Groundwater Application Review Summary Form

Application # G- _18843_

GW Reviewer _Ben Scandella, Jen Woody_ Date Review Completed: _1/10/2022_

Summary of GW Availability and Injury Review:

☒ Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

Summary of Potential for Substantial Interference Review:

☒ There is the potential for substantial interference per Section C of the attached review form.

Summary of Well Construction Assessment:

☐ The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).

WATER RESOURCES DEPARTMENT

MEMO **January 10,** 2022

TO: **Application** G-**18843**

FROM: **GW: Ben Scandella, Jen Woody**
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ **YES**
☒ **NO** The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

☐ **YES**
☒ **NO** Use the Scenic Waterway Condition (Condition 7J)

☐ Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below

☐ Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is *unable to make a Preponderance of Evidence finding.*

Exercise of this permit is calculated to reduce monthly flows in _____ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date January 10, 2022

FROM: Groundwater Section Ben Scandella and Jen Woody
Reviewer's Name

SUBJECT: Application G- 18843 Supersedes review of April 3, 2020
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525.* Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. **This review is based upon available information and agency policies in place at the time of evaluation**.

A. GENERAL INFORMATION: Applicant's Name: **Wag Holdings LLC** County: **Yamhill**

A1. Applicant(s) seek(s) 0.019 cfs from 1 well(s) in the Willamette Basin, Chehalem Creek subbasin

A2. Proposed use Irrigation & Nursery (21 AF/yr on 21 Acres) Seasonality: March 1 – October 31 (Irr). Yr-round for Nursery

A3. Well and aquifer data **(attach and number logs for existing wells; mark proposed wells as such under logid)**:

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	PROP 3		Columbia River Basalt	0.019	2S/2W-31 NE/SE	2320' N, 500' W fr SE cor S31
2						
3						

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	1355				400 (TBD)							

Use data from application for proposed wells.

A4. **Comments:** This re-review evaluates a revised location for the proposed well, received August 28, 2020. The applicant proposes to use a maximum rate of 0.019 cfs (8.5 gpm) from 1 proposed well for irrigation and nursery uses with a maximum annual volume of 21 acre feet for primary irrigation of 21 acres. Although the revised location is not within the Chehalem Creek Water Availability Basin (WAB), as was the original location, the revised location still has the Potential for Substantial Injury with that WAB, which has a low season 80% exceedance flow of 0.39 cfs. Therefore, the maximum permitted rate, should a permit be issued, would be 1% of that rate, or 0.0039 cfs (1.75 gpm). Water level data collected since the first review also suggest that further groundwater allocation is likely beyond the capacity of the resource.

A5. ☒ **Provisions of the** Willamette Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water ☐ **are**, *or* ☒ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: The well will produce from a confined aquifer so the pertinent basin rules (OAR 690-502-0240) do not apply.

A6. ☒ **Well(s) #** 1 , _____ , _____ , _____ , _____ , tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **Chehalem Mountain Groundwater Limited Area (OAR 690-502-0200).**

Comments: New irrigation use is permitted in the limited area, but permits may only be issued for a maximum of 5 years and must require drip or equally efficient irrigation and a limit of one acre-foot per acre per year. In addition, within two years of permit issuance, the applicant is required to submit a plan for obtaining an alternate long-term water supply.

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

a. ☐ **is** over appropriated, ☐ **is not** over appropriated, *or* ☒ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;

b. ☐ **will not** *or* ☒ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;

c. ☒ **will not** *or* ☐ **will** likely to be available within the capacity of the groundwater resource; or

d. ☐ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
i. ☒ The permit should contain condition #(s) **7i, large water-use reporting**;
ii. ☒ The permit should be conditioned as indicated in item 2 below.
iii. ☒ The permit should contain special condition(s) as indicated in item 3 below;

B2. a. ☐ **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;

b. ☐ **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;

c. ☒ **Condition** to allow groundwater production only from ~~the~~ **a single basalt aquifer in the Columbia River Basalt Group aquifer system** ~~groundwater reservoir between approximately _____ ft. and _____ ft. below land surface;~~

d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. **Groundwater availability remarks:**
Groundwater for the proposed use cannot be determined to be over-appropriated due to insufficient available data regarding rates of recharge and the current quantity of groundwater withdrawals from the aquifer system.

The proposed well is located just north of the crest of the Chehalem Mountains, a prominent northwest-trending ridge that forms the southern erosional edge of a sequence of Columbia River Basalt Group (CRBG) flows that are tilted at low-lying angles to the northeast toward the Tualatin River. The entire sequence of basalts is exposed by erosion on the southern slope of the mountain; the contact with underlying Tertiary marine sediments occurs at an elevation of about 600 feet, which indicates a local CRBG thickness of about 800 feet. North and east of the proposed well, the basalt surface is deeply incised by local streams tributary to the Tualatin River. Although unconfined groundwater occurs near the surface of the basalts, most water occurs in confined aquifers within thin rubble zones (interflow zones) that occur at the contacts between lava flows. The thick interiors of the basalt flows generally have very low porosity and permeability and act as confining beds. This physical geometry generally produces a stack of thin, tabular aquifers (interflow zones) separated by thick confining beds (flow interiors). Because of the low permeability of the basalt flow interiors, the natural connection between the stacked aquifers is general very limited (very inefficient). As a result, hydraulic heads in the individual aquifers can be substantially different, especially in upland areas where the basalts crop out at land surface. Because the aquifers are confined (storativity is commonly on the order of 0.0001), hydraulic diffusivity is generally very high which causes the cone of depression to propagate outward at rapid rates to impact nearby wells and hydraulically connected springs and streams. In the absence of barriers to horizontal flow, impacts can occur at distances up to a mile within a matter of minutes.

