Groundwater Application Review Summary Form

Application # G- _19376_

GW Reviewer _Steve Ahlquist/Travis Brown_ Date Review Completed: _2/15/2024_

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 **_2/15/2024_**

TO: **Application** G-**_19376_**

FROM: **GW:** **_Steve Ahlquist/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 2/15/2024
FROM: Groundwater Section Steve Ahlquist / Travis Brown
Reviewer's Name
SUBJECT: Application G- **19376** 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 Valley Land, LLC** County: **Yamhill**

A1. Applicant(s) seek(s) 0.67 cfs from up to 4 well(s) in the Willamette Basin, Yamhill 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)**:

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	proposed	1	Alluvium	0.67	T4S/R3W-19 SE SW	50'S, 100'E fr SW cor DLC 48
2	proposed	2	Alluvium	0.67	T4S/R3W-19 SW SE	240'N, 1165'E fr SW cor DLC 48
3	proposed	3	Alluvium	0.67	T4S/R3W-30 NW NE	1240'S, 1215'E fr SW cor DLC 48
4	proposed	4	Alluvium	0.67	T4S/R3W-30 SW NE	1940'S, 1495'E fr SW cor DLC 48

* Alluvium, CRB, Bedrock

POA Well	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Drawdown (ft)	Test Type
1	150 - 250	TBD	TBD	TBD	TBD	TBD	TBD	TBD
2	150 - 250	TBD	TBD	TBD	TBD	TBD	TBD	TBD
3	150 - 250	TBD	TBD	TBD	TBD	TBD	TBD	TBD
4	150 - 250	TBD	TBD	TBD	TBD	TBD	TBD	TBD

POA Well	Land Surface Elevation at Well (ft amsl)	Depth of First Water (ft bls)	SWL (ft bls)	SWL Date	Reference Level (ft bls)	Reference Level Date
1	161	TBD	TBD	TBD	27 [a]	3/18/2016
2	159	TBD	TBD	TBD	33 [a]	3/18/2016
3	161	TBD	TBD	TBD	37 [a]	3/18/2016
4	161	TBD	TBD	TBD	37 [a]	3/18/2016

Use data from application for proposed wells.

A4. **Comments:** This application is for seasonal irrigation of 145.4 acres in Yamhill County, southwest of Dayton, OR. Applicant proposes to install up to four new wells completed up to 250 feet deep to provide a total maximum instantaneous flow rate of 300 gpm (0.67 cfs) and annual volume of 300 acre-feet.
There is a discrepancy between the metes-and-bounds location description for Well 4 and the location shown for Well 4 on the application map. The metes-and-bounds description places the well approximately 80 feet east of tax parcel 00200 within the right-of-way of OR-154. This review assumes Well 4 will be in the southeast corner of tax lot 0200 as shown on the application map.
[a] Reference level elevation is based on the highest known measured groundwater elevation for a similarly constructed well in the area – measured at well YAMH 52469, located approximately 2900 feet northwest of proposed Well 2. Reference levels were calculated to account for land surface elevation at the proposed well locations and the approximate horizontal hydraulic gradient inferred from water table maps (Gannett and Caldwell, 1998; Conlon et al., 2005).

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 wells will be completed in a confined aquifer, therefore the pertinent rules (OAR 690-502-240) do not apply.

A6. ☐ **Well(s) #** _____ , _____ , _____ , _____ , _____ , tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **N/A**
Comments: N/A

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) **7RLA (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 **alluvial** 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 included in this application will produce water from water-bearing sand and gravel layers in the Willamette Aquifer and the Willamette Confining Unit. In this area, the Willamette Aquifer is 20-40 feet thick; it is overlain by approximately 100 feet of fine-grained Willamette Silt Unit; and underlain by approximately 200 feet of the Willamette Confining Unit. The Willamette Confining Unit contains sufficient sand and gravel to produce relatively high yields in some areas. The regional water table resides in the Willamette Silt which acts as a leaky confining unit in relation to the underlying aquifer (Gannett and Caldwell, 1998). Recharge to the aquifer is primarily through the silt unit. Regional discharge is to the Willamette and Yamhill Rivers which have incised completely through the silt unit into the underlying Willamette aquifer. Smaller streams, such as West Fork Palmer Creek, are entrenched in, but do not fully penetrate, the silt unit. Although these smaller streams are hydraulically connected to the underlying aquifer, the connection is weak because of the low vertical permeability of the silt that occurs between the streambed and the aquifer. Because the aquifer is confined, pumping impacts will propagate rapidly to aquifer boundaries. The principal boundaries are the Willamette and Yamhill Rivers and the Willamette Silt (diffuse downward seepage over a large area). Smaller streams will be very weak boundaries (diffuse seepage over a small area). Pumping withdrawals will be offset by a decrease in stored water in the aquifer, reduced streamflow in the Willamette and Yamhill Rivers, downward leakage of water from the overlying silt into the aquifer, and reduced streamflow to smaller streams over the long term. Due to the low permeability of the silt unit, depletion of nearby small streams (West Fork Palmer Creek, Unnamed Tributary to Yamhill River) is expected to be small relative to pumping over the short term.

