Approved: 

MEMO

To:	Kristopher Byrd, Well Construction Section Manager
From:	Tommy Laird, Well Construction Program Coordinator
Subject:	Review of Water Right Application G-19162
Date:	October 18, 2023

The attached application was forwarded to the Well Construction Section by the Groundwater Section. Travis Brown reviewed the application. Please see Travis' Groundwater Review.

Applicant's Well #1 (Proposed Well): Well #1 is a proposed well, therefore it cannot be reviewed for construction. Construction of this proposed well shall be completed in a manner that protects ground water resources as required under Oregon Administrative Rules 690-200 through 690-240. During construction of this well, specific attention should be paid to ensure sealing requirements are met and that the well does not commingle aquifers.

The construction of proposed Well #1 may not satisfy hydraulic connection issues.

Groundwater Application Review Summary Form

Application # G- 19162

GW Reviewer Travis Brown Date Review Completed: 2/17/2023

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 **_March 4 2022_**

TO: **Application** G-**_19162_**

FROM: **GW:** **_Stacey Garrison/Travis Brown_**
(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 _[Enter]_ 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 2/17/2023
FROM: Groundwater Section Travis Brown
Reviewer's Name
SUBJECT: Application G- **19162** Supersedes review of 3/4/2022
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: **Andrew and Abigail Heneveld** County: **Marion**

A1. Applicant(s) seek(s) 0.10 cfs from 1 well(s) in the Willamette Basin, Molalla-Pudding subbasin

A2. Proposed use Nursery Seasonality: Year round (Jan 1-Dec 31)

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	Proposed	1	Alluvial[a]	0.10	7S/2W-33	70' S,1650' W fr NE cor S33[b]

* 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	226[c]				120[a]	0-25[a]	0-120[a]		TBD[a]			

Use data from application for proposed wells.

A4. **Comments:** The requested POA/POU are located approximately 3 miles to the east of Salem, Oregon. The applicant requests to use 0.10 cfs (~44.88 gpm) for 4 ac of nursery for a maximum annual duty of 20 acre-feet (AF) year round, from January 1-December 31.

[a] Proposed well construction from applicant.

[b] There appears to be a discrepancy in the Public Lands Survey System (PLSS) projection used in the application map and that used by Department. The "metes-and-bounds" location description provided in the application for POA 1 is 110 feet southeast of the mapped location. The mapped location is used for this review.

[c] Well head elevation estimated based on LIDAR measurements at proposed/existing well locations (Watershed Sciences, 2009).

A5. ☐ **Provisions of the** Willamette River 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 requested POAs are anticipated to produce groundwater from a confined aquifer, therefore, per OAR 690-502-0240, the relevant Willamette Basin Rules (OAR 690-502-0120) do not apply.

A6. ☐ **Well(s) #** _____ , _____ , _____ , _____ , _____ , tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: _____
Comments: _____

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) **7c (initial and 7-year annual water level measurement)**;

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 **alluvial** 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:**

The proposed POA/POU are on Pleistocene alluvial deposits, primarily associated with older terrace and fan deposits as well as fine sediments from the Missoula Floods (Tolan and Beeson 2001). Terrace deposit formations can alternate between fine and coarse-grained layers and can be discontinuous (Gannet & Caldwell 1998). Hampton (1972) mapped this area as Willamette Silt with a thickness of approximately 20 to 60 ft, and the underlying Troutdale Formation ranging from 50 to 100 ft thick. This is consistent with the yellow and blue clays recorded in nearby well logs (MARI 7834, MARI 16474, MARI 16526, MARI 19261, MARI 7085), as the Willamette Silt is typified as sand or silty clay, in tones of blue and yellow (Hampton 1972, Conlon et al 2005). These wells appear to utilize the Willamette aquifer, with reported layers of sandy clay and blue clay overlying the utilized water-bearing zones (WBZ), (Gannett & Caldwell 1998, Conlon et al 2005, Swanson et al 1993). There is a wide variability in hydraulic characteristics of the Willamette aquifer, owing to the variety of compositions and degree of consolidation (O'Connor et al 2001). Given the proposed depth of Well 1, it is also likely to utilize a WBZ in the Willamette aquifer. The thickness of WBZs using this aquifer in surrounding wells varies from 1 foot to 70 feet in thickness, with pumping rates ranging from 25 to 175 gpm.