Long-term water level data in some nearby basalt wells show relatively stable trends (WASH 817 and WASH 13210), but the closest relevant well shows significant declines over the period of record (YAMH 57902). Complex hydrogeology makes it difficult to be certain which CRBG aquifer would be accessed by the proposed well, but the presence of nearby declines suggests that the proposed use may be beyond the capacity of the groundwater resource. In addition, multiple nearby shallow

basalt wells have been deepened, including YAMH 917 and WASH 13177. The new proposed well location is at elevation 1355 feet, which is only 400 feet above the top of most recent water levels in nearby basalt wells, between 895 to 955 feet (see hydrograph below). The deepening of nearby shallow wells, combined with recent water levels below the bottom of the proposed "400 feet (TBD)" depth, suggest that the subject well would need to be drilled up to 500 feet deep in order to access a productive aquifer. The nearest analogous well, YAMH 56904 was drilled over 500 feet deep and has still experienced significant declines. Therefore, even with a deeper well, the deepenings and declining water levels suggest that the proposed use is likely not within the capacity of the resource.

Only one permitted basalt irrigation well (YAMH 928, at about 3600 feet to the west, on Certificate 48416) occurs within a 1-mile radius of the proposed well. However, tax lot maps and the OWRD well log database indicate that at least 50 domestic wells lie within a 1-mile radius. Potential impacts to existing wells from the proposed well are difficult to assess because of a lack of knowledge about local hydraulic properties and the geometry of individual aquifers. The well most likely to experience greatest interference depends on the construction of the subject well; if it is limited to 400 feet, then YAMH 917 (about 750 feet northeast) would be the nearest well likely to intersect a matching water-bearing zone, but if the well depth is 500 feet, then YAMH 55490 would likely also be affected and is closer (280 feet to the northwest). Theis modeling suggests that interference with YAMH 917 could range between 1 and 30 feet over 1 year of continuous pumping, depending on aquifer properties derived from nearby pumping tests in the CRBG. However, interference is likely to be limited to less than 5 feet, which is not likely to cause Substantial or Undue Interference. Interference with YAMH 55490 would be somewhat larger due to its proximity, but interference would still likely be limited to 5 feet within 1 year. In case a permit is issued, the potential for significant interference within the range of plausible aquifer properties indicates the aquifer test condition below.

Springs in the CRBG commonly occur where porous interflow aquifers are breached by erosion. There are 2 certificated springs within ¼ mile of the proposed well location: Certificate 7689, approximately 800 feet E, and Certificate 92233, approximately 500 feet NW. Certificate 7689 lists a maximum rate of 0.05 cfs for domestic use. Assuming that the certificated rate of reflect low flow rates from these springs, they may be particularly susceptible to interference. However, these springs are located at elevations of 1190 and 1240 feet, respectively, such that they should be protected from interference if the well is continuously cased and continuous sealed to 200 feet (approximately 1150 feet elevation), as recommended in the special conditions below. The next most distant springs are listed on Certificate 44800, at distances of 1450 and 1700 feet, with a total rate of 0.022 cfs. Theis modeling suggests that interference would most likely be in the range of 2 to 3 feet after 1 year of pumping at the proposed rate, which is not likely sufficient to cause injury.

The uncertainty in the aquifer properties that will determine the extent of interference and long-term water level declines in the local basalt aquifer indicate the following **Special Conditions** to protect existing users. These should apply to any permit issued pursuant to this application:

Special Conditions (The Water Rights section should substitute standard language, as appropriate for special conditions 1-2):

1. Best management practices shall be used to maximize the efficiency of water use. Drip irrigation or low-pressure sprinklers shall be used. Use shall be limited to one acre-foot per acre per year.
2. The amount of water used for irrigation shall be limited to one acre-foot per acre per year.
3. Well construction conditions:
    a. The well shall be continuously cased and continuously sealed into hard, dense basalt and to at least 200 feet below land surface, or as approved by a Department hydrogeologist during the drilling process.
    b. The well shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval in each well shall be no greater than 100 feet. However, an open interval of greater than 100 feet may be allowed if substantial evidence of a single aquifer completion can be demonstrated to the satisfaction of the Department hydrogeologists, using information from a video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval.
    c. If during well construction it becomes apparent that the well can be constructed to eliminate commingling between aquifers in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Groundwater Hydrology Section Manager to request approval of such construction. The request shall be in writing and shall include a rough well log and a proposed construction design for approval by the Department. The request can be approved only if it is received and reviewed prior to placement of any permanent casing and sealing material. If the request is made after casing and seal are placed, the requested

modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.

d. A dedicated water-level measuring tube shall be installed in the production well. The measuring tube shall meet the standards described in OAR 690-215-0060. When requested, access to the well shall be provided to Department staff in order to make water-level measurements.

e. Drill cuttings shall be collected at 10-foot intervals and at changes in formation in the well and a split of each sampled interval shall be provided to the Department.

f. Copies of all geologic and hydrogeologic reports completed for the permittee during the development of the wells, including geophysical well logs and borehole video logs, shall be provided to the Department. Except for borehole video logs, two paper copies, or a single electronic copy, shall be provided of each report. Digital tables of any data shall be provided upon request.

g. Prior to using water on this permit, the permittee shall ensure that the well on this permit has an OWRD Well Identification Number (Well ID or Well tag number). If a well does not have a Well ID, the permittee shall apply for one from the Department. The Well ID shall be attached to the well and shall be used as a reference identification number for any correspondence regarding the well including any water use, water level, or pump test reports.

