Groundwater Application Review Summary Form

Application # LL- _1958_

GW Reviewer _Stacey Garrison/Travis Brown_ Date Review Completed: _8/30/2023_

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 **_August 30 2023_**

TO: **Application** LL-**_1958_**

FROM: **GW:** **_Stacey Garrison/Travis Brown_**
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ **YES**
☒ **NO** The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

☐ **YES**
☒ **NO** Use the Scenic Waterway Condition (Condition 7J)

☐ Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below

☐ Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is *unable to make a Preponderance of Evidence finding.*

Exercise of this permit is calculated to reduce monthly flows in _[Enter]_ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 8/30/2023
FROM: Groundwater Section Stacey Garrison/Travis Brown
Reviewer's Name
SUBJECT: Application LL- **1958** 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: **Bieze Property Investors LLC** County: **Polk**

A1. Applicant(s) seek(s) 0.216 cfs from 1 well(s) in the Willamette Basin, Molalla-Pudding subbasin

A2. Proposed use irrigation 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	POLK 1000/993	**1**	**CRB**	0.216	6S/3W-7	240' S, 680' W of NE cor taxlot 700

* 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	286[b]		**23**	**5/17/1973**	327	0-27	+1-28			**100**	23	**air**

Use data from application for proposed wells.

A4. **Comments:** The POA/POU are located 4.6 miles northwest of Keizer, Oregon. Applicant proposes to irrigate up to 17.3 acres with a maximum annual volume of 17.3 af, based on the maximum allowed duty of 1 af/acre.
The POA (POLK 1000/993) is also authorized for Irrigation Use on 10.2 ac at a maximum rate of 0.13 cfs (58.3 gpm) and a maximum annual volume of 25.5 af under Certificate 51892 (priority date 4/28/1975). The POA will therefore be assessed at the **total combined rate of 0.346 cfs (155.3 gpm)** and a **maximum annual volume of 42.8 af**.
[a] There appears to be a discrepancy in the Public Lands Survey System (PLSS) projection used in the application map and that used by Department. The "metes-and-bounds" location descriptions provided in the application for the POA is 25 ft north of the mapped location; the mapped location is used for this review.
[b] Well head elevation estimated based on LIDAR measurements at well locations (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 POA is anticipated to develop a confined aquifer; therefore, per OAR 690-502-0240, the relevant Willamette Basin Rules (OAR 690-502-0120) do not apply.

A6. ☐ **Well(s) #** _____ , tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **Eola Hills Groundwater Limited Area (OAR 690-502-0200)**
Comments: Groundwater in the basalt aquifers in the Eola 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 provided the Director finds the proposed use and amount do not pose a threat to the groundwater resource or existing permit holders" (OAR 690-502-0200).
This proposed limited license application appears to be consistent with the provisions of OAR 690-502-0200

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

a. ☐ **is over appropriated**, ☒ **is not** over appropriated, *or* ☐ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;

b. ☐ **will not** *or* ☐ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;

c. ☒ **will not** *or* ☐ **will** likely to be available within the capacity of the groundwater resource; or

d. ☐ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:

i. ☒ The permit should contain condition #(s) **7c (7-yrs measurements)**;

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 **CRB** 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. **Special Conditions:**

1. Each basalt well shall be cased and continuously sealed from land surface to a depth of at least 50 feet 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. All new, altered, deepened or converted wells on this or subsequent permits must have nominal well casing diameter of at least 6 inches.

4. 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.

5. 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.

6. 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.

7. Water use under this limited license shall be shut off if Certificate 73429 does not receive the water to which it is legally entitled. Water use shall remain shut off until the following spring, unless it is specifically re-authorized by The Director.

Groundwater availability remarks:

The POA/POU are located on the Columbia River Basalt Group (CRBG) on the eastern slope of the Eola Hills. The CRBG and underlying older rock are eastward-dipping, resulting in the cuesta shape of the Eola-Amity Hills (Price 1967). The POA (POLK 1000/993) utilizes water-bearing zones (WBZs) within the CRBG. Aquifers in the CRBG are typically thin interflow zones between lava flows and confined by thicker flow interiors that have low porosity and low permeability (Conlon et al 2005, Gannett & Caldwell 1998, Reidel et al 2002). The POA is in an area deformed by faults, possibly resulting in compartmentalization of aquifers (Brownfield and Schlicker 1981). There is a northeast trending fault approximately 200 ft southeast of the POA, two other northeast trending faults 1.2 miles southeast and 2.5 miles northeast of the POA, and a northwest trending fault 1.7 miles northwest of the POA (Brownfield and Schlicker 1981). The degree of compartmentalization due to nearby faults, which is unknown at this time, may exacerbate well-to-well interference and longer-term water level declines in the local basalt aquifer (Conlon et al 2005). CRBG wells in the Eola Hills are expected to experience annual declines of 5 to 15 ft at lower elevations, up to 30 ft at higher elevations, and wells that tap thin and/or perched aquifers may go dry in the summer (Price 1967). The CRBG pinches out at numerous locations in this area, indicating potential locations for springs fed by perched aquifers (Woodward et al 1998, Conlon et al, 2005, Gannett and Caldwell 1998, Price 1967).

