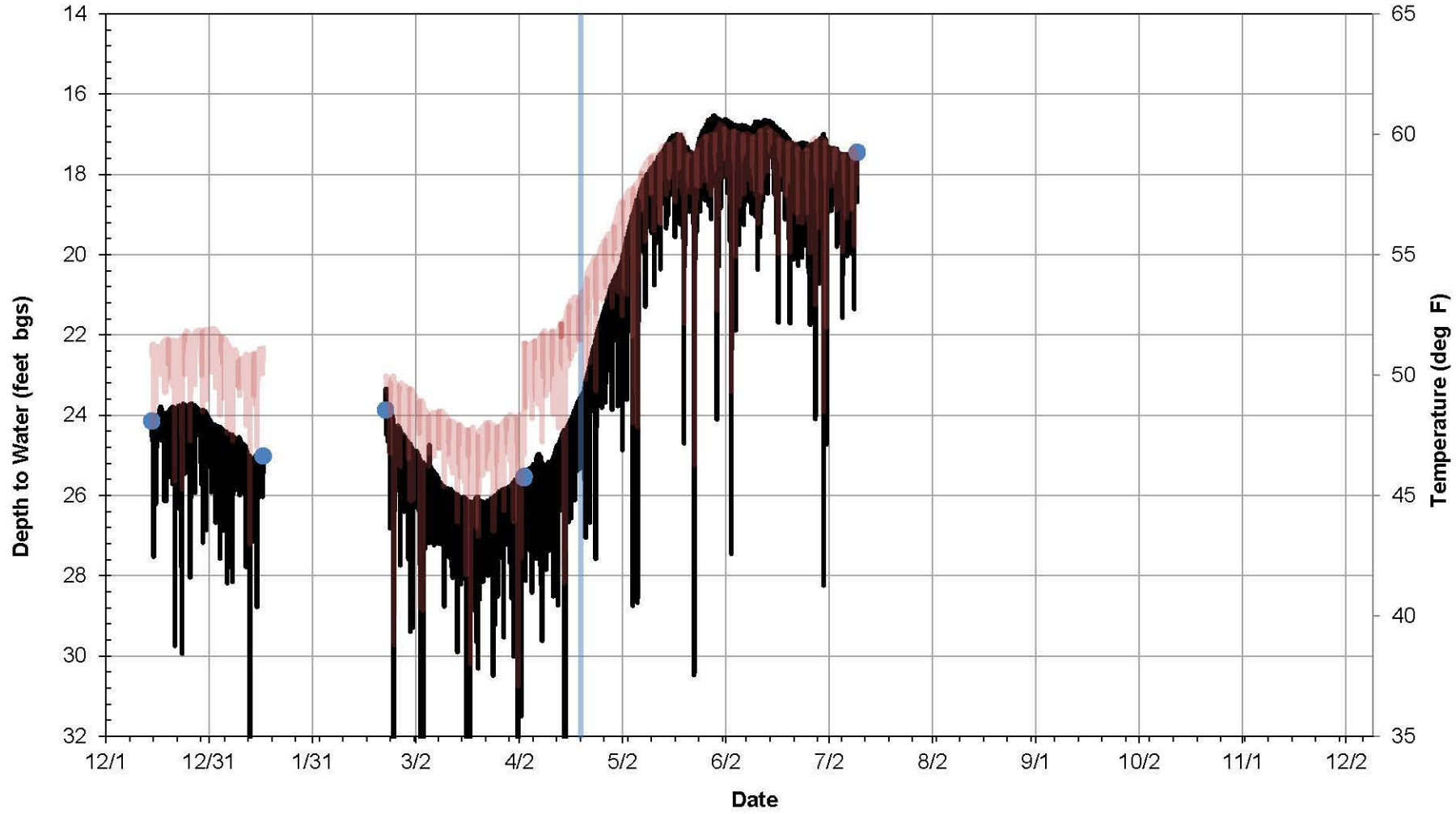
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-6**

STATION 6 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed depth unknown, owner estimates 120 feet bgs (assumed alluvium/ Upper Ellensburg Formation)

Golder Associates

LEGEND

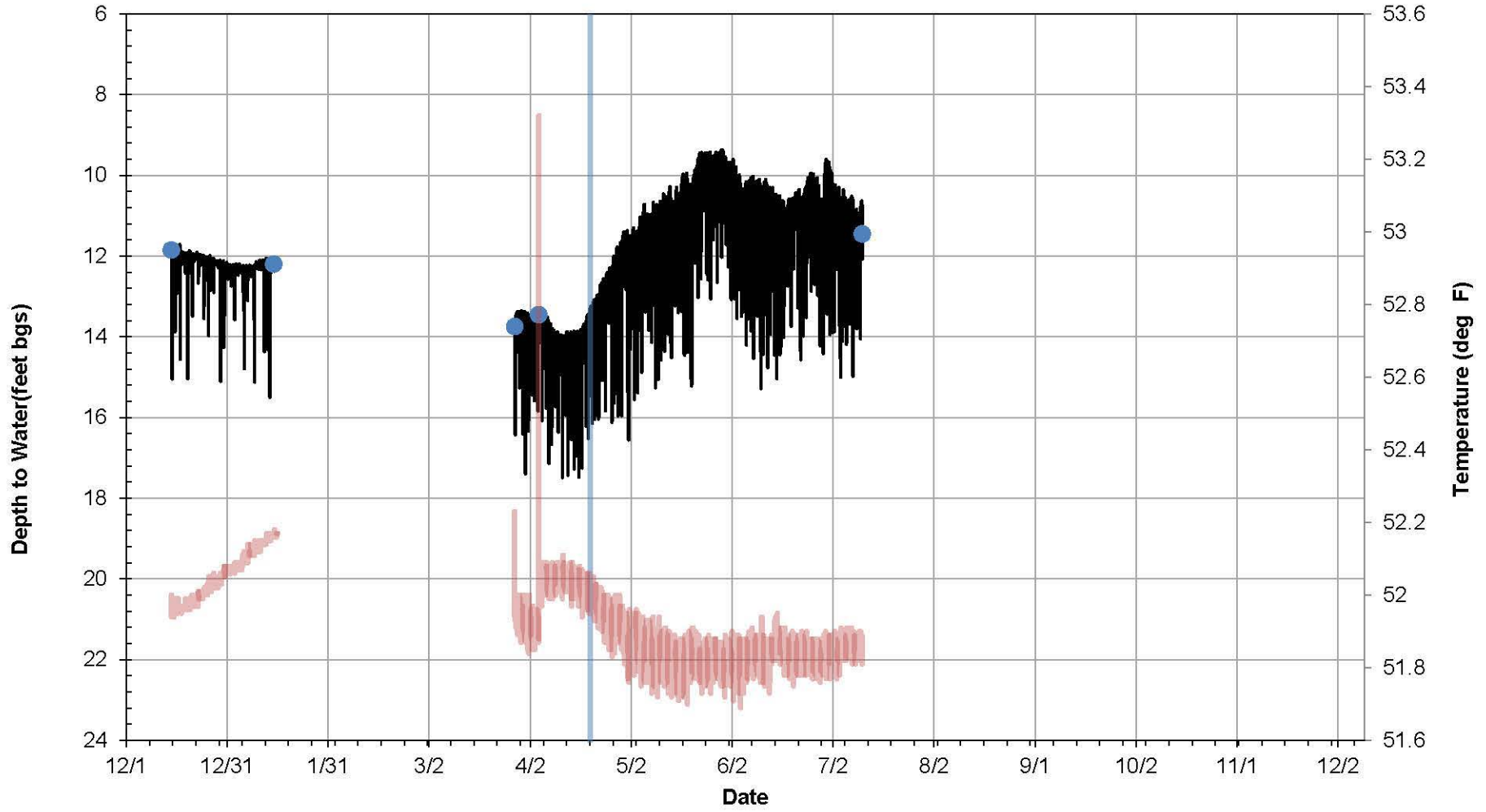
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-7**

STATION 7 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 117 feet bgs , open boring 115 to 117 feet bgs (assumed Upper Ellensburg Formation)

LEGEND

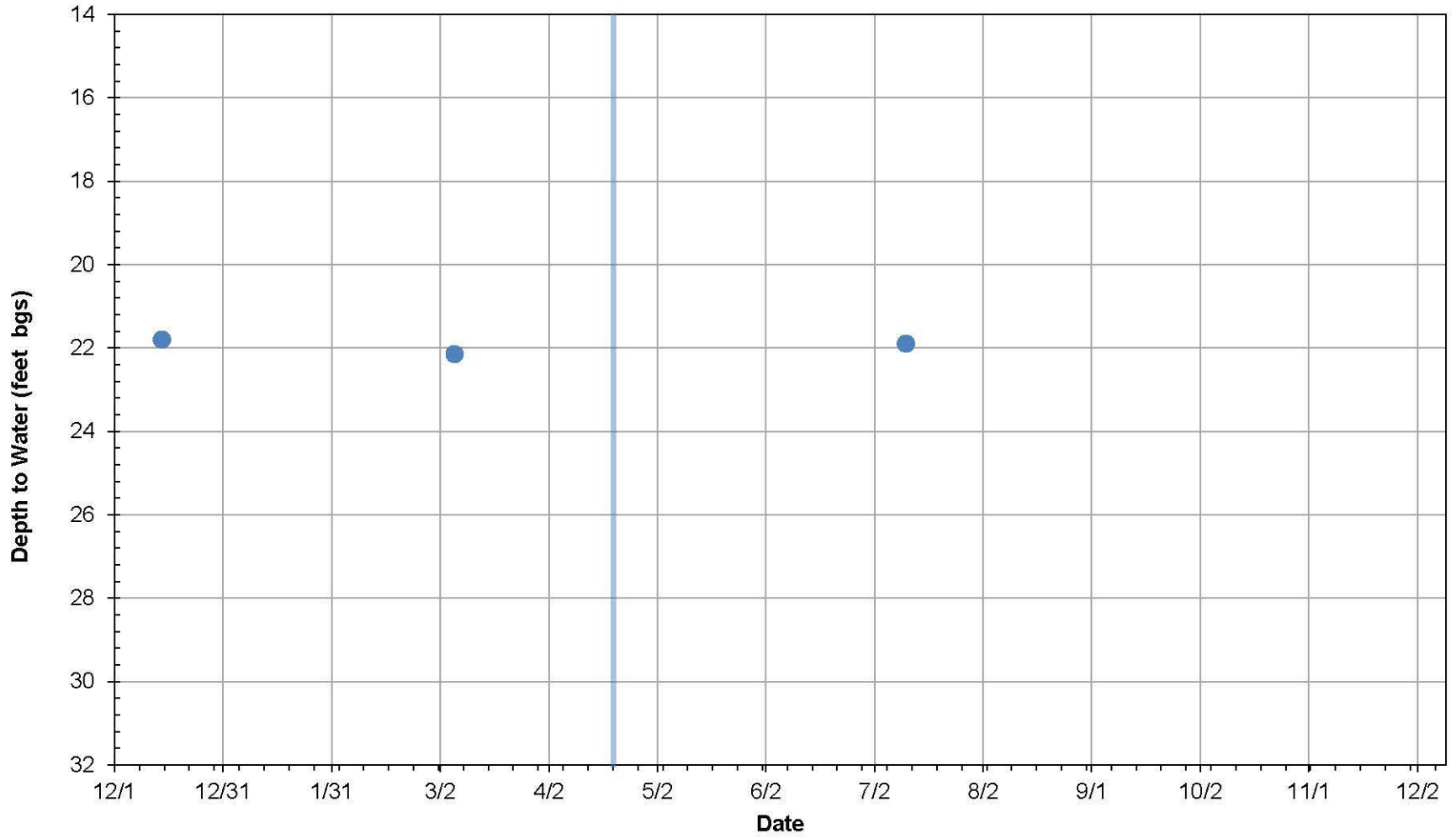
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-8**

STATION 8 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 70 feet bgs (assumed Upper Ellensburg)

Golder Associates

LEGEND

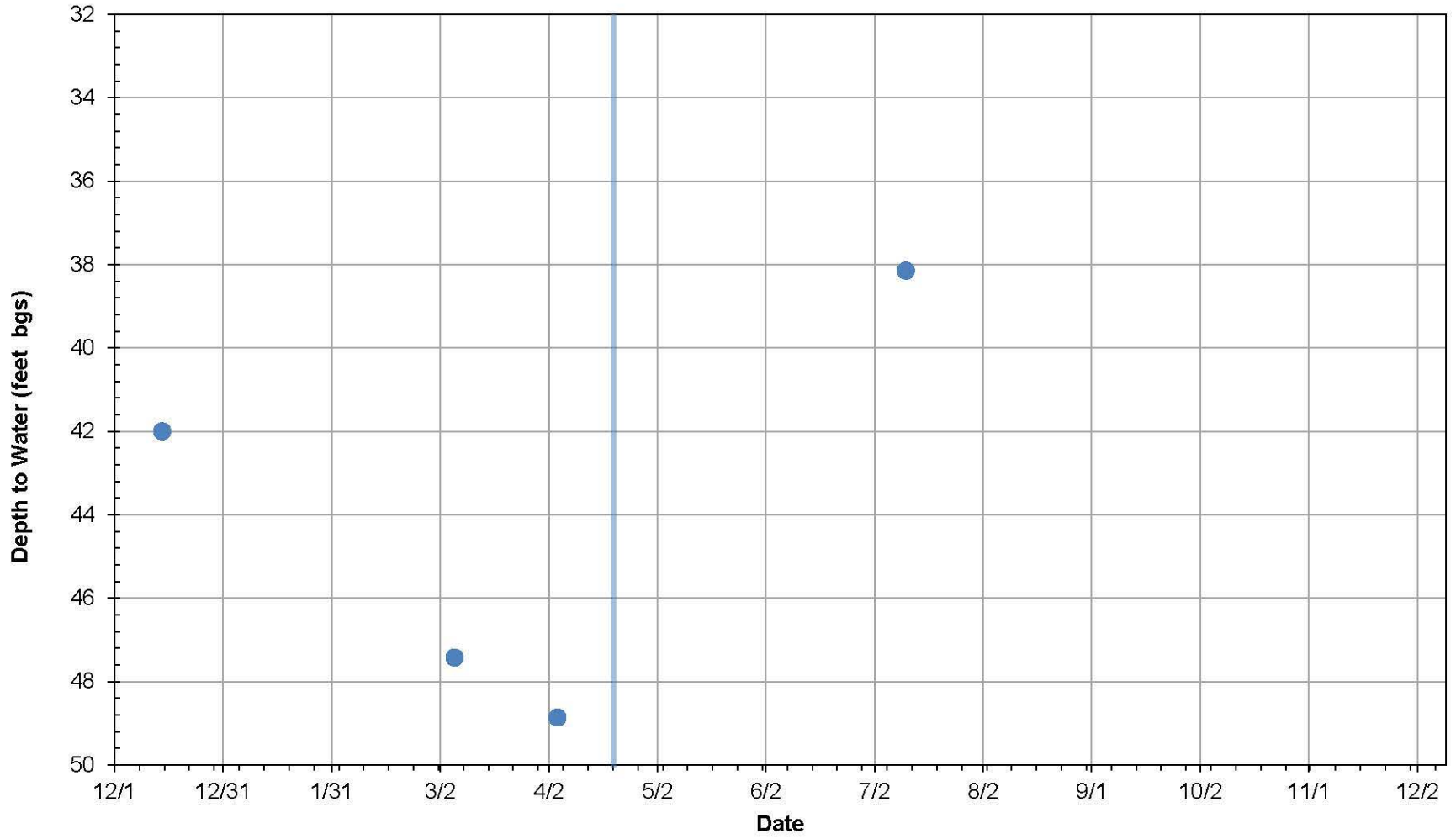
- Manual Measurements
- KRD Canal Turn On/Off

