

Approved:



MEMO

To: Kristopher Byrd, Well Construction Section Manager
From: Tommy Laird, Well Construction Program Coordinator
Subject: Review of Water Right Application LL-1878
Date: February 23, 2024

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

Applicant's Well #1 (PROP0000158): 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.

Applicant's Well #2 (PROP0000159): Well #2 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 #2 may not satisfy hydraulic connection issues.

Applicant's Well #3 (PROP0000160): Well #3 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 #3 may not satisfy hydraulic connection issues.

Applicant's Well #4 (PROP0000161): Well #4 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 #4 may not satisfy hydraulic connection issues.

Groundwater Application Review Summary Form

Application # LL- 1878

GW Reviewer Halley Schibel/Travis Brown Date Review Completed: 8/10/2023

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.
(Proposed Alluvial Wells)

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

August 10, 2023

TO: **Application LL- 1878**

FROM: **GW: Halley Schibel/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

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 8/10/2023
 FROM: Groundwater Section Halley Schibel/Travis Brown
Reviewer's Name
 SUBJECT: Application LL- 1878 Supersedes review of _____
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: Terry Silbernagel County: Marion

A1. Applicant(s) seek(s) 0.045 cfs from 4 well(s) in the Willamette Basin,
Molalla-Pudding subbasin

A2. Proposed use Irrigation Seasonality: March 1st – October 31st

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 | PROP0000158 | Well 1 | Basalt | 0.045 | 8S/2W-10NWNW | 315' S, 1140' E fr NW cor, S 10 |
| 2 | PROP0000159 | Well 2 | Alluvial | 0.045 | 8S/2W-10NWNW | 310' S, 1170' E fr NW cor, S 10 |
| 3 | PROP0000160 | Well 3 | Basalt | 0.045 | 8S/2W-10NWNW | 1035' S, 1130' E fr NW cor, S 10 |
| 4 | PROP0000161 | Well 4 | Alluvial | 0.045 | 8S/2W-10NWNW | 1035' S, 1160' E fr NW cor, S 10 |

* 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 | 456 | NA | NA | NA | >100+/- | 0 - >=105+/- | 0 - >=105+/- | TBD | TBD | - | - | - |
| 2 | 458 | NA | NA | NA | <100+/- | 0 - >=18 | 0 - >=18 | TBD | TBD | - | - | - |
| 3 | 453 | NA | NA | NA | >100+/- | 0 - >=105+/- | 0 - >=105+/- | TBD | TBD | - | - | - |
| 4 | 455 | NA | NA | NA | <100+/- | 0 - >=18 | 0 - >=18 | TBD | TBD | - | - | - |

Use data from application for proposed wells.

A4. **Comments:** Although the applicant is applying for four wells, only one well will be used. The applicant is proposing four different wells for the Groundwater Section to evaluate, with two in the basalt and two in the alluvial aquifer. Water is to be from the alluvial or the basalt aquifer, but not both. The application states that water use will occur during the "irrigation season," which should be March through October. No proposed construction information was given in the application except for an estimated depth of less than 100 ft for alluvial wells and greater than 100 ft for basalt wells. Nearby well MARI 9736 shows first water at 205 ft bls and water levels have generally been between 55 and 60 ft bls since 1993.

A5. **Provisions of the** _____ 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: _____

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) 7i & large water use reporting (basalt wells, POA 1 and 3); 7n & Medium Water Use Reporting (alluvial wells, POA 2 and 4);
 - 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: Water levels in the basalt appear to be reasonably stable (see attached Hydrograph). The alluvial aquifer system appears to be hydraulically connected to local surface water sources and therefore should have relatively stable groundwater levels. Therefore, the groundwater resource is not over appropriated.

The proposed POA are located in the Central Willamette Valley just outside of Salem. The majority of wells in the immediate vicinity draw water from the Columbia River Basalts. The applicant is proposing either developing from Columbia River Basalts or overlying alluvium but not both. Driller-reported lithologies for wells drilled in the immediate vicinity show that the basalts are primarily overlain by ~20-80 ft of decomposed rock and ~30-50 feet of clay (see attached cross-section), which this analysis includes as part of the shallow “alluvial” aquifer system.