The proposed rate is 0.346 cfs (155.3 gpm). Most CRBG wells in the Eola-Amity Hills area produce less than 15 gpm, but some can yield more than 100 gpm (Price 1967). A query of wells in the area (see Well Statistics) shows a max of 250 gpm and median of 20 gpm; the proposed rate is 62% of the maximum and 777% of the median. Wells within 1 mile of the POA have a maximum reported yield of 110 gpm (with 135 ft of drawdown), and a median of 25 gpm. The well logs for the POA (POLK 993 and deepening POLK 1000) report 50 gpm and 100 gpm, but these were measured with an air test which can be less accurate than a pump test; in addition, drawdown for the 50 gpm air test was 128 ft after 1 hour, and for the 100 gpm air test was 23 ft after 1 hour. **It is not likely the POA is capable of supplying the total combined rate of 0.346 cfs (155.3 gpm), and therefore the proposed rate is not within the capacity of the resource.**

Water level trends for nearby (0 to 3 miles from POA) wells that utilize the CRBG with static water levels similar to the POA are overall declining (see Water Levels Measurements in Nearby Wells). Water levels have remained essentially unchanged in 1 well (YAMH 53325); increased in 5 wells (POLK 1225, POLK 52073, YAMH 3900, YAMH 3997); declined by less than 10 ft in 3 wells (YAMH 53317, YAMH 53318, 53324); declined by greater than 10 ft in 4 wells (YAMH 611, YAMH 51617, YAMH 51826, YAMH 52277). There are 5 well-sourced groundwater rights within 1 mile of the POA, and 19 spring-sourced water rights within 1 mile of the POA. Given the cuesta shape and incline of the CRBG formation and multiple faults in perpendicular orientation, it is difficult to determine which observation wells and groundwater rights have the highest likelihood of coincidence with the proposed POA. While there is not a preponderance of evidence that the groundwater resource is over-appropriated, **given the designation of the Eola Hills Groundwater Limited Area (OAR 690-502-0200), the extent of compartmentalization of CRBG fault blocks in this area, the overall declining water level conditions, and high density of groundwater and spring use in the area it is likely the proposed use is not likely within the capacity of the resource.**

The nearest CRB groundwater user to the POA is the exempt domestic well serving tax lot 300 at 3730 Lone Star Rd NW Salem, OR, located ~1,016 ft west of the POA, at an elevation of ~378 ft msl. A well log could not be associated with this tax lot or address but is likely given the identification of well logs associated with other domestic tax lots in this area (POLK 1002, POLK 1020, POLK 990, POLK 51811, POLK 52789, POLK 1179, YAMH 1907, POLK 52960, YAMH 7739, YAMH 7738). It is likely the proposed use would cause some degree of well-to-well interference with the well serving tax lot 300. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis). **Results indicate that the proposed use is likely to cause well-to-well interference with the well serving tax lot 300 that exceeds the threshold under the standard condition for basalt aquifers in the Willamette**

Basin. Based on this analysis of the available data and under the assumptions previously identified, groundwater for the proposed use **is not likely within capacity of the resource.**

There are multiple springs with associated rights within 1 mile from the subject well: Certificate 73429 with a priority date of 1/1/1938 located 1,012 ft and 1,560 ft from the POA; Certificates 5027, 5028, and 5029 located 1,964 ft from the POA all with priority date of 5/24/1922; Certificate 62370 and 62371 located 2,378 ft from POA both with a priority date of 7/10/1978; Certificate 96878 located 3,010 ft from the POA with priority date 9/12/2008; Certificate 49610 located 4,303 ft from the POA with priority date of 12/31/1890; Certificate 8677 located 4,953 ft from the POA with priority dates of 7/31/1929; Certificate 49599 located 5,006 ft from the POA with a priority date of 12/31/1904; Permit 15324 located 4,314 ft from the POA with a priority date of 1/24/2018.

Analytic modeling using the Theis (1941) drawdown model with relevant parameters (Conlon et al 2005) suggests that pumping at the proposed rate for 245 days could plausibly cause between 12 and 490 feet of drawdown at the spring on Certificate 73429 (see attached Theis Drawdown Analysis-Certificate 73429 Lowest and Highest Scenario). The large range of plausible outcomes makes it difficult to determine whether the proposed use is likely to interfere with the spring and cause a senior user not to receive their entitled water. However, given the strong potential for injury to the certificated springs under the proposed rate, and the unknown sensitivity of the springs to drawdown, the Limited License should be conditioned per Special Condition 7, above.

If a water right is permitted for this application, the conditions specified in B1.d., B2.c, and B3 are strongly recommended to protect senior users and the groundwater resource.

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

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	**CRB**	☒	☐

Basis for aquifer confinement evaluation: The SWL for the POA (POLK 1000/993) is reported at 23 ft bls [elevation of 263 ft msl], with a confining layer from 0 to 28 bls [258 to 286 msl]. The elevation of the SWL is above the bottom of the overlying confining layer, indicating the well utilizes a confined aquifer.

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[a]	SW Elev ft msl[b]	Distance (ft)	Hydraulically Connected? YES NO ASSUMED			Potential for Subst. Interfer. Assumed? YES NO	
1	**1**	**King Creek**	**263**	**149-452**	**2,040**	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: The POA is cased to 28 ft bls and sealed continuously to a depth of 27 ft bls [362 ft msl]. The local streambed of SW 1 (King Creek) is 149 to 452 ft msl. The surface water drainage has incised below the elevation of the WBZs of the wells within a mile, which range from -39 to 642 ft msl[c]. has incised through the CRBG in the vicinity of the POA, and the coincidence of head values with SW elevations supports a finding of hydraulic connection (Herrera et al 2014). Given the eastward-dipping CRBG block and proximity of exposed CRBG, the alluvial deposits underlying SW 1 (King Creek) are assumed to be relatively thin (Price 1967). Based on these factors, the POA is likely in hydraulic connection with SW 1 (King Creek).

[a] Groundwater elevation calculated from static water level reported in well logs and/or latest static water level reported for POLK 1000 and POLK 993 and well head elevations estimated based on LIDAR measurements at existing well location (Watershed Sciences, 2009).
[b] Surface water elevations were estimated from land surface elevations along stream reaches (Watershed Sciences, 2009; USGS, 2013).

[c] Water-bearing zone elevations calculated from water-bearing layers reported in well POLK 1000 and POLK 993

Water Availability Basin the well(s) are located within:
SW 1: WILLAMETTE R>COLUMBIA R-AB MOLALLA R

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?
1	**1**	☐	☐	**MF182A**	**1,500**	☐	**3,830**	☐	**	☐

Comments: ***There is no appropriate model to estimate streamflow depletion from pumping in CRBG interflow zones that are incised by streams or discharge to point sources such as springs. Therefore, the percentage of interference at 30 days was not calculated.**

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.