4. Other conditions as required by OAR 690-502-0200

5. For any well drilled under a permit issued pursuant to this application, a constant-rate aquifer test shall be conducted before beneficial use of the well begins to determine aquifer properties and to assess the potential impacts from use of the well. The test shall be designed and conducted by an Oregon Registered Geologist, and the test design shall be subject to the approval of the Groundwater Section of the Department prior to the test. At a minimum, the test shall include discharge and water-level measurements in the pumping well and simultaneous water-level measurements in all other wells drilled under this water right. Simultaneous water-level measurements shall also be made in YAMH 55490, YAMH 917, YAMH 57088, YAMH 57902, and WASH 13168, or in substitute wells approved by the Groundwater Section of the Department. The applicant will be responsible for obtaining permission from the owners of these wells to monitor their water levels throughout the aquifer test. Additionally, water-level measurements shall be made at a minimum of one observation well that is constructed to a similar bottom elevation as the pumping well, and with a similar open interval. The observation well shall be at least 500 feet from the production well and shall be constructed by the applicant and maintained as a dedicated observation well for the duration of groundwater use under this permit. Pumping duration for the test shall be determined by the Groundwater Section of the Department after well yield and specific capacity are determined. The results of each aquifer test shall be presented in a report to the Department that includes an analysis of aquifer properties, aquifer boundaries, and the potential impact on nearby wells that is likely to occur over the duration of an irrigation season if the well is used at the proposed rate and duty. Use of the well under this permit shall not be authorized until the test report is approved by the Groundwater Section of the Department. If the test results combined with Theis modeling suggest that any well would experience more than 15 feet of interference over a 365-day period of continuous pumping at the permitted rate, then the authorized pumping rate on this permit shall be reduced to a level that reduces the modeled interference to less than 15 feet, as determined by Department Groundwater Section staff. The permittee shall allow Department staff access to install water-level monitoring equipment prior to any aquifer tests and for the duration of any permitted water use pursuant to this application.

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	**Columbia River Basalt**	☒	☐

Basis for aquifer confinement evaluation: General knowledge indicates that groundwater is generally confined in the basalt aquifer system. Water levels in nearby basalt wells show static water levels that are substantially higher than the top of the reported water bearing zone.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	**1**	**Unnamed trib to Chehalem Cr (fed by Gordon Springs)**	**900-940**	**350-720**	**3480**	☒	☐	☐	☐	☒
1	**2**	**Unnamed trib to Chehalem Cr (east of Gordon Spring)**	**900-940**	**520-930**	**3480**	☒	☐	☐	☐	☒
1	**3**	**Unnamed trib to Chehalem Cr (fed by Skelton Spring)**	**900-940**	**650-890**	**4930**	☒	☐	☐	☐	☒
1	**4**	**Unnamed trib to Heaton Cr**	**900-940**	**690-910**	**2380**	☒	☐	☐	☐	☒
1	**5**	**McFee Creek tributaries**	**900-940**	**730-1270**	**2670**	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: The relatively flat lying basalt aquifers in the vicinity of the proposed well are truncated by local stream drainages which erode through the basalt column. Perennial streams, as shown on USGS 7.5-minute topographic maps, have their headwaters in the area of basalt outcrop. Mapped springs, or springs listed on water rights, occur within the stream drainages, commonly at the head of perennial reaches. Perennial reach elevations within 1 mile of the proposed well coincide with the elevations of water-bearing zones and water levels reported on nearby well logs. These facts indicate that ground water discharges from the basalt aquifers to support local stream flow; therefore, the streams and the aquifers are hydraulically connected. The distances between the well and perennial streams listed in table C2 are based on the nearest perennial reach as shown on USGS 7.5-minute topographic maps (see enclosed map). The groundwater elevation is assumed to match water levels in nearby wells (YAMH 917, YAMH 817, YAMH 55490, and YAMH 57902).

Water Availability Basin the well(s) are located within: CHEHALEM CR > WILLAMETTE R - AT MOUTH (WAB ID 30200707) & MCFEE CR > TUALATIN R - AT MOUTH (WAB ID 30201001). The well is located within the McFee Creek drainage basin near the ridgeline that separates the Chehalem Creek and McFee drainage basins. Pumping is expected to impact streams in both drainage basins, but Chehalem Creek is the limiting water-availability basin because it has the lowest 80%-exceedance natural stream flows (0.39 cfs in September).

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked ☒ box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	**1**	☐	☐			☐	**0.39**	☒		☒
1	**2**	☐	☐			☐	**0.39**	☒		☒
1	**3**	☐	☐			☐	**0.39**	☒		☒
1	**4**	☐	☐			☐	**1.90**	☐		☐
1	**5**	☐	☐			☐	**1.90**	☐		☐

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells**. Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			☐			☐		☐		☐

Comments: Interference at 30 days was not evaluated because of the lack of a readily available model for assessing stream impacts in a geometrically complex aquifer system. PSI was found with SW #1, 2, and 3 because the proposed rate is greater than 1% of the 80% natural flow in the Chehalem WAB. This finding would be reversed if the rate was reduced to 0.0039 cfs.

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation: NA

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

C5. ☐ **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:

i. ☐ The permit should contain condition #(s)_____;

ii. ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** PSI was found with SW #1, 2, and 3 because the proposed rate is greater than 1% of the 80% natural flow in the Chehalem WAB. This finding would be reversed if the rate was reduced to 0.0039 cfs.

References Used:

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, B.J., Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-water hydrology of the Willamette Basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5168.

