

Groundwater Application Review Summary Form

Application # G- 19371

GW Reviewer Gabriela Ferreira / Travis Brown Date Review Completed: December 29, 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

December 29, 2023

TO: Application G- 19371

FROM: GW: Gabriela Ferreira / Travis Brown
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ YES The source of appropriation is hydraulically connected to a State Scenic
☒ NO 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 December 29, 2023
 FROM: Groundwater Section Gabriela Ferreira / Travis Brown
 Reviewer's Name
 SUBJECT: Application G- 19371 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: Willamette Tree Wholesale c/o Ray Gannon
 County: Marion

A1. Applicant(s) seek(s) 0.17 cfs from three well(s) in the Willamette Basin,
 _____ subbasin

A2. Proposed use Irrigation (13.7 acres) Seasonality: March 1 – October 31

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

POA 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 4897	Well 2	Alluvial	1.90 ^a	6S / 3W - 13 SE-SW	1320' N, 650' W fr E cor S 13
2	MARI 70766	Well 3	Alluvial	3.67 ^a	6S / 3W - 13 NE-NE	1410' N, 650' W fr E cor S 13
3	MARI 4888	Well 4	Alluvial	3.67 ^a	6S / 3W - 13 SE-SW	1110' N, 2190' W fr E cor S 13

* Alluvium, CRB, Bedrock

POA Well	Well Elev ft msl	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Drawdown (ft)	Test Type
1	180	40	5/3/1968	180	0 – 20	0 – 180	--	90 – 135	600	45	Pump
2	180	49	1/19/2023	257	0 – 36	0 – 36 (20") 36 – 257 (16")	--	202.25 – 254	1125	69	Pump
3	175	46	7/7/1978	163	0 – 20	0 – 163	--	110 – 160	650	5	N/A

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU are ~ 2.5 mile north of Keizer city limits. Applicant proposes to irrigate up to 13.7 acres by three wells already constructed (MARI 4897; MARI 70766; MARI 4888) with a maximum annual volume of 34.25 af.

^a The proposed POA MARI 4897 is also an authorized POA for Irrigation Use on 99.0 acres with a maximum rate of 1.0 cfs under Certificate 50713 (priority date 2/22/1977). Two pending transfers, T-14251 and T-14252, also relate to the proposed POAs. For purposes of determining the potential impacts of the proposed use on groundwater and hydraulically connected surface water, the authorized and proposed rates of diversion are summed for each POA under "Proposed Rate (cfs)" in Table A3, above. All relevant water rights are for Irrigation Use authorized from March 1 to October 31. See attached Water Rights Summary table for more details.

^b Land surface 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 produce from a confined aquifer and are greater than ¼ mile from the nearest perennial surface water body; therefore, per OAR 690-502-0160 the relevant Willamette Basin rules (OAR 690-502-0050) do not apply.

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
 Name of administrative area: _____
 Comments: Not applicable

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

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

- a. ☐ is over appropriated, ☒ is not over appropriated, or ☐ cannot be determined to be over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. ☐ will not or ☐ will likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c. ☐ will not or ☐ will likely 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) 7RLN (Annual Measurements), 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 _____ 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 are located in the central Willamette Valley and will produce from water-bearing sand and gravel layers within the Willamette Aquifer and the Willamette Confining Unit. The Willamette Aquifer in this area is estimated to be ~90 ft thick and is covered by ~60-70 ft of silt (the Willamette Silt); the underlying Willamette Confining Unit is estimated to range from 550-600 feet thick (Gannett and Caldwell, 1998). The majority of wells in the immediate vicinity draw water from the Willamette Aquifer or upper Willamette Confining unit down to ~200 ft depth (see attached well statistics).

Within approximately one mile of the proposed POA locations there at least 40 authorized groundwater POAs, typically for irrigation and nursery use, with wells completed in the alluvial aquifer system and additional exempt (domestic) wells. Reported maximum yields in the nearby alluvial wells range up to ~1200 gpm but are more typically on the order of 20-200 gpm. Well deepenings are not prevalent. The requested maximum combined rate (3.67 cfs) is within the range of reported yields for water wells in this area.