Well	SW #		Qw > 5 cfs?	Instream Water Right	Instream Water Right Q	Qw > 1% ISWR?	80% Natural Flow	Qw > 1% of 80% Natural	Interference @ 30 days (%)	Potential for Subst. Interfer.

				ID	(cfs)		(cfs)	Flow?		Assumed?
			☐			☐		☐		☐

Comments: NA-Q is not distributed among wells.

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
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: NA-streams within 1 mile evaluated above.

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:** See discussion on spring Certificate 73429 in section B3, GW Availability Remarks and attached Theis Drawdown-Certificate 73429; this certificate is within 0.25 miles of the POA.

References Used:

Application File: LL-1958

Pumping Test Files: POLK 1225, YAMH 7749, YAMH 50559, YAMH 51347, YAMH 52453

Well Reports: MARI 56016, POLK 990, POLK 992, POLK 993, POLK 994, POLK 1000, POLK 1002, POLK 1003, POLK 1020, POLK 1179, POLK 51811, POLK 52789, POLK 52960, POLK 53123, POLK 54779, YAMH 1907, YAMH 7749, YAMH 7756, YAMH 54722, POLK 1225, YAMH 7749, YAMH 50559, YAMH 51347, YAMH 52453

Brownfield, M. and Schlicker, H.G. 1981. Preliminary geologic map of the Amity and Mission Bottom quadrangles, Oregon. Department of Geology and Mineral Industries.

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.

Herrera, N.B., Burns, E.R., and Conlon, T.D., 2014, Simulation of groundwater flow and the interaction of groundwater and surface water in the Willamette Basin and Central Willamette subbasin, Oregon: U.S. Geological Survey Scientific Investigations Report 2014-5136, 152 p.

Price, D. 1967. Ground Water in the Eola-Amity Hills Area Northern Willamette Valley, Oregon. USGS Water-Supply Paper 1847, 66 pages

Reidel, S.P., Johnson, V.G., and Spane, 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.

Theis, C.V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage: American Geophysical Union transactions, v. 16, p. 519-524.

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

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

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 #:** 1 **Logid:** POLK 1000 (original)/POLK 993 (deepening)

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

a. ☒ review of the well log;

b. ☐ field inspection by _____;

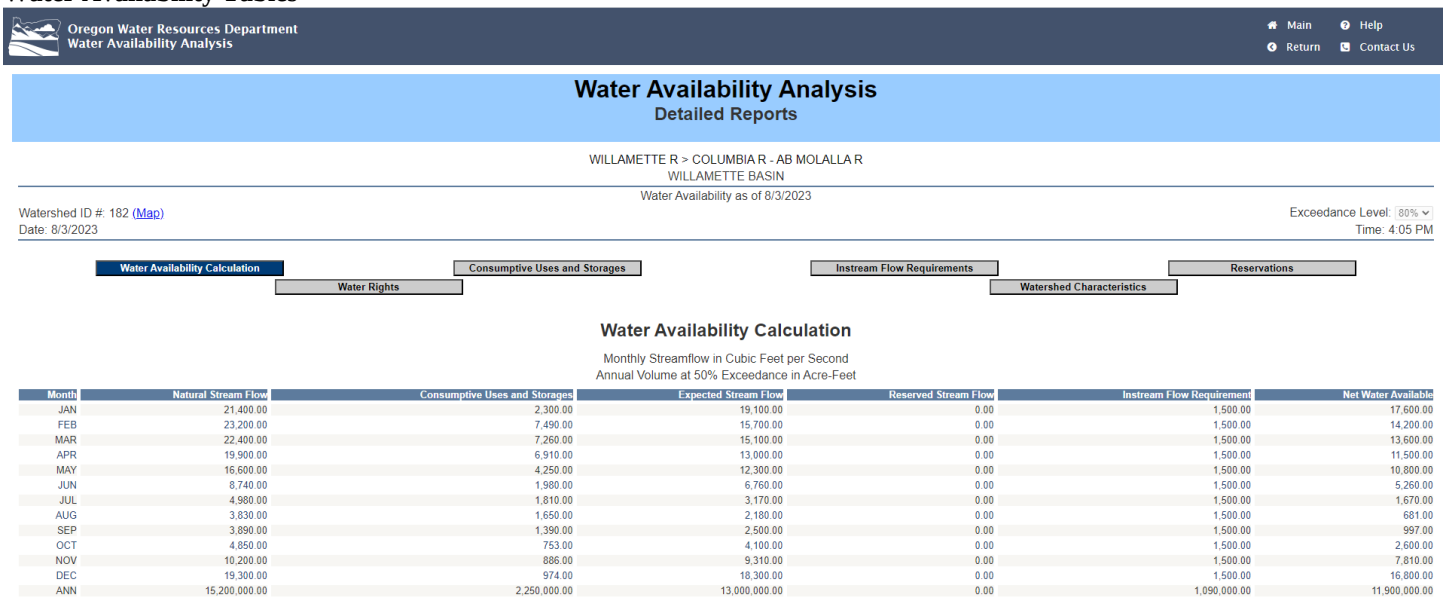
c. ☐ report of CWRE _____;

d. ☐ other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** Well 1 (POLK 1000/POLK 993) has an open interval from 28 to 327 ft below land surface, which is greater than the 100 ft maximum in Special Condition (2). Well 1 is not cased/sealed to at least 50 ft below land surface as specified in Special Condition (1).