FIGURE **B-9**

STATION 9 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 80 feet bgs , screened 40 to 80 feet bgs (fractured basalt from 27 to 80 feet bgs)

LEGEND

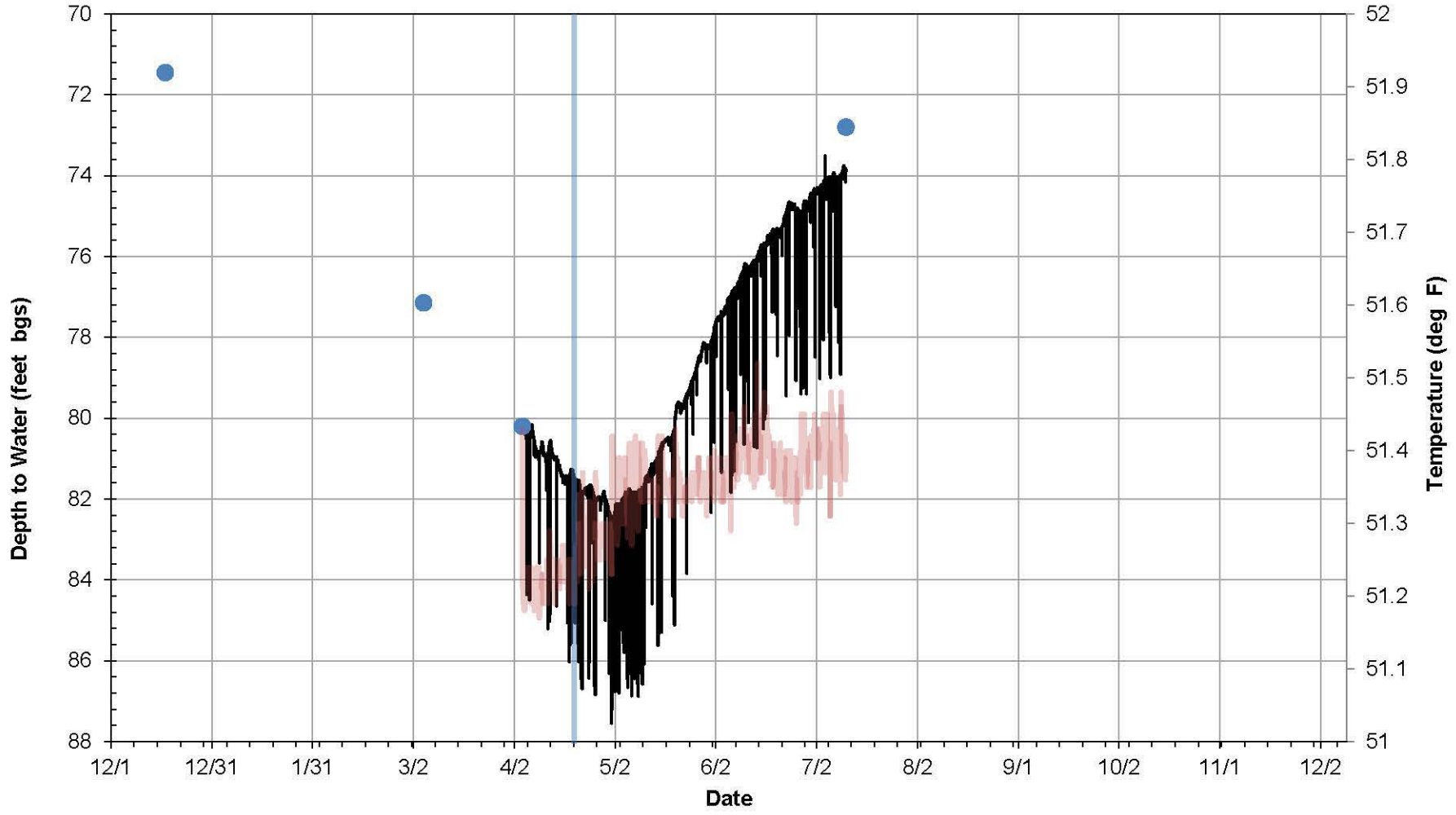
- Manual Measurements
- KRD Canal Turn On/Off

FIGURE **B-10**

STATION 10 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 182 feet bgs , screened 142 to 182 feet bgs (fractured basalt; basalt from 47 to 182)

Golder Associates

LEGEND

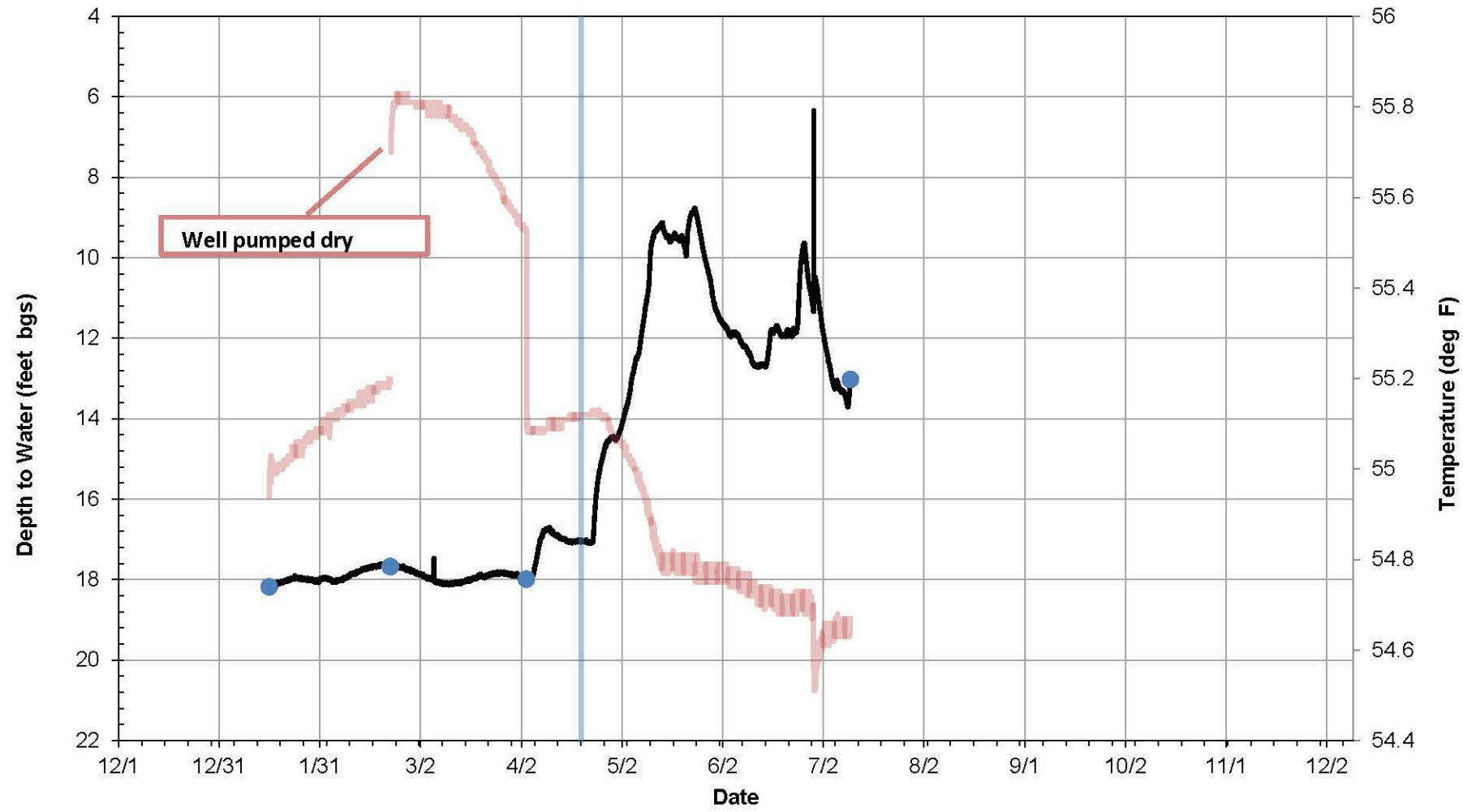
- Water Level
- Manual Measurements
- Water Temperature
- KRD Canal Filled

FIGURE **B-11**

STATION 11 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 43 feet bgs (assumed Upper Ellensburg Formation)

Golder Associates

LEGEND

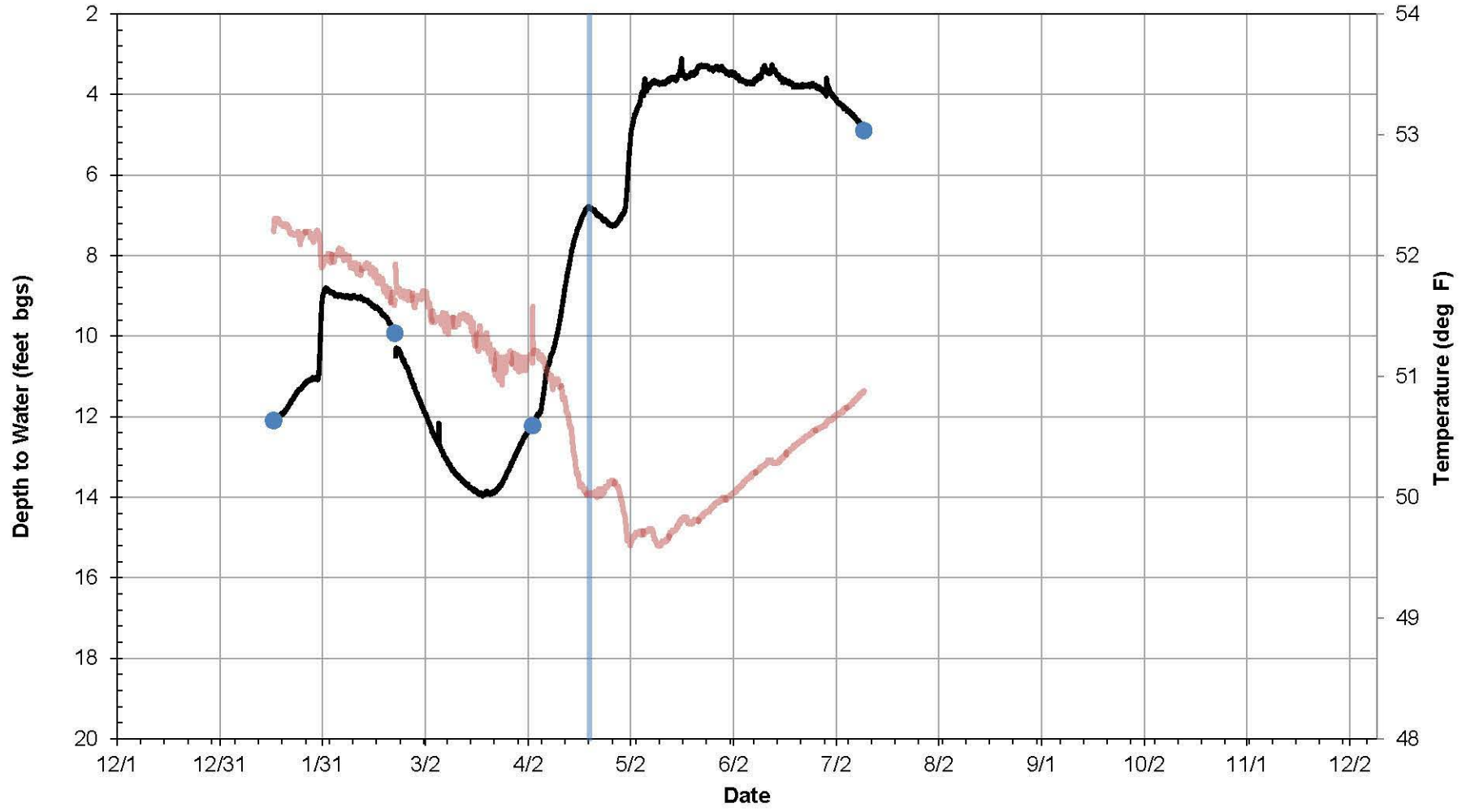
- Water Level Elevation
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-12**

STATION 13 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**3 ft diameter dug well, completed 17 feet bgs (assumed