The nearest groundwater user with a similar completion depth was identified as MARI 4199, located approximately 1,900 feet east of the proposed POAs. MARI 4199 is a permitted irrigation well completed to a depth of 147 feet bls and sealed to 20 feet bls. Despite not fully penetrating the alluvial aquifer system, potential impacts on MARI 4199 were modeled using the attached Theis drawdown analysis and assuming the full duty and rate of the proposed POAs. Transmissivity values are based on pump tests from nearby alluvial wells. With more conservative transmissivity and storativity values, drawdown may temporarily exceed typical permit conditions; however, it appears unlikely that interference in excess of the typical permit

condition limits would occur at MARI 4199 as a result of the requested withdrawal.

Six wells with sufficient water level data for evaluation were identified within approximately 2 miles of the POA, ranging in total depth from 123 to 273 feet bls. Reported water level elevations for these wells range from about 140 to 175 feet amsl. Water level data for these wells are generally stable over the time period available (~mid-1960's through present) although some variability up to 15 feet is observed, typically corresponding with precipitation, and a slight long-term decline of less than 10 feet.

The stable groundwater conditions indicate that the proposed use is within the capacity of the resource. However, in order to monitor and protect the resource and other groundwater rights in the area, the recommended permit conditions should be included.

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	Alluvial	☒	☐

Basis for aquifer confinement evaluation: The well reports indicate water levels are 40 to 50 feet bls and water-bearing zones are reported at depths greater than 63 feet bls. The water-bearing zones are overlain by a ~60-70 feet of silt and clay (Willamette Silt) (Gannett and Caldwell, 1998). Based on the available evidence, the aquifer is confined.

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	Patterson Creek	~130 - 145	~170 – 140	6,300	☒	☐	☐	☐	☒
2	1	Patterson Creek	~130 – 145	~170 – 140	6,500	☒	☐	☐	☐	☒
3	1	Patterson Creek	~130 - 145	~170 – 140	6,900	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: The nearest perennial stream, Patterson Creek, is greater than one mile from the proposed POAs. SWLs are based on reported water levels at time of drilling. Nearby wells (in particular, MARI 4160) with long records of measurement records indicate that the seasonal high water table is likely approximately 155-165 ft above mean sea level near the proposed POAs. The water levels in the proposed POAs and nearby wells are generally above or coincident with nearby perennial stream reaches, which indicates groundwater discharges to local streams. Published water table maps in the area corroborate this elevation and indicate that groundwater is hydraulically connected to local streams (Gannett and Caldwell, 1998; Conlon et al., 2005).

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

SW 1: WID # 182, Willamette River > Columbia River – Above Molalla River

C3a. 690-09-040 (4): Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked ☒ box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Q _w > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Q _w > 1% ISWR?	80% Natural Flow (cfs)	Q _w > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

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

Comments: N/A

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
2	1	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %	<1 %
Well Q as CFS		0	0	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	0	0
Interference CFS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
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.		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
(B) = 80 % Nat. Q		21400	23200	22400	19900	16600	8740	4980	3830	3890	4850	10200	19300
(C) = 1 % Nat. Q		214	232	224	199	166	87.4	49.8	38.3	38.9	48.5	102	193
(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: The low pumping rate and great distance between the proposed well and Patterson Creek combined with existing knowledge of the hydrogeologic regime in this area indicate that it is unlikely for the well to cause substantial interference. Potential for substantial interference was estimated for Well 2 on SW 1 (other well locations and pumping rates are likely to have reduced interference) by the quantitative Hunt (2003) model using hydraulic parameters derived from regional data and studies (Pumping test reports; Conlon et al., 2005; Freeze and Cherry, 1979). Results indicate that interference with SW 1 is not anticipated to exceed 25 percent of the rate of withdrawal within the first year of continuous pumping. The low initial interference with surface water is primarily attributed to the substantial thickness of fine-grained sediments between the relevant water-bearing zones and local streambeds. While net impacts will be small at the onset of pumping, stream depletions will increase with time until a new equilibrium between local recharge and discharge is reached, at which time surface water depletion is anticipated to be relatively constant throughout the year.

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:** The nearest perennial surface water source is greater than 1 mile from the proposed POAs. Based on the distance from the stream and low pumping rate relative to water availability, potential for substantial interference was not found.