A review of statistics for nearby alluvial well records was completed and compared with the proposed rate of 0.10 cfs (44.88 gpm) for this application (see Well Statistics). The proposed rate of use of 0.10 cfs (44.88 gpm) is likely within the capacity of the groundwater resource; median reported well yield is 210 gpm, and the maximum reported yield is 800 gpm. The proposed rate for this application is 21% of the median and 6% of the maximum reported yield.

Water level trends for nearby (0.7 to 4 miles from POA) wells that utilize alluvial aquifers appear to be steady (see Water Level Measurements in Nearby Wells). Five of the wells included have experienced water level declines ranging from 3 to 5 ft over the last 10 years (MARI 17377, MARI 50474, MARI 50650, MARI 56474, MARI 63354); all of these wells utilize predominantly coarse water-bearing zones, ie sand and/or gravel, and the wells with the highest declines have yields greater than 300 gpm. The remaining 13 wells appear to have steady water levels.

The nearest groundwater user to Well 1 is MARI 16525 (POD for Cert 60030 with priority date 25 January 1978 and Claim GR 1041 with priority date 31 December 1945) is 422 ft northwest of the POA, at an elevation of ~232 ft msl. MARI 16525

is completed to a depth of 93 ft bls (139 ft msl). It is likely the proposed use would cause some degree of well-to-well interference with MARI 16525. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis). Results indicate that the proposed use is not likely to cause well-to-well interference with MARI 16525 that exceeds the threshold under the standard condition for alluvial aquifers in the Willamette Basin.

Based on this analysis of the available data and under the assumptions previously identified, groundwater for the proposed use **will likely be available in the amounts requested and within capacity of the resource; however, the conditions specified in B1.d. and B2.c. are strongly recommended to protect senior users and the groundwater resource.**

NOTE: This evaluation considers a conservative scenario for the nearest authorized POA not owned by the applicant. Other authorized POAs in the area may also experience an increase in interference as a result of this application, although to a lesser extent than the scenario evaluated here.

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	**Alluvial aquifer**	☒	☐

Basis for aquifer confinement evaluation: A review of surrounding well logs identifies consistent confining layers overlying confined alluvial aquifers. In all these nearby wells, the static water level is above the bottom of the confining layer, indicating a confined aquifer. The well to be constructed will be continuously sealed from the surface to 25 ft bls, and is anticipated to be 120 ft deep.

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**	**Little Pudding River**	**180-199[a]**	**190[b]**	**6,742**	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: Proposed Well 1 is anticipated to be continuously sealed to 25 ft bls [201 ft msl]. Static water levels in surrounding wells that utilize only alluvial aquifer sources vary from 180 to 199 ft msl (MARI 16525, MARI 16526, MARI 7834, MARI 16492, MARI 16474). The local streambed of SW 1 (Little Pudding River) is around 190 ft msl in elevation, indicating that the local groundwater is likely discharging to surface water. The surface water drainages have not incised below the elevation of the water-bearing zones (WBZ) of the alluvial aquifer-sourced wells, which range from 103 to 175 ft msl[c]. Hydraulic connection to nearby streams is likely but anticipated to be inefficient due to the horizontal distance and the low vertical permeability of the overlying fine-grained sediments.

[a] Groundwater elevation calculated from static water level reported in well logs and/or latest static water level reported for MARI 16525, MARI 16526, MARI 7834, MARI 16492, MARI 16474 and well head elevations estimated based on LIDAR measurements at existing well locations (Watershed Sciences, 2009).

[b] Surface water elevations were estimated from land surface elevations along stream reaches (Watershed Sciences, 2009; USGS, 2013).

[c] Water-bearing zone elevations calculated from alluvial aquifer water-bearing layers reported in well logs for MARI 16526, MARI 7834, MARI 16492, MARI 16474, MARI 19261, MARI 7085.