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

Water Availability Tables



Oregon Water Resources Department
Water Availability Analysis

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Water Availability Analysis
Detailed Reports

WILLAMETTE R > COLUMBIA R - AB MOLALLA R
WILLAMETTE BASIN
Water Availability as of 8/3/2023

Watershed ID #: 182 (Map)
Date: 8/3/2023

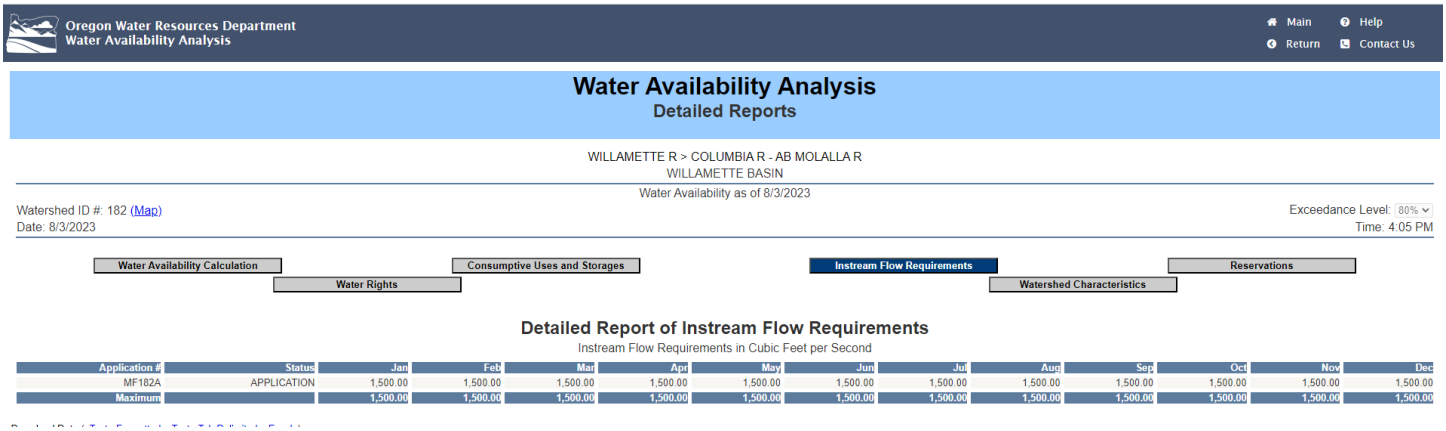
Exceedance Level: 80%
Time: 4:05 PM

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

Water Availability Calculation

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

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	21,400.00	2,300.00	19,100.00	0.00	1,500.00	17,600.00
FEB	23,200.00	7,490.00	15,700.00	0.00	1,500.00	14,200.00
MAR	22,400.00	7,260.00	15,100.00	0.00	1,500.00	13,600.00
APR	19,900.00	6,910.00	13,000.00	0.00	1,500.00	11,500.00
MAY	16,600.00	4,250.00	12,300.00	0.00	1,500.00	10,800.00
JUN	8,740.00	1,980.00	6,760.00	0.00	1,500.00	5,260.00
JUL	4,980.00	1,810.00	3,170.00	0.00	1,500.00	1,670.00
AUG	3,830.00	1,650.00	2,180.00	0.00	1,500.00	681.00
SEP	3,890.00	1,390.00	2,500.00	0.00	1,500.00	997.00
OCT	4,850.00	753.00	4,100.00	0.00	1,500.00	2,600.00
NOV	10,200.00	886.00	9,310.00	0.00	1,500.00	7,810.00
DEC	19,300.00	974.00	18,300.00	0.00	1,500.00	16,800.00
ANN	15,200,000.00	2,250,000.00	13,000,000.00	0.00	1,090,000.00	11,900,000.00



Oregon Water Resources Department
Water Availability Analysis

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Water Availability Analysis
Detailed Reports

WILLAMETTE R > COLUMBIA R - AB MOLALLA R
WILLAMETTE BASIN
Water Availability as of 8/3/2023

Watershed ID #: 182 (Map)
Date: 8/3/2023

Exceedance Level: 80%
Time: 4:05 PM

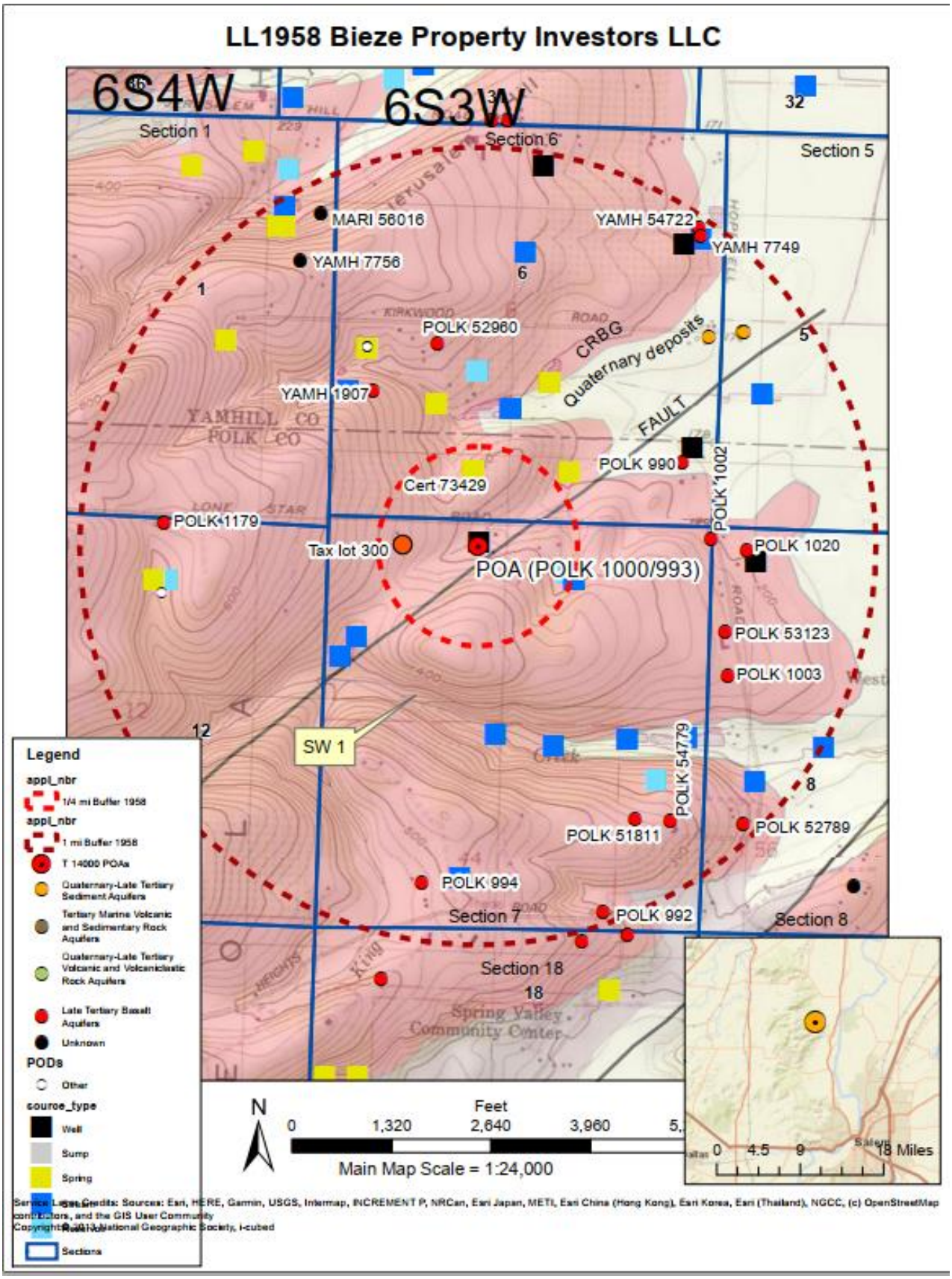
Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations | Water Rights | Watershed Characteristics