References Used:

Application File G-19371, T-14251, T-14252

Certificate

Well reports: MARI 4888, MARI 770766, MARI 4897, MARI 3799, MARI 3875, MARI 3878, MARI 3875, MARI 4110, MARI 4217, MARI 5148

Pumping tests: MARI 4218, MARI 4880

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: U.S. Geological Survey Professional Paper 1424-A, 32 p.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: *Journal of Hydrologic Engineering*, Janu
Iverson, J., 2002, Investigation of the hydraulic, physical, and chemical buffering capacity of Missoula flood deposits for water quality and supply in the Willamette Valley of Oregon: Unpublished M.S. thesis, Oregon State University, 147 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 groundwater storage, *American Geophysical Union Transactions*, vol. 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, 2017, Stayton NE 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 690-200D1. Well #: 1, 2, 3 Logid: MARI 4888, MARI 4897, MARI 70766

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.**Relevant Water Rights**

POA	Water Right	Max Rate (cfs)	Combined Total Max Rate (cfs)
1 MARI 4897	Certificate 50713	1.0	1.90
	Certificate 40295 / T14251	0.73	
	App G-19371	0.17	
2 MARI 70766	Certificate 50713 / T14251	1.55	3.67
	Certificate 40295 / T14251	0.73	
	GR 3046 / T14252	1.22	
	App G-19371	0.17	
3 MARI 4888	Certificate 50713 / T14251	1.55	3.67
	Certificate 40295 / T14251	0.73	
	GR 3046 / T14252	1.22	
	App G-19371	0.17	