Several of the proposed POAs are less than ¼ -mile from known water wells. Theis (1935) drawdown analyses were conducted to assess potential well-to-well interference at nearby wells due to pumping at the proposed POAs. Permits issued for nearby POAs contain the standard condition requiring curtailment of pumping when interference with a neighboring well exceeds 25 feet of drawdown; any permit pursuant to this application would be conditioned similarly. Therefore, the potential for interference to nearby wells was evaluated based on the likelihood of well-to-well interference exceeding 25 feet due to pumping at the proposed POAs. Hydraulic parameters used in the Theis analyses are from pumping tests performed on nearby wells and from regional studies (Pumping Tests; Conlon et al., 2005). To be conservative, each proposed POA was evaluated individually, and it was assumed to be pumped continuously at the maximum requested rate (0.67 cfs/300 gpm) until reaching the requested annual volume of 300 acre-feet, which would take approximately 226 days. The nearest known well is YAMH 58088, located approximately 600 ft east-southeast of proposed Well 4. YAMH 58088 is an exempt domestic well completed to a depth of 138 feet bls and sealed to 37 feet bls. Results of the Theis analysis indicate drawdown at YAMH 58088 would likely exceed 25 feet after 59 days of pumping at Well 4. The next closest well, YAMH 54354, is located approximately 780 feet west of proposed Well 1. YAMH 54354 is an authorized POA under Permit G-11886 with a total depth of 218 feet bls. Results of the Theis analysis indicate drawdown at YAMH 54354 would likely exceed 25 feet after 100 days of pumping at Well 1. **Based on the anticipated interference at wells YAMH 58088 and YAMH 54354, groundwater for the proposed use will not likely be available within the capacity of the resource for the amount requested at proposed Well 1 and proposed Well 4. However, if the maximum requested rate were reduced to 0.56 cfs (251 gpm) or less in order to avoid the assumption of PSI (see Section C, below), then use likely would be within the capacity of the resource.**

Reported maximum yields for alluvial water wells located within approximately 1 mile of the proposed POAs range up to ~600 gpm, but the majority are typically in the 20-100 gpm range (see attached Well Statistics). The requested maximum rate (300 gpm) is in the upper range of reported yields and may require multiple wells to obtain.

Long-term hydrographs in the area show no progressive long-term declines (see attached Water-Level Measurements in Nearby Wells).

To reduce interference with known wells in the area, the proposed use should be limited to the proposed locations for Well 2 and Well 3 or the requested rate should be reduced to 0.56 cfs or less.

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	**Alluvium**	☒	☐
2	**Alluvium**	☒	☐
3	**Alluvium**	☒	☐
4	**Alluvium**	☒	☐

Basis for aquifer confinement evaluation: The Willamette Silt unit overlying the Willamette Aquifer in this area has an approximate thickness of 100 feet. In the central Willamette Valley, the Willamette Silt typically creates confined conditions in the underlying water-bearing sand and gravel deposits (Conlon et al., 2005). Static groundwater levels in nearby wells are above the water-bearing units, indicating the wells obtain groundwater from 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	SW Elev ft msl	Distance (ft)	Hydraulically Connected? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	**1**	**West Fork Palmer Creek**	**Est 123-133**	**92-111**	**2700**	☒	☐	☐	☐	☒
2	**1**	**West Fork Palmer Creek**	**Est 123-133**	**90-111**	**1800**	☒	☐	☐	☐	☒
3	**1**	**West Fork Palmer Creek**	**Est 123-133**	**92-113**	**1400**	☒	☐	☐	☐	☒
4	**1**	**West Fork Palmer Creek**	**Est 123-133**	**93-114**	**1380**	☒	☐	☐	☐	☒
2	**2**	**Palmer Creek**	**Est 123-133**	**90**	**5100**	☒	☐	☐	☐	☒
3	**2**	**Palmer Creek**	**Est 123-133**	**89-95**	**5020**	☒	☐	☐	☐	☒
4	**2**	**Palmer Creek**	**Est 123-133**	**89-95**	**4750**	☒	☐	☐	☐	☒
1	**3**	**Unnamed tributary to Yamhill River**	**Est 123-133**	**101-123**	**3600**	☒	☐	☐	☐	☒
2	**3**	**Unnamed tributary to Yamhill River**	**Est 123-133**	**101-123**	**4600**	☒	☐	☐	☐	☒
3	**3**	**Unnamed tributary to Yamhill River**	**Est 123-133**	**123**	**5100**	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: Groundwater elevations in nearby wells are similar and above the surface water elevations of SW1, SW2, and SW3. Water table maps in the area indicate that groundwater in the alluvial aquifer flows towards and discharges to local streams incised into the Willamette Silt (Gannet and Caldwell, 1998). These facts indicate that the alluvial aquifer is hydraulically connected to local streams.

Water Availability Basin the well(s) are located within:
SW1 and SW2: Yamhill R > Willamette R > At Mouth (WID 30200801)
SW3: Yamhill R > Willamette R > AB Palmer Cr (WID 188)

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**	☐	☐	**N/A**	**N/A**	☐	**56.50**	☒	**<25**	☒
2	**1**	☐	☐	**N/A**	**N/A**	☐	**56.50**	☒	**<25**	☒
3	**1**	☐	☐	**N/A**	**N/A**	☐	**56.50**	☒	**<25**	☒
4	**1**	☐	☐	**N/A**	**N/A**	☐	**56.50**	☒	**<25**	☒
2	**2**	☐	☐	**N/A**	**N/A**	☐	**56.50**	☒	**<25**	☒
3	**2**	☐	☐	**N/A**	**N/A**	☐	**56.50**	☒	**<25**	☒
4	**2**	☐	☐	**N/A**	**N/A**	☐	**56.50**	☒	**<25**	☒
1	**3**	☐	☐	**N/A**	**N/A**	☐	**56.30**	☒	**<25**	☒
2	**3**	☐	☐	**N/A**	**N/A**	☐	**56.30**	☒	**<25**	☒
3	**3**	☐	☐	**N/A**	**N/A**	☐	**56.30**	☒	**<25**	☒

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

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

Comments: C3a: **The requested rate of appropriation (0.67 cfs) is greater than 1% of the natural flow that is exceeded 80% of the time for SW1 and SW 2 (56.50 cfs) and SW3 (56.30 cfs) (see attached Water Availability Tables). Per OAR 690-009-0040(c), PSI with SW1, SW2, and SW3 is assumed.**

An analytical stream depletion model (Hunt, 2003) was used to estimate potential interference with streamflow due to the proposed use. Hydraulic parameters used in the model were obtained from regional data and studies (Pumping Test Reports, Conlon et al., 2005, Iverson, 2002). Specific parameter values used in the analyses are listed in the attached Stream Depletion Model Analyses. Potential interference estimates for SW1 (West Fork Palmer Creek) and SW2 (Palmer Creek) were modeled based on pumping of Well 4. Potential interference for SW#3 (unnamed tributary to the Yamhill River) was modeled based on pumping at Well 1. Other proposed well locations are farther from streams and are expected to result in less interference. Hunt model results indicate that stream depletion (interference) due to pumping of the proposed POAs is anticipated to be much less than 25% of the well discharge at 30 days of continuous pumping at the maximum requested rate of 0.67 cfs.