Frank, F.J., and Collins, C.A., 1978, Groundwater in the Newberg area, northern Willamette Valley, Oregon: Oregon Department of Water Resources Ground Water Report No. 27, 77p.

Gannett, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A, 32 p.

O'Connor, J.E., Sarna-Wojcicki, A., Wozniak, K.C., Polette, D.J., and Fleck, R.J., 2001: U.S. Geological Survey Professional Paper 1620.

Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82p.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #**: _____ **Logid:** _____

D2. **THE WELL does not appear to meet current well construction standards based upon:**

a. ☐ review of the well log;

b. ☐ field inspection by _____;

c. ☐ report of CWRE _____;

d. ☐ other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** _____

D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION
Water Availability as of 3/11/2005 for
CHEHALEM CR > WILLAMETTE R - AT MOUTH

Watershed ID #: 30200707 Basin: WILLAMETTE Exceedance Level: 80
Time: 08:35 Date: 03/11/2005

Month	Natural Stream Flow	CU + Stor Prior to 1/1/93	CU + Stor After 1/1/93	Expected Stream Flow	Reserved Stream Flow	Instream Water Rights	Net Water Available
1	101.00	3.11	0.00	97.90	0.00	0.00	97.90
2	115.00	2.97	0.00	112.00	0.00	0.00	112.00
3	80.60	2.20	0.00	78.40	0.00	0.00	78.40
4	33.00	1.31	0.00	31.70	0.00	0.00	31.70
5	14.90	1.87	0.00	13.00	0.00	0.00	13.00
6	8.48	3.14	0.00	5.34	0.00	0.00	5.34
7	2.13	4.69	0.00	-2.56	0.00	0.00	-2.56
8	0.59	3.87	0.00	-3.28	0.00	0.00	-3.28
9	0.39	2.26	0.00	-1.87	0.00	0.00	-1.87
10	3.05	0.61	0.00	2.44	0.00	0.00	2.44
11	11.50	0.90	0.00	10.60	0.00	0.00	10.60
12	66.20	2.44	0.00	63.80	0.00	0.00	63.80
Stor	48900	1770	0	47300	0	0	47300

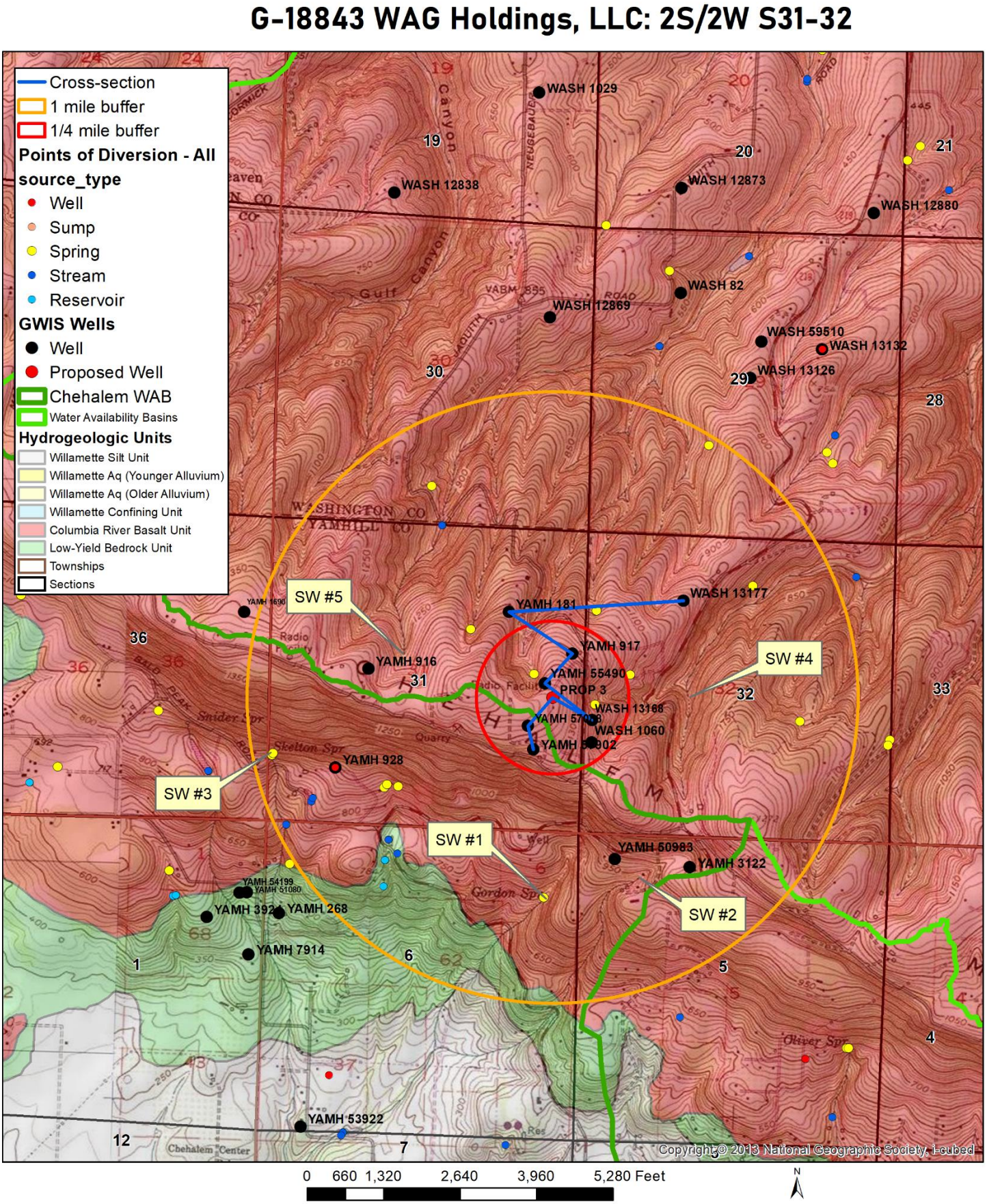
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

