Groundwater Application Review Summary Form

Application # G- _19269_

GW Reviewer: _Mitra Khadka/Travis Brown_ Date Review Completed: _07/05/2023_

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).

Scenic Waterway Interference Evaluation

Application # G- _19269_

GW Reviewer: _Mitra Khadka/Travis Brown Date Review Completed: _07/05/2023_

☐ **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 the [_____] 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 07/05/2023

FROM: Groundwater Section Mitra Khadka/Travis Brown/Justin Iverson
Reviewer's Name

SUBJECT: Application G- 19269 Supersedes review of [xx/xx/xxxx]
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: Mayfield Farms LLC County: Marion

A1. Applicant(s) seek(s) 0.45 cfs from 3 well(s) in the Willamette Basin Basin, Mainstem Willamette subbasin

A2. Proposed use Commercial Seasonality: Year-round

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 69206	Well 1	CRB	0.45[a]	3S/1W-32 SE-SE	365' N, 1180' W fr SE cor S 32
2	PROP 323	Well 2	CRB	0.45[a]	3S/1W-32 SE-SE	945' N, 490' W fr SE cor S 32
3	PROP 324	Well 3	CRB	0.45[a]	3S/1W-32 SE-SE	40' N, 345' W fr SE cor S 32

* 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	~195[b]	144	77.5	3/8/2022	460	0-385	+2.25-385	NA	None	240	NA	Air
2	~190[b]	NA	NA	NA	500	0-385	0-385	NA	None	NA	NA	NA
3	~195[b]	NA	NA	NA	500	0-385	0-385	NA	None	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The proposed POAs are approximately 0.5 miles east of the unincorporated community of Butteville, OR. Applicant proposes to pump 0.45 cfs groundwater from one existing well (MARI 69206) and two proposed wells (PROP 323 and PROP 324) for commercial use. The applicant holds a limited license LL-1812, which authorizes 0.22 cfs groundwater pumping from POA, MARI 69206.

[a] The proposed POAs were evaluated at a total rate of 0.45 cfs.

[b] Well elevation data from LiDAR ground surface elevation (Watershed Sciences, 2009).

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 are not located within ¼ mile of any perennial surface water body, and the wells will produce groundwater from a confined basalt aquifer. Therefore, per OAR 690-502-0240, the relevant Willamette Basin rules 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) **Willamette CRB condition 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 **Columbia River Basalt Group (CRBG)** 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 POAs will produce groundwater from a water-bearing zone within the Columbia River Basalt Group (CRBG), a series of lava flows with composite thickness of about 600-700 ft in the area. Thickness of the CRBG decreases towards the northwest and increases towards the southeast (Conlon et al., 2005). Units of the CRBG outcrop southwest of the proposed POAs and across the Willamette River to the northwest. Aquifers within the CRBG typically occur in relatively thin brecciated, porous, and permeable zones at the contacts of lava flows. The aquifers are generally overlain and confined by thick and dense flow interiors with very low porosity and permeability (Conlon et al., 2005; Gannett and Caldwell, 1998).

There are about 5 active groundwater rights, mostly for irrigation and nursery uses, and several exempt (domestic) wells within approximately 1 mile of the proposed POA locations, that produce groundwater from the CRBG. Reported well yields for the wells in the area that produce groundwater from the CRBG, have a wide range from 14 to 300 gpm with a median value of 60 gpm. The requested pumping rate (~168 gpm) is within the range of the reported yields in the area and lower than reported yield in the proposed POA, MARI 69206.

The nearest CRBG well to the proposed POAs is an exempt use domestic well MARI 68801, located about 600 ft west to the proposed Well 1 (MARI 69206). Interference with MARI 68801 was quantitatively estimated using a Theis (1935) time-drawdown model for a confined aquifer. Hydraulic parameters used for the analysis were derived from regional data and studies (Pumping Test Reports; Conlon et al., 2005; McFarland and Morgan, 1996). The analysis estimates maximum drawdown to be less than 16 ft in MARI 68801 after 365 days of continuous pumping at the maximum requested rate (see attached Well to Well Interference). Under the standard condition for basalt aquifers in the Willamette Basin, Condition 7i,

the requested use would need to be curtailed if hydraulic interference exceeded 15 ft in any neighboring well providing senior exempt uses or covered by prior rights. However, given the fact that the MARI 68801 is completed to a depth of 286 ft and does not fully penetrate the CRBG, the proposed use of groundwater is unlikely to cause Substantial and Undue Interference with the neighboring well.