C3b: not applicable.

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

Non-Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(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: Not applicable.

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:** **PSI is assumed per OAR 690-009-0040(4)(c) because the requested rate of appropriation (0.67 cfs/300 gpm) is greater than 1% of the 80% exceedance flow. If the requested rate of appropriation is reduced to 0.56 cfs (251 gpm), PSI would no longer be assumed.**

References Used:

Application File G-19376

Pumping Test Report: YAMH 712, YAMH 2912, YAMH 5370, YAMH 5447, YAMH 5954

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, January/February, Vol 8,p.12-19.

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, 2017, Dayton quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, Virginia.

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.**

Water Availability Tables

YAMHILL R > WILLAMETTE R - AB PALMER CR
WILLAMETTE BASIN

Water Availability as of 12/29/2023

Watershed ID #: 188 (Map) Exceedance Level: 80%
Date: 12/29/2023 Time: 7:23 AM

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	1,780.00	61.60	1,720.00	0.00	31.00	1,690.00
FEB	2,010.00	59.40	1,950.00	0.00	31.00	1,920.00
MAR	1,710.00	38.00	1,670.00	0.00	31.00	1,640.00
APR	1,030.00	43.90	986.00	0.00	31.00	955.00
MAY	512.00	56.40	456.00	0.00	31.00	425.00
JUN	229.00	75.30	154.00	0.00	31.00	123.00
JUL	107.00	95.60	11.40	0.00	31.00	-19.60
AUG	66.60	84.70	-18.10	0.00	31.00	-49.10
SEP	56.30	54.00	2.27	0.00	31.00	-28.70
OCT	72.70	15.10	57.60	0.00	31.00	26.60
NOV	465.00	31.60	433.00	0.00	31.00	402.00
DEC	1,640.00	58.30	1,580.00	0.00	31.00	1,550.00
ANN	1,150,000.00	40,700.00	1,100,000.00	0.00	22,500.00	1,080,000.00

YAMHILL R > WILLAMETTE R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 12/28/2023

Watershed ID #: 30200801 (Map) Exceedance Level: 80%
Date: 12/28/2023 Time: 10:51 AM