Water Availability Basin the well(s) are located within: PUDDING R>MOLALLA R-AB MILL CR

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 (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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?
		☐	☐			☐		☐		☐

Comments: NA-no perennial streams within 1 mile of proposed location of POA

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: NA-the proposed rate is not distributed among wells.

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
1	**1**	**~0%**	**~0%**	**~0%**	**~0%**	**~0%**	**~1%**	**~1%**	**~1%**	**~1%**	**~1%**	**~1%**	**~1%**
Well Q as CFS		**0.028**	**0.028**	**0.028**	**0.028**	**0.028**	**0.028**	**0.028**	**0.028**	**0.028**	**0.028**	**0.028**	**0.028**
Interference CFS		**<0.00028**	**<0.00028**	**<0.00028**	**<0.00028**	**<0.00028**	**~0.00028**	**~0.00028**	**~0.00028**	**~0.00028**	**~0.00028**	**~0.00028**	**~0.00028**
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Well Q as CFS													
Interference CFS													
		%	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Well Q as CFS													
Interference CFS													
(A) = Total Interf.		**<0.00028**	**<0.00028**	**<0.00028**	**<0.00028**	**<0.00028**	**~0.00028**	**~0.00028**	**~0.00028**	**~0.00028**	**~0.00028**	**~0.00028**	**~0.00028**
(B) = 80 % Nat. Q		**1,040**	**1,180**	**1,010**	**787**	**425**	**224**	**109**	**71**	**67.3**	**91.6**	**363**	**957**
(C) = 1 % Nat. Q		**10.4**	**11.8**	**10.1**	**7.87**	**4.25**	**2.24**	**1.09**	**0.71**	**0.673**	**0.916**	**3.63**	**9.57**
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		**<1%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**

(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: SW1 is located more than a mile from Well 1 and is anticipated to have a weak hydraulic connection. A single well is anticipated for the appropriation of the requested rate of 0.10 cfs (~44.88 gpm) for a year-round (365 day) season of use. The requested rate could not occur continuously for the entire 365-day season, as the maximum allowed duty of 20 AF would be appropriated within approximately 101 days of continuous pumping. A prorated multiplier has been applied, and is calculated from the maximum continuous rate that could occur for the 365-day season of use and the maximum allowed duty of 20 AF; this rate is 0.028 cfs (~12.4 gpm). As this is a year-round use, each month represents an active well, and none of the months are residual. Potential depletion of (interference with) SW 1 (Little Pudding River) was

estimated based on the prorated rate of 0.028 cfs (~12.4 gpm) pumping continuously for 365 days using the Hunt (2003) analytical model.
Hydraulic parameters used for the model were derived from regional data or studies of the hydrogeologic regime (OWRD Well Log Query Report; Conlon et al., 2003, 2005; Iverson, 2002; McFarland and Morgan, 1996; Woodward et al., 1998) or are within a typical range of values for the parameter within the hydrogeologic regime (Freeze and Cherry, 1979; Domenico and Mifflin, 1965). See attached "Stream Depletion Analysis – SW 1" for the specific parameters used in the analysis. This analysis indicates that the depletion of (interference with) SW 1 due to pumping of the proposed POA is anticipated to be much less than 1 percent of the natural streamflow which is exceeded 80 percent of time ("80% Nat. Q"). Because only the distance is expected to vary between the POA and other surface water sources, only the POA-SW pair with the shortest distance (in this case, POA 1 and SW 1) was analyzed quantitatively for interference (stream depletion). All other POA-SW pairs would presumably result in less interference due to their greater separation relative to POA 1 and SW 1. Therefore, the interference of the proposed POA with all surface water sources is also likely to be minimal.

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:** The proposed POA/rate is anticipated to cause interference with SW 1 that is much less than 1 percent of the well discharge over a year.

References Used:

Application file: G-19162
Pumping Test Files: MARI 1407, MARI 7128, MARI 7393, MARI 7461, MARI 7530, MARI 7581, MARI 7582, MARI 7613, MARI 7631, MARI 7641, MARI 7872, MARI 8111
Well Reports: MARI 16525, MARI 16526, MARI 7834, MARI 16492, MARI 16474, MARI 19261, MARI 7085
Conlon, T.D., Lee, K.K., and Risley, J.R., 2003, Heat tracing in streams in the central Willamette Basin, Oregon, in Stonestrom, D.A. and Constantz, Jim, eds., Heat as a tool for studying the movement of groundwater near streams: U.S. Geological Survey Circular 1260, chapter 5, p. 29-34.