Water Availability Tables

WILLAMETTE R > COLUMBIA R - AB MOLALLA R
WILLAMETTE BASIN

Watershed ID #: 182 (Map)
Date: 12/29/2023

Water Availability as of 12/29/2023

Exceedance Level: 80%
Time: 11:08 AM

Water Availability Calculation

Consumptive Uses and Storages

Instream Flow Requirements

Reservations

Water Rights

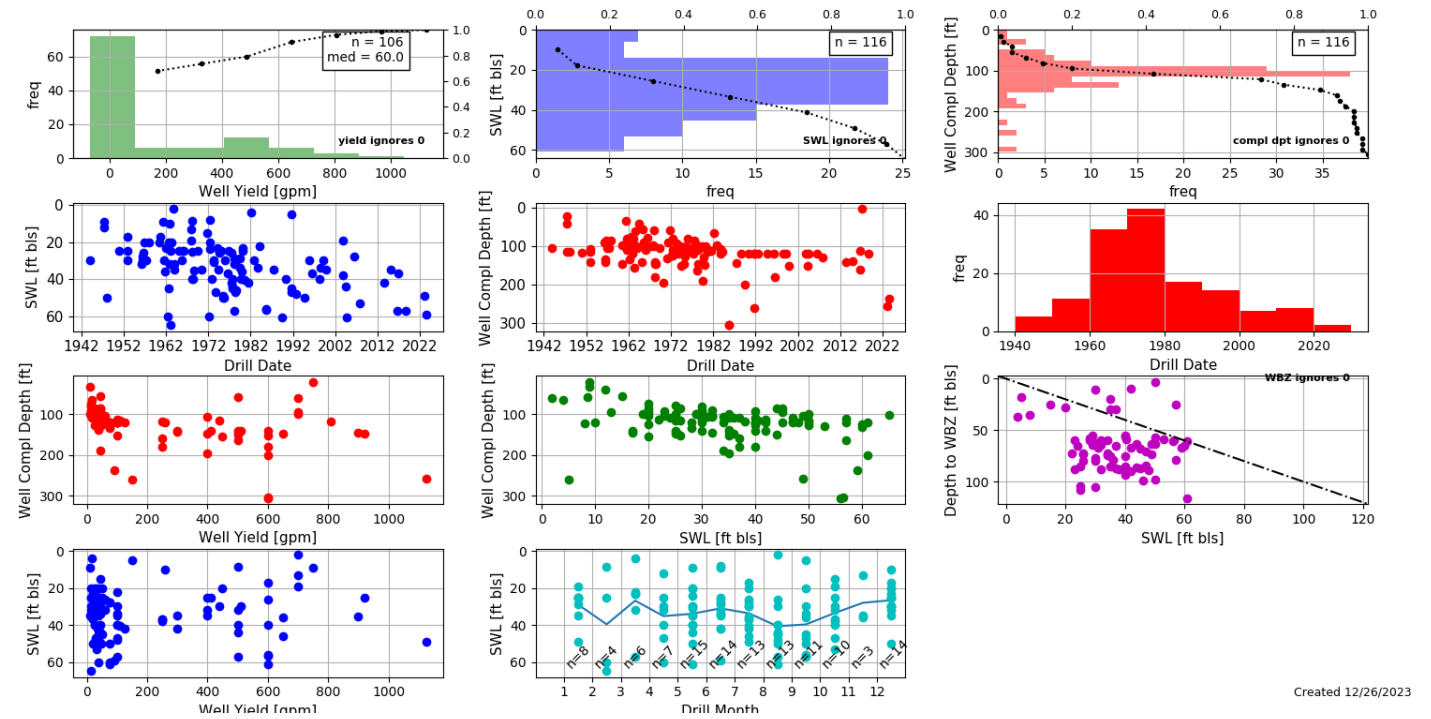
Watershed Characteristics

Water Availability Calculation

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

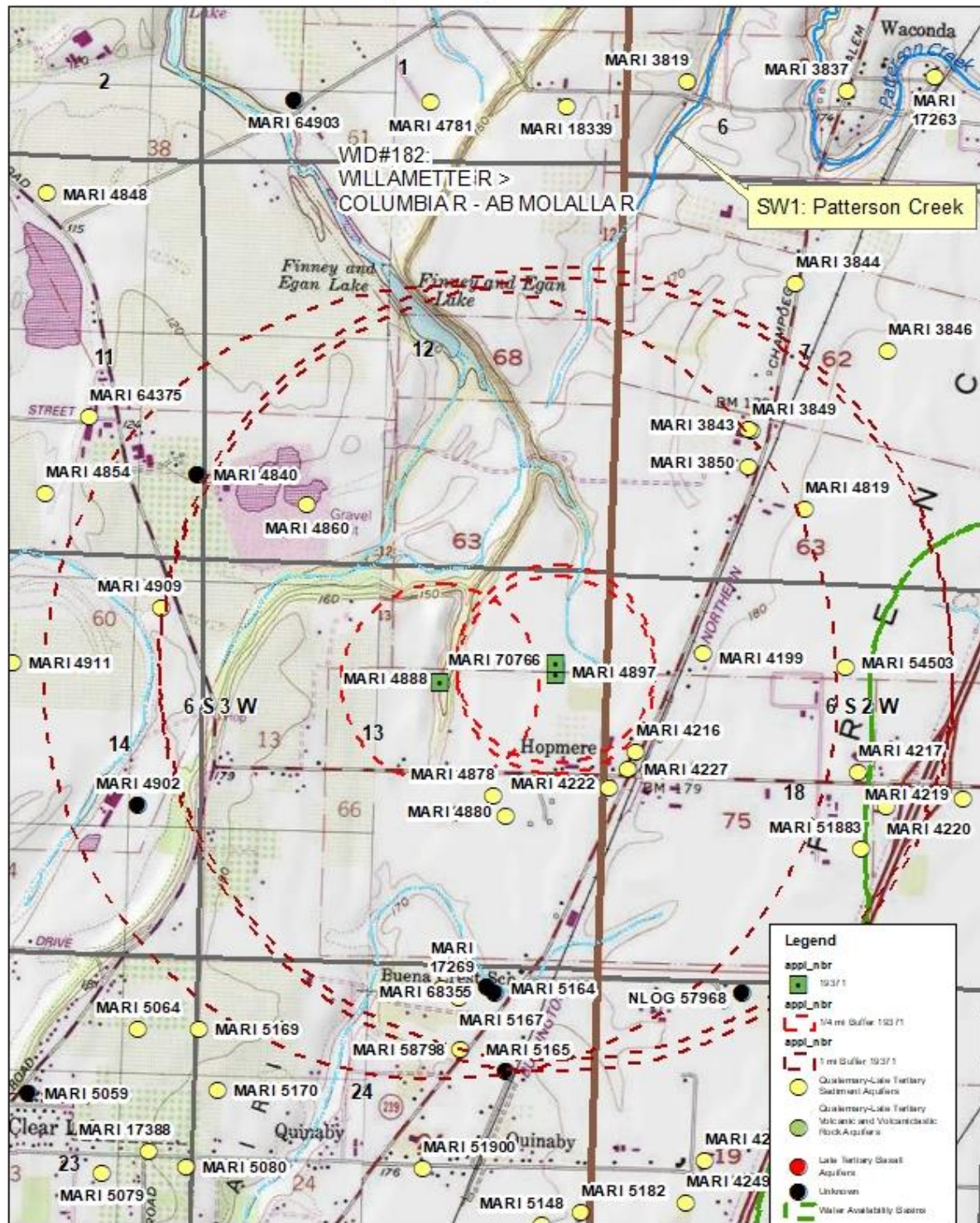
Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	21,400.00	2,300.00	19,100.00	0.00	1,500.00	17,600.00
FEB	23,200.00	7,490.00	15,700.00	0.00	1,500.00	14,200.00
MAR	22,400.00	7,260.00	15,100.00	0.00	1,500.00	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	754.00	4,100.00	0.00	1,500.00	2,600.00
NOV	10,200.00	888.00	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