Water availability data for the CRBG aquifers in the area of proposed POAs are limited. The nearest observation wells (MARI 50403 and MARI 54523) with relevant long-term groundwater level data are located about 4000-5000 ft southwest of the proposed POAs, within the outcrop area of CRBG surrounding La Butte. Data from those wells indicate that the basalt aquifer system experienced rising groundwater levels starting early 2000. Rising groundwater level in the area is attributed to the City of Wilsonville switching from groundwater to surface water as their primary drinking source. The most recent data indicate declining groundwater levels in some wells (e.g., MARI 69206, MARI 64382). While data records are not long enough to establish a definitive trend (see attached Hydrograph), the aquifer does not appear to be over-appropriated. The proposed POAs are less than a mile outside of the boundary (northwest bank of the Willamette River) of the Sherwood-Dammasch-Wilsonville Groundwater Limited Area (OAR 690-502-0190), which is classified for exempt use only. As such, there are significant concerns about the potential for future groundwater level decline in the CRBG aquifers in the area. To avoid injury to senior groundwater users and the groundwater resources, the Conditions specified in B1(d), B2(c), and B3 (Special Conditions) are recommended for any permit issued pursuant to this application.

Special Conditions:
To protect senior users and the groundwater resource, the following Special Conditions are recommended:

1. Each basalt well shall be cased and continuously sealed from land surface into at least 5 feet of hard dense basalt, estimated to be at a depth of ~375 ft below land surface (bls), to preclude hydraulic connection to nearby streams.
2. Any well authorized as a Point of Appropriation (POA) under this or subsequent permits 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. 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. Single aquifer completion for any well with an open interval greater than 100 ft should be demonstrated to the satisfaction of the Department Hydrogeologists prior to authorization as a POA under this or subsequent permits.

   If, during well construction or repair, it becomes apparent that the well can be constructed to eliminate aquifer commingling or interference with hydraulically connected streams in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Ground Water/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 new 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.
3. For any well constructed under this or subsequent permits, a dedicated water-level measuring tube shall be installed in each well. The measuring tube shall meet the standards described in OAR 690-215-0060. When requested, access to the wells shall be provided to Department staff in order to make water-level measurements.
4. For any wells constructed or deepened under this or subsequent permits, the applicant shall coordinate with the driller to ensure that drill cuttings are collected at 10 ft intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.
5. If any geologic and hydrogeologic reports are completed for the permittee during the development of permitted wells, including geophysical well logs and borehole video logs, then copies of the reports 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.

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**	☒	☐

2	**Columbia River Basalt**	☒	☐
3	**Columbia River Basalt**	☒	☐

Basis for aquifer confinement evaluation: In general, the Columbia River Basalt (CRB) aquifers are confined by the dense interflow zones, which restrict vertical movement of groundwater. The well log for proposed POA (MARI 69206) reports static water level of 75 ft below land surface, about 70 ft above the first water bearing zone, corroborating the confined nature of the water-bearing zone of the CRBG at this location.

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**	**Willamette River**	**~118**	**~63**	**~3200**	☐	☒	☐	☐	☒
1	**2**	**Deer Creek**	**~118**	**~158-168**	**~3550**	☐	☒	☐	☐	☒
2	**1**	**Willamette River**	**~118**	**~63**	**~3400**	☐	☒	☐	☐	☒
2	**2**	**Deer Creek**	**~118**	**~158-168**	**~3500**	☐	☒	☐	☐	☒
3	**1**	**Willamette River**	**~118**	**~63**	**~4000**	☐	☒	☐	☐	☒
3	**2**	**Deer Creek**	**~118**	**~158-168**	**~2700**	☐	☒	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: The applicant's existing well (MARI 69206) is continuously cased and sealed to a depth of 385 ft bls. The proposed wells (PROP 323 and PROP 324) will also be continuously cased and sealed to the similar depth. Given the extremely low vertical permeability of basalt flow interiors, there should not be a viable path for hydraulic connection with surface waters within 1 mile of the proposed POAs. Therefore, no potential for substantial interference (PSI) with the Willamette River and Deer Creek is assumed.