The requested rate (0.045 cfs) is well within the range of reported yields for basalt water wells in this area (see attached well statistics) and is unlikely to injure the closest neighboring well, MARI 9736 (see attached Theis analysis). MARI 9736 is a 228-ft deep irrigation well drawing water from basalt about 160 ft to the northeast of proposed POA #1. The nearest known alluvial well, MARI 9772 is about 2,650 ft to the southeast and is not expected to experience significant interference drawdown from potential pumping under this proposed LL.

Nearby basalt observation wells include wells on water rights with permit conditions requiring annual measuring and reporting dating back to as early as 1991 (see attached Hydrograph). The hydrographs of four wells ~2,400-2,900 feet to the

southeast (MARI 73, 9725, 9729, and 19996) appear hydraulically distinct from the nearest – and presumably most applicable – well (MARI 9736), suggesting some degree of compartmentalization between these two well sets..

In order to protect senior users and the resource, the conditions listed in Items B1(d)(i) and B2, above are recommended for any permit issued pursuant to this application. For a development into Basalt aquifer (POA 1 and 3), the following Special Conditions are recommended:

Special Conditions:

A. Each basalt well shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the applicable well construction standards (OAR 690-200 and OAR 690-210).

In addition, the open interval in each well shall be no greater than 100 feet. 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.

If during well construction, it becomes apparent that the well can be constructed to eliminate the comingling of aquifers and/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 Groundwater Section Manager to request approval of such construction. The request shall be in writing and shall include a rough well log and a proposed construction design for approval by the Department. The request can be approved only if it is received and reviewed prior to placement of any permanent casing and sealing material. If the request is made after casing and seal are placed, the requested modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.

B. 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.

C. For any wells constructed under this or subsequent permits, the permittee shall coordinate with the driller to ensure that drill cuttings are collected at 10-foot intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.

D. 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 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2 | Alluvial | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3 | Columbia River Basalt | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4 | Alluvial | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Basis for aquifer confinement evaluation: Wells 1 and 3 are proposed to draw from the Columbia River Basalt (CRB) locally overlain by clay and silt. Water levels in nearby CRB wells generally have water levels above or coincident with the relevant water-bearing zones (indicating a confined aquifer). Wells 2 and 4 are proposed to draw from the overlying clay and silt. Limited water level information from nearby alluvial wells suggests the alluvial system is confined in this area.

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 Fruitland Creek | 405-412 ^a | 244-493 | 1,115 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2 | 1 | Unnamed tributary to Fruitland Creek | 440-450 ^b | 244-493 | 1,140 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3 | 1 | Unnamed tributary to Fruitland Creek | 405-412 ^a | 247-493 | 1,200 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4 | 1 | Unnamed tributary to Fruitland Creek | 440-450 ^b | 248-493 | 1,225 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 1 | 2 | Blossom Creek | 405-412 ^a | 430-527 | 3,740 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2 | 2 | Blossom Creek | 440-450 ^b | 429-527 | 3,725 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3 | 2 | Blossom Creek | 405-412 ^a | 430-567 | 3,295 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4 | 2 | Blossom Creek | 440-450 ^b | 430-567 | 3,280 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Basis for aquifer hydraulic connection evaluation: The nearest perennial stream is less than one quarter mile from all proposed wells and the next closest stream is within one mile. In the alluvial aquifer, water levels indicate that groundwater flows towards, and discharges into local streams. Therefore, the alluvial aquifer appears to be hydraulically connected to SW 1 and 2. However, because local streams do not appear to have incised into the shallowest noted basalt water-bearing zone (~261 ft msl based on the log for MARI 9736), there is not an apparent pathway for hydraulic connection between the basalt aquifer and SW 1 and 2.

^a Basalt water levels based on recent measurements from nearby well MARI 9736.

^b Alluvial water levels based on well completion report measurement from nearest, most recently completed well MARI 9724 and land surface elevations at proposed POA 2 and 4.

