

Groundwater Application Review Summary Form

Application # G- 19333

GW Reviewer Dennis Orlowski Date Review Completed: 04/20/2023

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

April 20, 2023

TO: Application G- 19333

FROM: GW: Dennis Orlowski
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☒ YES The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries Clackamas Scenic Waterway

☐ NO

☒ YES Use the Scenic Waterway Condition (Condition 7J)

☐ NO

☒ 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 in the table below.

Stream depletions due to the proposed use will increase with time until a new steady state is reached between recharge (including stream capture) and discharge, at which time approximately 100 percent of the water consumed from the proposed POA will be depleted from surface water (Theis, 1940; Bredehoeft, 2011; Barlow and Leake, 2012). Therefore, the monthly interference with surface water above the State Scenic Waterway is estimated as 1/12 (~8.3%) of the full volume of consumptive use, assuming that at steady state the depletion of surface water will be distributed approximately evenly throughout the twelve months of the year. For nursery and irrigation use, this approach is expected to overestimate stream depletion during the cool, high-precipitation months (when groundwater demand is anticipated to be lowest) and underestimate stream depletion during the hot, dry summer months (when groundwater demand is anticipated to be highest). This bias will be greatest for wells that are closest to streams and will lessen the further a well is located from a stream (Bredehoeft, 2011; Barlow and Leake, 2012).

☐ 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 Clackamas 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
0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section
 FROM: Groundwater Section Dennis Orłowski
 Date April 20, 2023
 SUBJECT: Application G- 19333 Supersedes review of _____
 Reviewer's Name
 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: Elizabeth Pursley and Colin Randall County: Clackamas

A1. Applicant(s) seek(s) 0.0565 cfs from two well(s) in the Willamette Basin,
Clackamas subbasin

A2. Proposed use Irrigation (primary, 40.6 ac) Seasonality: March 1 – October 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	Alluvium	0.0565	T2S/R3E-28	975'N, 570'E fr SW cor S28
2	Proposed	2	Alluvium	0.0565	T2S/R3E-28	1475'N, 585'E fr SW cor S28

* 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		TBD	TBD	TBD	275	0-50	0-275	TBD	TBD	TBD	TBD	TBD
2		TBD	TBD	TBD	275	0-50	0-275	TBD	TBD	TBD	TBD	TBD

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU location is approximately 6-7 miles east-northeast of Oregon City, and about 1.5 miles south of the Clackamas River. This location is within the boundaries of the Clackamas Scenic Waterway.

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 proposed POAs will obtain groundwater from a confined aquifer, and thus the pertinent Basin rules (OAR 690-502-0240) will not apply.

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
 Name of administrative area: None
 Comments: Not applicable.

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) 7N, 7J (Scenic Waterway), medium 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 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 location is on an upland terrace bounded approximately 1 mile to the west-southwest by Clear Creek, and about 1 to 1.5 miles to the north by Foster Creek and the Clackamas River. These larger streams are deeply incised into underlying Quaternary alluvium, the Tertiary Troutdale Formation, and/or the Sandy River Mudstone. There are also tributaries to these streams located nearer to the POA locations, but are not as deeply incised into the underlying deposits. Basalt flows of the Boring Lava are also present in the area, although are more extensive to the south (Leonard and Collins, 1983; Conlon and others, 2005; Gannett and Caldwell, 1998).

Local wells obtain groundwater either from the uppermost Quaternary terrace deposits, the Troutdale Formation, or coarser sand and/or gravel units within the Sandy River Mudstone. Given the proposed depths for both wells (275 ft), it is probable that they will obtain groundwater from the Troutdale Formation and/or the Sandy River Mudstone. Yields from wells completed in these formations range from 3-500 gpm, with a median of 30 gpm (Leonard and Collins, 1983).

Local groundwater development is moderately-high, with about 10-15 irrigation wells and 90-100 domestic wells reported for Sections 28, 29, 32 and 33. The nearest domestic wells tend to be less than 200 ft deep (e.g., CLAC 5179, CLAC 5182, CLAC 14421). The nearest permitted wells are POAs associated with irrigation certificates 38515 and 85556 located about 3000-4000 feet from this application's proposed wells. It is unlikely that this proposed use will adversely affect these and other nearby wells due to the low requested allocation (0.0565 cfs, ~25 gpm). Also, none of these nearby wells fully penetrate the alluvial aquifer system.

Available groundwater level data for this area is very sparse. Water-level measurements from nearby CLAC 66847 (261 ft deep) indicate generally stable groundwater conditions (moderate declines since 2018 are likely drought related).

If a permit is granted, the noted conditions are recommended to both protect existing water resources and to improve future understanding of groundwater conditions in this area.

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	Alluvium	☒	☐
2	Alluvium	☒	☐

Basis for aquifer confinement evaluation: Static water levels in local wells are far above the depths at which groundwater was first encountered and where the principal water-bearing zones are located, indicating confined conditions.

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?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Unnamed tributary to Clear Creek (SW)	220-300	190-305	3100	☒	☐	☐	☐	☒
2	1	Unnamed tributary to Clear Creek (SW)	220-300	190-305	3400	☒	☐	☐	☐	☒
1	2	Unnamed tributary to Clear Creek (NW)	220-300	280-360	4650	☒	☐	☐	☐	☒
2	2	Unnamed tributary to Clear Creek (NW)	220-300	280-360	4300	☒	☐	☐	☐	☒
1	3	Foster Creek	220-300	210-230	5300	☒	☐	☐	☐	☒
2	3	Foster Creek	220-300	210-230	4780	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: * Groundwater elevations in local wells vary greatly depending on depth of completion; the estimated range of elevations for the proposed POA is based on sparse available information (primarily from a measurement recorded on the nearby CLAC 76550 well log and from CLAC 66847 data), hence the broad range.

** The headwaters of several tributaries to Clear Creek are located beginning within about 1/4 mile from the proposed POA locations; these tributaries are ephemeral in their upper reaches, but transition to perennial at downslope locations where they are more fully incised into underlying deposits. The distances shown for the two unnamed tributaries to Clear Creek (SW1 and SW2) are from the wells to locations where the stream elevation is first coincident with the estimated upper groundwater elevation. The estimated range of static water levels in the proposed POAs is coincident with or above the elevation ranges of the nearby surface water sources at their nearest applicable perennial reaches, indicating hydraulic connection.

Furthermore, the perennial nature of Clear Creek and its tributaries indicates that groundwater discharges sustain surface water flows during low-precipitation periods. This hydraulic connection between groundwater and surface water is substantiated by the presence of several permitted spring water rights along escarpments to the northeast and south of the proposed POAs; these springs discharge water from the terrace deposits at or just below the elevations of water-bearing zones noted on area well logs.

The hydraulic connection between the proposed POAs is likely strongest with the tributaries to Clear Creek (SW 1-2), given their relative proximity. It is unlikely that pumping impacts at the two proposed wells would extend beyond these nearer surface water sources to have a measurable impact on Foster Creek.

Water Availability Basin the well(s) are located within:

SW 1-2: WID 82, Clear Creek > Clackamas River – at mouth;

SW 3: WID 80, Clackamas River > Willamette River – at mouth.

- 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?	Q _w > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Q _w > 1% ISWR?	80% Natural Flow (cfs)	Q _w > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	☐	☐	MF82A	20.00	☐	5.65	☐	<<25%	☐
2	1	☐	☐	MF82A	20.00	☐	5.65	☐	<<25%	☐
1	2	☐	☐	MF82A	20.00	☐	5.65	☐	<<25%	☐
2	2	☐	☐	MF82A	20.00	☐	5.65	☐	<<25%	☐
2	3	☐	☐	SY90206A	890.00	☐	822.00	☐	<<25%	☐

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

Comments: C3a: based on past stream depletion modeling experience in similar settings (Hunt, 2003), it is likely that interference at 30 days of continuous pumping at the maximum authorized rate will be much less than 25% of that rate. This conclusion is due largely to the presence of shallow, thick sequences of low-permeability silt and clay that exist between the stream beds and deeper, confined water-bearing sands and gravels.

C3b: not applicable.

- 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													
		%	%	%	%	%	%	%	%	%	%	%	%
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: Not applicable.

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: All of the hydraulically connected stream reaches identified in Section C2 are above the Clackamas River State Scenic Waterway. Due to the hydraulic connection between these streams and the alluvial aquifer in this area, the relevant State Scenic Waterway provisions apply to the proposed use (note recommended related condition 7J in Section B2c).**

References Used: Application file: G-19333.

Groundwater reviews: applications G-19072, G-18622, G-17427, G-17426, G-16444.

Barlow, P., and Leake, J., 2012, Streamflow depletion by wells – understanding and managing the effects of groundwater pumping on streamflow: U.S. Geological Survey, Circular 1376, 84 p.

Bredehoeft, J., 2011, Hydrologic trade-offs in conjunctive use management: Ground Water, v. 49, no. 4, p. 468-475.

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.

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.

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

McFarland, W.D., and Morgan, D.S., 1996, Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington: U.S. Geological Survey Water Supply Paper 2470-A, 58 p.

Theis, C.V., 1940, The source of water derived from wells: Essential factors controlling the response of an aquifer to development: Civil Engineering, Vol. 10, p. 277–280.

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

United States Geological Survey, 2017, Redland 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, Hood to Coast 2009, Portland, OR, May 27.

D. WELL CONSTRUCTION, OAR 690-200

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

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

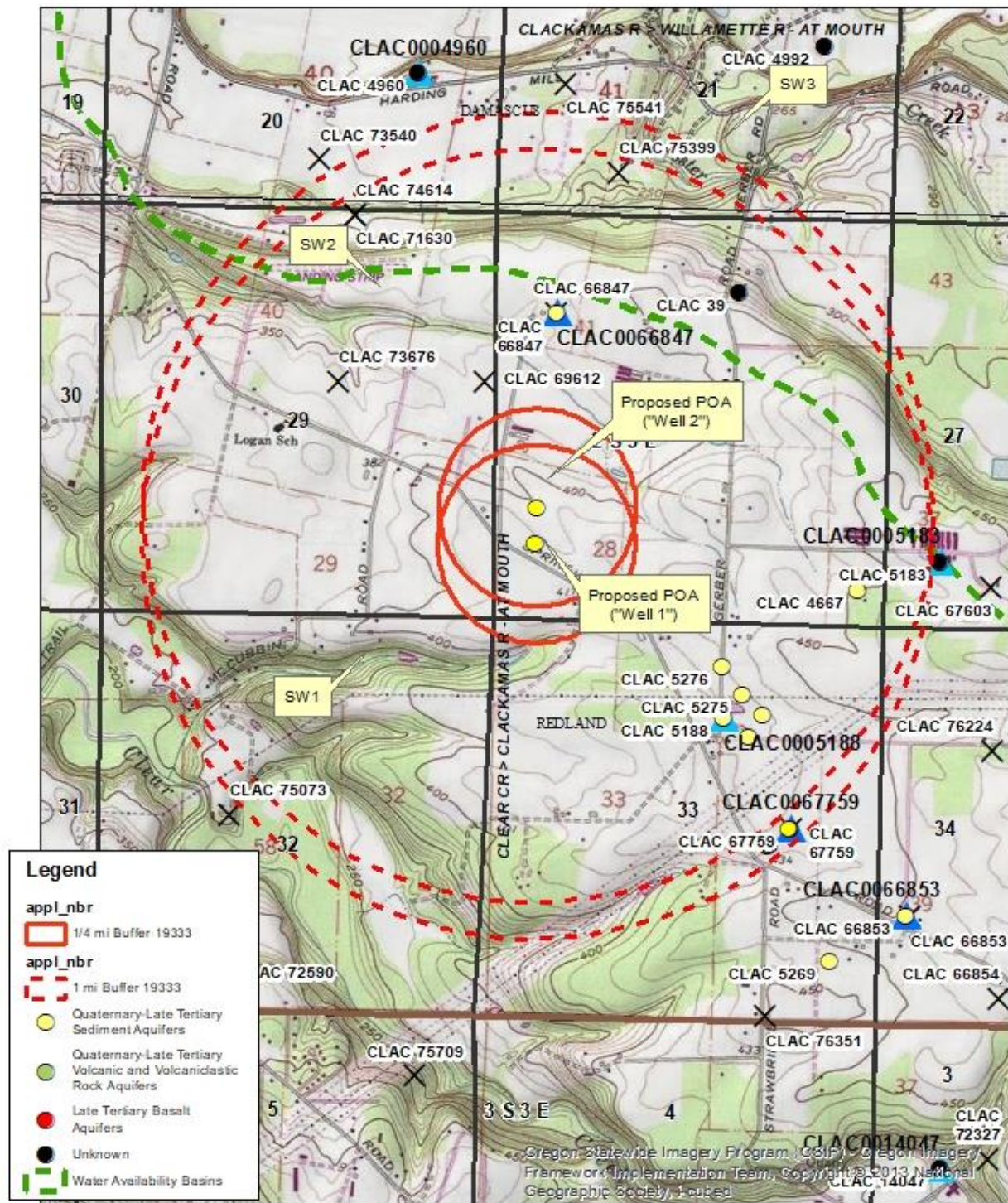
- a. ☐ review of the well log;
- b. ☐ field inspection by _____;
- c. ☐ report of CWRE _____;
- d. ☐ other: (specify) _____

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

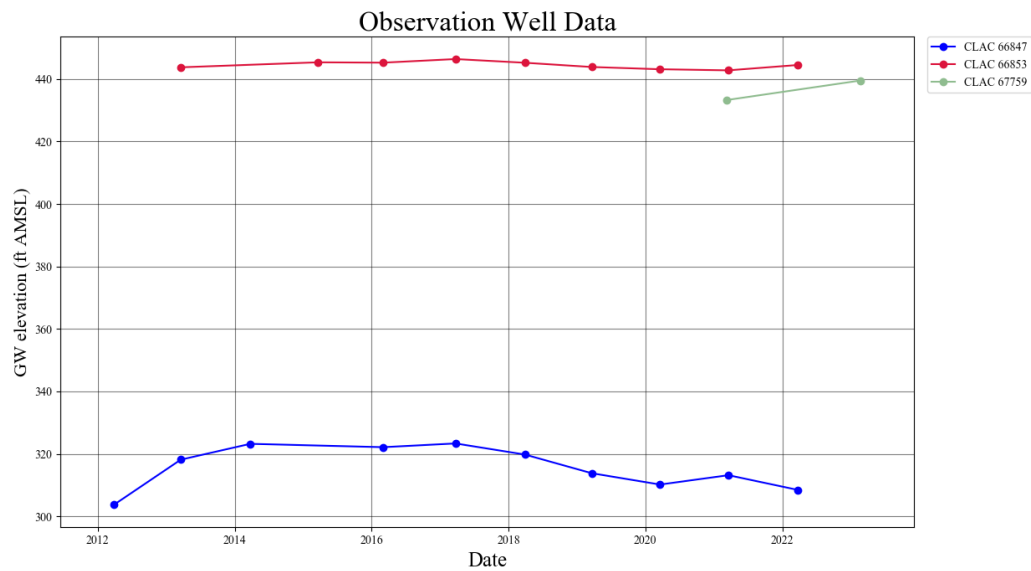
D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Well Location Map

Application G-19333, Pursley and Randall T2S, R3E, Section 28



Water-Level Measurements in Nearby Wells



Water Availability Tables



Oregon Water Resources Department
Water Availability Analysis

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CLEAR CR > CLACKAMAS R - AT MOUTH

WILLAMETTE BASIN

Water Availability as of 4/21/2023

Watershed ID #: 82 [\(Map\)](#)

Date: 4/21/2023

Exceedance Level: 80%

Time: 10:48 AM

Water Availability Calculation

Water Rights

Consumptive Uses and Storages

Instream Flow Requirements

Watershed Characteristics

Reservations

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	126.00	1.37	125.00	0.00	0.00	125.00
FEB	128.00	1.28	127.00	0.00	0.00	127.00
MAR	128.00	0.90	127.00	0.00	0.00	127.00
APR	131.00	1.05	130.00	0.00	0.00	130.00
MAY	111.00	2.76	108.00	0.00	0.00	108.00
JUN	48.10	3.81	44.30	0.00	40.00	4.29
JUL	19.00	6.52	12.50	0.00	40.00	-27.50
AUG	8.92	5.34	2.68	0.00	20.00	-17.30
SEP	5.65	2.33	3.32	0.00	20.00	-16.70
OCT	6.23	0.97	5.26	0.00	0.00	5.26
NOV	21.50	0.94	20.60	0.00	0.00	20.60
DEC	103.00	1.44	102.00	0.00	0.00	102.00
ANN	99,100.00	1,740.00	97,300.00	0.00	7,260.00	93,200.00



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CLACKAMAS R > WILLAMETTE R - AT MOUTH

WILLAMETTE BASIN

Water Availability as of 4/21/2023

Watershed ID #: 80 [\(Map\)](#)

Date: 4/21/2023

Exceedance Level: 80%

Time: 10:48 AM

Water Availability Calculation

Water Rights

Consumptive Uses and Storages

Instream Flow Requirements

Watershed Characteristics

Reservations

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	2,670.00	327.00	2,340.00	0.00	1,000.00	1,340.00
FEB	2,900.00	362.00	2,540.00	0.00	1,000.00	1,540.00
MAR	2,800.00	331.00	2,470.00	0.00	1,000.00	1,470.00
APR	3,010.00	400.00	2,610.00	0.00	1,000.00	1,610.00
MAY	2,740.00	398.00	2,340.00	0.00	1,000.00	1,340.00
JUN	1,620.00	309.00	1,310.00	0.00	1,000.00	310.00
JUL	980.00	309.00	671.00	0.00	1,000.00	-329.00
AUG	822.00	294.00	528.00	0.00	890.00	-362.00
SEP	833.00	283.00	550.00	0.00	890.00	-340.00
OCT	882.00	277.00	605.00	0.00	1,000.00	-395.00
NOV	1,630.00	324.00	1,310.00	0.00	1,000.00	306.00
DEC	2,650.00	329.00	2,320.00	0.00	1,000.00	1,320.00
ANN	2,110,000.00	238,000.00	1,870,000.00	0.00	711,000.00	1,200,000.00