Water Availability Basin the well(s) are located within: SW 1: WILLAMETTE R > COLUMBIA R – AB MOLALLA R
SW 2: MILL CR > PUDDING 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 (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?
		☐	☐			☐		☐		☐

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: _____

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: _____

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 File: G-19269

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, 83 p.

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

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

Pumping Test Report: MARI 50403, MARI 54523.

Theis, C.V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, American Geophysical Union Transactions, vol. 16, p. 519-524.

Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Hood to Coast, Oregon: 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:** _____

_____

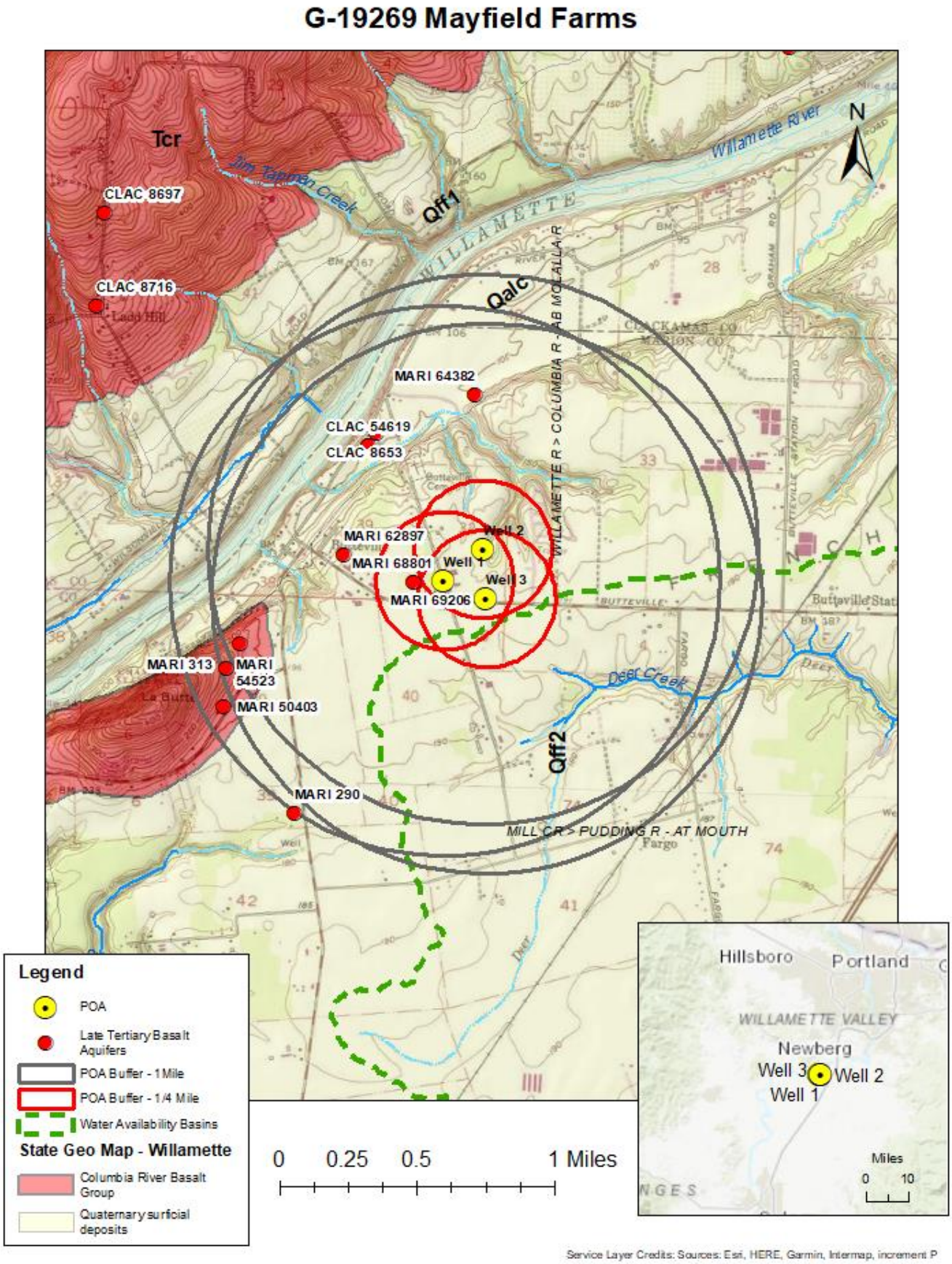
_____

_____

_____

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

Well Location Map



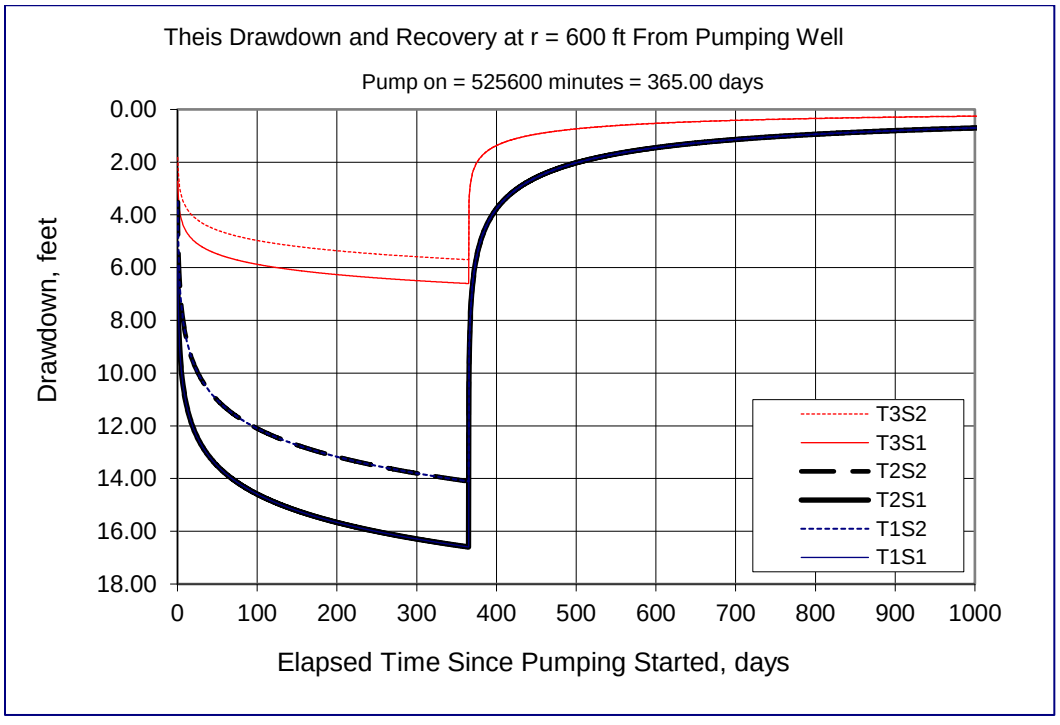
Well to Well Interference – Theis (1935) Drawdown analysis at MARI 68801

Theis Time-Drawdown Worksheet v.5.00

Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.

Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

Input Data:	Var Name	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**	
Total pumping time	t		**365**		d	
Radial distance from pumped well:	r		**600**		ft	**Q conversions**
Pumping rate	Q		**0.45**		cfs	201.96 gpm
Hydraulic conductivity	K	**2000**	**2000**	**5500**	ft/day	0.45 cfs
Aquifer thickness	b		**1**		ft	27.00 cfm
Storativity	S_1		**0.0001**			38,880.00 cfd
	S_2		**0.0005**			0.89 af/d
Transmissivity Conversions	T_f2pd	2000	2000	5500	ft2/day	
	T_ft2pm	1.38888889	1.38888889	3.81944444	ft2/min	Recalculate
	T_gpdpft	14960	14960	41140	gpd/ft	



Hydrographs