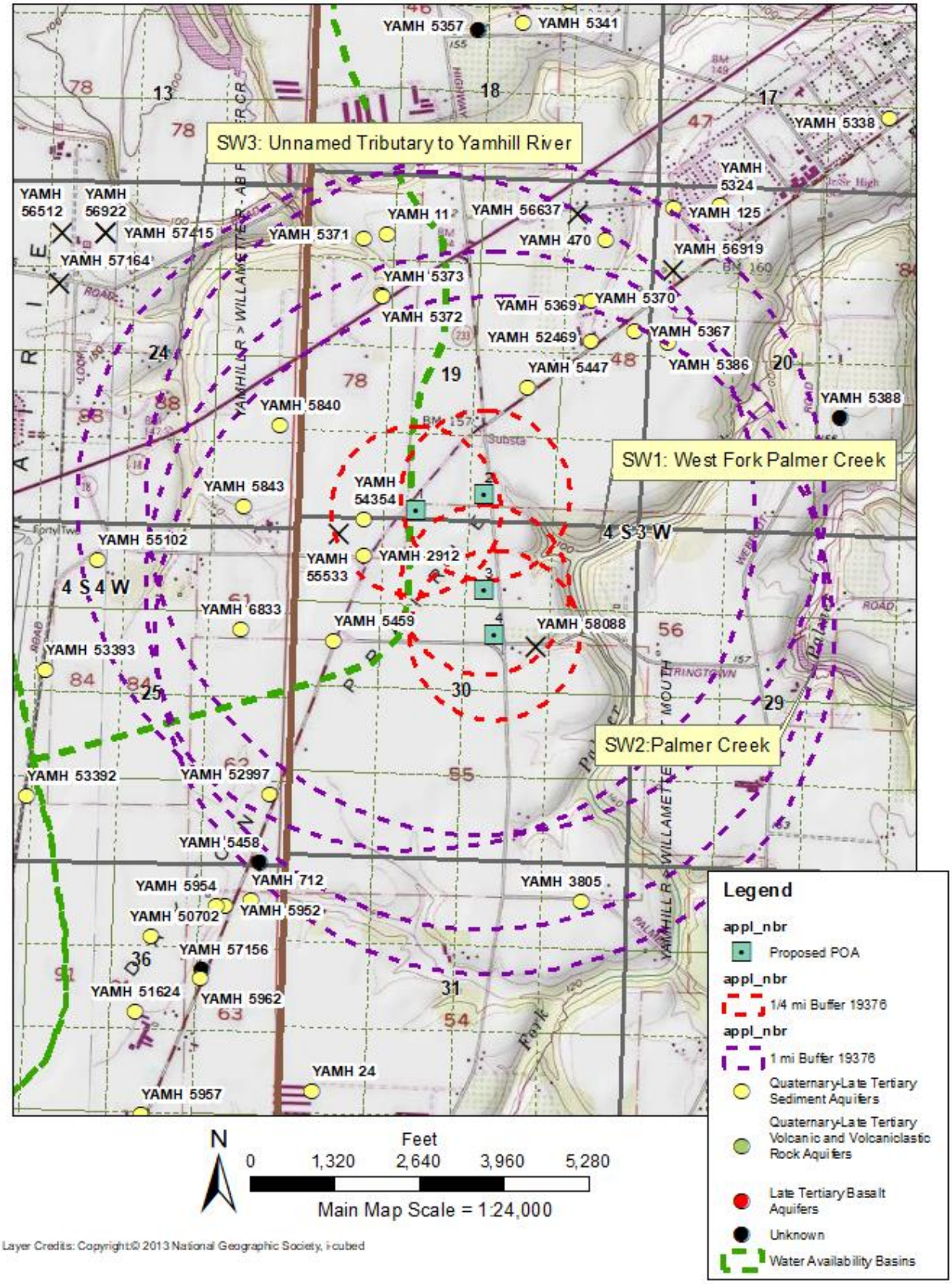
Water Availability Calculation

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

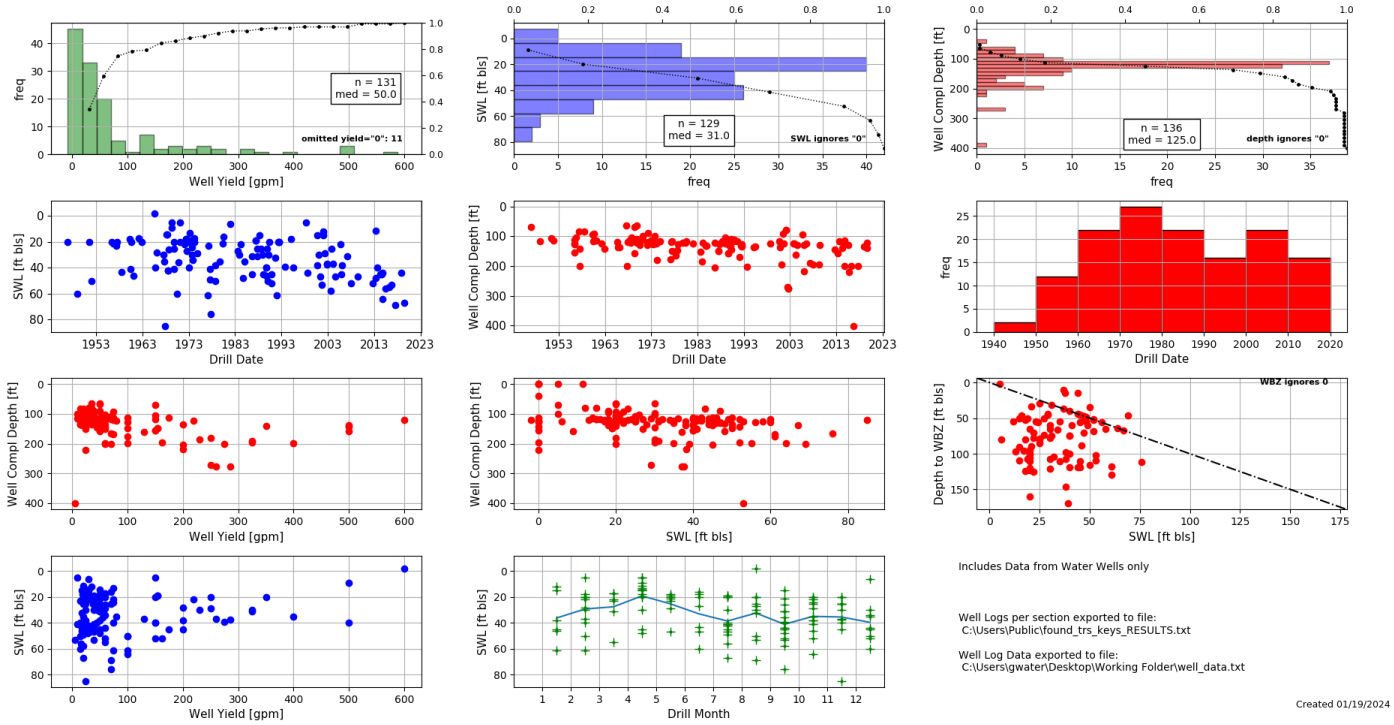
Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	1,840.00	70.30	1,770.00	0.00	31.70	1,740.00
FEB	2,070.00	68.00	2,000.00	0.00	31.70	1,970.00
MAR	1,760.00	44.20	1,720.00	0.00	31.70	1,680.00
APR	1,060.00	51.20	1,010.00	0.00	31.70	977.00
MAY	523.00	67.00	456.00	0.00	31.70	424.00
JUN	232.00	87.60	144.00	0.00	31.70	113.00
JUL	108.00	111.00	-2.98	0.00	31.70	-34.70
AUG	66.90	98.30	-31.40	0.00	31.70	-63.10
SEP	56.50	62.80	-6.26	0.00	31.70	-38.00
OCT	72.50	16.50	56.00	0.00	31.70	24.30
NOV	462.00	38.20	424.00	0.00	31.70	392.00
DEC	1,670.00	66.70	1,600.00	0.00	31.70	1,570.00
ANN	1,180,000.00	47,200.00	1,130,000.00	0.00	23,000.00	1,110,000.00