Water Availability Basin the well(s) are located within: Watershed ID #151 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? |
|------|------|-------------------------------------|--------------------------|-------------------------|------------------------------|--------------------------|------------------------|------------------------------|----------------------------|---|
| 2 | 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | 0.673 | <input type="checkbox"/> | * | <input checked="" type="checkbox"/> |
| 4 | 1 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | 0.673 | <input type="checkbox"/> | * | <input checked="" type="checkbox"/> |
| 2 | 2 | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | 0.673 | <input type="checkbox"/> | * | <input type="checkbox"/> |
| 4 | 2 | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | 0.673 | <input type="checkbox"/> | * | <input type="checkbox"/> |

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? |
|--|------|--------------------------|-------------------------|------------------------------|--------------------------|------------------------|------------------------------|----------------------------|---|
| | | <input type="checkbox"/> | | | <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> |
| | | <input type="checkbox"/> | | | <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> |

Comments: *Surface water interference due to pumping could not be quantitatively estimated due to the lack of an appropriate, readily-available model for the hydrogeologic setting and insufficient data to characterize the system's hydraulic properties.

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 LL-1878 and application map received 6/4/2021.

Pumping test reports (MARI 73, 9729, and 9736), well logs (MARI 74, 9463, 9725, 9736, 9756, 52276, and 59050), and water levels for selected nearby wells (MARI 73, 74, 9426, 9725, 9729, 9736, 9772, 10059, 16563, 19996, 52517, 52518, 53017, 58044, 59050, 69404).

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, Scientific Investigations Report 2005-5168: U. S. Geological Survey, Reston, VA.

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.

Theis, C.V., 1941, The effect of a well on the flow of a nearby stream: Am. Geophys. Union Trans., v. 22, pt.3, p. 734-738.

United States Geological Survey, 2014, National Hydrography Dataset (NHD), 1:24,000, U. S. Department of the Interior, Reston, VA.

United States Geological Survey, 2017, Salem East quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, VA.

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

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.

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) _____

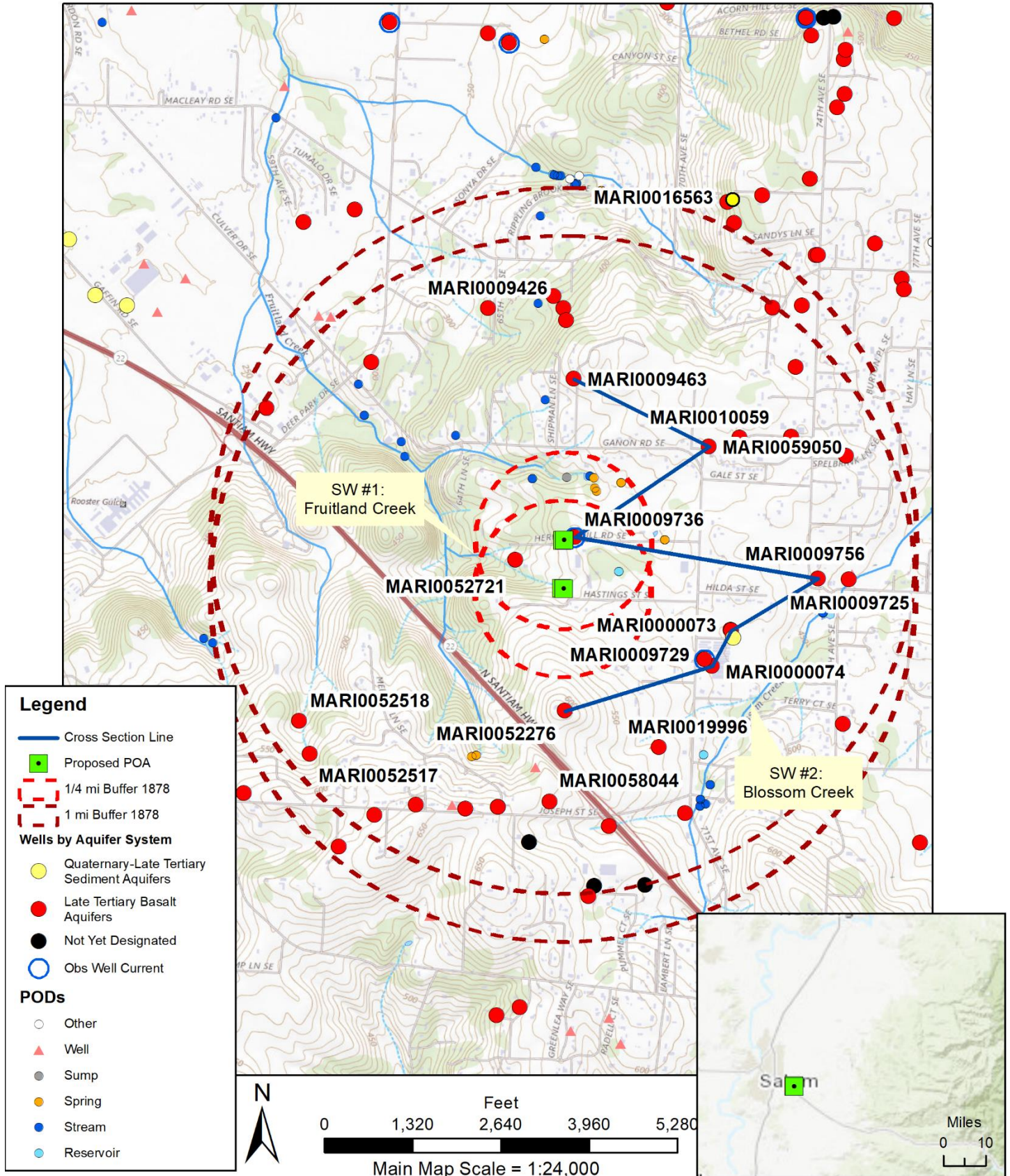
D3. **THE WELL construction deficiency or other comment is described as follows:** _____