LEGEND

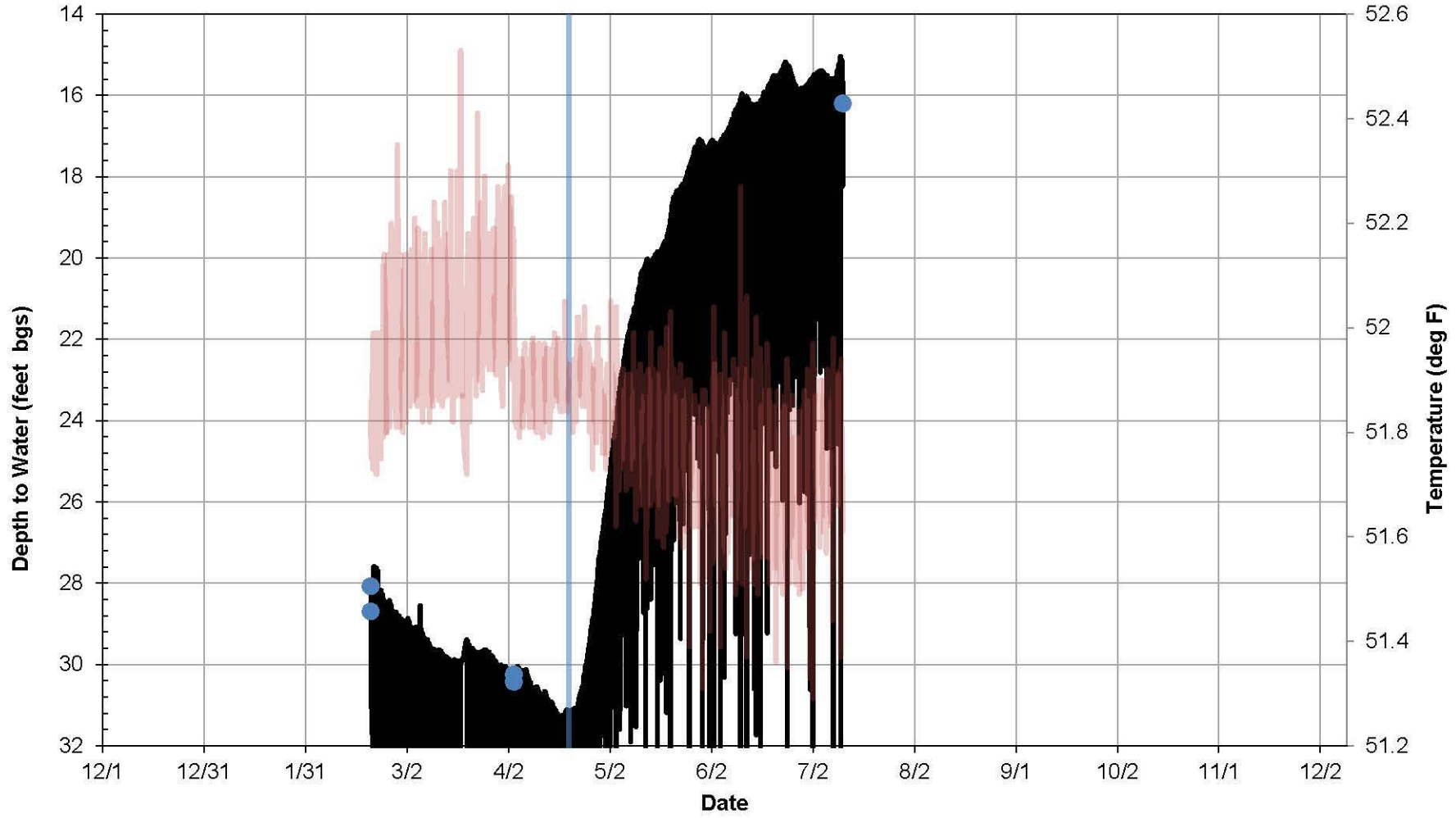
- Water Level Elevation
- Manual Measurements
- KRD Canal Filled
- Water Temperature (deg F)

FIGURE **B-13**

STATION 14 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 160 feet bgs (fractured basalt; basalt from 114 feet bgs)

Golder Associates

LEGEND

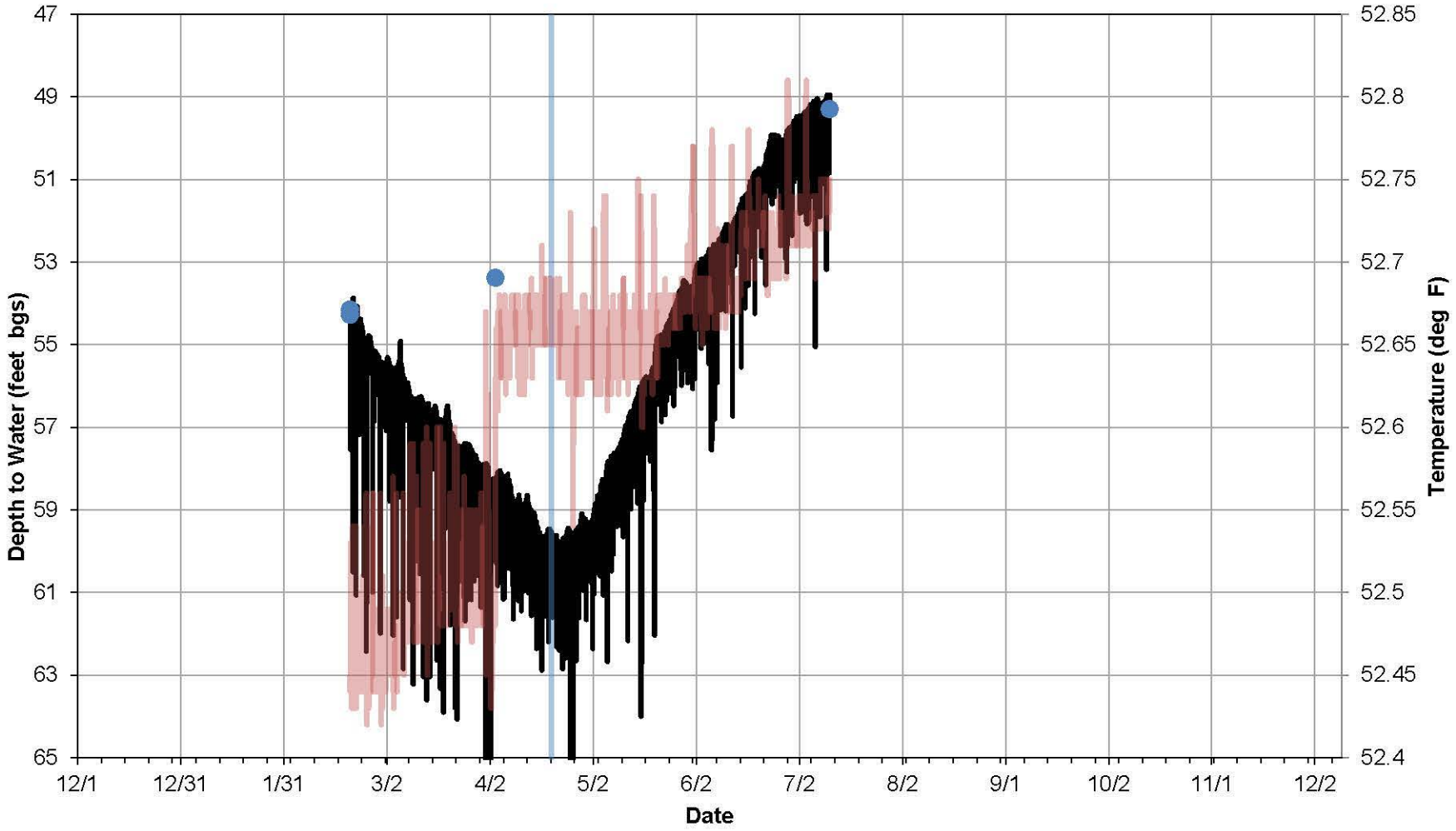
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-14**

STATION 17 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 220 feet bgs (fractured basalt; basalt from 116 feet bgs)

Golder Associates

LEGEND

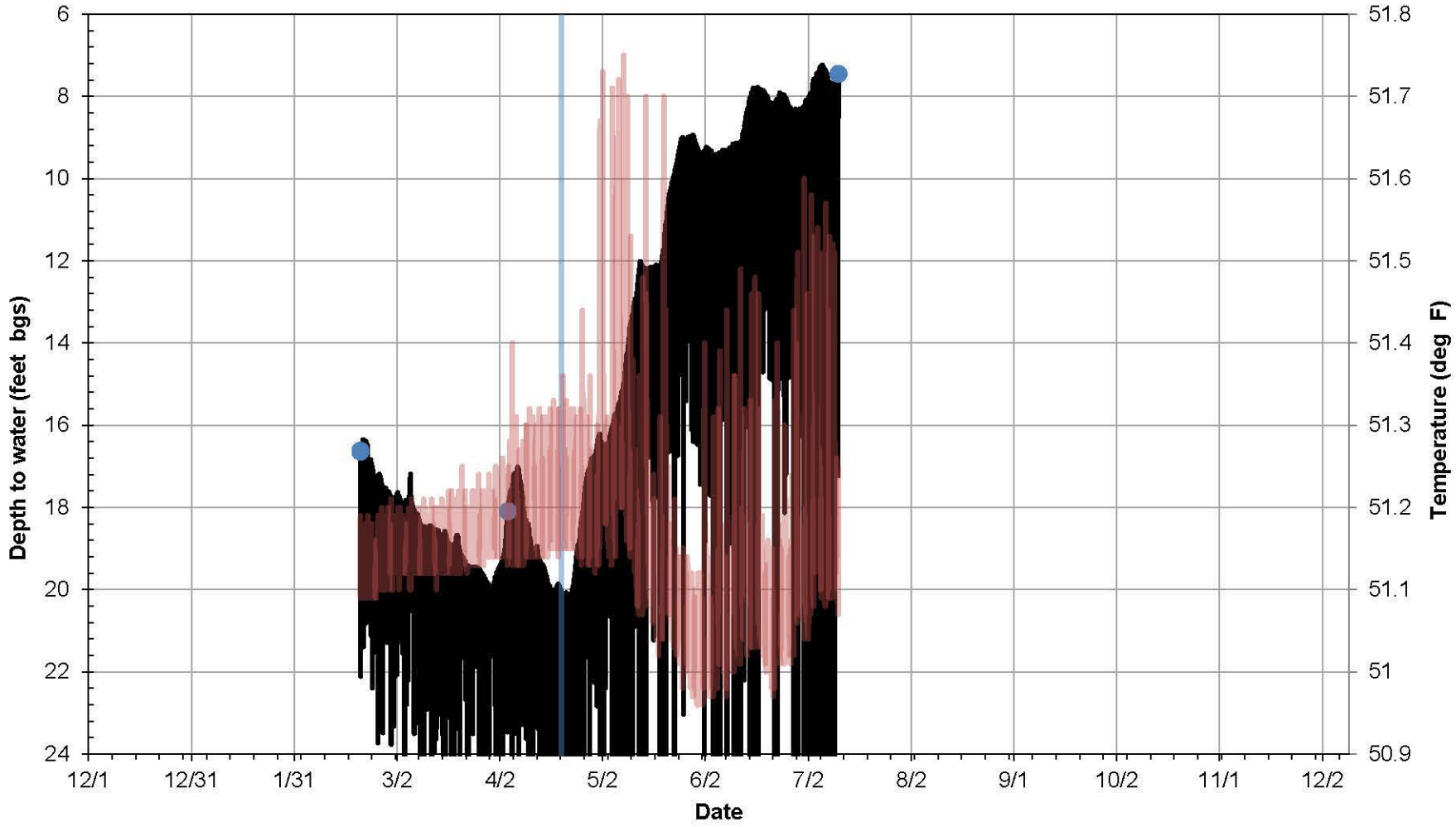
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-15**

STATION 18 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed depth unknown, owner estimates 120 feet bgs, likely corresponding to fractured basalt

Golder Associates

LEGEND

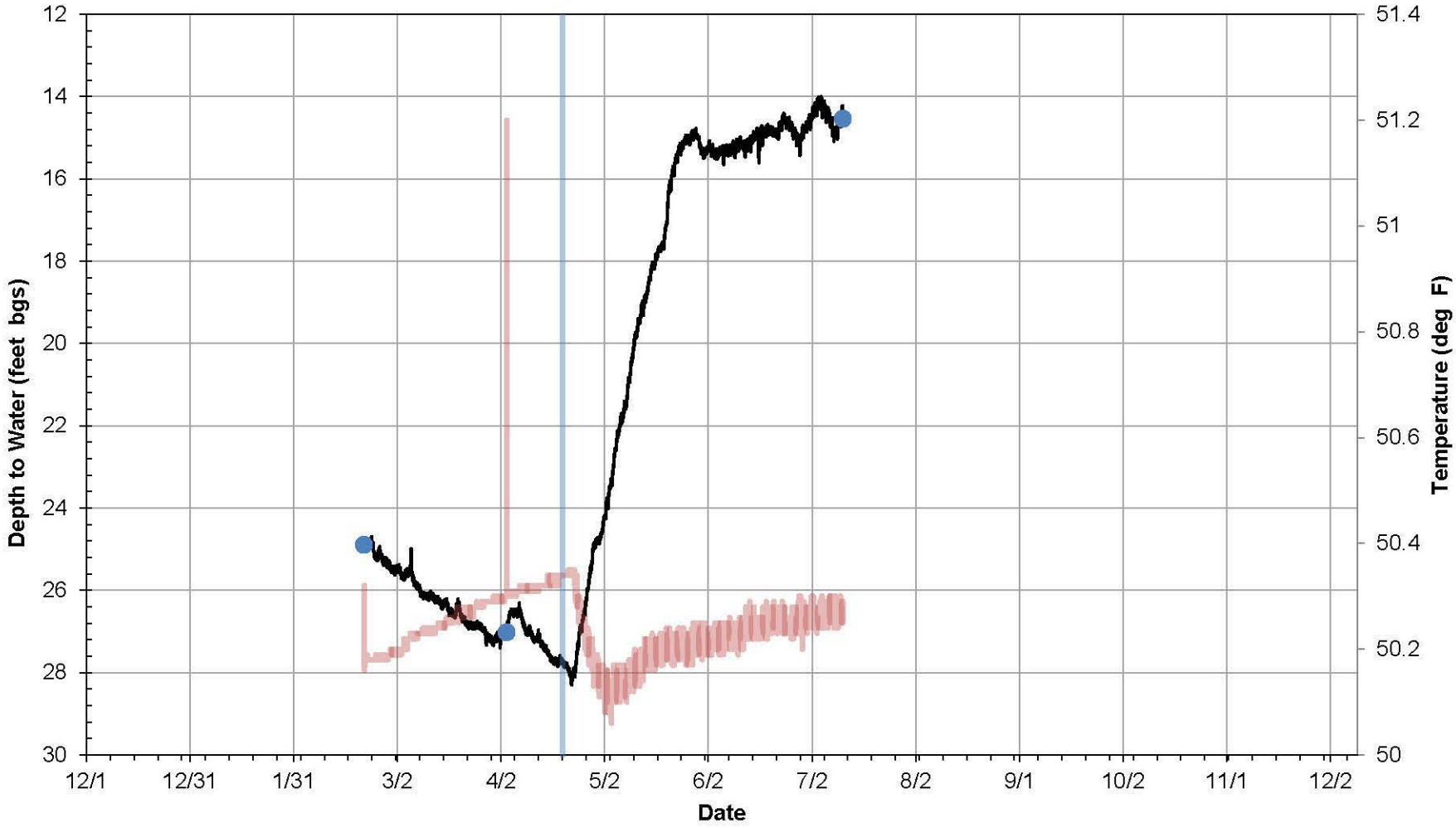
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-16**