Well Location Map

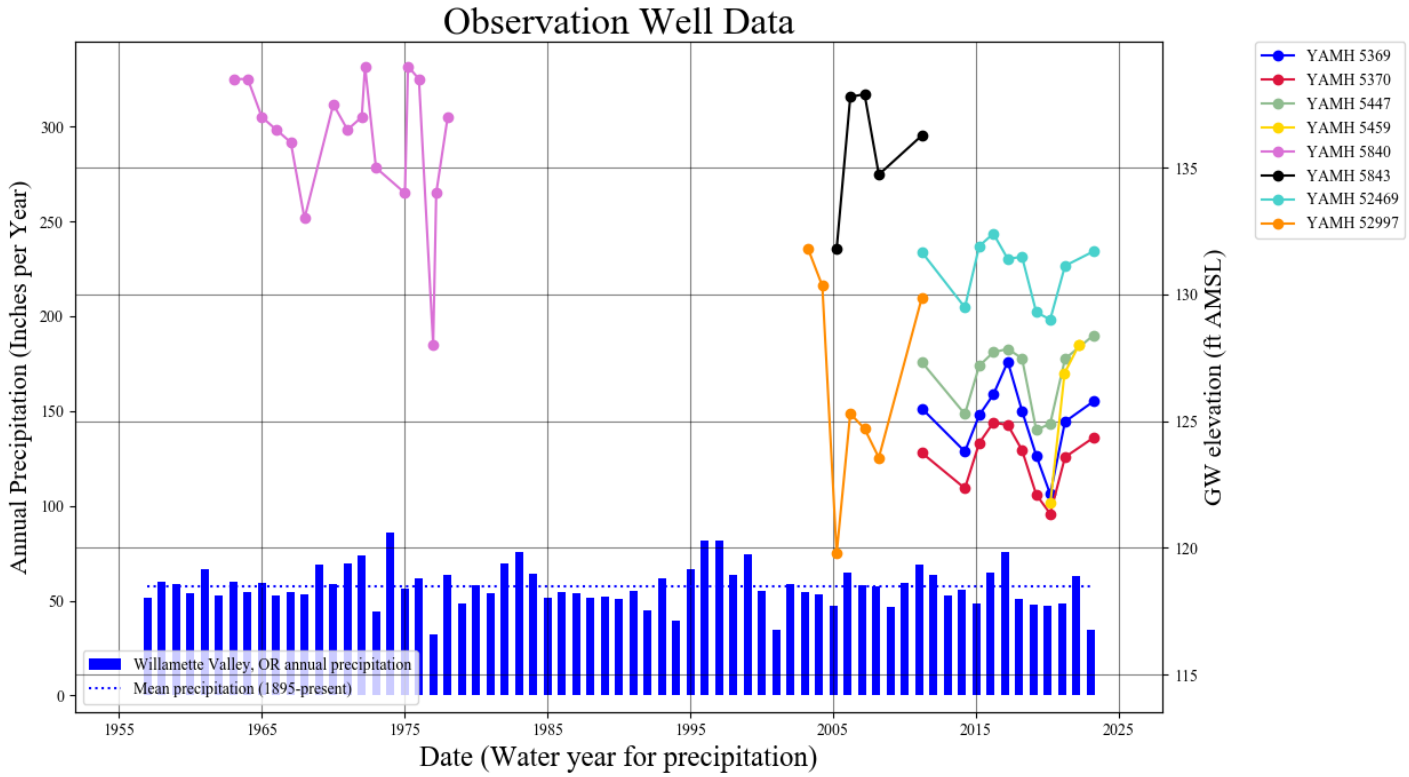
Application G19376 Willamette Valley Land, LLC
T4S, R3W, Sections 19 & 30



Well Statistics



Water-Level Measurements in Nearby Wells



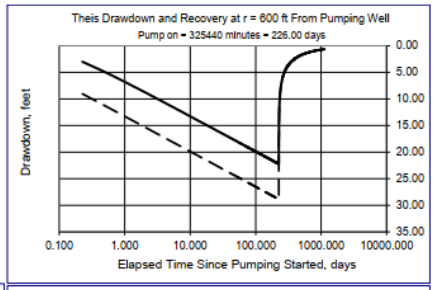
Theis Interference Analyses

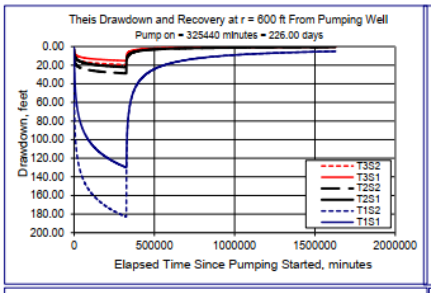
Theis Time-Drawdown Worksheet v.5.00

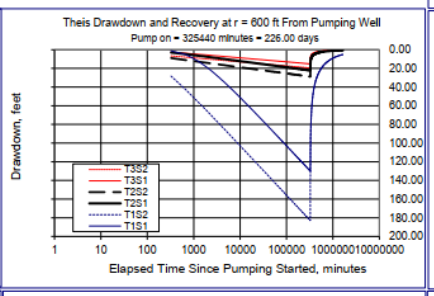
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.
Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

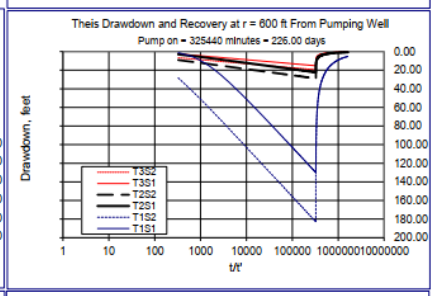
Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		226		d	
Radial distance from pumped well:	r		600		ft	Q conversions
Pumping rate	Q		0.67		cfs	300.70 gpm
Hydraulic conductivity	K	6.6666667	53.333333	82.333333	ft/day	0.67 cfs
Aquifer thickness	b		30		ft	40.20 cfm
Storativity	S_1		0.001			57,888.00 cfd
	S_2		0.0001			1.33 af/d
Transmissivity Conversions	T_f2pd	200	1600	2470	ft2/day	
	T_ft2pm	0.1388889	1.1111111	1.7152778	ft2/min	
	T_gpdpft	1496	11968	18475.6	gpd/ft	

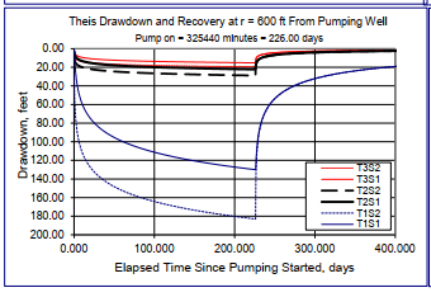
Use the Recalculate button if recalculation is set to manual