Detailed Report of Instream Flow Requirements

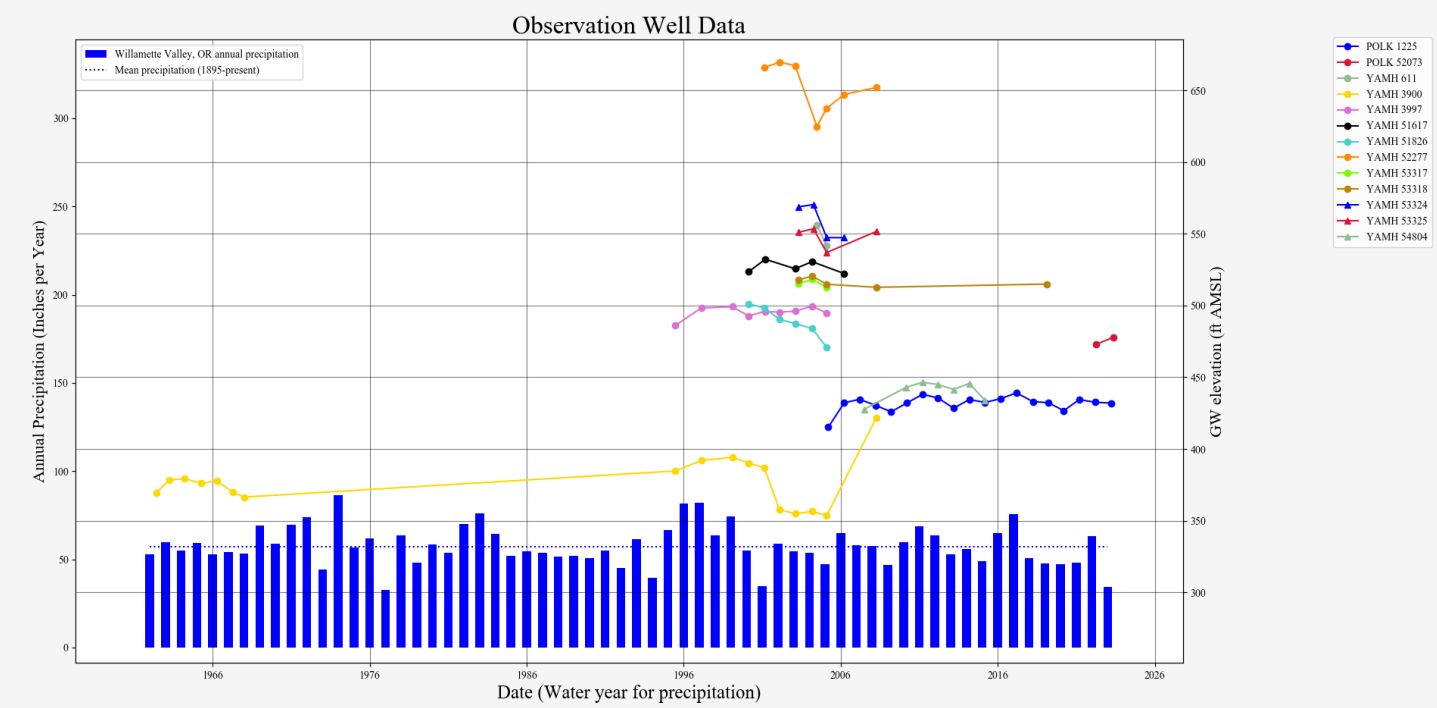
Instream Flow Requirements in Cubic Feet per Second

Application #	Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MF182A	APPLICATION	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
Maximum		1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00