STATION 19 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 145 feet bgs , open boring 60 to 145 feet bgs (fractured basalt; basalt from 45 to 145 feet bgs)

Golder Associates

LEGEND

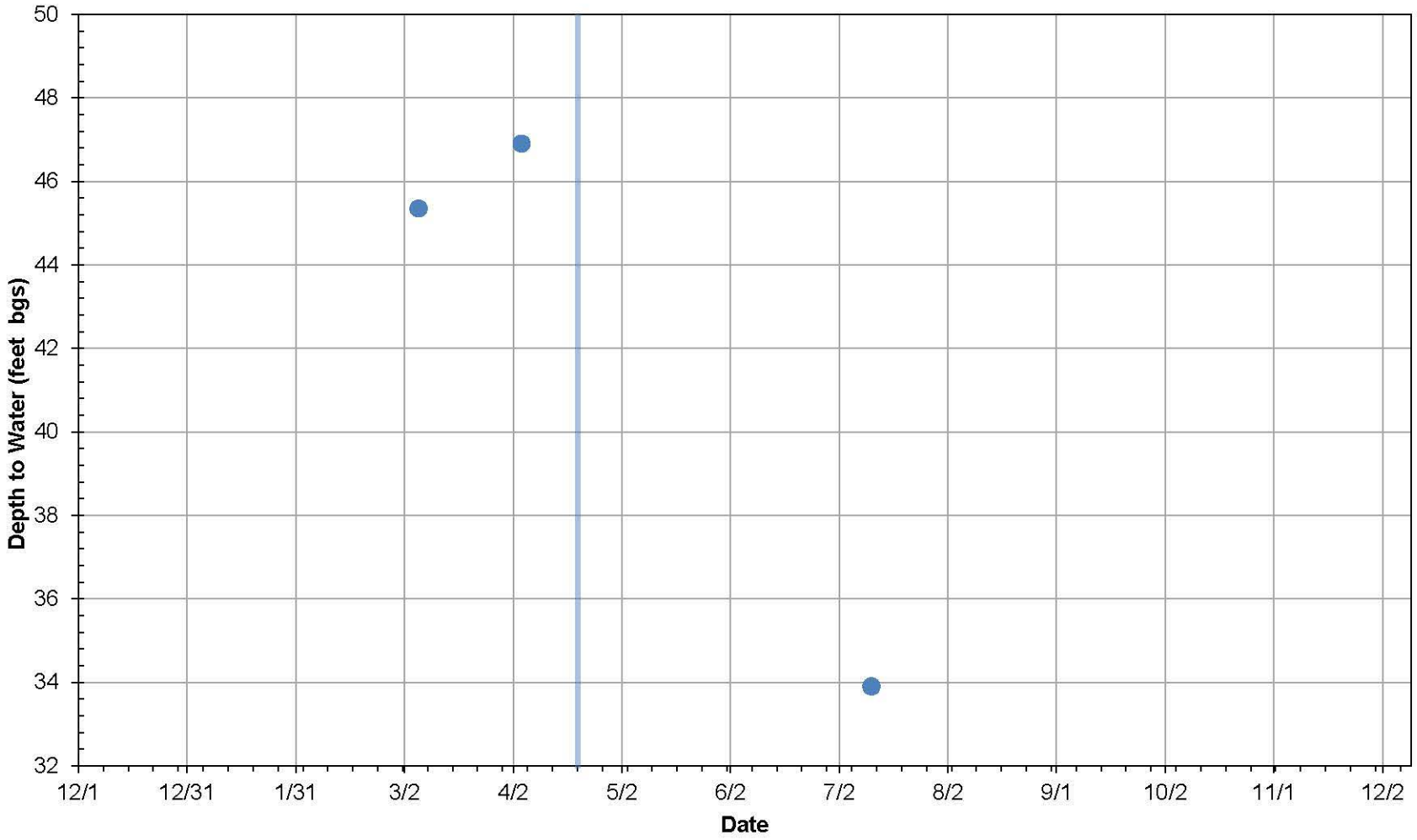
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-17**

STATION 20 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 120 feet bgs (assumed Upper Ellensburg Formation)

LEGEND

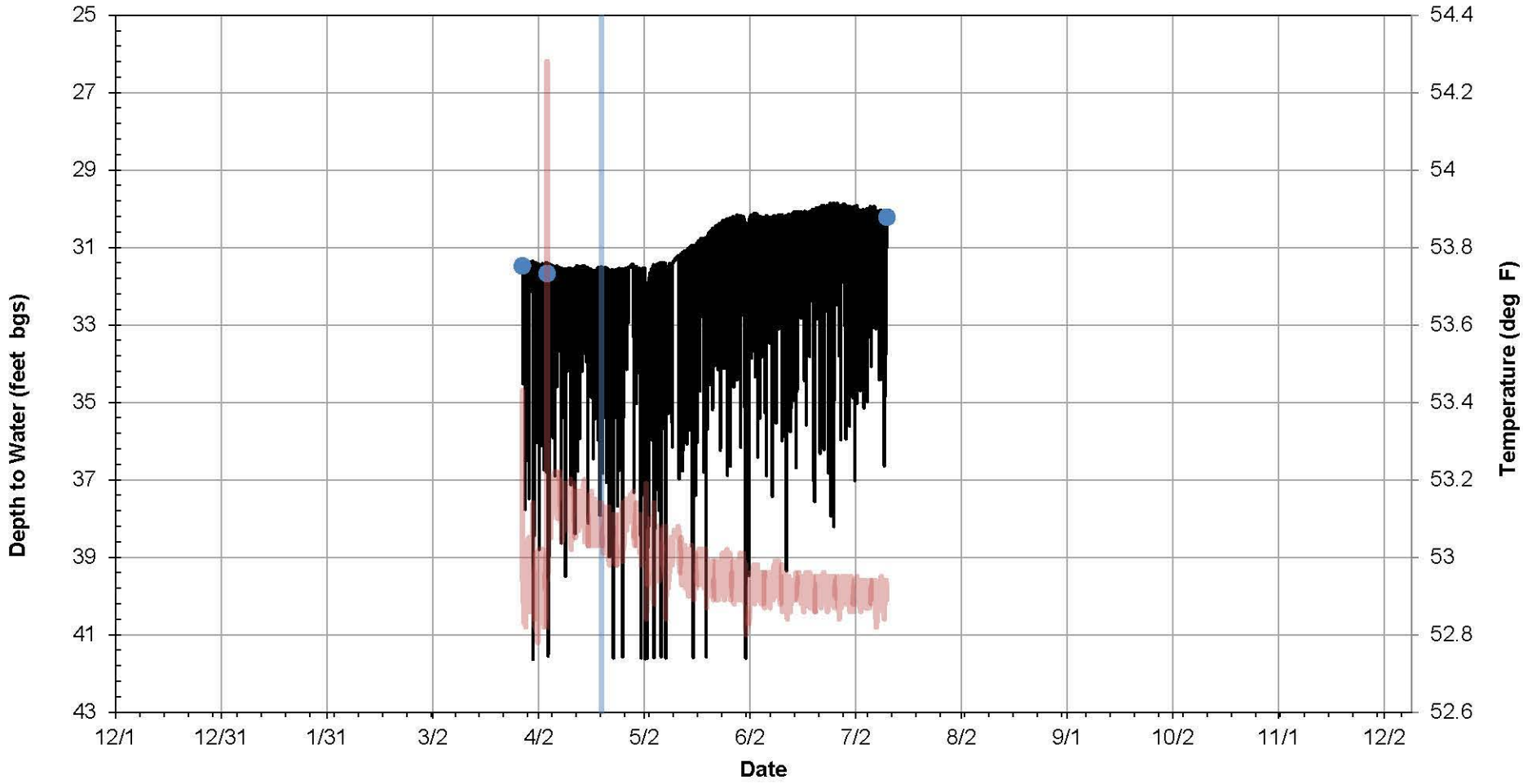
- Manual Measurements
- KRD Canal Filled

FIGURE **B-18**

STATION 21 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



**Completed 192 feet bgs , screened 140 to 192 feet bgs (assumed Upper Ellensburg Formation)

Golder Associates

LEGEND

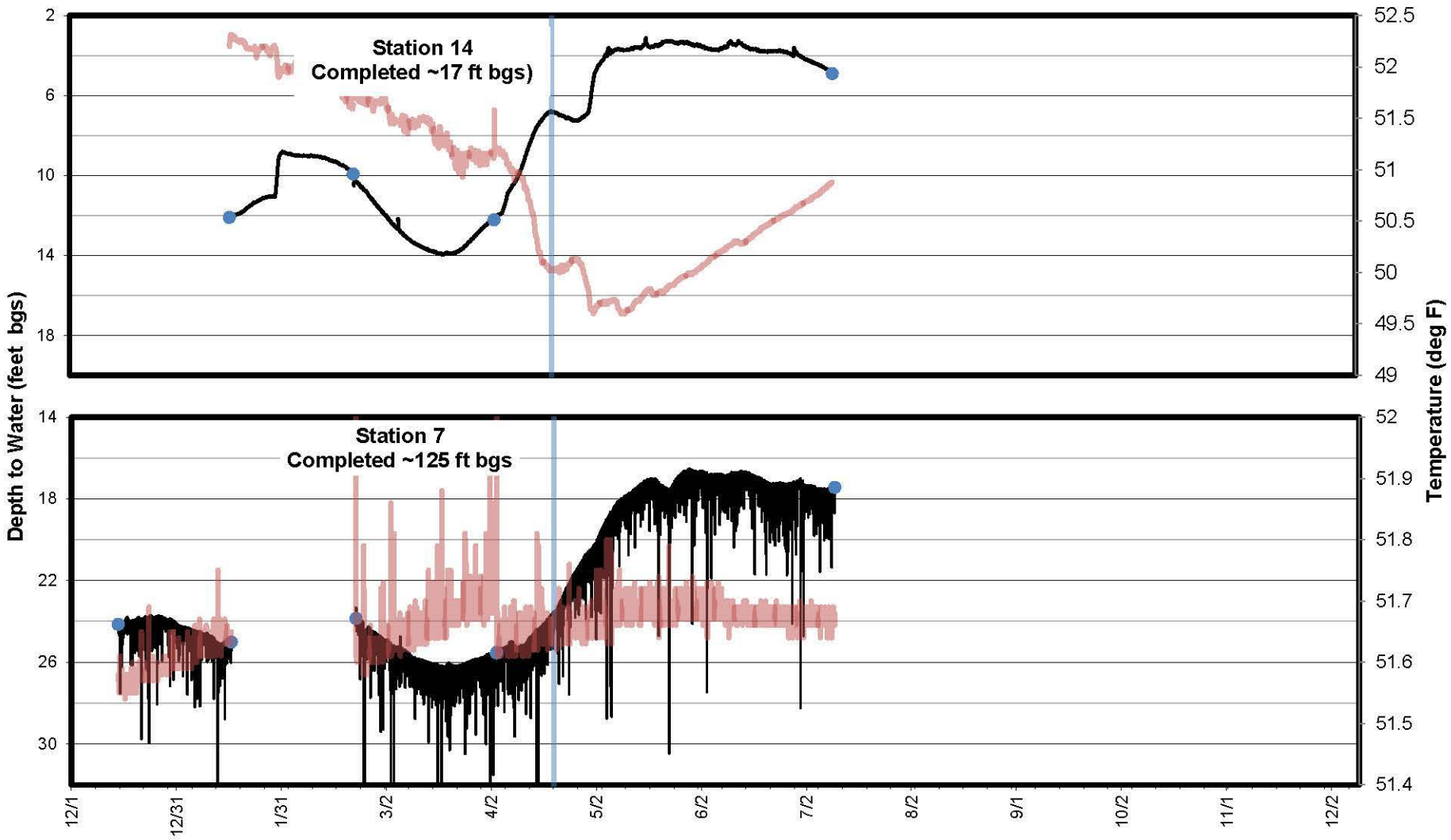
- Water Level Elevation
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-19**

STATION 22 WELL HYDROGRAPH

Yakima Basin Early Actions Groundwater Storage

103-9306001



LEGEND

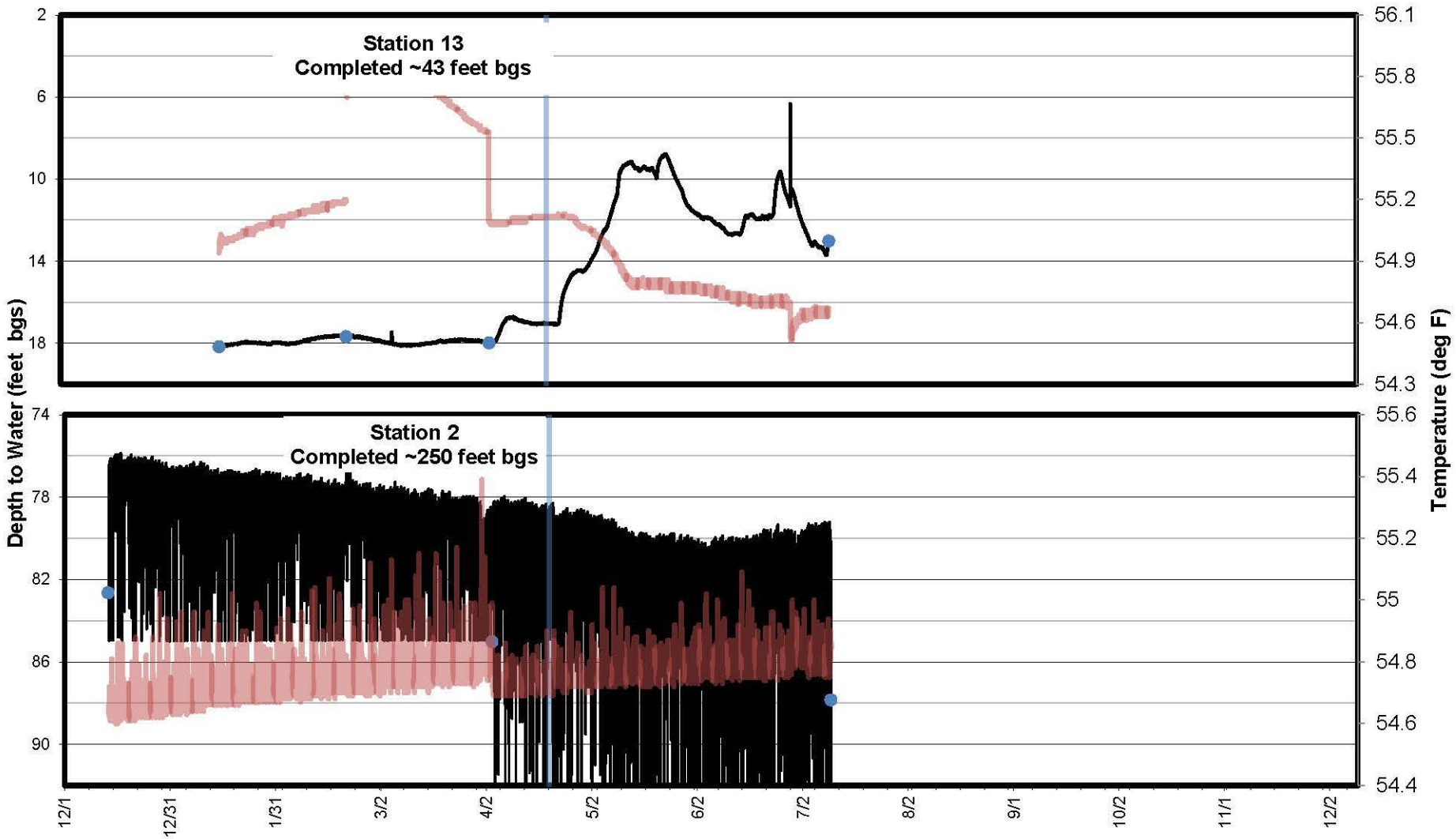
- Water Level
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-20**