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



Well Location Map

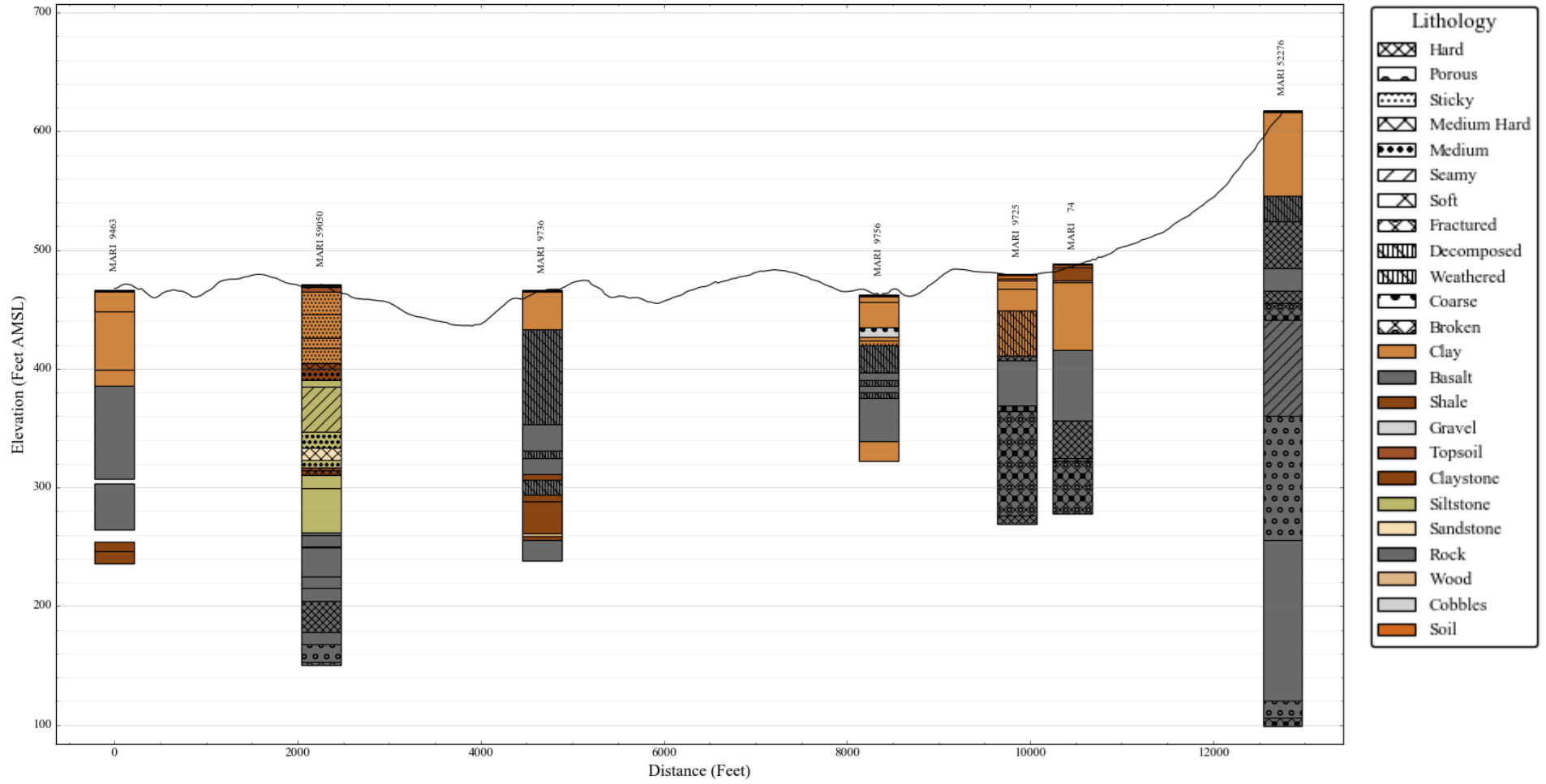
Application LL-1878



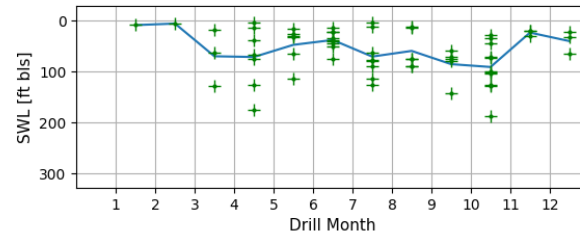
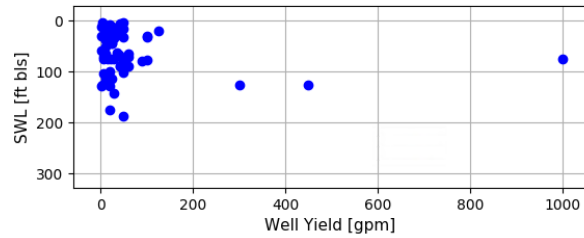
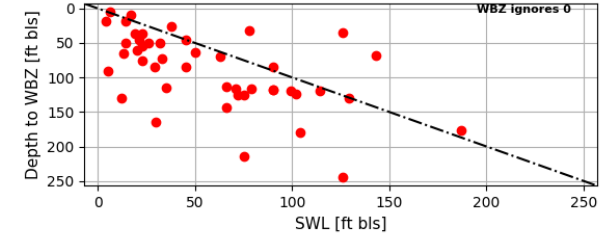
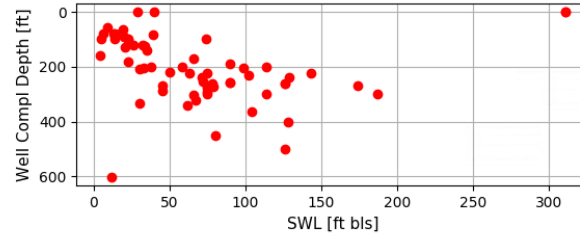
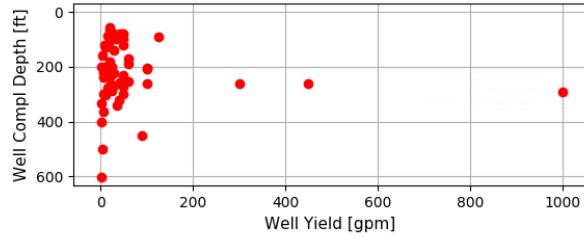