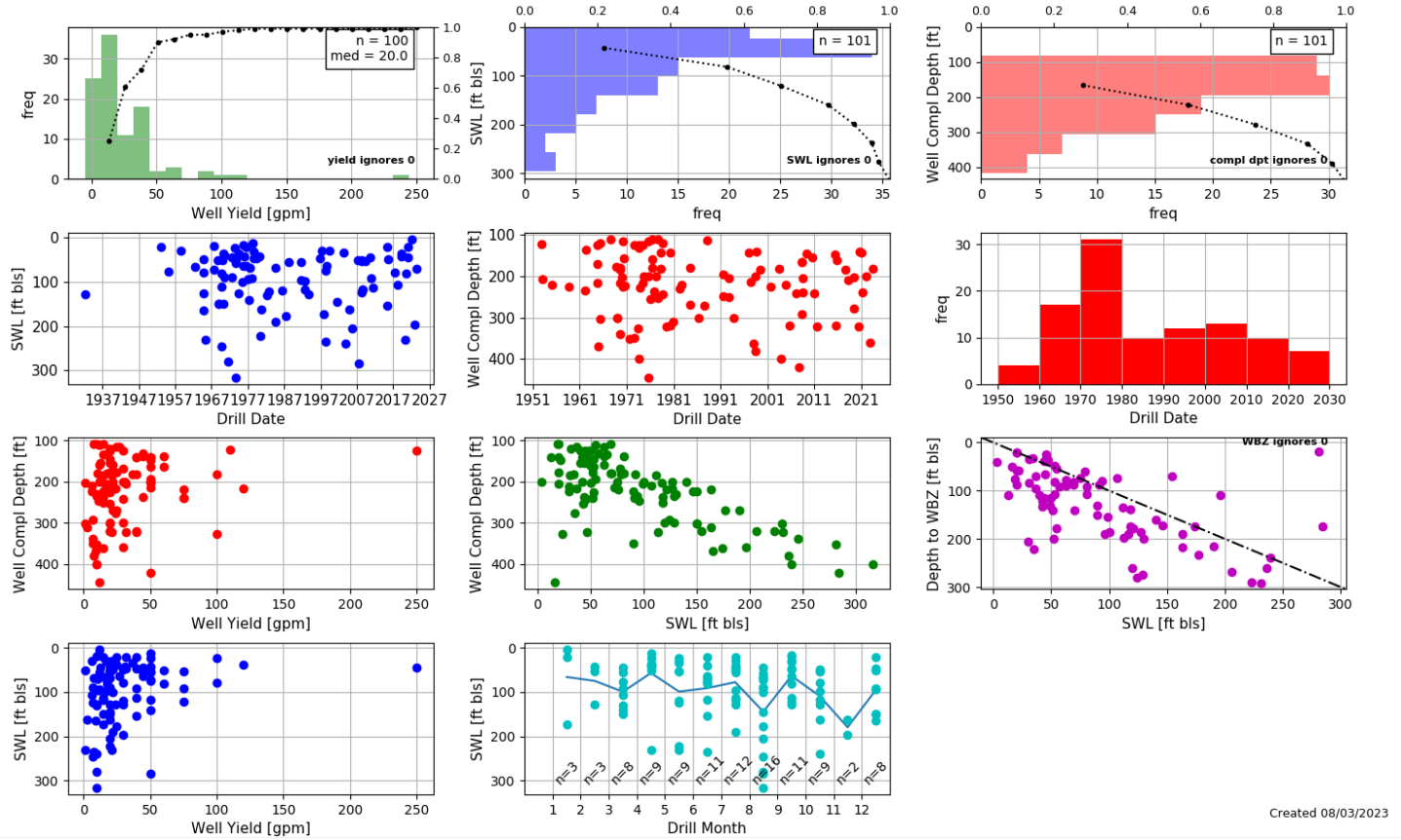
Well Location Map



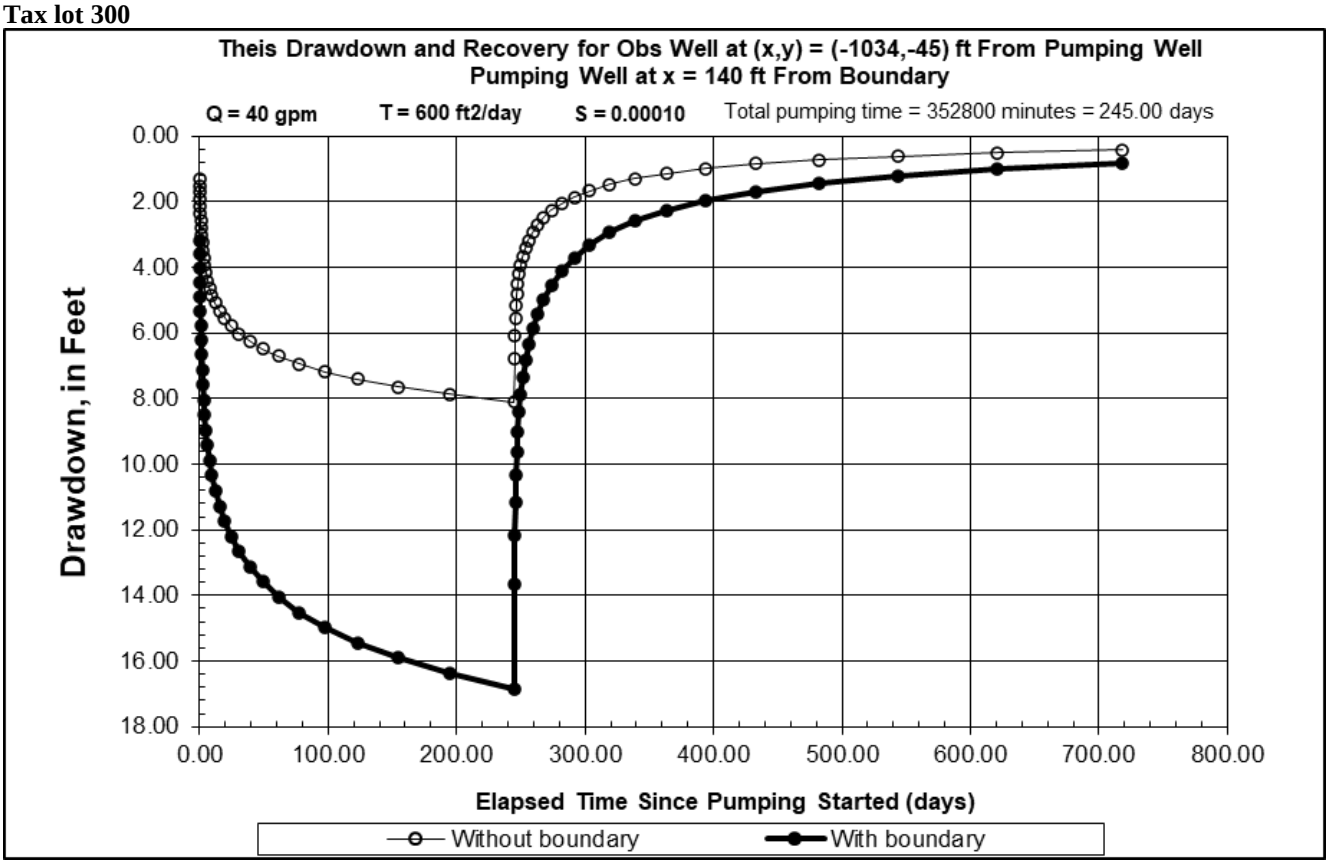
Water-Level Measurements in Nearby Wells