NESTED WELLS (STATIONS 7 & 14)

Yakima Basin Early Actions Groundwater Storage

103-9306001



LEGEND

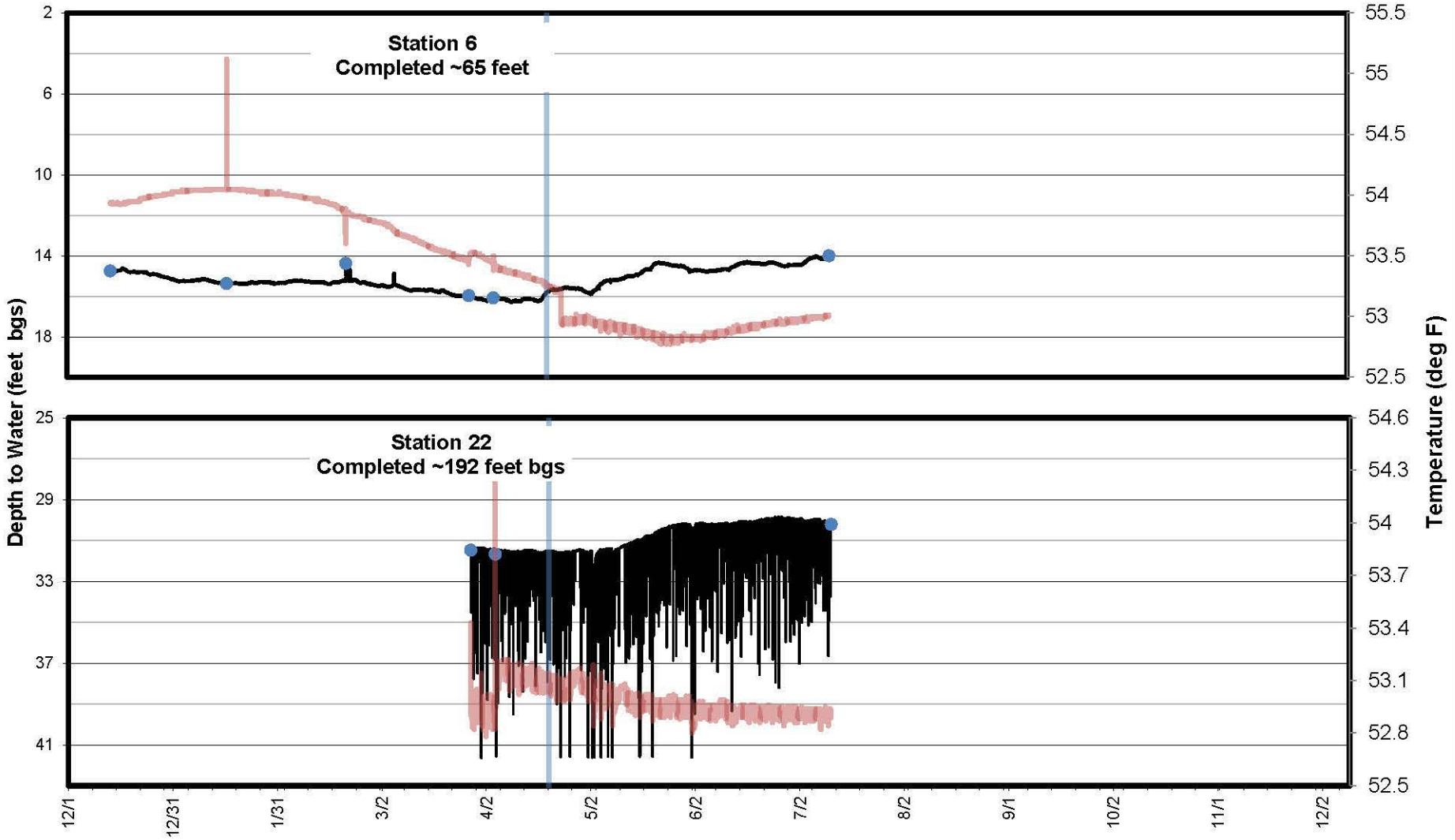
- Water Level Elevation
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-21**

NESTED WELLS (STATIONS 2 & 13)

Yakima Basin Early Actions Groundwater Storage

103-9306001



LEGEND

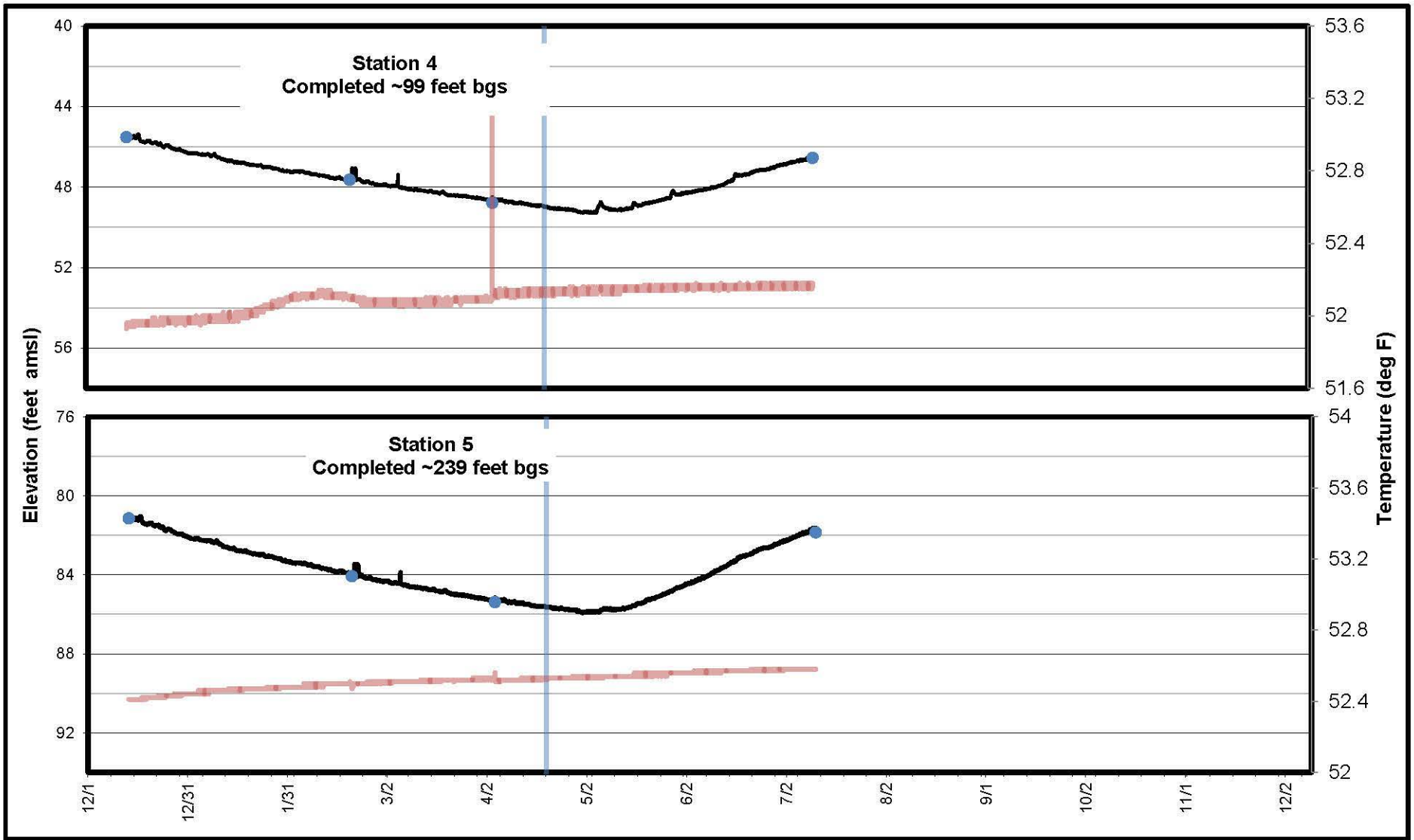
- Water Level Elevation
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-22**

NESTED WELLS (STATIONS 6 & 22)

Yakima Basin Early Actions Groundwater Storage

103-9306001



LEGEND

- Water Level Elevation
- Manual Measurements
- KRD Canal Filled
- Water Temperature

FIGURE **B-23**

NESTED WELLS (STATIONS 4 & 5)

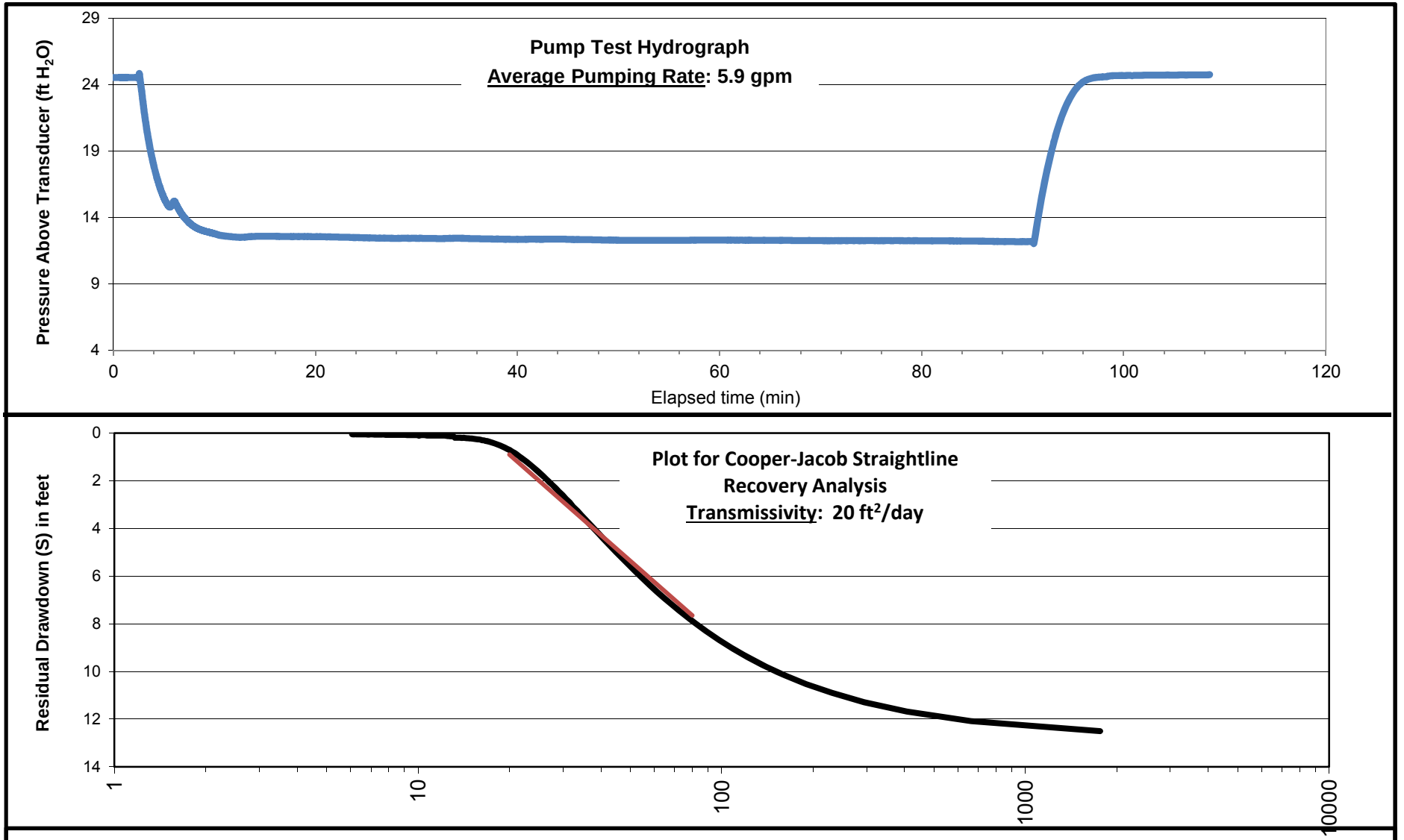
Yakima Basin Early Actions Groundwater Storage

103-9306001

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Appendix C
Pumping Test Results