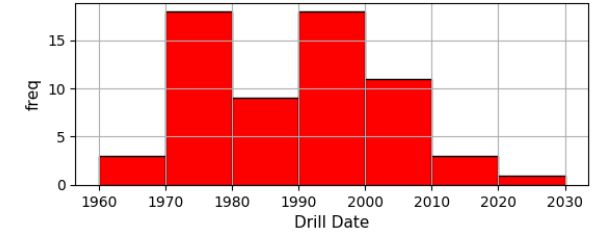
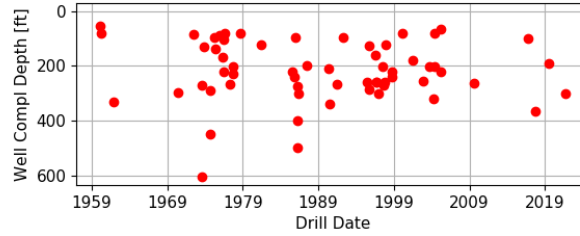
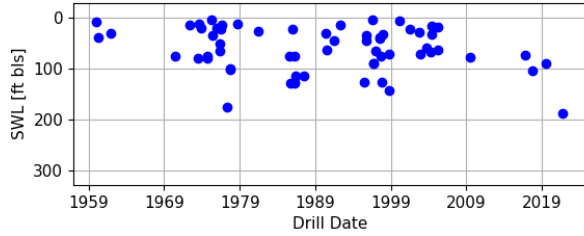
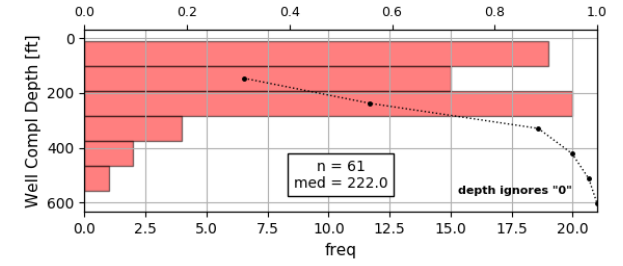
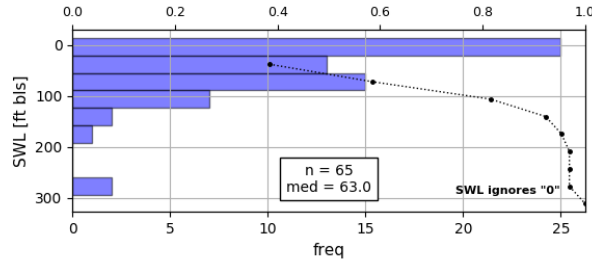
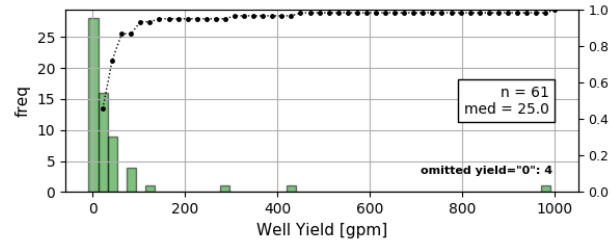
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
 USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State