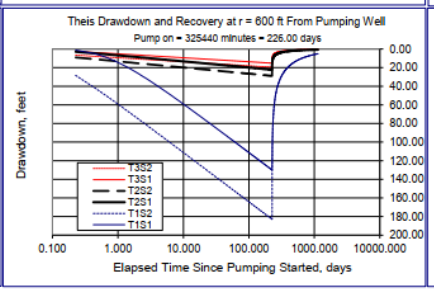


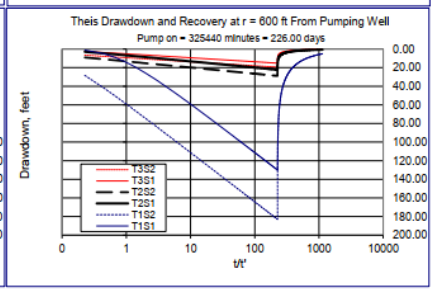










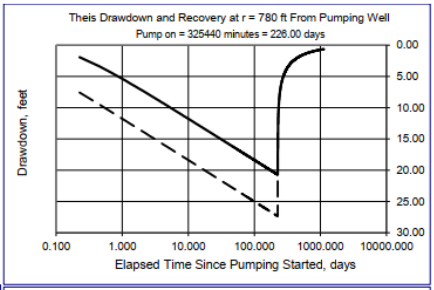


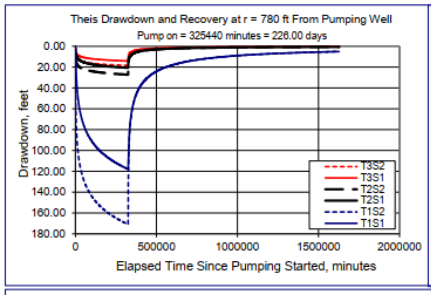
Theis Time-Drawdown Worksheet v.5.00

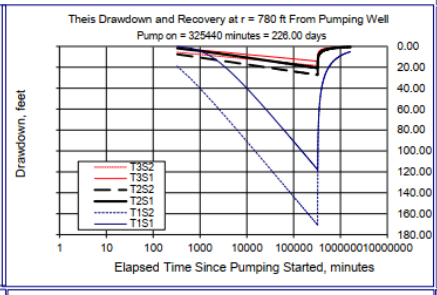
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.
Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

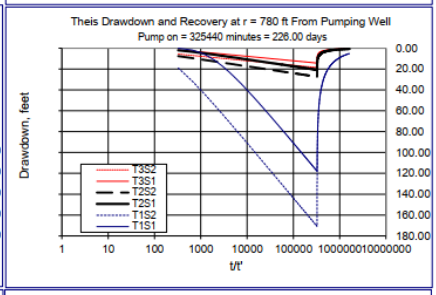
Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		226		d	
Radial distance from pumped well:	r		780		ft	Q conversions
Pumping rate	Q		0.67		cfs	300.70 gpm
Hydraulic conductivity	K	6.6666667	53.333333	82.333333	ft/day	0.67 cfs
Aquifer thickness	b		30		ft	40.20 cfm
Storativity	S_1		0.001			57,888.00 cfd
	S_2		0.0001			1.33 af/d
Transmissivity Conversions	T_f2pd	200	1600	2470	ft2/day	
	T_ft2pm	0.1388889	1.1111111	1.7152778	ft2/min	
	T_gpdpft	1496	11968	18475.6	gpd/ft	

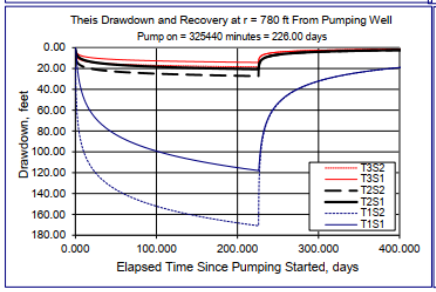
Use the Recalculate button if recalculation is set to manual

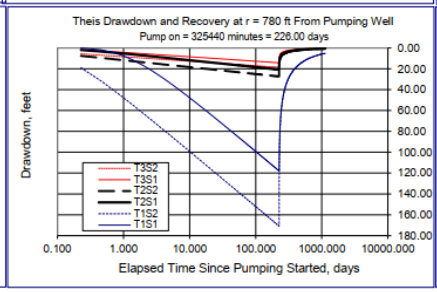


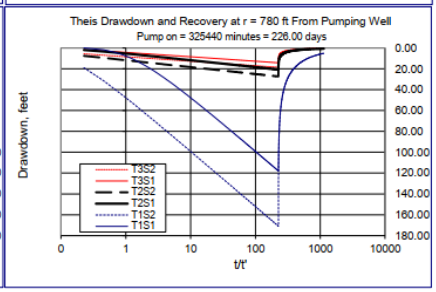












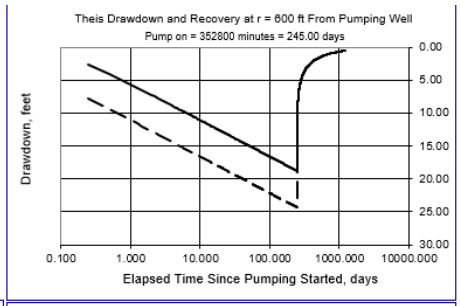
Theis Time-Drawdown Workshee v.5.00

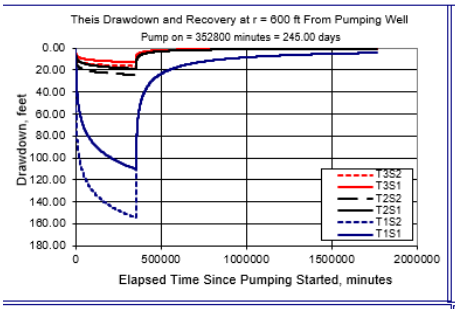
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.