Well Statistics



Well Location Map

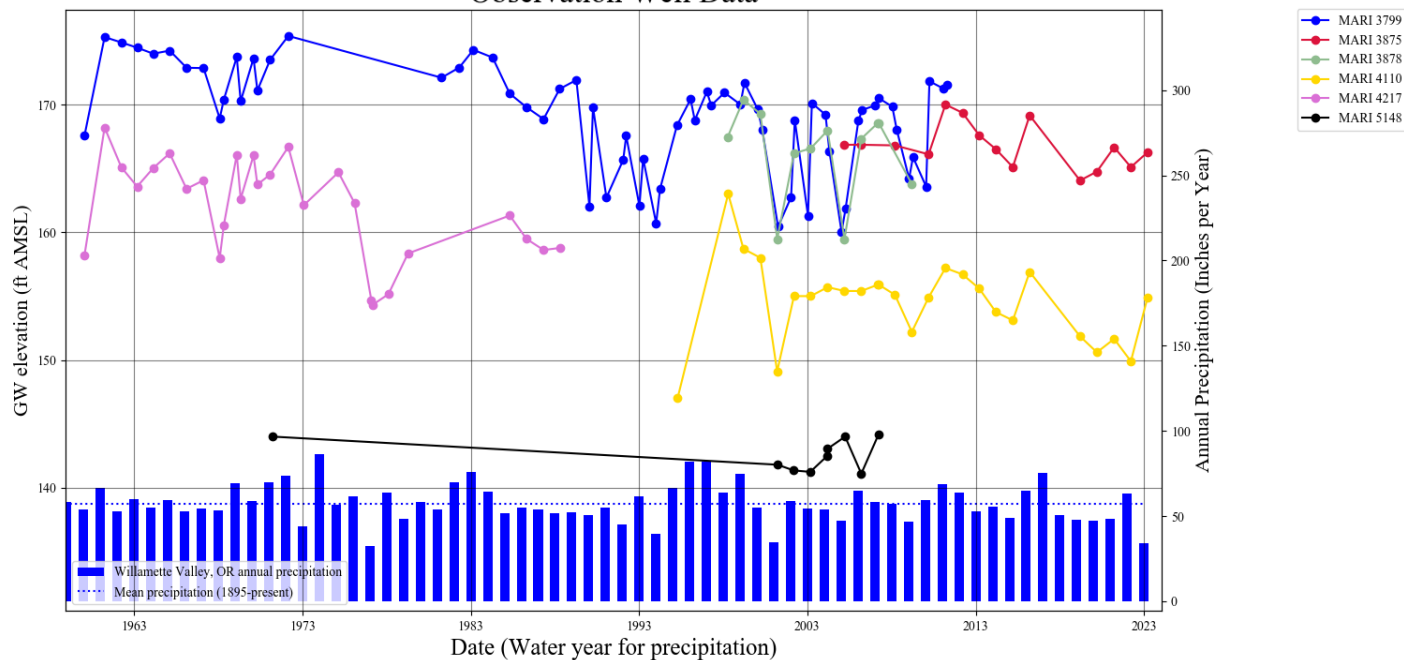
Application G-19371 Willamette Tree T6S, R3W, Section 13