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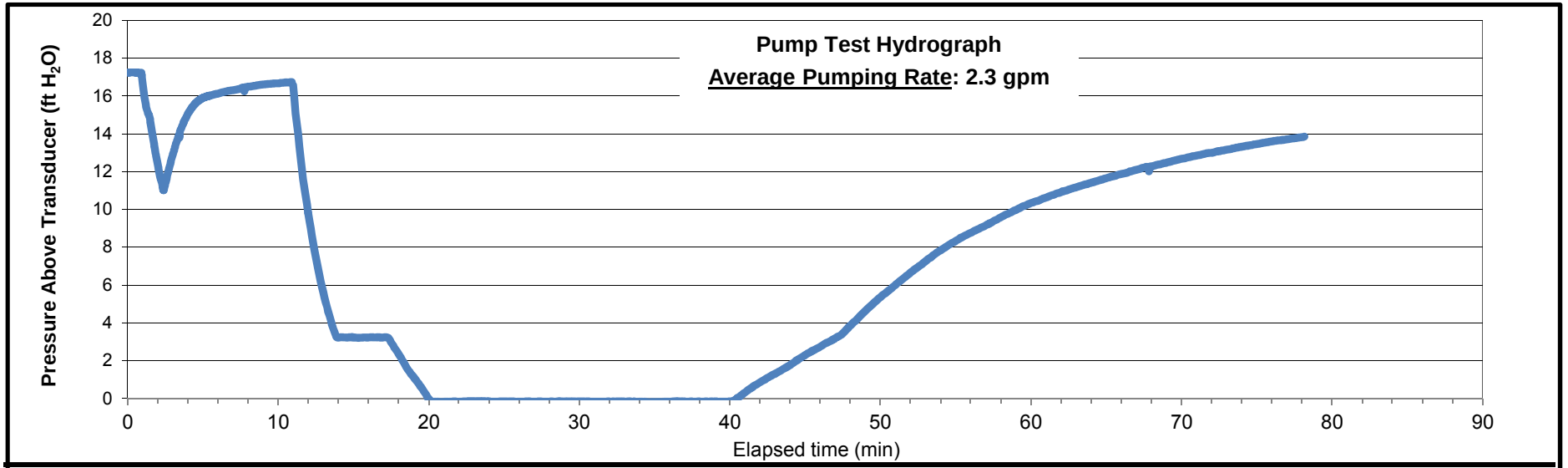
Golder Associates

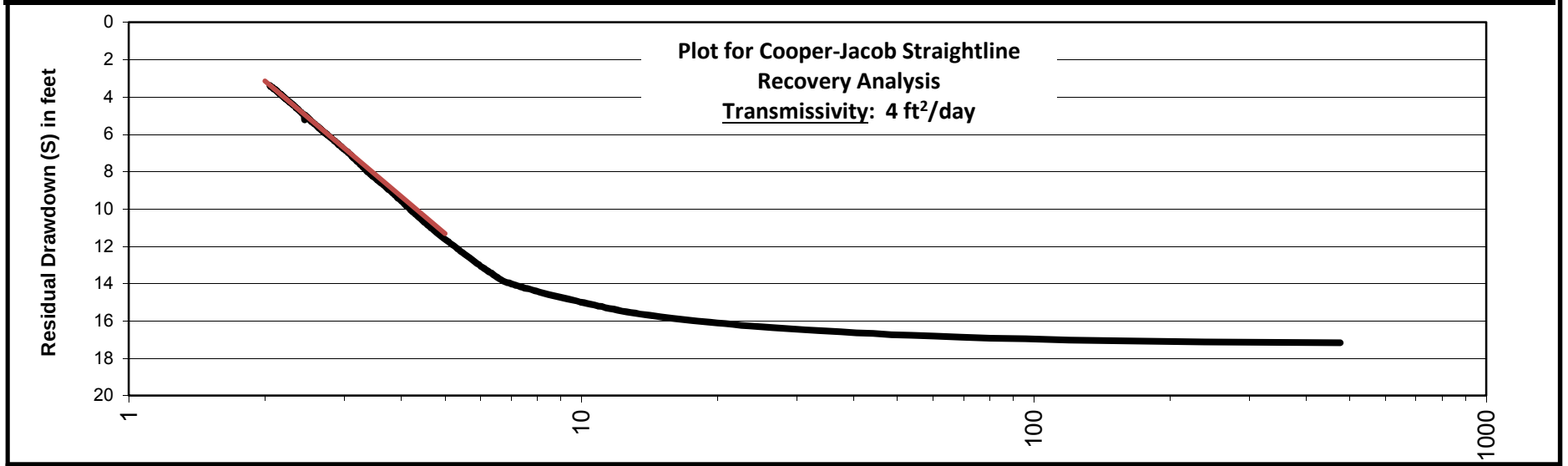
FIGURE **C-1**

STATION 2 PUMP TEST RESULTS & ANALYSIS

HDR/Yakima Basin Storage Alternatives/State

103-9306001





Golder Associates

LEGEND

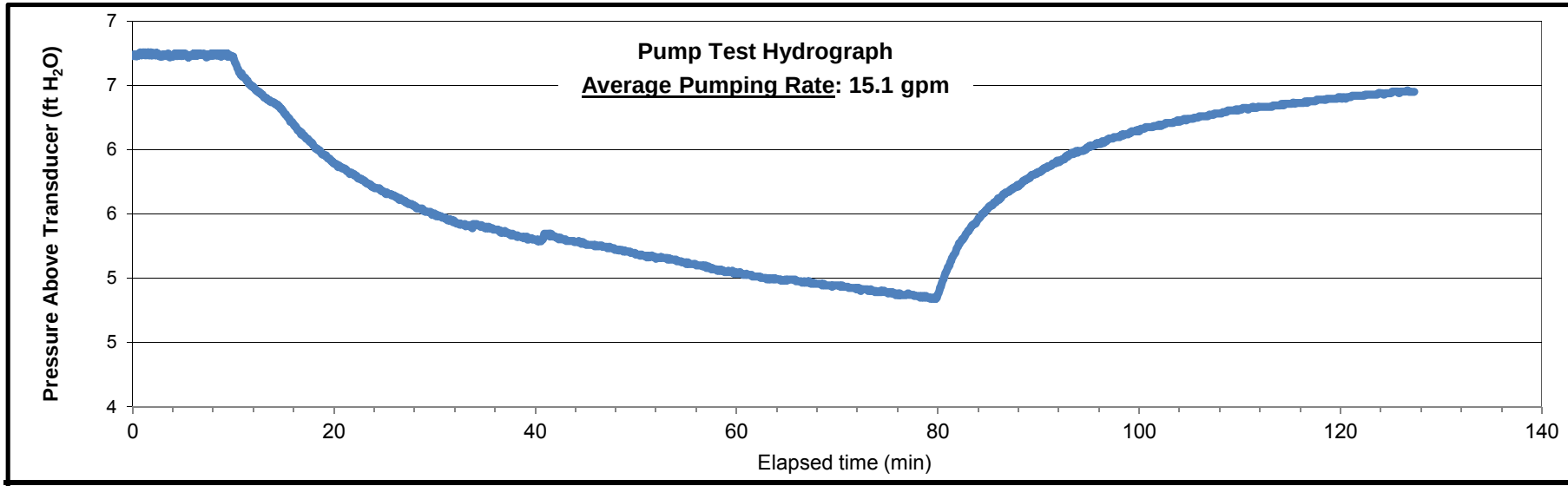
- Water Head Above Transducer
- Residual Drawdown (Cooper-Jacob)
- Calcualted Slope of Residual Drawdown (delta/log cycle)

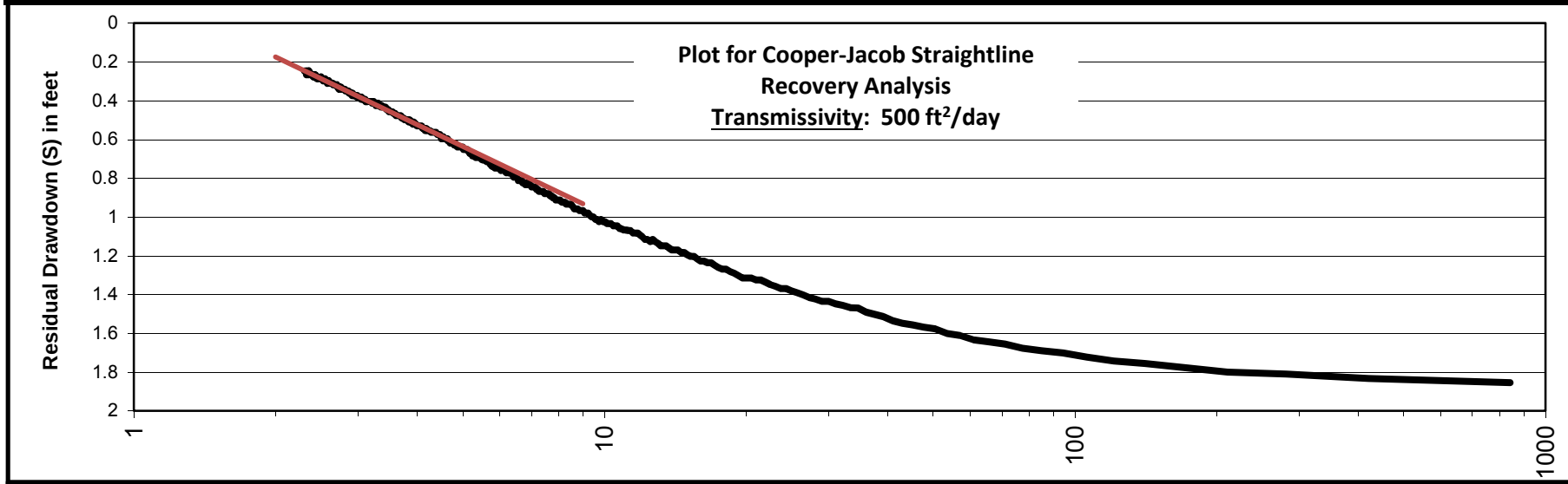
FIGURE **C-2**

STATION 13 PUMP TEST RESULTS & ANALYSIS

HDR/Yakima Basin Storage Alternatives/State

103-9306001





Golder Associates

LEGEND

- Water Head Above Transducer
- Residual Drawdown (Cooper-Jacob)
- Calcualted Slope of Residual Drawdown (delta/log cycle)

FIGURE **C-3**

STATION 14 PUMP TEST RESULTS & ANALYSIS

HDR/Yakima Basin Storage Alternatives/State

103-9306001

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Appendix D
Water Quality Results

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OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

March 6, 2013

Chris Pitre
Golder Associates Inc.
18300 NE Union Hill Road
Suite 200
Redmond, WA 98052-3333

Re: Analytical Data for Project 103-9306001-2-2.2
Laboratory Reference No. 1302-159

Dear Chris:

Enclosed are the analytical results and associated quality control data for samples submitted on February 22, 2013.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: March 8, 2013
Samples Submitted: February 22, 2013
Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

Case Narrative

Samples were collected on February 20, 2013 and received by the laboratory on February 22, 2013. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: March 8, 2013
Samples Submitted: February 22, 2013
Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

ALKALINITY
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Carbonate Alkalinity	**ND**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**70**	2.0	SM 2320B	2-25-13	2-25-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Carbonate Alkalinity	**ND**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**44**	2.0	SM 2320B	2-25-13	2-25-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Carbonate Alkalinity	**8.0**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**38**	2.0	SM 2320B	2-25-13	2-25-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Carbonate Alkalinity	**ND**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**66**	2.0	SM 2320B	2-25-13	2-25-13	

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ALKALINITY
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0225W1					
Carbonate Alkalinity	**ND**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**ND**	2.0	SM 2320B	2-25-13	2-25-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-159-01								
	ORIG	DUP							
Total Alkalinity	**70.0**	**70.0**	NA	NA	NA	NA	0	10	
SPIKE BLANK									
Laboratory ID:	SB0225W1								
	SB		SB		SB				
Total Alkalinity	**102**		100	NA	102	89-112	NA	NA	

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AMMONIA (as Nitrogen)
SM 4500-NH_3 D

Matrix: Water
Units: mg NH3-N/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Ammonia	**ND**	0.050	SM 4500-NH3 D	2-27-13	2-27-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Ammonia	**0.32**	0.050	SM 4500-NH3 D	2-27-13	2-27-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Ammonia	**0.32**	0.050	SM 4500-NH3 D	2-27-13	2-27-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Ammonia	**0.13**	0.050	SM 4500-NH3 D	2-27-13	2-27-13	

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AMMONIA (as Nitrogen)
SM 4500-NH_3 D
QUALITY CONTROL

Matrix: Water
Units: mg NH3-N/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0227W1					
Ammonia	**ND**	0.050	SM 4500-NH3 D	2-27-13	2-27-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-159-01								
	ORIG	DUP							
Ammonia	**ND**	**ND**	NA	NA	NA	NA	NA	11	
MATRIX SPIKE									
Laboratory ID:	02-159-01								
	MS		MS		MS				
Ammonia	**4.43**		5.00	ND	89	84-98	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0227W1								
	SB		SB		SB				
Ammonia	**4.72**		5.00	NA	94	86-99	NA	NA	

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CHLORIDE
SM 4500-Cl E

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Chloride	**3.6**	2.0	SM 4500 Cl E	2-25-13	2-25-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Chloride	**4.9**	2.0	SM 4500 Cl E	2-25-13	2-25-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Chloride	**4.5**	2.0	SM 4500 Cl E	2-25-13	2-25-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Chloride	**3.2**	2.0	SM 4500 Cl E	2-25-13	2-25-13	

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CHLORIDE
SM 4500-Cl E
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0225W1					
Chloride	**ND**	2.0	SM 4500 Cl E	2-25-13	2-25-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-159-01								
	ORIG	DUP							
Chloride	**3.63**	**2.38**	NA	NA	NA	NA	42	10	C
MATRIX SPIKE									
Laboratory ID:	02-159-01								
	MS		MS		MS				
Chloride	**60.2**		50.0	3.63	113	94-125	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0225W1								
	SB		SB		SB				
Chloride	**54.5**		50.0	NA	109	92-119	NA	NA	

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DISSOLVED ORGANIC CARBON
SM 5310B

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Dissolved Organic Carbon	**2.6**	1.0	SM 5310 B	2-22-13	2-25-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Dissolved Organic Carbon	**ND**	1.0	SM 5310 B	2-22-13	2-25-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Dissolved Organic Carbon	**1.8**	1.0	SM 5310 B	2-22-13	2-25-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Dissolved Organic Carbon	**1.1**	1.0	SM 5310 B	2-22-13	2-25-13	

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DISSOLVED ORGANIC CARBON
SM 5310B
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0222F2					
Dissolved Organic Carbon	**ND**	1.0	SM 5310 B	2-22-13	2-25-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-159-03								
	ORIG	DUP							
Dissolved Organic Carbon	**1.79**	**1.65**	NA	NA	NA	NA	8	20	
MATRIX SPIKE									
Laboratory ID:	02-159-03								
	MS		MS		MS				
Dissolved Organic Carbon	**11.1**		10.0	1.79	93	75-125	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0222F2								
	SB		SB		SB				
Dissolved Organic Carbon	**10.5**		10.0	NA	105	75-125	NA	NA	