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.

Domenico, P.A. and Mifflin, 1965, Water from low-permeability sediments and land subsidence: Water Resource Research, v. 1, no. 4, p. 563-576.

Freeze, R.A. and Cherry, J.A., 1979, *Groundwater*, Prentice Hall, Englewood Cliffs, New Jersey, 604 p.

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.

Hampton, E.R. 1972. Geology and Ground Water of the Molalla-Salem Slope Area, Northern Willamette Valley, Oregon. USGS Water Supply Paper 1997.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Iverson, J., 2002, Investigation of the hydraulic, physical, and chemical buffering capacity of Missoula flood deposits for water quality and supply in the Willamette Valley of Oregon: Unpublished M.S. thesis, Oregon State University, 147 p.

O'Connor, J.E., Sarna-Wojcick, A., Woznikak, K.C., Polette, D.J., Fleck, R.J., 2001, Origin, Extent, and Thickness of Quaternary Geologic Units in the Willamette Valley, Oregon; U.S. Geological Survey, Professional Paper 1620, 51 p.

Tolan, T.L. and Beeson, M.H. Digital Database By DuRoss, C.B. 2001. Geologic Map and Database of the Salem East and Turner 7.5-Minute Quadrangles, Marion County, Oregon: A Digital Database: U.S. Geological Survey Open-file Report 00-351, https://pubs.usgs.gov/of/2000/0351/.

United States Geological Survey, 2013, National Elevation Dataset (NED) [DEM geospatial data]. 1/9th arc-second, updated 2013.

United States Geological Survey, 2014, *Salem East quadrangle*, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, Virginia.

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, 82 p.

Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Willamette Valley Phase I, Oregon, Portland, OR, December 21.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #**: **1** **Logid: N/A (proposed)**

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

Water Availability Analysis
Detailed Reports

PUDDING R > MOLALLA R – AB MILL CR
WILLAMETTE BASIN
Water Availability as of 2/14/2022