Well Statistics 6S/3W-7 and surrounding sections



Theis Drawdown Analysis
Tax lot 300



Distance to Barrier/Boundary (aquifer boundary/contact) from Pumping Well (x): 140 ft

Distance from Pumping Well to Affected Well (Tax lot 300) (x,y): -1034 ft, -45 ft

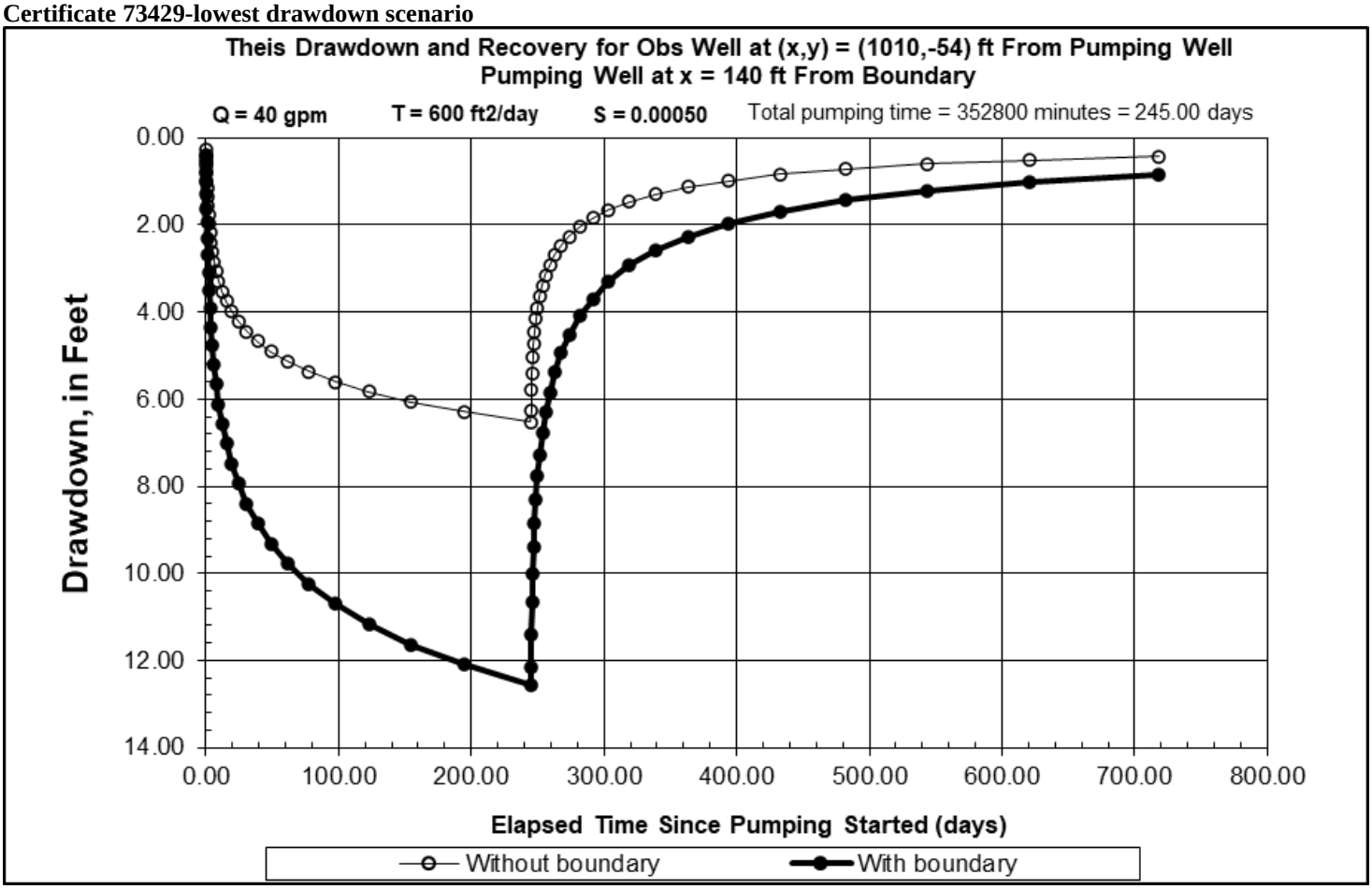
Pumping Rate (Q): 39.5 gpm [average pumping rate; the full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 42.8 ac-ft maximum allowed duty. For the maximum allowed duty of 42.8 ac-ft, continuous pumping would occur for 245 days at a rate of 0.088 cfs (39.5 gpm)]