Main Map Scale = 1:24,000

Water-Level Measurements in Nearby Wells

Observation Well Data



Theis Interference Analysis

Theis Time-Drawdown Worksheet

v.5.00

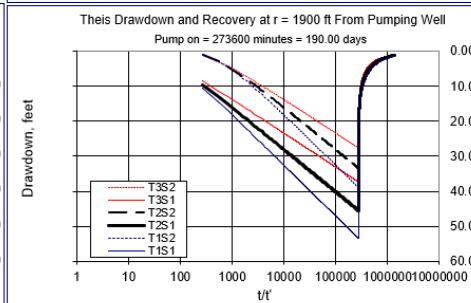
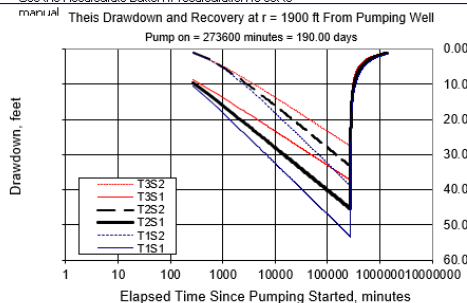
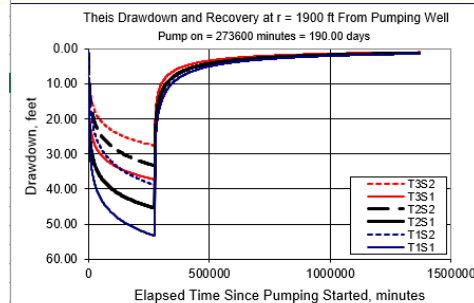
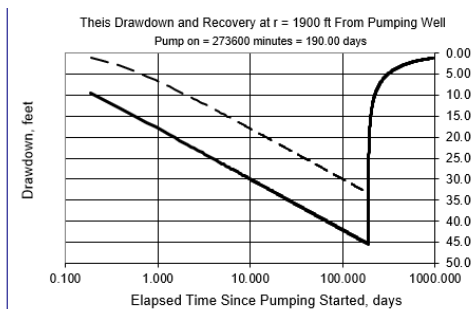
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r , from a pumping well for 3 different T values and radial distance, r , from a pumping well for 3 different T values and 2 different S values.

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		190		d	
Radial distance from pumped well:	r		1900		ft	Q conversions
Pumping rate	Q		3.67		cfs	1,647.10 gpm
Hydraulic conductivity	K	100	120	150	ft/day	3.67 cfs
Aquifer thickness	b		40		ft	220.20 cfm
Storativity	S 1		0.0001			317,088.00 cfd
	S 2		0.001			7.28 af/d
Transmissivity Conversions						
	T f2pd	4000	4800	6000	ft ² /day	
	T ft2pm	2.77777778	3.33333333	4.16666667	ft ² /min	
	T_gpdft	29920	35904	44880	gpd/ft	

Recalculate

Use the Recalculate button if recalculation is set to manual



Hunt (2003) Model Parameters and Output

Application type:	G
Application number:	19371
Well number:	2
Stream Number:	1
Pumping rate (cfs):	3.67
Pumping duration (days):	244.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	6500	6500	6500	ft
Aquifer transmissivity	T	6000	4800	4000	ft ² /day
Aquifer storativity	S	0.001	0.0005	0.0001	-
Aquitard vertical hydraulic conductivity	Kva	0.01	0.005	0.001	ft/day
Aquitard saturated thickness	ba	25	25	25	ft
Aquitard thickness below stream	babs	50	45	40	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-

Stream depletion for Scenario 2:

Days	10	330	360	30	60	90	120	150	180	210	240
Depletion (%)	0	0	0	0	0	0	0	0	0	0	0