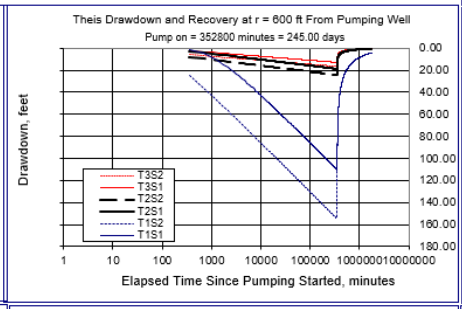
Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

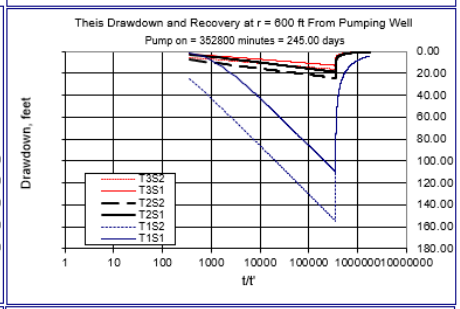
Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		245		d	
Radial distance from pumped well:	r		600		ft	Q conversions
Pumping rate	Q		0.56		cfs	251.33 gpm
Hydraulic conductivity	K	6.6666667	53.333333	82.333333	ft/day	0.56 cfs
Aquifer thickness	b		30		ft	33.60 cfm
Storativity	S_1		0.001			48,384.00 cfd
	S_2		0.0001			1.11 af/d
Transmissivity Conversions	T_f2pd	200	1600	2470	ft2/day	
	T_ft2pm	0.1388889	1.1111111	1.7152778	ft2/min	Recalculate
	T_gpdpft	1496	11968	18475.6	gpd/ft	

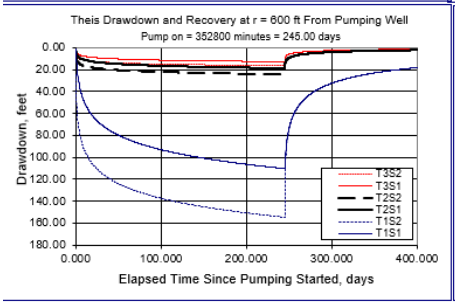
Use the Recalculate button if recalculation is set to manual

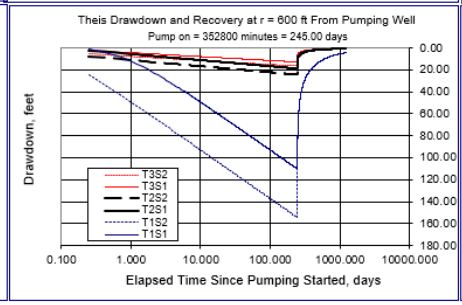


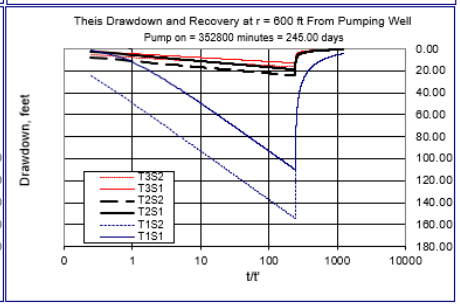












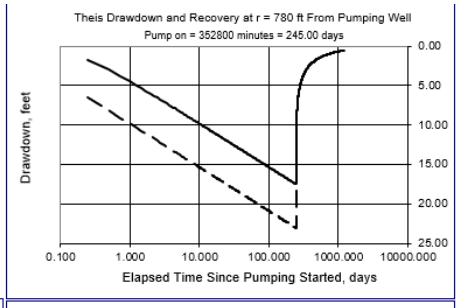
Theis Time-Drawdown Workshee v.5.00

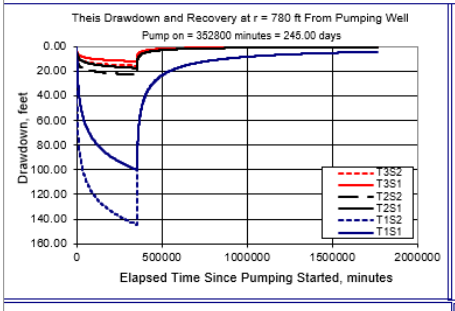
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.

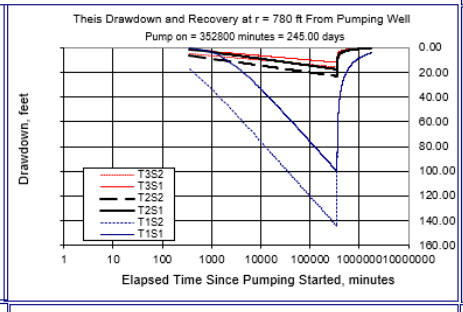
Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

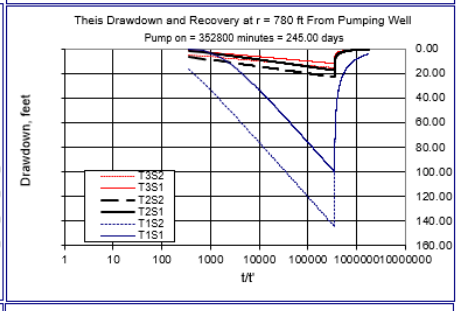
Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		245		d	
Radial distance from pumped well:	r		780		ft	Q conversions
Pumping rate	Q		0.56		cfs	251.33 gpm
Hydraulic conductivity	K	6.6666667	53.333333	82.333333	ft/day	0.56 cfs
Aquifer thickness	b		30		ft	33.60 cfm
Storativity	S_1		0.001			48,384.00 cfd
	S_2		0.0001			1.11 af/d
Transmissivity Conversions	T_f2pd	200	1600	2470	ft2/day	
	T_ft2pm	0.1388889	1.1111111	1.7152778	ft2/min	Recalculate
	T_gpdpft	1496	11968	18475.6	gpd/ft	

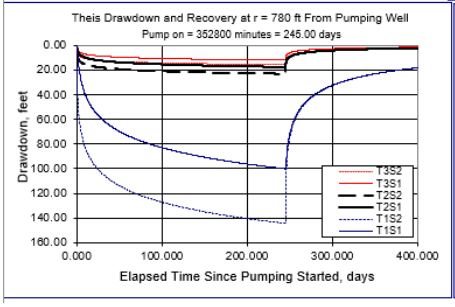
Use the Recalculate button if recalculation is set to manual