Aquifer Transmissivity (T) = 4,488 gpd/ft (600 ft^2/day) [based on data from nearby pumping tests]

Aquifer Storativity (S) = $1x10^{-4}$ [Table 2 Central CRB Conlon et al 2005]

Total Pumping Time = 245 days [irrigation season, March 1-October 31]

Theis Drawdown Analysis
Certificate 73429-lowest drawdown scenario



Distance to Barrier/Boundary (aquifer boundary/contact) from Pumping Well (x): 140 ft

Distance from Pumping Well to Certificated Spring (Certificate 5027/5028/5029) (x,y): 1889 ft, -45 ft

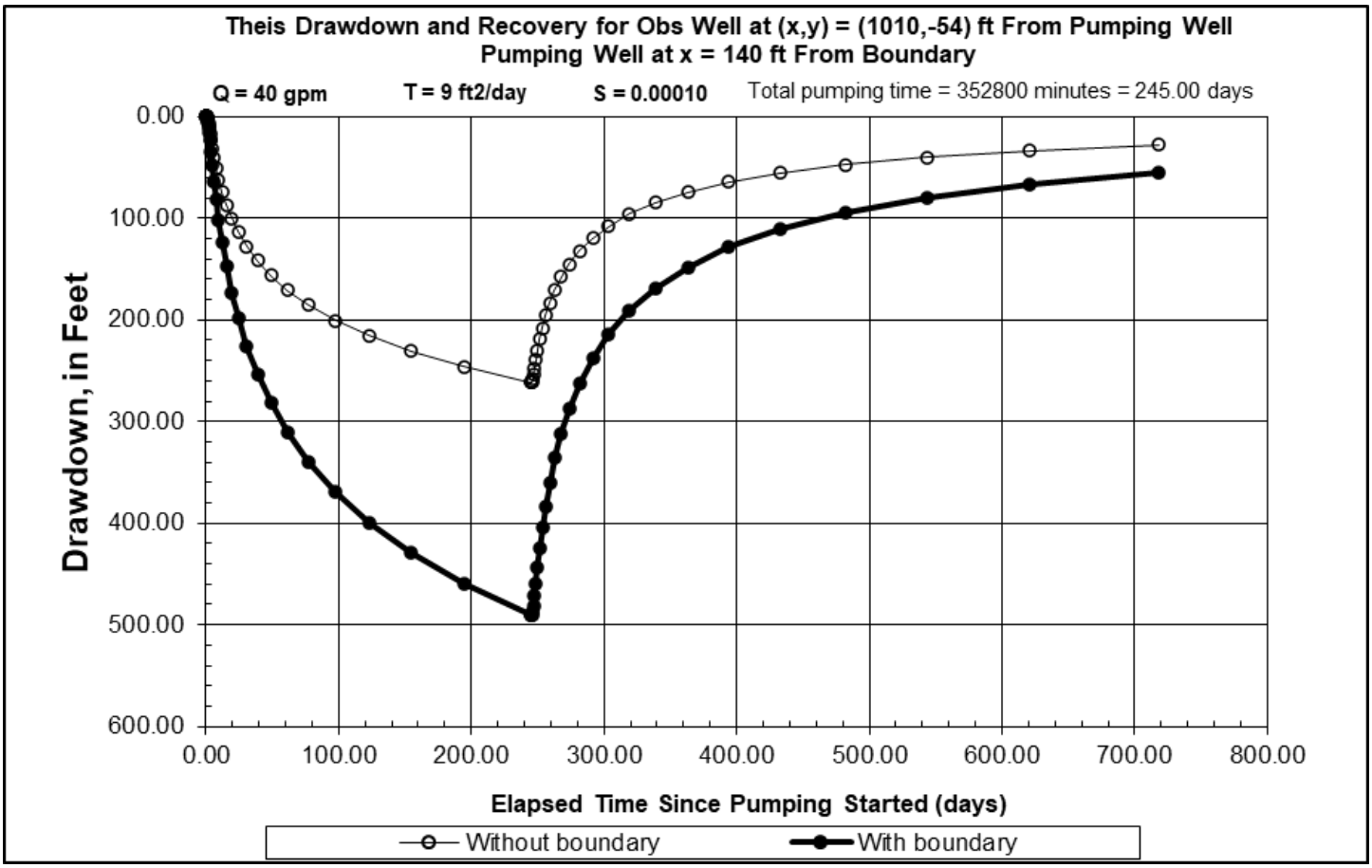
Pumping Rate (Q): 39.5 gpm [average pumping rate; the full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 42.8 ac-ft maximum allowed duty. For the maximum allowed duty of 42.8 ac-ft, continuous pumping would occur for 245 days at a rate of 0.088 cfs (39.5 gpm)]

Aquifer Transmissivity (T) = 4,488 gpd/ft (600 ft^2/day) [based on data from nearby pumping tests]

Aquifer Storativity (S) = $5x10^{-4}$ [Table 2 Central CRB Conlon et al 2005]

Total Pumping Time = 245 days [irrigation season, March 1-October 31]

Certificate 73429-highest drawdown scenario



Distance to Barrier/Boundary (aquifer boundary/contact) from Pumping Well (x): 140 ft

Distance from Pumping Well to Certificated Spring (Certificate 5027/5028/5029) (x,y): 1010 ft, -54 ft

Pumping Rate (Q): 39.5 gpm [average pumping rate; the full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 42.8 ac-ft maximum allowed duty. For the maximum allowed duty of 42.8 ac-ft, continuous pumping would occur for 245 days at a rate of 0.088 cfs (39.5 gpm)]

Aquifer Transmissivity (T) = 67.44 gpd/ft (9.016 ft^2/day) [based on data from nearby pumping tests]

Aquifer Storativity (S) = $1x10^{-4}$ [Table 2 Central CRB Conlon et al 2005]

Total Pumping Time = 245 days [irrigation season, March 1-October 31]