Cross-Section

LITHOLOGY



Well Statistics in Quarters 8S/2W-10(NW) and -3(SW)



Includes Data from Water Wells only

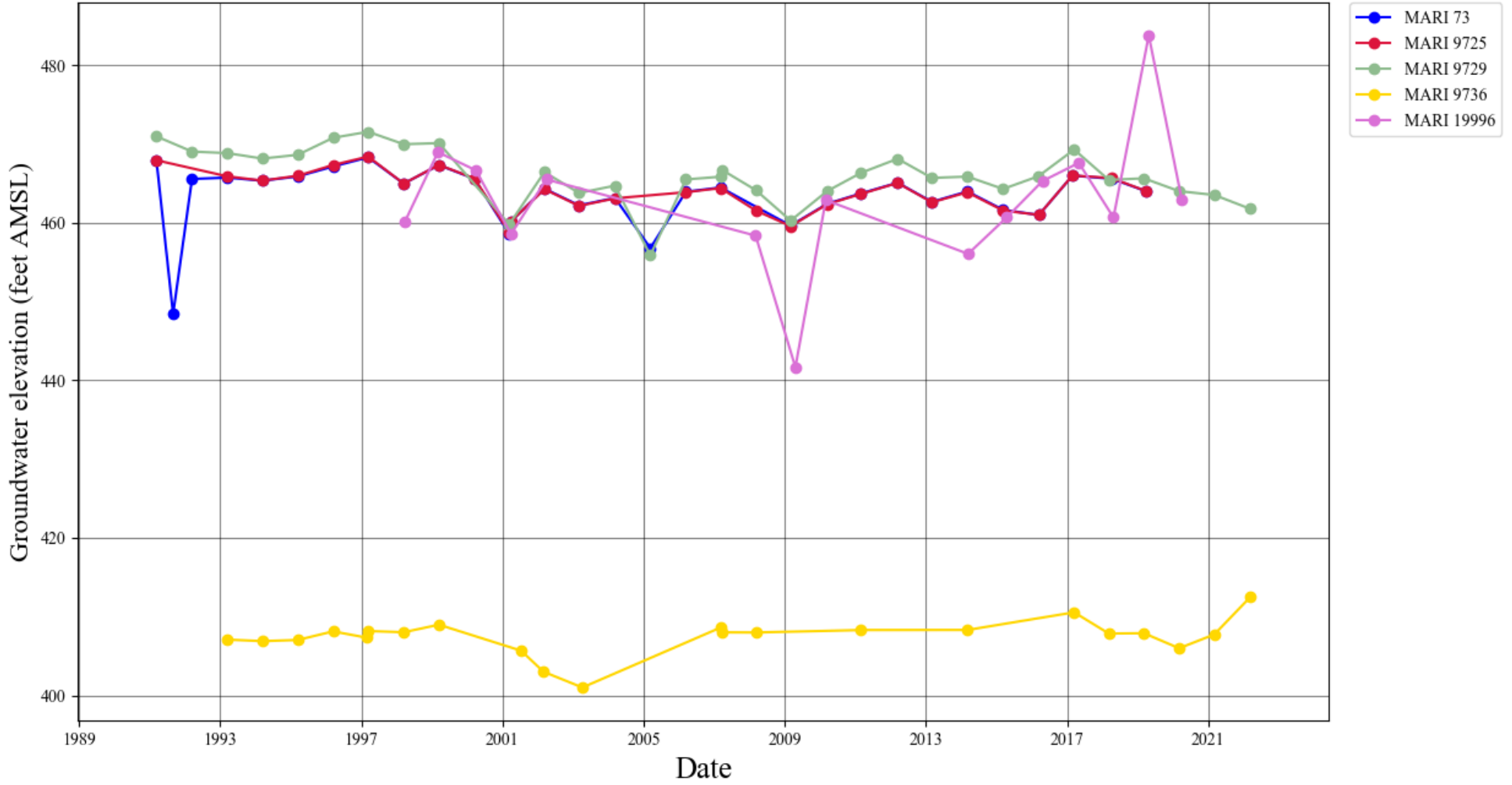
Well Logs per section exported to file:
C:\Users\Public\found_trs_keys_RESULTS.txt

Well Log Data exported to file:
C:\Users\gwater\Desktop\Working Folder\well_data.txt

Created 05/26/2022

Basalt Well Hydrograph

Observation Well Data



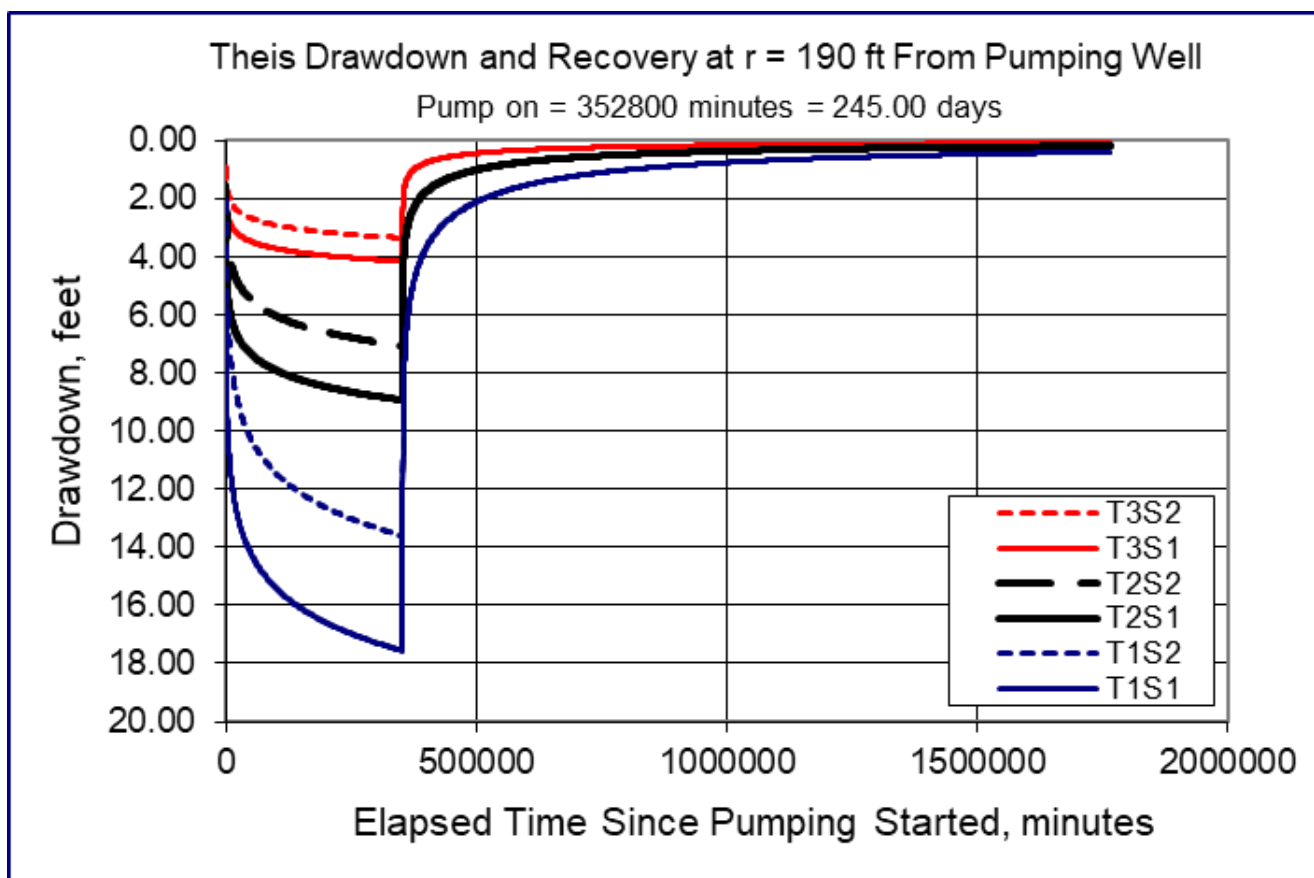
This Interference Analysis (Well 1 to MARI 9736)

This 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 | | 245 | | d | |
| Radial distance from pumped well: | r | | 190 | | ft | Q conversions |
| Pumping rate | Q | | 0.045 | | cfs | 20.20 gpm |
| Hydraulic conductivity | K | 12 | 25.333333 | 58.666667 | ft/day | 0.05 cfs |
| Aquifer thickness | b | | 15 | | ft | 2.70 cfm |
| Storativity | S 1 | | 0.0001 | | | 3,888.00 cfd |
| | S 2 | | 0.001 | | | 0.09 af/d |
| Transmissivity Conversions | T f2pd | 180 | 380 | 880 | ft ² /day | <input type="button" value="Recalculate"/> |
| | T f2pm | 0.125 | 0.2638889 | 0.6111111 | ft ² /min | |
| | T_gpdpft | 1346.4 | 2842.4 | 6582.4 | gpd/ft | |



Water Availability Analysis

Detailed Reports

PUDDING R > MOLALLA R - AB MILL CR
WILLAMETTE BASIN