MCFEE CR > TUALATIN R - AT MOUTH

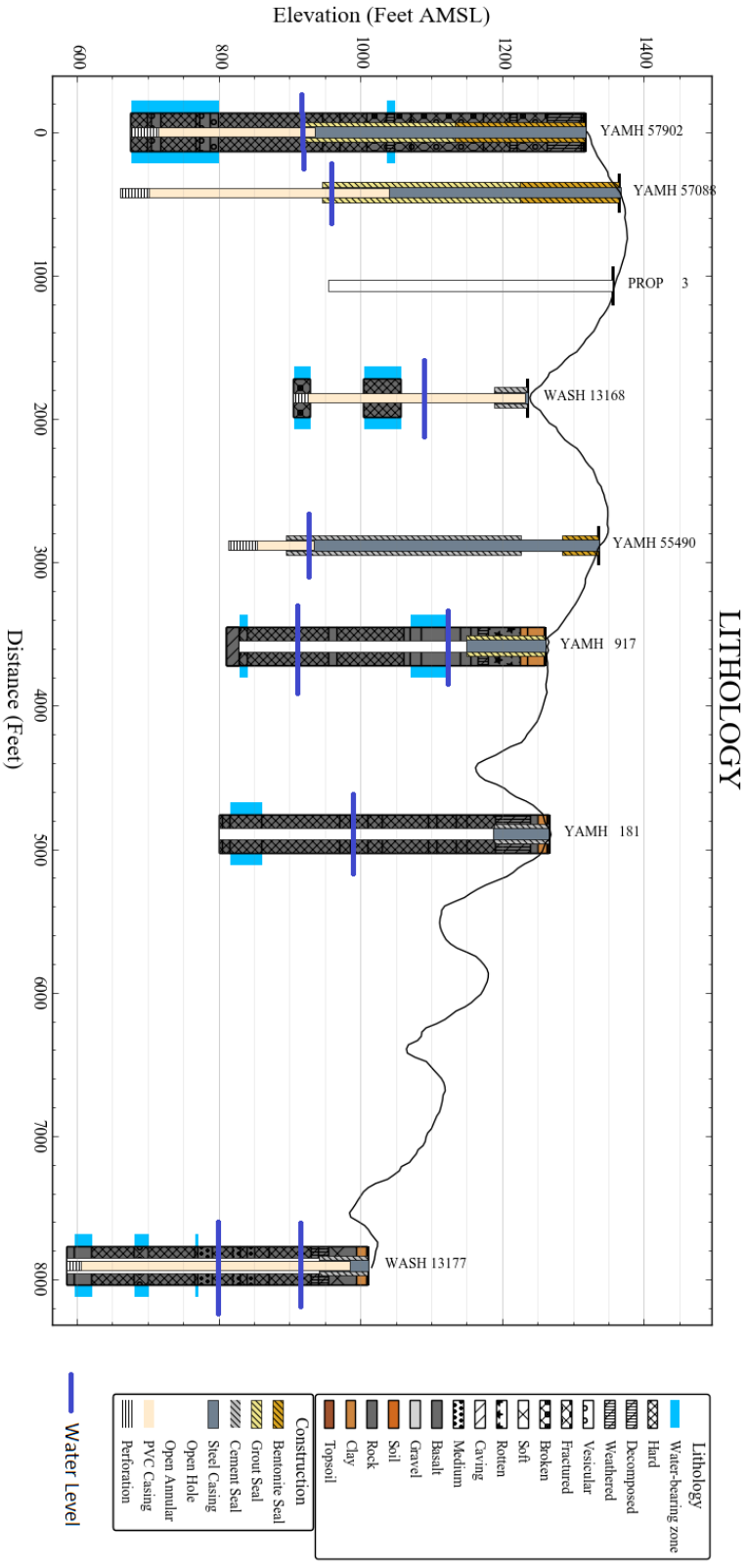
Watershed ID #: 30201001 Basin: WILLAMETTE Exceedance Level: 80
Time: 9:02 AM Date: 11/27/2019

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
	Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.					
JAN	36.60	0.89	35.70	0.00	0.00	35.70
FEB	42.00	0.89	41.10	0.00	0.00	41.10
MAR	34.20	0.75	33.50	0.00	0.00	33.50
APR	21.60	0.66	20.90	0.00	0.00	20.90
MAY	11.70	2.99	8.71	0.00	0.00	8.71
JUN	5.40	3.64	1.76	0.00	0.00	1.76
JUL	3.02	5.02	-2.00	0.00	0.00	-2.00
AUG	2.22	4.32	-2.10	0.00	0.00	-2.10
SEP	1.97	2.35	-0.38	0.00	0.00	-0.38
OCT	1.90	0.41	1.49	0.00	0.00	1.49
NOV	5.34	0.48	4.86	0.00	0.00	4.86
DEC	25.20	0.85	24.30	0.00	0.00	24.30
ANN	22,300	1,410	21,100	0	0	21,100