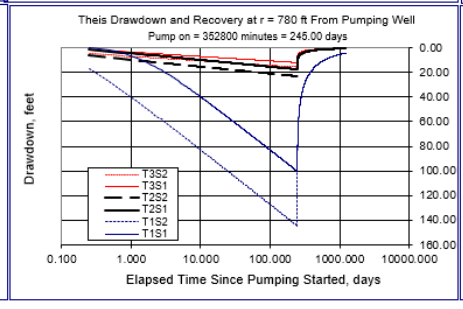


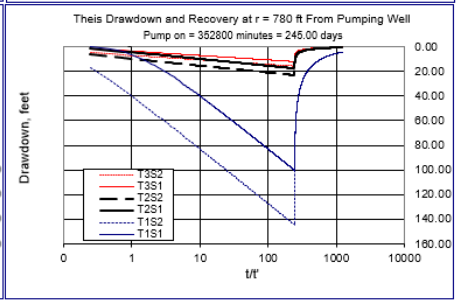












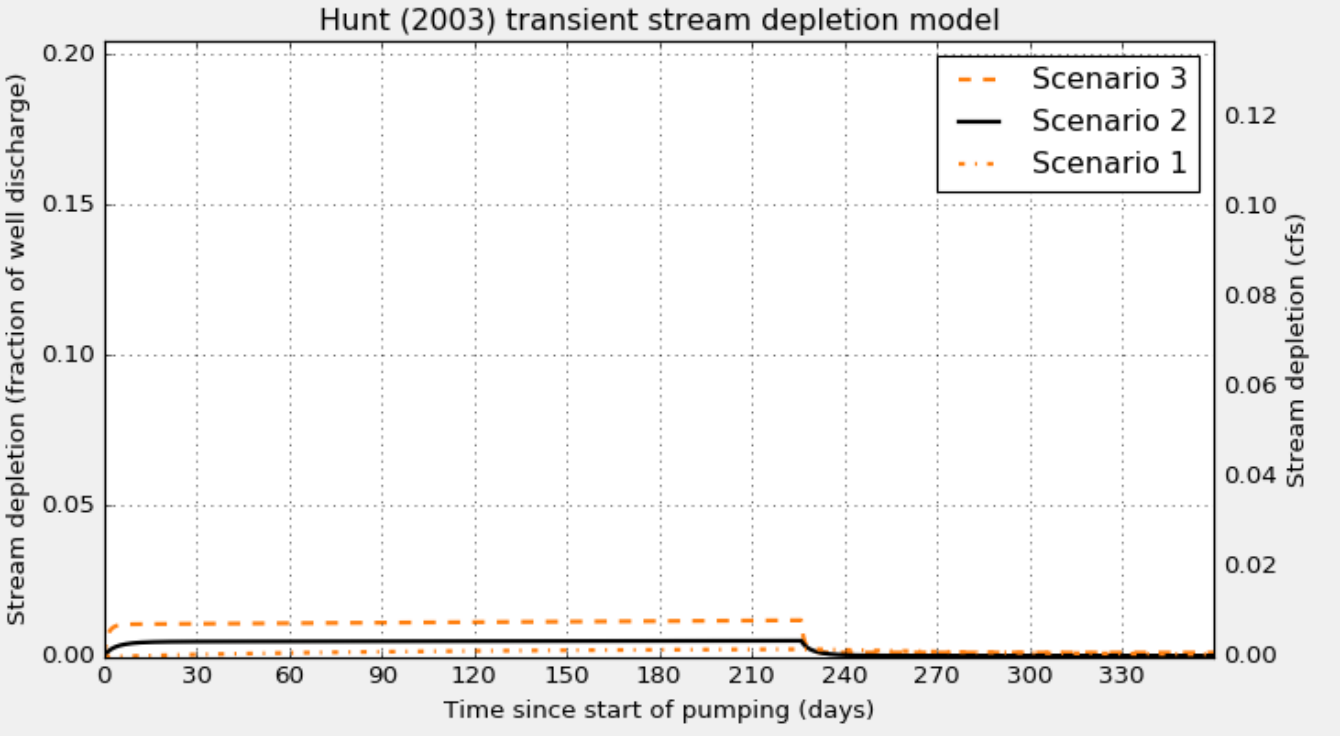
Stream Depletion (Hunt) Model Analyses

Application type:	G
Application number:	19376
Well number:	Well 4
Stream Number:	SW1
Pumping rate (cfs):	0.67
Pumping duration (days):	226.0
Pumping start month number (3=March)	3.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	1380.0	1380.0	1380.0	ft
Aquifer transmissivity	T	200.0	1600.0	2470.0	ft2/day
Aquifer storativity	S	0.003	0.0005	0.0003	-
Aquitard vertical hydraulic conductivity	Kva	0.001	0.005	0.01	ft/day
Aquitard saturated thickness	ba	60.0	60.0	60.0	ft
Aquitard thickness below stream	babs	10	10	10	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	5.0	10.0	20.0	ft

Stream depletion for Scenario 2:

Days	10	330	360	30	60	90	120	150	180	210	240	270	300
Depletion (%)	0	0	0	0	1	1	1	1	1	1	0	0	0
Depletion (cfs)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Application type:	G
Application number:	19376
Well number:	Well 1
Stream Number:	SW3
Pumping rate (cfs):	0.67
Pumping duration (days):	226
Pumping start month number (3=March)	3.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	3600	3600	3600	ft
Aquifer transmissivity	T	200	1600	2470	ft2/day
Aquifer storativity	S	0.003	0.0005	0.0003	-
Aquitard vertical hydraulic conductivity	Kva	0.001	0.005	0.01	ft/day
Aquitard saturated thickness	ba	60	60	60	ft
Aquitard thickness below stream	babs	5	5	5	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	5	10	20	ft

Stream depletion for Scenario 2:

Days	10	330	360	30	60	90	120	150	180	210	240	270
Depletion (%)	1	0	0	1	1	1	1	1	1	1	0	0
Depletion (cfs)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00