Water Availability as of 8/10/2023

Watershed ID #: 151 ([Map](#))
Date: 8/10/2023

Exceedance Level: 80%
Time: 11:44 AM

| | | | |
|--------------------------------|-------------------------------|----------------------------|--------------|
| 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 | 114.00 | 1,070.00 | 0.00 | 36.00 | 1,030.00 |
| MAR | 1,010.00 | 76.50 | 934.00 | 0.00 | 36.00 | 898.00 |
| APR | 787.00 | 52.40 | 735.00 | 0.00 | 36.00 | 699.00 |
| MAY | 425.00 | 50.90 | 374.00 | 0.00 | 36.00 | 338.00 |
| JUN | 224.00 | 73.00 | 151.00 | 0.00 | 36.00 | 115.00 |
| JUL | 109.00 | 115.00 | -5.87 | 0.00 | 36.00 | -41.90 |
| AUG | 71.00 | 94.10 | -23.10 | 0.00 | 36.00 | -59.10 |
| SEP | 67.30 | 53.40 | 13.90 | 0.00 | 36.00 | -22.10 |
| 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 | 118.00 | 839.00 | 0.00 | 36.00 | 803.00 |
| ANN | 706,000.00 | 56,300.00 | 650,000.00 | 0.00 | 26,100.00 | 626,000.00 |