Watershed ID #: 151 (Map)
Date: 2/14/2022

Exceedance Level: 80%
Time: 12:20 PM

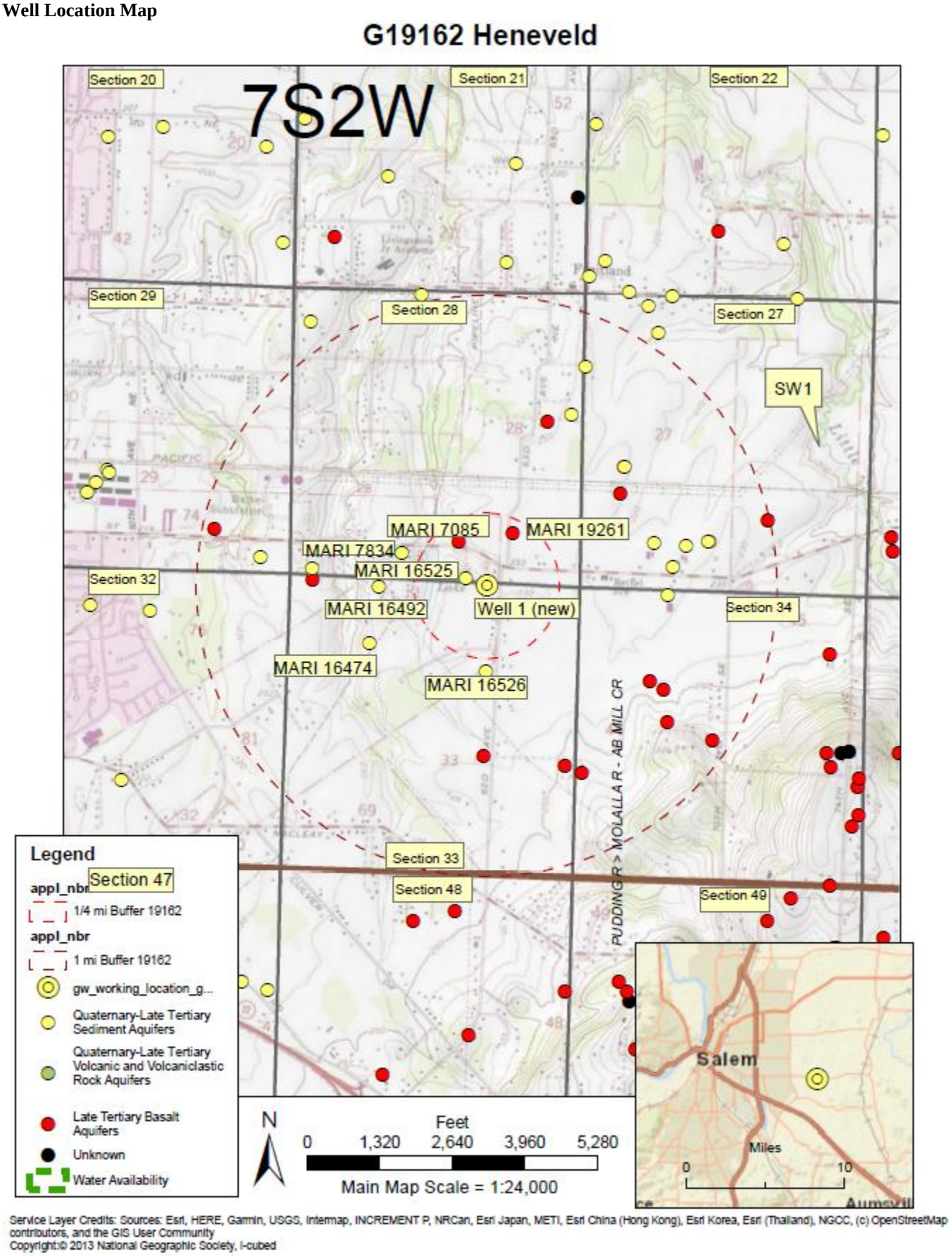
Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations
Water Rights | Watershed Characteristics

Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	1,040.00	125.00	915.00	0.00	36.00	879.00
FEB	1,180.00	115.00	1,070.00	0.00	36.00	1,030.00
MAR	1,010.00	76.60	933.00	0.00	36.00	897.00
APR	787.00	52.40	735.00	0.00	36.00	699.00
MAY	425.00	50.60	374.00	0.00	36.00	338.00
JUN	224.00	72.50	152.00	0.00	36.00	116.00
JUL	109.00	114.00	-4.89	0.00	36.00	-40.90
AUG	71.00	93.40	-22.40	0.00	36.00	-58.40
SEP	67.30	53.00	14.30	0.00	36.00	-21.70
OCT	91.60	11.50	80.10	0.00	36.00	44.10
NOV	363.00	48.60	314.00	0.00	36.00	278.00
DEC	957.00	119.00	838.00	0.00	36.00	802.00
ANN	706,000.00	56,100.00	650,000.00	0.00	26,100.00	626,000.00