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TOTAL ORGANIC CARBON
SM 5310B

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Total Organic Carbon	**1.8**	1.0	SM 5310 B	2-22-13	2-22-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Total Organic Carbon	**ND**	1.0	SM 5310 B	2-22-13	2-22-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Total Organic Carbon	**1.1**	1.0	SM 5310 B	2-22-13	2-22-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Total Organic Carbon	**ND**	1.0	SM 5310 B	2-22-13	2-22-13	

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TOTAL ORGANIC CARBON
SM 5310B
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0222W1					
Total Organic Carbon	**ND**	1.0	SM 5310 B	2-22-13	2-22-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-101-02								
	ORIG	DUP							
Total Organic Carbon	**84.7**	**84.7**	NA	NA	NA	NA	0	20	
MATRIX SPIKE									
Laboratory ID:	02-101-02								
	MS		MS		MS				
Total Organic Carbon	**94.3**		10.0	84.7	96	75-125	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0222W1								
	SB		SB		SB				
Total Organic Carbon	**9.41**		10.0	NA	94	75-125	NA	NA	

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FLUORIDE
SM 4500-F C

Matrix: Water
Units: mg F- /L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Fluoride	**0.077**	0.020	SM 4500-F C	3-1-13	3-1-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Fluoride	**1.7**	0.020	SM 4500-F C	3-1-13	3-1-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Fluoride	**0.074**	0.020	SM 4500-F C	3-1-13	3-1-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Fluoride	**0.071**	0.020	SM 4500-F C	3-1-13	3-1-13	

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FLUORIDE
SM 4500-F C
QUALITY CONTROL

Matrix: Water
Units: mg F- /L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0301W1					
Fluoride	**ND**	0.020	SM 4500-F C	3-1-13	3-1-13	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	02-159-03							
	ORIG DUP							
Fluoride	**0.0744 0.0675**	NA	NA	NA	NA	10	16	
MATRIX SPIKE								
Laboratory ID:	02-159-03							
	MS	MS		MS				
Fluoride	**0.507**	0.500	0.0744	87	59-139	NA	NA	
SPIKE BLANK								
Laboratory ID:	SB0301W1							
	SB	SB		SB				
Fluoride	**0.511**	0.500	NA	102	74-125	NA	NA	

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HARDNESS
EPA 6010C/SM2340B

Matrix: Water
Units: mg eqt. Caco3/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Total Hardness	**60**	2.0	EPA 6010C/SM 2340B		2-26-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Total Hardness	**43**	2.0	EPA 6010C/SM 2340B		2-26-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Total Hardness	**42**	2.0	EPA 6010C/SM 2340B		2-26-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Total Hardness	**64**	2.0	EPA 6010C/SM 2340B		2-26-13	

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HARDNESS
EPA 6010C/SM2340B
QUALITY CONTROL

Matrix: Water
Units: mg eqt. Caco3/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0226H1					
Total Hardness	**ND**	2.0	EPA 6010C/SM 2340B		2-26-13	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-159-03										
	ORIG	DUP									
Total Hardness	**41.9**	**42.7**	NA		NA	NA		NA	2	20	
MATRIX SPIKES											
Laboratory ID:	02-159-03										
	MS	MSD	MS	MSD		MS	MSD				
Total Hardness	**186**	**187**	147	147	41.9	98	99	75-125	1	20	
SPIKE BLANK											
Laboratory ID:	SB0226H1										
	SB		SB			SB					
Total Hardness	**145**		147		NA	99		80-120	NA	NA	

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NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Nitrate	**ND**	0.050	EPA 353.2	3-4-13	3-4-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Nitrate	**0.18**	0.050	EPA 353.2	3-4-13	3-4-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Nitrate	**ND**	0.050	EPA 353.2	3-4-13	3-4-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Nitrate	**0.61**	0.050	EPA 353.2	3-4-13	3-4-13	

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NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0304W1					
Nitrate	**ND**	0.050	EPA 353.2	3-4-13	3-4-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-159-02								
	ORIG	DUP							
Nitrate	**0.179**	**0.170**	NA	NA	NA	NA	5	11	
MATRIX SPIKE									
Laboratory ID:	02-159-02								
	MS		MS		MS				
Nitrate	**2.10**		2.00	0.179	96	81-122	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0304W1								
	SB		SB		SB				
Nitrate	**1.93**		2.00	NA	97	86-114	NA	NA	

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NITRITE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Nitrite	**ND**	0.020	EPA 353.2	2-22-13	2-22-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Nitrite	**ND**	0.020	EPA 353.2	2-22-13	2-22-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Nitrite	**ND**	0.020	EPA 353.2	2-22-13	2-22-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Nitrite	**ND**	0.020	EPA 353.2	2-22-13	2-22-13	

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NITRITE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0222W1					
Nitrite	**ND**	0.020	EPA 353.2	2-22-13	2-22-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-159-02								
	ORIG	DUP							
Nitrite	**ND**	**ND**	NA	NA	NA	NA	NA	13	
MATRIX SPIKE									
Laboratory ID:	02-159-02								
	MS		MS		MS				
Nitrite	**0.235**		0.250	ND	94	76-122	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0222W1								
	SB		SB		SB				
Nitrite	**0.250**		0.250	NA	100	80-116	NA	NA	

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ORTHO-PHOSPHATE
by EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Total Orthophosphate	**0.022**	0.010	EPA 365.1	2-22-13	2-22-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Total Orthophosphate	**ND**	0.010	EPA 365.1	2-22-13	2-22-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Total Orthophosphate	**ND**	0.010	EPA 365.1	2-22-13	2-22-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Total Orthophosphate	**0.030**	0.010	EPA 365.1	2-22-13	2-22-13	

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ORTHO-PHOSPHATE
by EPA 365.1
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0222W1					
Total Orthophosphate	**ND**	0.010	EPA 365.1	2-22-13	2-22-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-159-02								
	ORIG	DUP							
Total Orthophosphate	**ND**	**ND**	NA	NA	NA	NA	NA	10	
MATRIX SPIKE									
Laboratory ID:	02-159-02								
	MS		MS		MS				
Total Orthophosphate	**0.219**		0.250	ND	88	69-120	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0222W1								
	SB		SB		SB				
Total Orthophosphate	**0.237**		0.250	NA	95	83-113	NA	NA	

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TOTAL PHOSPHOROUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Total Phosphorus	**0.018**	0.010	EPA 365.1	2-26-13	2-26-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Total Phosphorus	**ND**	0.010	EPA 365.1	2-26-13	2-26-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Total Phosphorus	**ND**	0.010	EPA 365.1	2-26-13	2-26-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Total Phosphorus	**0.021**	0.010	EPA 365.1	2-26-13	2-26-13	

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TOTAL PHOSPHOROUS
EPA 365.1
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0226W1					
Total Phosphorus	**ND**	0.010	EPA 365.1	2-26-13	2-26-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-134-01								
	ORIG	DUP							
Total Phosphorus	**ND**	**0.0111**	NA	NA	NA	NA	NA	13	
MATRIX SPIKE									
Laboratory ID:	02-134-01								
	MS		MS		MS				
Total Phosphorus	**0.272**		0.250	ND	109	92-115	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0226W1								
	SB		SB		SB				
Total Phosphorus	**0.242**		0.250	NA	97	89-110	NA	NA	

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Date of Report: March 8, 2013
Samples Submitted: February 22, 2013
Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

SULFATE
ASTM D516-02

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Sulfate	**ND**	5.0	ASTM D516-02	2-25-13	2-25-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Sulfate	**ND**	5.0	ASTM D516-02	2-25-13	2-25-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Sulfate	**ND**	5.0	ASTM D516-02	2-25-13	2-25-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Sulfate	**ND**	5.0	ASTM D516-02	2-25-13	2-25-13	

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Project: 103-9306001-2-2.2

SULFATE
ASTM D516-02
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0225W1					
Sulfate	**ND**	5.0	ASTM D516-02	2-25-13	2-25-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-117-01								
	ORIG	DUP							
Sulfate	**59.8**	**57.6**	NA	NA	NA	NA	4	10	
MATRIX SPIKE									
Laboratory ID:	02-117-01								
	MS		MS		MS				
Sulfate	**164**		100	59.8	104	84-117	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0225W1								
	SB		SB		SB				
Sulfate	**10.5**		10.0	NA	105	94-113	NA	NA	

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Project: 103-9306001-2-2.2

TOTAL DISSOLVED SOLIDS
SM 2540C

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Total Dissolved Solids	**91**	13	SM 2540C	2-25-13	2-26-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Total Dissolved Solids	**25**	13	SM 2540C	2-25-13	2-26-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Total Dissolved Solids	**35**	13	SM 2540C	2-25-13	2-26-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Total Dissolved Solids	**89**	13	SM 2540C	2-25-13	2-26-13	

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TOTAL DISSOLVED SOLIDS
SM 2540C
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0225W1					
Total Dissolved Solids	**ND**	13	SM 2540C	2-25-13	2-26-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-159-02								
	ORIG	DUP							
Total Dissolved Solids	**25.3**	**22.7**	NA	NA	NA	NA	11	16	
SPIKE BLANK									
Laboratory ID:	SB0225W1								
	SB		SB		SB				
Total Dissolved Solids	**461**		500	NA	92	86-111	NA	NA	

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DISSOLVED SILICA
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-159-01					
Client ID:	**Haberman Well**					
Silica	**36000**	2400	6010C	2-22-13	2-25-13	
Lab ID:	02-159-02					
Client ID:	**City Wells**					
Silica	**11000**	2400	6010C	2-22-13	2-25-13	
Lab ID:	02-159-03					
Client ID:	**Yakima R**					
Silica	**9700**	2400	6010C	2-22-13	2-25-13	
Lab ID:	02-159-04					
Client ID:	**Purnell**					
Silica	**36000**	2400	6010C	2-22-13	2-25-13	

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DISSOLVED SILICA
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Filtered:	2-22-13
Date Analyzed:	2-25-13
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0222F1

Analyte	Method	Result	PQL
Silica	6010C	**ND**	240

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Date of Report: March 8, 2013
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Project: 103-9306001-2-2.2

DISSOLVED SILICA
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Filtered:	2-22-13
Date Analyzed:	2-25-13
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-159-03

			Flags
	3	2400	

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Date of Report: March 8, 2013
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Laboratory Reference: 1302-159
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DISSOLVED SILICA
EPA 6010C
MS/MSD QUALITY CONTROL

Date Filtered: 2-22-13
Date Analyzed: 2-25-13

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-159-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Silica	47100	**57100**	101	**56200**	99	2	

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TOTAL METALS
EPA 6010C/200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-159-01					
Client ID:	**Haberman Well**					
Aluminum	**ND**	110	6010C	2-25-13	2-26-13	
Antimony	**ND**	5.6	200.8	2-25-13	2-25-13	
Arsenic	**ND**	3.3	200.8	2-25-13	2-25-13	
Barium	**ND**	28	200.8	2-25-13	2-25-13	
Beryllium	**ND**	11	200.8	2-25-13	2-25-13	
Boron	**ND**	110	6010C	2-25-13	2-26-13	
Cadmium	**ND**	4.4	200.8	2-25-13	2-25-13	
Calcium	**14000**	1100	6010C	2-25-13	2-26-13	
Chromium	**ND**	11	200.8	2-25-13	2-25-13	
Cobalt	**ND**	11	200.8	2-25-13	2-25-13	
Copper	**ND**	11	200.8	2-25-13	2-25-13	
Iron	**1200**	56	6010C	2-25-13	2-26-13	
Lead	**ND**	1.1	200.8	2-25-13	2-25-13	
Magnesium	**5900**	1100	6010C	2-25-13	2-26-13	
Manganese	**120**	11	200.8	2-25-13	2-25-13	
Mercury	**ND**	0.50	7470A	2-26-13	2-26-13	
Nickel	**ND**	22	200.8	2-25-13	2-25-13	
Potassium	**1700**	1100	6010C	2-25-13	2-26-13	
Selenium	**ND**	5.6	200.8	2-25-13	2-25-13	
Silver	**ND**	11	200.8	2-25-13	2-25-13	
Sodium	**5000**	1100	6010C	2-25-13	2-26-13	
Thallium	**ND**	5.6	200.8	2-25-13	2-25-13	
Vanadium	**ND**	11	200.8	2-25-13	2-25-13	
Zinc	**ND**	28	200.8	2-25-13	2-25-13	

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TOTAL METALS
EPA 6010C/200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-159-02					
Client ID:	**City Wells**					
Aluminum	**ND**	110	6010C	2-25-13	2-26-13	
Antimony	**ND**	5.6	200.8	2-25-13	2-25-13	
Arsenic	**ND**	3.3	200.8	2-25-13	2-25-13	
Barium	**ND**	28	200.8	2-25-13	2-25-13	
Beryllium	**ND**	11	200.8	2-25-13	2-25-13	
Boron	**ND**	110	6010C	2-25-13	2-26-13	
Cadmium	**ND**	4.4	200.8	2-25-13	2-25-13	
Calcium	**10000**	1100	6010C	2-25-13	2-26-13	
Chromium	**ND**	11	200.8	2-25-13	2-25-13	
Cobalt	**ND**	11	200.8	2-25-13	2-25-13	
Copper	**ND**	11	200.8	2-25-13	2-25-13	
Iron	**ND**	56	6010C	2-25-13	2-26-13	
Lead	**ND**	1.1	200.8	2-25-13	2-25-13	
Magnesium	**4200**	1100	6010C	2-25-13	2-26-13	
Manganese	**ND**	11	200.8	2-25-13	2-25-13	
Mercury	**ND**	0.50	7470A	2-26-13	2-26-13	
Nickel	**ND**	22	200.8	2-25-13	2-25-13	
Potassium	**ND**	1100	6010C	2-25-13	2-26-13	
Selenium	**ND**	5.6	200.8	2-25-13	2-25-13	
Silver	**ND**	11	200.8	2-25-13	2-25-13	
Sodium	**5200**	1100	6010C	2-25-13	2-26-13	
Thallium	**ND**	5.6	200.8	2-25-13	2-25-13	
Vanadium	**ND**	11	200.8	2-25-13	2-25-13	
Zinc	**ND**	28	200.8	2-25-13	2-25-13	

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TOTAL METALS
EPA 6010C/200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-159-03					
Client ID:	**Yakima R**					
Aluminum	**ND**	110	6010C	2-25-13	2-26-13	
Antimony	**ND**	5.6	200.8	2-25-13	2-25-13	
Arsenic	**ND**	3.3	200.8	2-25-13	2-25-13	
Barium	**ND**	28	200.8	2-25-13	2-25-13	
Beryllium	**ND**	11	200.8	2-25-13	2-25-13	
Boron	**ND**	110	6010C	2-25-13	2-26-13	
Cadmium	**ND**	4.4	200.8	2-25-13	2-25-13	
Calcium	**11000**	1100	6010C	2-25-13	2-26-13	
Chromium	**ND**	11	200.8	2-25-13	2-25-13	
Cobalt	**ND**	11	200.8	2-25-13	2-25-13	
Copper	**ND**	11	200.8	2-25-13	2-25-13	
Iron	**ND**	56	6010C	2-25-13	2-26-13	
Lead	**ND**	1.1	200.8	2-25-13	2-25-13	
Magnesium	**3600**	1100	6010C	2-25-13	2-26-13	
Manganese	**ND**	11	200.8	2-25-13	2-25-13	
Mercury	**ND**	0.50	7470A	2-26-13	2-26-13	
Nickel	**ND**	22	200.8	2-25-13	2-25-13	
Potassium	**ND**	1100	6010C	2-25-13	2-26-13	
Selenium	**ND**	5.6	200.8	2-25-13	2-25-13	
Silver	**ND**	11	200.8	2-25-13	2-25-13	
Sodium	**4200**	1100	6010C	2-25-13	2-26-13	
Thallium	**ND**	5.6	200.8	2-25-13	2-25-13	
Vanadium	**ND**	11	200.8	2-25-13	2-25-13	
Zinc	**ND**	28	200.8	2-25-13	2-25-13	

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TOTAL METALS
EPA 6010C/200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-159-04					
Client ID:	**Purnell**					
Aluminum	**ND**	110	6010C	2-25-13	2-26-13	
Antimony	**ND**	5.6	200.8	2-25-13	2-25-13	
Arsenic	**ND**	3.3	200.8	2-25-13	2-25-13	
Barium	**ND**	28	200.8	2-25-13	2-25-13	
Beryllium	**ND**	11	200.8	2-25-13	2-25-13	
Boron	**ND**	110	6010C	2-25-13	2-26-13	
Cadmium	**ND**	4.4	200.8	2-25-13	2-25-13	
Calcium	**14000**	1100	6010C	2-25-13	2-26-13	
Chromium	**ND**	11	200.8	2-25-13	2-25-13	
Cobalt	**ND**	11	200.8	2-25-13	2-25-13	
Copper	**ND**	11	200.8	2-25-13	2-25-13	
Iron	**96**	56	6010C	2-25-13	2-26-13	
Lead	**ND**	1.1	200.8	2-25-13	2-25-13	
Magnesium	**6600**	1100	6010C	2-25-13	2-26-13	
Manganese	**ND**	11	200.8	2-25-13	2-25-13	
Mercury	**ND**	0.50	7470A	2-26-13	2-26-13	
Nickel	**ND**	22	200.8	2-25-13	2-25-13	
Potassium	**1900**	1100	6010C	2-25-13	2-26-13	
Selenium	**ND**	5.6	200.8	2-25-13	2-25-13	
Silver	**ND**	11	200.8	2-25-13	2-25-13	
Sodium	**4000**	1100	6010C	2-25-13	2-26-13	
Thallium	**ND**	5.6	200.8	2-25-13	2-25-13	
Vanadium	**ND**	11	200.8	2-25-13	2-25-13	
Zinc	**ND**	28	200.8	2-25-13	2-25-13	

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TOTAL METALS
EPA 6010C/200.8
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted:	2-25-13
Date Analyzed:	2-25&26-13
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0225WM1

Analyte	Method	Result	PQL
Aluminum	6010C	**ND**	110
Antimony	200.8	**ND**	5.6
Arsenic	200.8	**ND**	3.3
Barium	200.8	**ND**	28
Beryllium	200.8	**ND**	11
Boron	6010C	**ND**	110
Cadmium	200.8	**ND**	4.4
Calcium	6010C	**ND**	1100
Chromium	200.8	**ND**	11
Cobalt	200.8	**ND**	11
Copper	200.8	**ND**	11
Iron	6010C	**ND**	56
Lead	200.8	**ND**	1.1

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TOTAL METALS
EPA 6010C/200.8/7470A
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Date Extracted:	2-25-13
Date Analyzed:	2-25&26-13
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0225WM1

Analyte	Method	Result	PQL
Magnesium	6010C	**ND**	1100
Manganese	200.8	**ND**	11
Nickel	200.8	**ND**	22
Potassium	6010C	**ND**	1100
Selenium	200.8	**ND**	5.6
Silver	200.8	**ND**	11
Sodium	6010C	**ND**	1100
Thallium	200.8	**ND**	5.6
Vanadium	200.8	**ND**	11
Zinc	200.8	**ND**	28

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TOTAL METALS
EPA 6010C/200.8
DUPLICATE QUALITY CONTROL
Page 1 of 2

Date Extracted: 2-25-13
Date Analyzed: 2-25&26-13

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-159-01

	Flags
Aluminum	
Antimony	
Beryllium	
Boron	
Cadmium	
Calcium	
Chromium	
Cobalt	
Copper	
Iron	

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TOTAL METALS
EPA 6010C/200.8/7470A
DUPLICATE QUALITY CONTROL
Page 2 of 2

Date Extracted: 2-25-13
Date Analyzed: 2-25&26-13

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-159-01

	Flags
Magnesium	
Manganese	
Potassium	
Sodium	
Thallium	
Vanadium	

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TOTAL METALS
EPA 6010C/200.8
MS/MSD QUALITY CONTROL
Page 1 of 2

Date Extracted: 2-25-13
Date Analyzed: 2-25&26-13

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-159-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Aluminum	22200	**22400**	101	**21900**	99	2	
Antimony	111	**110**	99	**109**	98	1	
Arsenic	111	**106**	96	**104**	93	3	
Barium	111	**119**	107	**117**	106	2	
Beryllium	111	**98.1**	88	**99.0**	89	1	
Boron	1110	**1100**	99	**1100**	99	0	
Cadmium	111	**104**	93	**105**	95	2	
Calcium	22200	**33500**	88	**34100**	91	2	
Chromium	111	**105**	95	**105**	95	0	
Cobalt	111	**115**	104	**111**	100	4	
Copper	111	**110**	99	**108**	98	1	
Iron	22200	**23300**	100	**23200**	99	1	
Lead	111	**108**	97	**107**	96	1	

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Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

TOTAL METALS
EPA 6010C/200.8/7470A
MS/MSD QUALITY CONTROL
Page 2 of 2

Date Extracted: 2-25-13
Date Analyzed: 2-25&26-13

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-159-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Magnesium	22200	**27400**	97	**27400**	97	0	
Manganese	111	**213**	85	**220**	91	3	
Nickel	111	**115**	103	**112**	101	2	
Potassium	22200	**23700**	99	**23700**	99	0	
Selenium	111	**99.8**	90	**96.6**	87	3	
Silver	111	**101**	91	**103**	93	2	
Sodium	22200	**26100**	95	**26200**	96	0	
Thallium	111	**112**	97	**112**	99	2	
Vanadium	111	**107**	97	**109**	99	2	
Zinc	111	**108**	97	**105**	95	3	

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Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

CARBONATE/BICARBONATE
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Haberman Well**					
Laboratory ID:	02-159-01					
Carbonate Alkalinity	**ND**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**70**	2.0	SM 2320B	2-25-13	2-25-13	
Client ID:	**City Wells**					
Laboratory ID:	02-159-02					
Carbonate Alkalinity	**ND**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**44**	2.0	SM 2320B	2-25-13	2-25-13	
Client ID:	**Yakima R**					
Laboratory ID:	02-159-03					
Carbonate Alkalinity	**8.0**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**38**	2.0	SM 2320B	2-25-13	2-25-13	
Client ID:	**Purnell**					
Laboratory ID:	02-159-04					
Carbonate Alkalinity	**ND**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**66**	2.0	SM 2320B	2-25-13	2-25-13	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: March 8, 2013
Samples Submitted: February 22, 2013
Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

CARBONATE/BICARBONATE
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0225W1					
Carbonate Alkalinity	**ND**	2.0	SM 2320B	2-25-13	2-25-13	
Bicarbonate Concentration	**ND**	2.0	SM 2320B	2-25-13	2-25-13	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-159-01								
	ORIG	DUP							
Total Alkalinity	**70.0**	**70.0**	NA	NA	NA	NA	0	10	
SPIKE BLANK									
Laboratory ID:	SB0225W1								
	SB		SB		SB				
Total Alkalinity	**102**		100	NA	102	89-112	NA	NA	

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Date of Report: March 8, 2013
Samples Submitted: February 22, 2013
Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

TOTAL STRONTIUM
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	02-159-01					
Client ID:	**Haberman Well**					
Strontium	**69**	11	6010C	2-25-13	2-26-13	
Lab ID:	02-159-02					
Client ID:	**City Wells**					
Strontium	**48**	11	6010C	2-25-13	2-26-13	
Lab ID:	02-159-03					
Client ID:	**Yakima R**					
Strontium	**57**	11	6010C	2-25-13	2-26-13	
Lab ID:	02-159-04					
Client ID:	**Purnell**					
Strontium	**62**	11	6010C	2-25-13	2-26-13	

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Date of Report: March 8, 2013
Samples Submitted: February 22, 2013
Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

TOTAL STRONTIUM
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-25-13
Date Analyzed:	2-26-13
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0225WM1

Analyte	Method	Result	PQL
Strontium	6010C	**ND**	11

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: March 8, 2013
Samples Submitted: February 22, 2013
Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

TOTAL STRONTIUM
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted:	2-25-13
Date Analyzed:	2-26-13
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	02-159-01

Flags

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: March 8, 2013
Samples Submitted: February 22, 2013
Laboratory Reference: 1302-159
Project: 103-9306001-2-2.2

TOTAL STRONTIUM
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 2-25-13
Date Analyzed: 2-26-13

Matrix: Water
Units: ug/L (ppb)

Lab ID: 02-159-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Strontium	1110	**1140**	97	**1140**	97	0	

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OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

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

Professional Analytical Services

Mar 6 2013
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your 103-9306001-2-2.2 project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
Haberman Well	Water	13-A002065	CONV
City Wells	Water	13-A002066	CONV
Yakima R	Water	13-A002067	CONV
Purnell	Water	13-A002068	CONV

Your samples were received on Friday, February 22, 2013. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,



Aaron W. Young
Laboratory Manager

BACT = Bacteriological
CONV = Conventionals
MET = Metals
ORG = Organics
NUT=Nutrients
DEM=Demand
MIN=Minerals

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

Professional Analytical Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: 103-9306001-2-2.2
Project #:
All results reported on an as received basis.

Date Received: 02/22/13
Date Reported: 3/ 6/13

AMTEST Identification Number **13-A002065**
Client Identification **Haberman Well**
Sampling Date **02/20/13, 13:30**

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Bromide	< 0.05	mg/l		0.05	EPA 300.0	EB	03/01/13

AMTEST Identification Number **13-A002066**
Client Identification **City Wells**
Sampling Date **02/20/13, 15:20**

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Bromide	< 0.05	mg/l		0.05	EPA 300.0	EB	03/01/13

AMTEST Identification Number **13-A002067**
Client Identification **Yakima R**
Sampling Date **02/20/13, 15:55**

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Bromide	< 0.05	mg/l		0.05	EPA 300.0	EB	03/01/13

AMTEST Identification Number **13-A002068**
Client Identification **Purnell**
Sampling Date **02/21/13, 15:10**

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Bromide	< 0.05	mg/l		0.05	EPA 300.0	EB	03/01/13

Aaron W. Young
Laboratory Manager

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

AMTEST LABORATORIES

Professional Analytical Services

QC Summary for sample numbers: 13-A002065 to 13-A002068

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
13-A002065	Bromide	mg/l	< 0.05	< 0.05	

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
13-A002065	Bromide	mg/l	< 0.05	2.2	2.0	110.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Bromide	mg/l	2.0	2.1	105. %

BLANKS

ANALYTE	UNITS	RESULT
Bromide	mg/l	< 0.05

T = 5.3

Page 1 of 1

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory Reference #: 02-159

Subcontract Laboratory: AmTest Laboratories

Turnaround Request:

Project Manager: David Baumeister

Attention: Aaron Young

1 Day 2 Day 3 Day

email: dbaumeister@onsite-env.com

13600 NE 126th Pl Kirkland, WA 98034

(Standard)

Project Number: 103-930600.1-2-2.2

Phone Number: (425) 885-1664

Other: _____

Project Name: _____

Date/Time: _____

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analysis
2065	Haberman Well	2/20/13	1330	W	1	Bromide
66	City Wells	↓	1530	↓	↓	↓
67	Yakima R	↓	1555	↓	↓	↓
68	Purnell	2/21/13	1510	↓	↓	↓

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by:		OSE	2/22/13	1505	EIM
Received by:		speedy messenger	2/22/13	15:05	
Relinquished by:		speedy messenger	2/2/13	15:20	
Received by:		AmTest	2/22/13	15:20	
Relinquished by:					
Received by:					

See attached

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Laboratory Number: 02-159

Company: Golder
Project Number: 103-9306001-2-2.2
Project Name: Yakima Basin Storage Alternatives
Project Manager: Chris Pitre
Sampled by:

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260B	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals / MTCA Metals (circle one)	TCLP Metals	HEM (oil and grease) 1664A	Dissolved Si	TOTAL METALS *	CARB / BICARB		STRONTIUM - TOTAL		% Moisture
1	Haberman Well	2/20	(see label) ~1310	H_2O	7	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X		
2	City Wells	2/20	1520	H_2O	7																				X		
3	Yakima R	2/20	1555	H_2O	7																				X		
4	Purnell	2/21	1510	H_2O	7																				X		
																			X								

Added 3/4/13. DB (STA)

	Signature	Company	Date	Time
Relinquished		Golder	2/22	11:10
Received	Van	Spdy	2/22	11:10
Relinquished	Van	Spdy	2/22/13	11:30
Received		OSE	2/22/13	1130
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Please analyze per the agreement between Golder and [redacted] On-Site Environmental dated 2/18/13 (attached). Cy has been removed from the analyte list.

* Al, Sb, As, Ba, Be, Bo, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Na, Tl, V, Zn, Ag

Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ _____