

Groundwater Application Review Summary Form

Application # G- 18793 re-review

GW Reviewer Travis Brown Date Review Completed: 5/11/2023

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

May 11, 2023

TO: Application G- 18793 re-review

FROM: GW: Travis Brown
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

- ☐ YES The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries
- ☐ 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 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 October 14, 2019
 FROM: Groundwater Section Aurora C Bouchier
 REVIEWER'S NAME
 SUBJECT: Application G- 18793 Supersedes review of na
 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: Wilson Dinsdale County: Marion

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

A2. Proposed use irrigation (215 acres) Seasonality: May - October

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	MARI 4111 ⁽¹⁾	1	CRB	1	8S/4W-25 SE-NE	130' N, 2000' E from center S 25
2						

* 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	920	98 ⁽²⁾	155	7/16/1990	315	0-79	+1-79	0-315	255-313	35	48	P

Use data from application for proposed wells.

A4. **Comments:** Please see previous application G-18421 (groundwater review dated 3/30/2017) which covers the same land, the same well, the same requested maximum flow rate, and the same incorrect well log i.d. listed on the application.
⁽¹⁾ The application lists MARI 53151 (owned by Peter Dinsdale on well log, which is located at 3515 Howell Prairie Road in 8S/2W-12), however the application provides well construction information from MARI 4111 (also owned by Peter Dinsdale on the well log, and located at 7445 Skyline Road South in 8S/4W-25 – consistent with this application). This review is based on MARI 4111 being the intended well.
⁽²⁾ It appears that the well bore is open to multiple water-bearing zones (see Section D and diagram from Foxworthy, 1970 at end of review).
 As noted in this application, the well was authorized previously under a limited duration water right (application G-12184, limited license G-11951, extended by limited license G-15035)

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 is producing from basalt, likely confined, within ¼ mile of the bank of a stream or surface water source. The pertinent rules (OAR 690-502-0240) apply to unconfined alluvium, so it appears they are not activated by this application.

A6. ☒ **Well(s) #** 1, _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
 Name of administrative area: South Salem Hills Groundwater Limited Area
 Comments: According to OAR 690-502-0200, Groundwater in the basalt aquifers in the South Salem Hills Groundwater Limited Area is classified for exempt uses, irrigation, and rural residential fire protection systems only. Permits may be issued, for a period not to exceed five years, for fire protection and for drip or equally efficient irrigation. The amount of water used for irrigation shall be further limited to one acre-foot per acre per year. Permits may be extended for additional five-year periods if the Director of the Water Resources Department finds that the groundwater resource can probably support the extended use.

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) 7L, Large Water User;
 - 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 _____ 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:** _____

Special Conditions:

1. A dedicated water-level measurement tube shall be installed in the well for the purpose of collecting manual water-level measurements.
2. As per the Willamette Basin Special Columbia River Basalt Group Aquifer Permit Conditions (OAR 690-502-0250 (1)), a static water-level measurement [shall] be made and submitted to OWRD before use of water may commence at the well, [OWRD Groundwater Section staff can collect this measurement once a dedicated measurement tube is installed];
3. As per the Willamette Basin Special Columbia River Basalt Group Aquifer Permit Conditions (OAR 690-502-0250(5)), the Department shall determine... the initial and subsequent [reference] water levels from which...[groundwater] declines are referenced;
4. The permit shall expire on 10/31/2021, consistent with other time-limited permits recently renewed in the South Salem Hills Groundwater Limited Area.

Remarks:

The appropriation status of the aquifer cannot be determined due to a lack of relevant water level data.

The applicant well produces from one or more water-bearing zones in the Columbia River Basalt Group (CRBG), a series of lava flows with a composite thickness that ranges from 200 to 300 feet in this area (Conlon et al., 2005). Each flow is characterized by a series of internal features, including a thin rubble zone at the contact between flows and a thick, dense, low porosity and low permeability interior zone. In some cases, sedimentary layers were deposited during the time between basalt flow emplacements. A flow top, sedimentary interbed and flow bottom are collectively referred to as an interflow zone. Unconfined groundwater occurs near the weathered top of the basalts, but most water occurs in interflow zones at the contacts between lava flows. CRBG flow features result in a series of stacked, thin aquifers that are confined by dense flow

interiors. The low permeability of the basalt flow interiors usually results in little connection between stacked aquifers, which generally results in tabular aquifers with unique water level heads (Reidel et al., 2002).

Constructing a well that is open to multiple water-bearing zones with distinct water level heads can commingle multiple aquifers (see diagram from Foxworthy, 1970 at end of review). When the pump is off, water migrates through the well bore from an aquifer of higher pressure to an aquifer of lower pressure. Over time, this can depressurize the aquifer and exacerbates water level decline. Well construction conditions are specified to protect the resource and other existing users.

Vertical offset is mapped along the southeast and northeast- trending normal faults mapped in the vicinity of this well. The faults juxtapose the Winter Water Unit of the Grande Ronde Basalt Formation against the Silver Falls Basalt of the Frenchman Springs Basalt Member of the Wanapum Basalt Formation. The Sentinel Bluffs Unit of the Grande Ronde Basalt Formation is also vertically offset and mapped against the Sentinel Bluffs Unit (Tolan and Beeson, 2000b). Vertical offset of CRBG flows can cause juxtaposition of permeable interflows with dense flow interiors, resulting in a low flow boundary at the fault trace. At the subject site, the degree of compartmentalization by faulting is unknown. Compartmentalization could buffer or delay well-to-well impacts, while also limiting the aquifer extent. The CRBG overlies Tertiary marine sediments, which are typically low-permeability, fractured and consolidated rocks. The unconformity between the marine sediments and the basalts locally limits the thickness and extent of individual CRBG aquifers.

Generally, pumping drawdown effects can be detected at distances of a mile or greater within minutes of turning on a pump in a CRBG aquifer. For these reasons, the potential for the proposed use to interfere with senior groundwater rights, both permitted and exempt, is significant.

The reported yield (35 gpm) of the sole requested POA well (MARI 4111) is ~8% of the total requested rate (1 cfs). Reported yields from nearby wells range from 15 to 150 gpm, with a median reported yield of 12 gpm (see attached Well Statistics). Even at the maximum reported nearby yield (150 gpm), the applicant would need at least 3 wells to achieve the requested rate of 1 cfs (448.8 gpm). As the applicant has not requested any additional POA wells, it is unclear how the applicant intends to achieve the requested rate. **Therefore, the proposed use appears to be beyond the capacity of the groundwater resource.**

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	CRB	☒	☐
		☐	☐

Basis for aquifer confinement evaluation: Based on the well log for the applicant's well (MARI 4111) the driller encountered water from 98 to 313 feet, with a static water level of 155 feet. Based on other well logs in the area (MARI 4180 and MARI 54020) one would expect confined conditions with static water levels rising to some extent above the zone at which the water was encountered. It appears that this well is (or at least was at the time of construction) open to water-bearing zones above the main confined aquifer (see diagram from Foxworthy, 1970 at end of review).

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	Wilkerson Creek – intermittent	725 ⁽¹⁾	735-1000	435	☐	☒	☐	☐	☒
1	2	Battle Creek – where mapped as perennial	725 ⁽¹⁾	615	7445	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: In the South Salem Hills area the basalt layers are gently dipping to the northeast (Foxworthy, 1970), and have been heavily faulted (Tolan and Beeson, 2000a and Tolan and Beeson, 2000b). Based on the dip, the mapped faults, and the stream locations, it appears that the well may be hydraulically connected to Battle Creek.

⁽¹⁾This groundwater elevation is based on a measurement by OWRD dated 12/20/1991 for establishment of a reference water level for permit G-11951, extended by permit G-15035. This is the last known water level at this well.

Water Availability Basin the well(s) are located within: The well is located within WAB 183 [WILLAMETTE R> COLUMBIA R-AB MILL CR AT GAGE 1419100]. However, given the geology it appears that the well is producing from WAB 30200701 [MILL CR> WILLAMETTE R- 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 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?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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: 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													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
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: _____

There is no model that is currently available that can appropriately estimate stream depletion impacts for wells that produce from a stratiform basalt aquifer.

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:** _____

References Used: _____

Application files: G-18793 and previous application G-18421 and previous limited license application file G-12184.

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.

Foxworthy, Bruce I., 1970, Hydrologic Conditions and Artificial Recharge Through a Well in the Salem Heights Area of Salem, Oregon: U.S. Geological Survey Water-Supply Paper 1594-F.

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, 32p.

Reidel, S.P., Johnson, V.G., and Spaine, F.A., 2002, Natural gas storage in basalt aquifers of the Columbia Basin, Pacific Northwest USA—A guide to site characterization: Richland, Wash., Pacific Northwest National Laboratory, 277 p.

Tolan, Terry L., and Beeson, Marvin H., 2000a, 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 Sheet 1 of 2 and 2 of 2.

Tolan, Terry L., and Beeson, Marvin H., 2000b, Geologic Map of the Sidney Quadrangle; unpublished.

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.

Yeats, R.S., Graven, E.P., Werner, K.S., Goldfinger, C., Popowski, T.A., 1996, Geologic map of the central and southern Willamette Valley, Benton, Lane, Linn, Marion and Polk counties, Oregon: U.S. Geological Survey, Reston, VA., Professional Paper PP-15

D. WELL CONSTRUCTION, OAR 690-200

- D1. Well #: 1 Logid: MARI 4111
- 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:** It appears that the well is open to multiple water-bearing zones within the basalt layers.
- 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						
Watershed ID #: 30200701		MILL CR > WILLAMETTE R - AT MOUTH			Exceedance Level: 80	
Time: 9:33 AM		Basin: WILLAMETTE			Date: 10/14/2019	
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	236.00	69.90	166.00	0.00	0.00	166.00
FEB	224.00	67.80	156.00	0.00	0.00	156.00
MAR	206.00	67.60	138.00	0.00	0.00	138.00
APR	155.00	67.50	87.50	0.00	0.00	87.50
MAY	78.30	67.90	10.40	0.00	0.00	10.40
JUN	40.70	66.10	-25.40	0.00	0.00	-25.40
JUL	20.60	64.80	-44.20	0.00	0.00	-44.20
AUG	16.30	70.00	-53.70	0.00	0.00	-53.70
SEP	17.20	69.00	-51.80	0.00	0.00	-51.80
OCT	20.30	66.90	-46.60	0.00	0.00	-46.60
NOV	59.30	67.00	-7.72	0.00	0.00	-7.72
DEC	167.00	69.00	98.00	0.00	0.00	98.00
ANN	135,000	49,100	96,200	0	0	96,200

Well Location Map

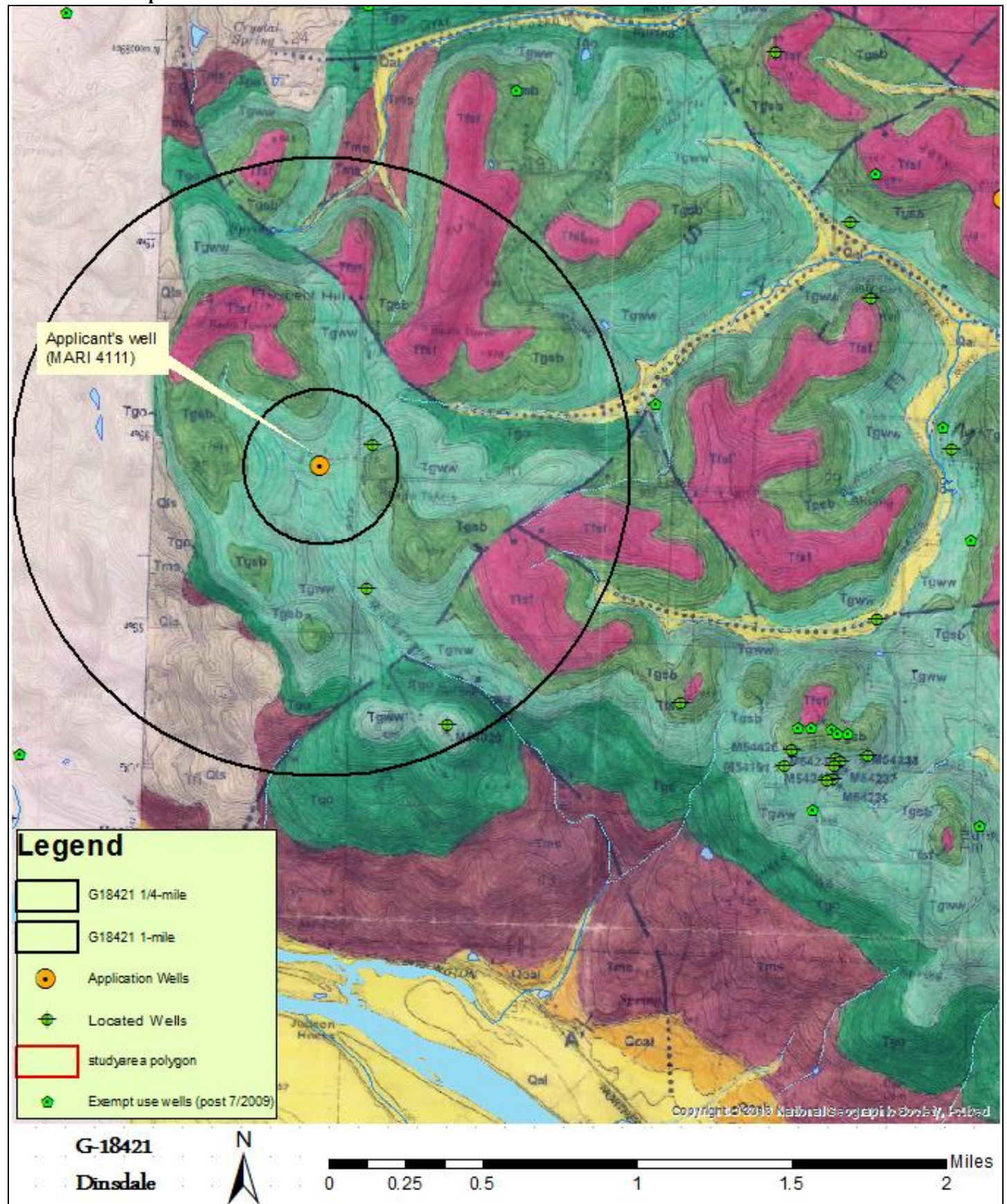
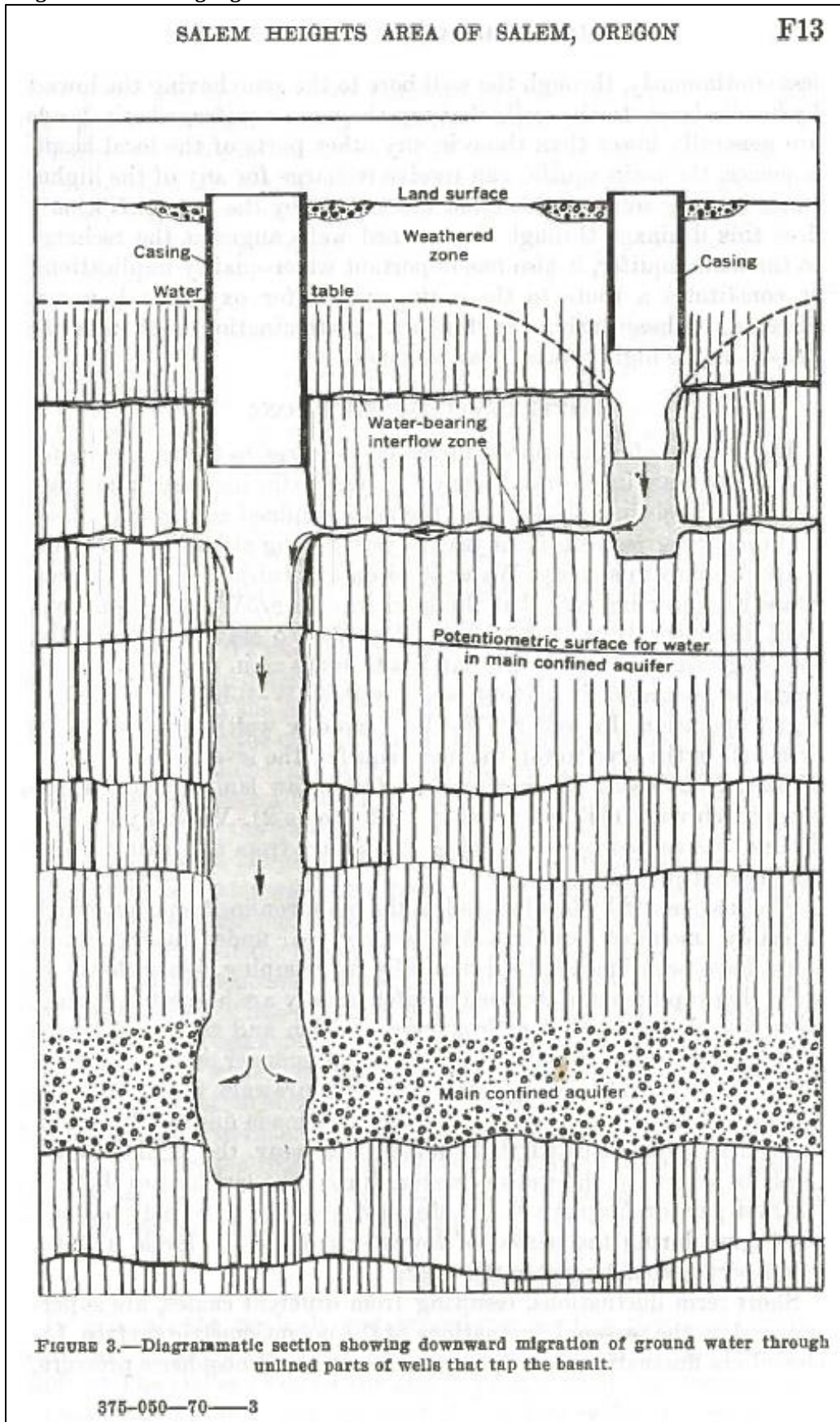
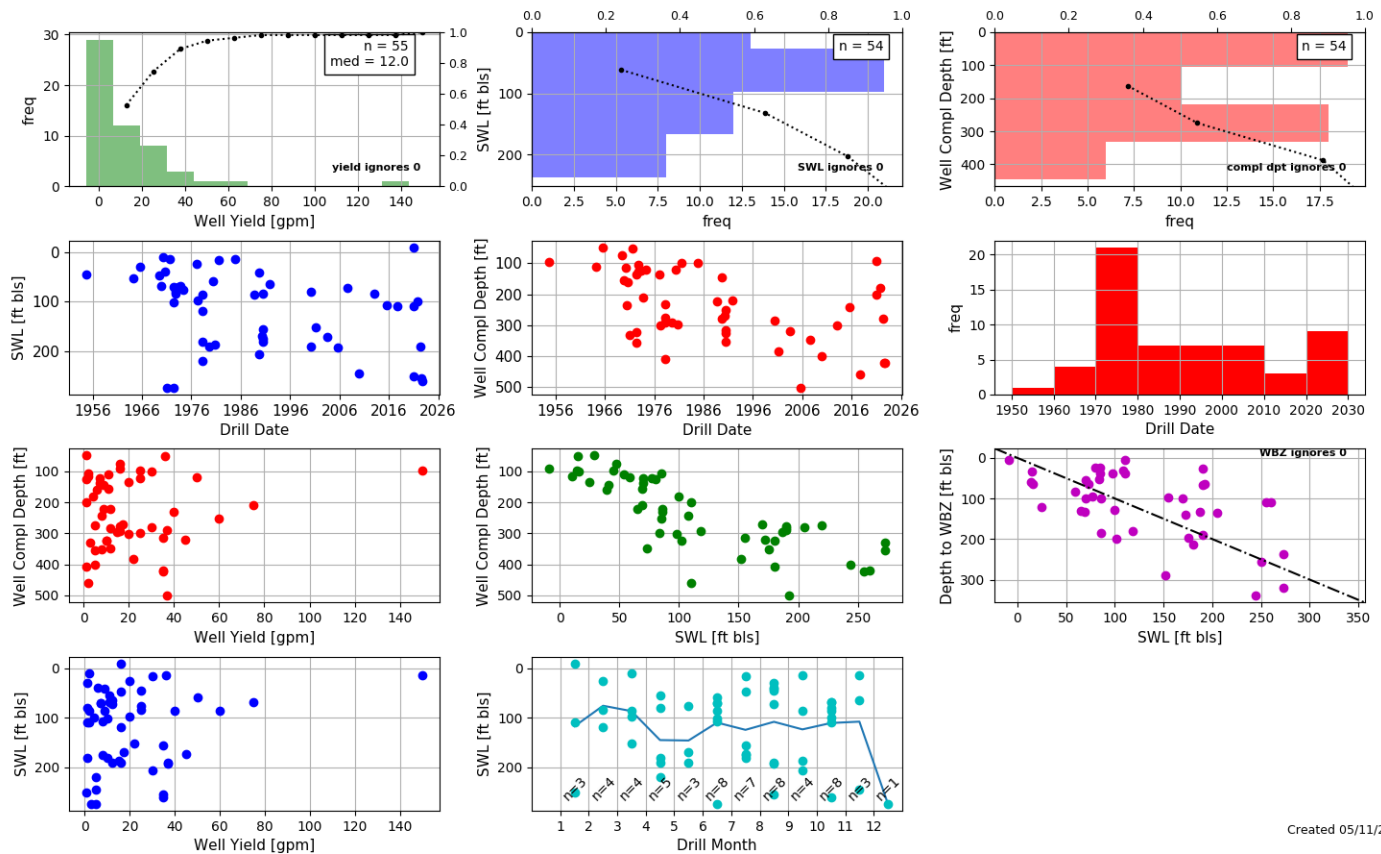


Diagram of Commingling Basalt Wells



(from Foxworthy, 1970.)

Well Statistics – T8SR4WS25 & T8SR3WS30



Created 05/11/2023