Well Location Map



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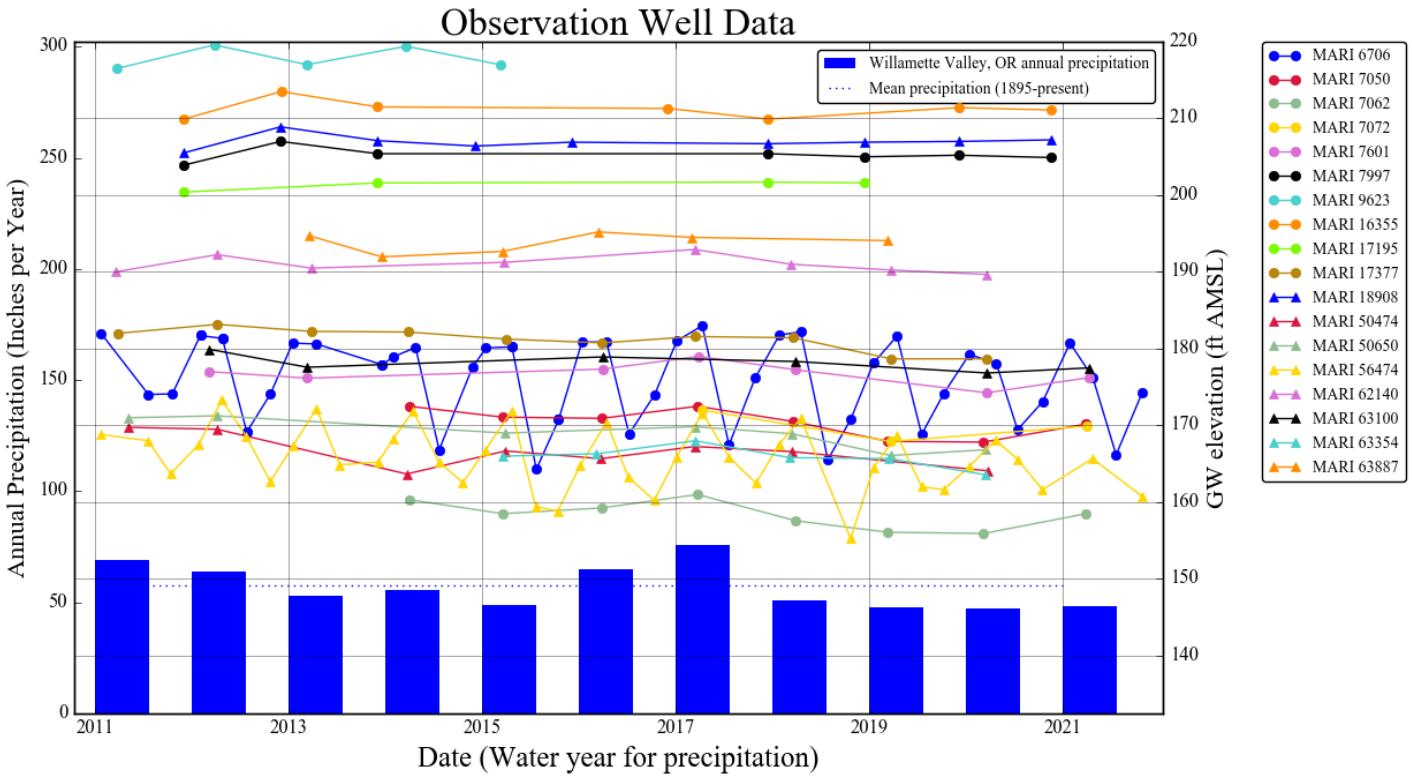
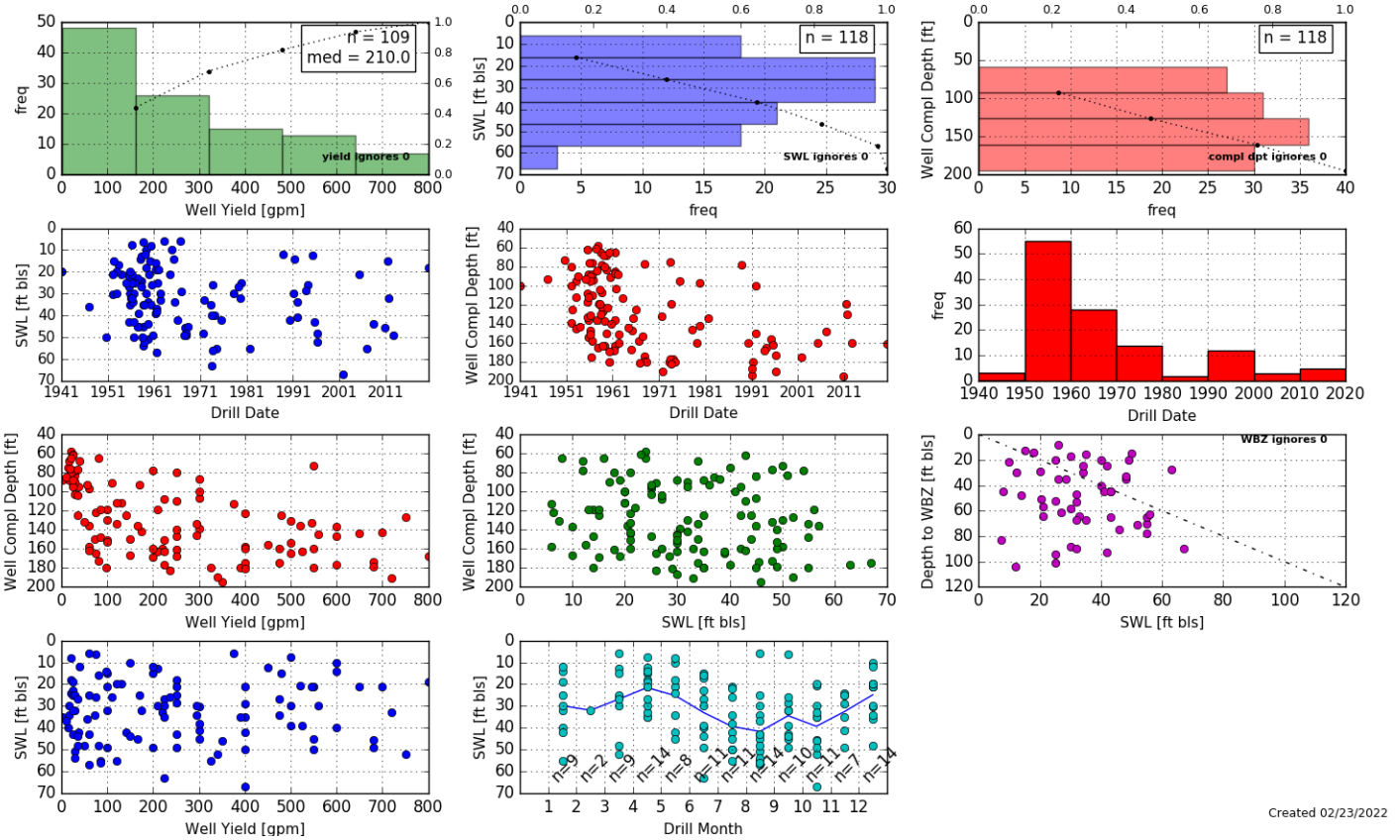
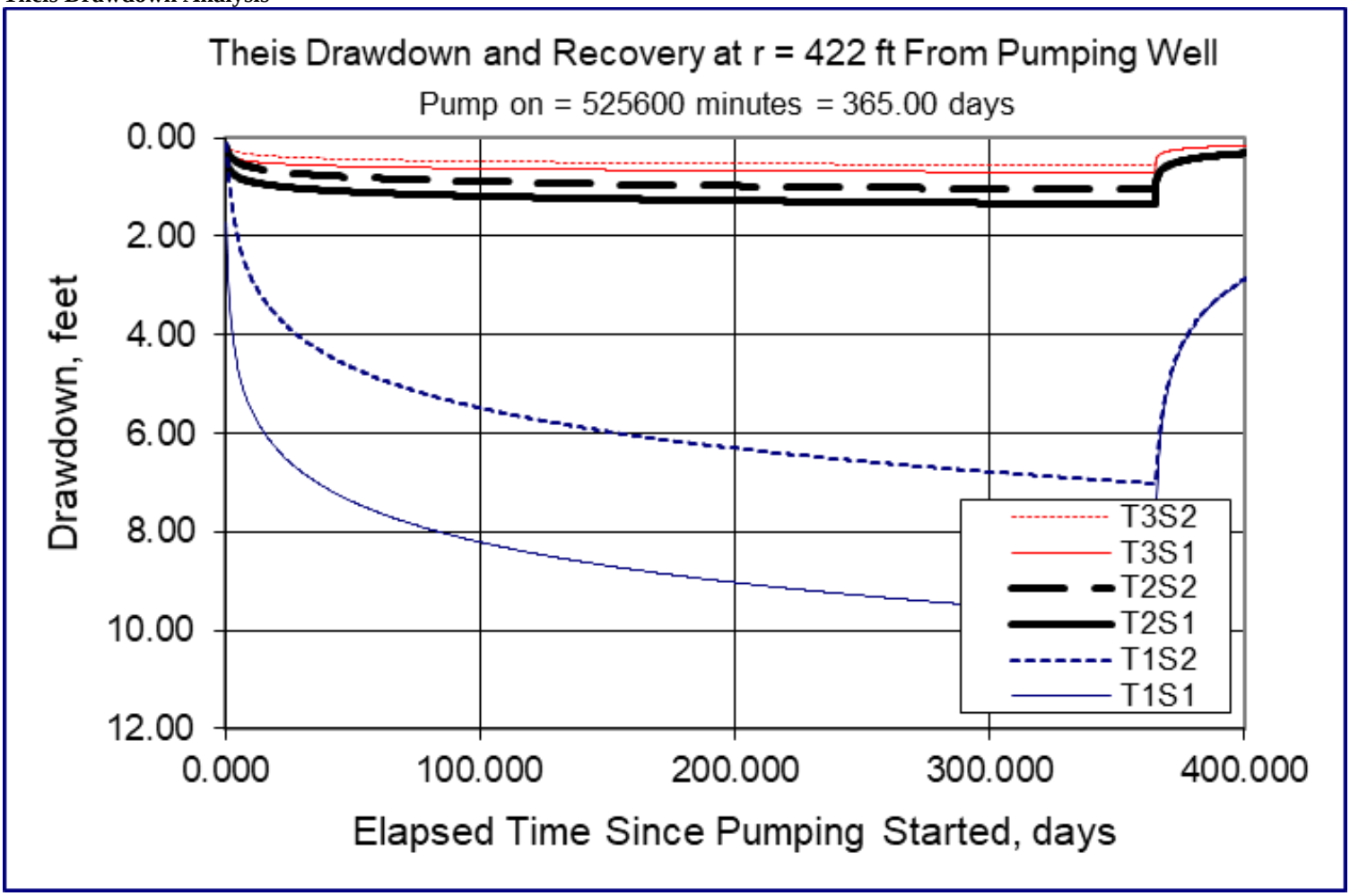
Water-Level Measurements in Nearby Wells



Well Statistics



Theis Drawdown Analysis



Radial distance from pumping well (r)=422 ft [estimated radial distance to nearest user, MARI 16525]
Pumping Rate (Q)= 0.0276 cfs (12.4 gpm) *
Aquifer Transmissivity (T1)= 1,196.8 gpd/ft (160 ft^2/day), (T2)= 10,952.2 gpd/ft (1,464.2 ft^2/day), (T3)= 22,440 gpd/ft (3,000 ft^2/day)
Storativity (s1) = 2 X 10^{-4}, (s2) = 2 X 10^{-3} [Conlon et al 2005, Tables 1 and 2 values for Central MSU]
Total pumping time = 365 days
*The full pumping rate could not be utilized continuously for the entire 365-day period of use without exceeding the 20 ac-ft maximum allowed duty. For the maximum allowed duty of 20 ac-ft, continuous pumping would occur for 365 days at a rate of 0.0276 cfs (12.4 gpm).

Stream Depletion Analysis-SW 1

Application type:	G
Application number:	19162
Well number:	1
Stream Number:	1
Pumping rate (cfs):	0.028
Pumping duration (days):	365.0
Pumping start month number (3=March)	1.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	6742.0	6742.0	6742.0	ft
Aquifer transmissivity	T	160.0	1464.0	3000.0	ft2/day
Aquifer storativity	S	0.0002	0.0011	0.002	-
Aquitard vertical hydraulic conductivity	Kva	0.001	0.005	0.01	ft/day
Aquitard saturated thickness	ba	15.0	15.0	15.0	ft
Aquitard thickness below stream	babs	10.0	10.0	10.0	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	300.0	300.0	300.0	ft

Stream depletion for Scenario 2:

Days	10	30	60	90	120	150	180	210	240	270	300	330	360
Depletion (%)	0	0	0	0	1	1	1	1	1	1	1	1	1
Depletion (cfs)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00