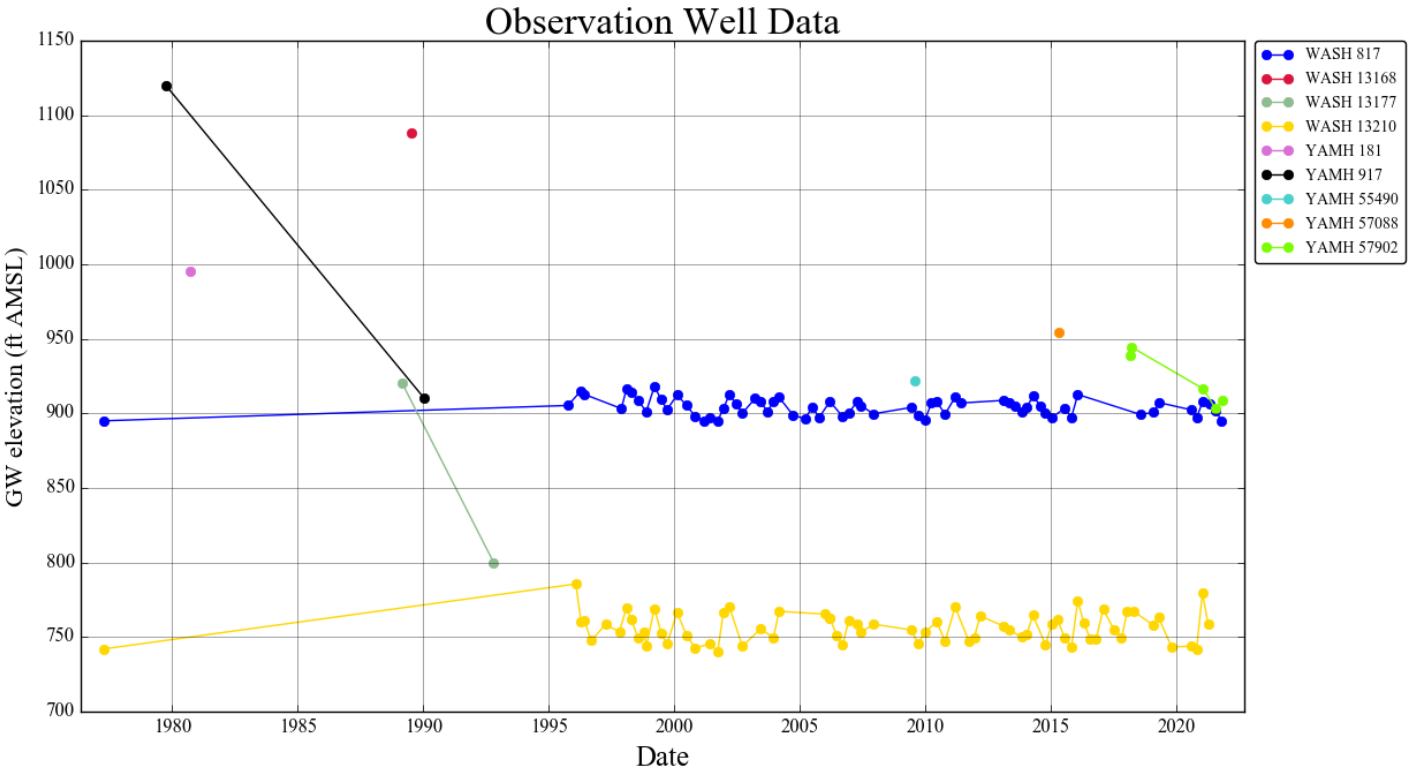
Well Location Map. Wells beyond the map extent include WASH 817 and WASH 13210.



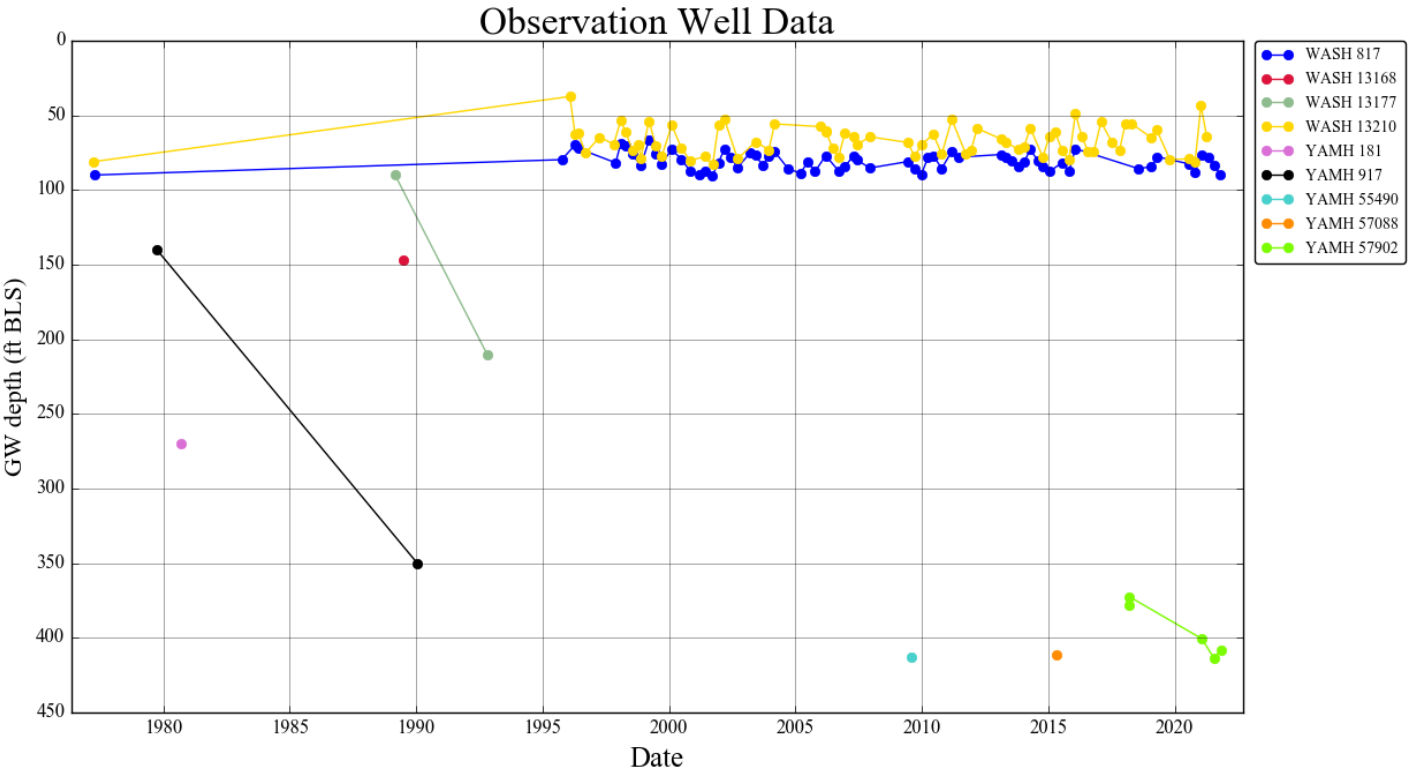
Cross-section of well construction with limited lithology and water-bearing zones from well logs, with appx water levels. The path of this cross-section appears as a jagged blue line in the map above.



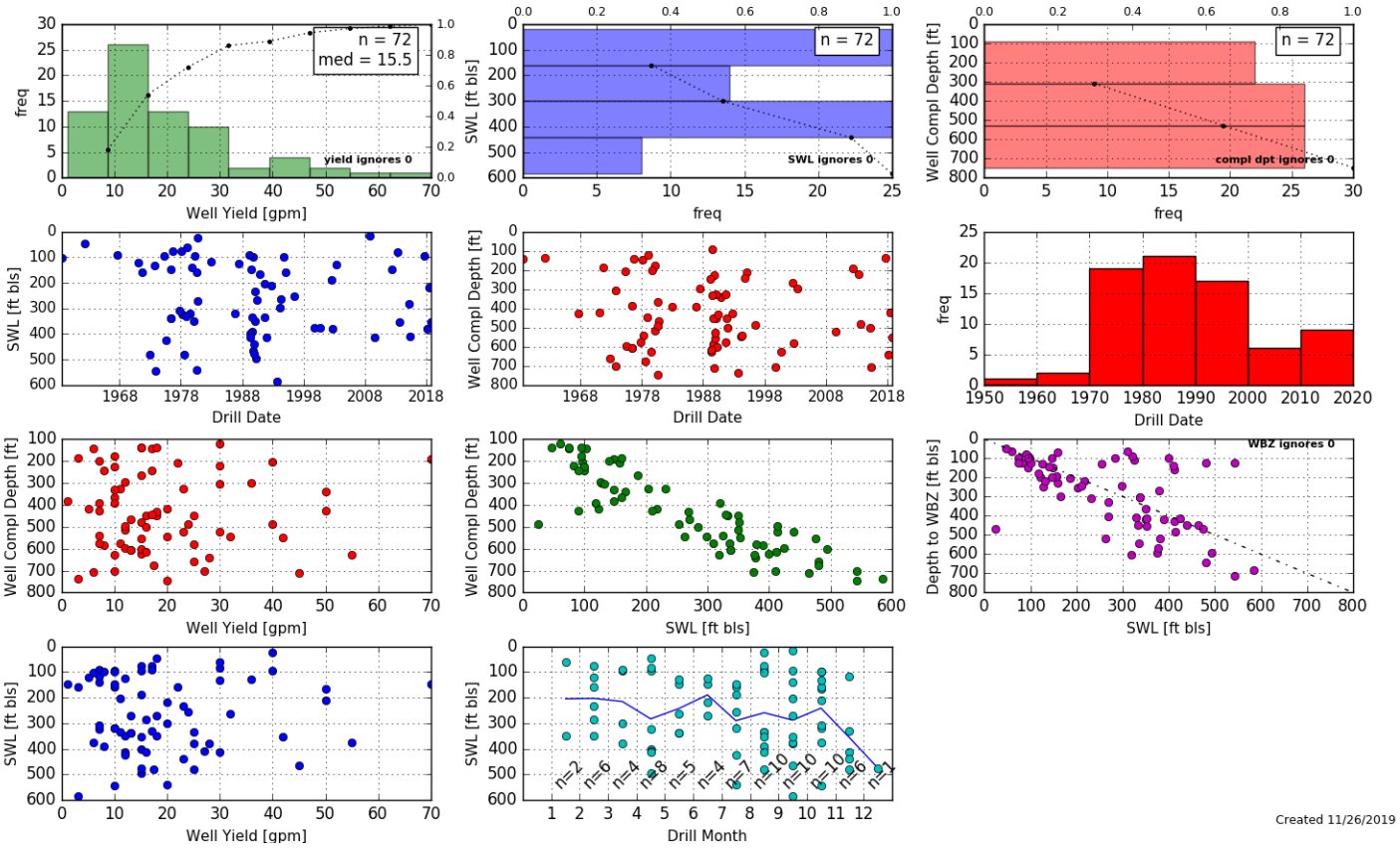
Hydrograph showing water level elevations in nearby wells



Hydrograph showing water level depths below land surface in nearby wells

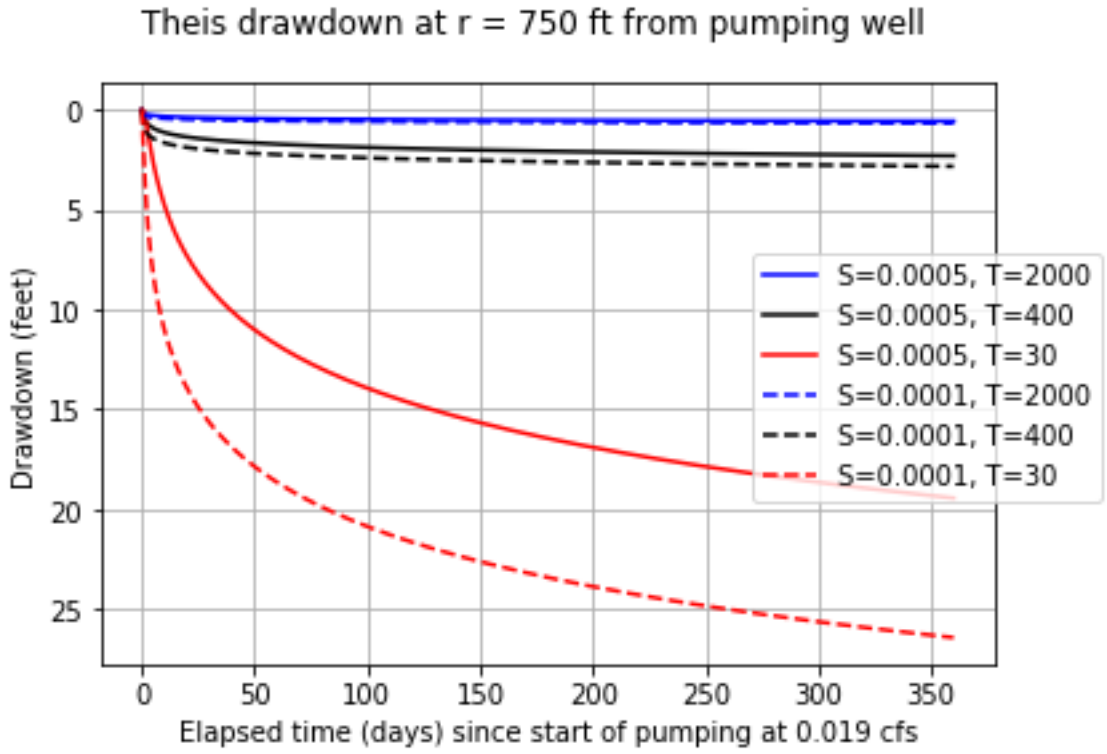


Well Statistics: Sections 31 & 32, 2S/2W

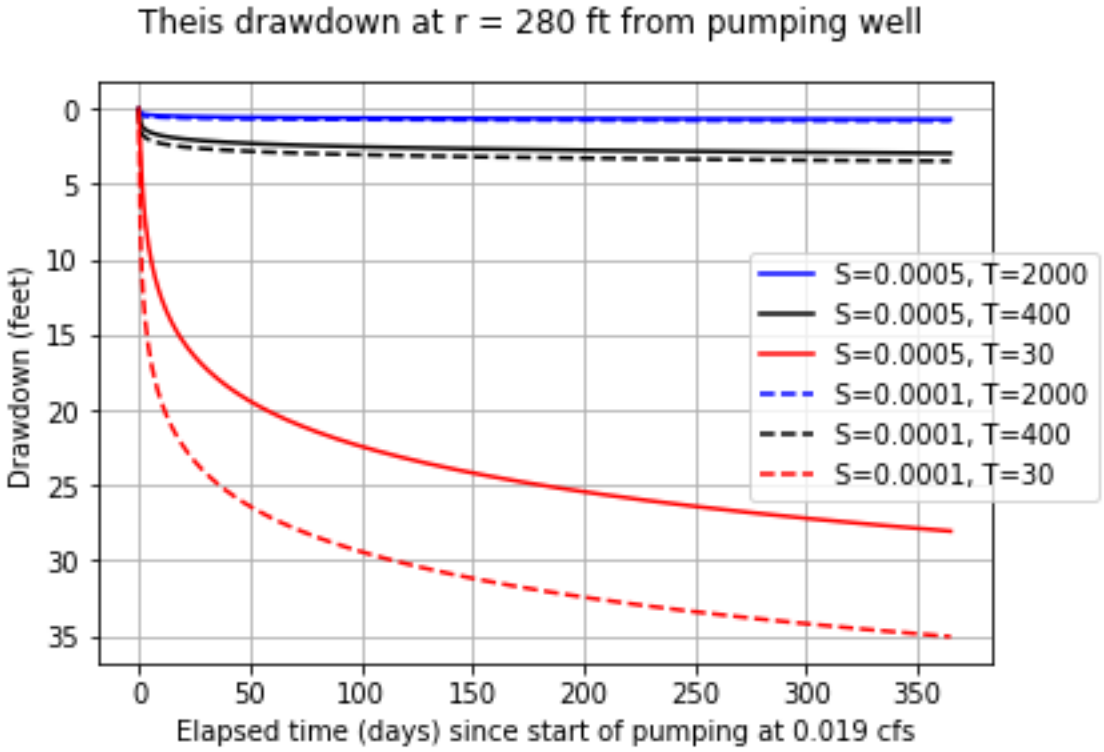


Interference Model Results

Impacts on YAMH 917 at the proposed rate, 0.019 cfs:



Impacts on YAMH 55490 at the proposed rate, 0.019 cfs:



Impacts on spring on Certificate 44800 at the proposed rate, 0.019 cfs: