

Groundwater Application Review Summary Form

Application # G- 18591

GW Reviewer DENNIS DRLOWSKI

Date Review Completed: 5/3/2018

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).

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 5/3/2018
 FROM: Groundwater Section Dennis Orlowski
 SUBJECT: Application G- 18591 Reviewer's Name
 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: William Radke County: Linn

A1. Applicant(s) seek(s) 0.70 cfs from two well(s) in the Willamette Basin,
Calapooia River subbasin

A2. Proposed use Primary irrigation, 55.66 ac Seasonality: March - October

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	Proposed	Well 1	Alluvium	0.70	T13S/R3W-16 SE-SW	13'S, 233'E fr SE cor DLC 52
2	Proposed	Well 2	Alluvium	0.70	T13S/R3W-16 SE-SW	17'S, 594'E fr SE cor DLC 52

* 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	270	TBD	Est. 10	TBD	45	0-20	0-45	--	TBD	TBD	TBD	TBD
2	270	TBD	Est. 10	TBD	45	0-20	0-45	--	TBD	TBD	TBD	TBD

Use data from application for proposed wells.

A4. **Comments:** The proposed permit area is located in the south-central Willamette Valley approximately 4-5 miles northwest of Brownsville, Oregon.

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: Proposed Well 1 is within 1/4 mile of a perennial stream reach, but the wells will produce from a confined aquifer and thus the pertinent rules (OAR 690-502-0240) 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 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) 7N (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): Not applicable.

- B3. **Groundwater availability remarks:** The area around proposed Wells 1 and 2 is likely underlain by 20-25 ft of Willamette Silt (silt, clay, fine sand) which acts as a laterally extensive confining unit in this flat, low-lying area. Water-bearing sand and coarse gravel deposits of about 20-25 ft cumulative thickness are reported beneath the Willamette Silt (Gannett and Caldwell, 1998; Conlon and others, 2005; Frank and Johnson, 1975).

This area directly adjacent to the I-5 corridor is primarily agricultural, with only a few farmhouses located along the Calapooia River about 0.5 to 0.75 miles to the northwest and south. There are very few recorded groundwater rights/wells in the area; most irrigation water needs appear to be provided by local surface water sources. LINN 11853 is one of the very few well records available for the area; it is a former USGS Willamette Basin study well, and its log indicates it is a “domestic” use well, though its currently-plotted location is not near to an existing house. The nearest residences on the near/east side of the Calapooia River (a local hydrologic divide for the shallow alluvial groundwater system) are about 2400 ft to the south of the proposed well locations. Available groundwater data for the alluvial aquifer system in this area is similarly very sparse.

Given the very low apparent groundwater development in this area, the groundwater resource is not over appropriated, and the potential for injury to other groundwater users is unlikely. However, because of the current lack of information for this aquifer system, if a permit is granted it should include both the long-term water level measurement condition 7N and large water-use reporting requirement.

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 (Willamette Aquifer)	☒	☐
2	Alluvium (Willamette Aquifer)	☒	☐

Basis for aquifer confinement evaluation: The SWLs reported in nearby well logs, as well as USGS water-table maps, show groundwater levels above first-encountered water-bearing zones, indicating the alluvial aquifer system is more confined than unconfined (Gannett and Caldwell, 1998; Conlon and others, 2005).

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	Calapooia River	260	260-265	980	☒	☐	☐	☐	☒
2	1	Calapooia River	260	260-265	1335	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: The estimated groundwater elevation is nearly coincident with the estimated elevation range for SW 1 within approximately one mile. Also, water table maps in similar nearby portions of the Willamette lowlands indicate that groundwater in the alluvial aquifer system either flows towards (gaining reaches) or away from (losing reaches) in local streams incised in the Willamette Silt. These facts indicate that the alluvial aquifer system and local streams are hydraulically connected.

There are several other surface water features within one mile and just beyond one mile of the proposed locations for Wells 1 and 2. To the east are water courses associated with the Sodom Ditch, which were not evaluated because these have been largely altered from their natural state (i.e., channelized and perhaps flow controlled). Walton Slough is just beyond one mile to the west, but all surface water impacts in this direction will be limited to the much nearer Calapooia River.

The depletion of local streams by the proposed wells will be attenuated, but not eliminated, by the low vertical hydraulic conductivity (permeability) of the Willamette Silt and other clays and silts that lie between the deeper sands and gravels and the stream beds. Net impacts will be relatively small at the onset of pumping, but will increase with time until a new equilibrium between local recharge and discharge is reached. After that time stream depletion is expected to be relatively constant throughout the year.

Water Availability Basin the well(s) are located within: WID 76: Calapooia River > Willamette River – above mouth

C3a. 690-09-040 (4): Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and 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	☒	☐	MF76A	20.00	☒	22.70	☒	<25%	☒
2	1	☐	☐	MF76A	20.00	☒	22.70	☒	<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.

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?
			☐			☐		☐		☐

Comments: C3a: The Hunt 2003 analytical stream depletion model was used to estimate 30-day interference at SW1 (Calapooia River) caused by pumping proposed Wells 1 and 2. Aquifer parameters typical for this hydrogeologic regime were used (Conlon and others, 2005), as well as a pumping rate pro-rated for 24/7 operation throughout the entire irrigation season. Model results indicate that interference is expected to be less than 25% of the maximum allocated pumping rate at 30 days for both well scenarios.

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													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation: _____

C4b. **690-09-040 (5) (b)** The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.

C5. ☐ **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:

- ☐ The permit should contain condition #(s) _____;
- ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. SW / GW Remarks and Conditions: None

References Used: Application file G-18591

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.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Frank, J.F. and Johnson, N.A., 1975, Ground-water data in the Harrisburg-Halsey area, central Willamette Valley, Oregon: State of Oregon, Ground Water Report No. 22.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: _____ Logid: _____

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

- a. ☐ review of the well log;
- b. ☐ field inspection by _____;
- c. ☐ report of CWRE _____;
- d. ☐ other: (specify) _____

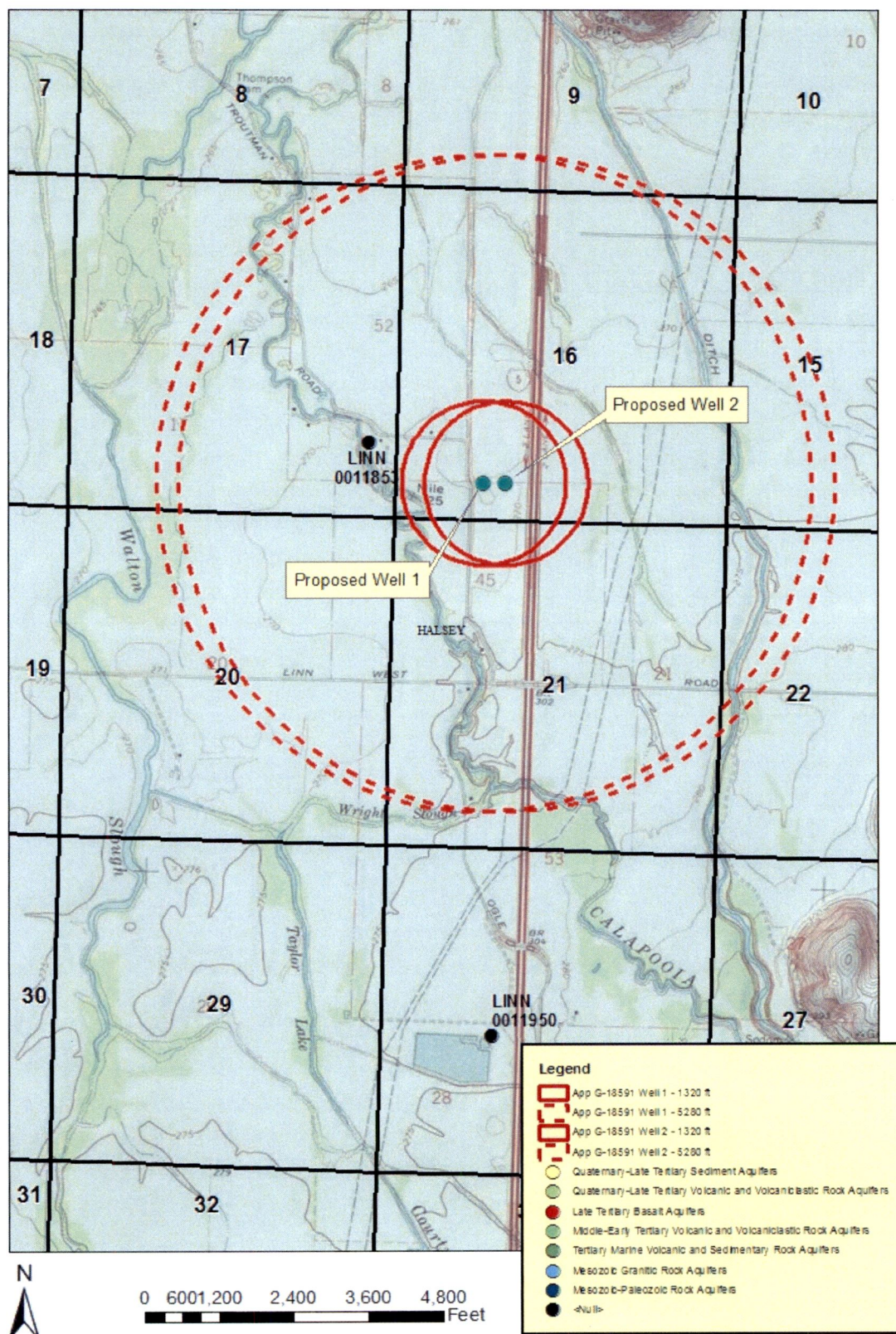
D3. **THE WELL construction deficiency or other comment is described as follows:** _____

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

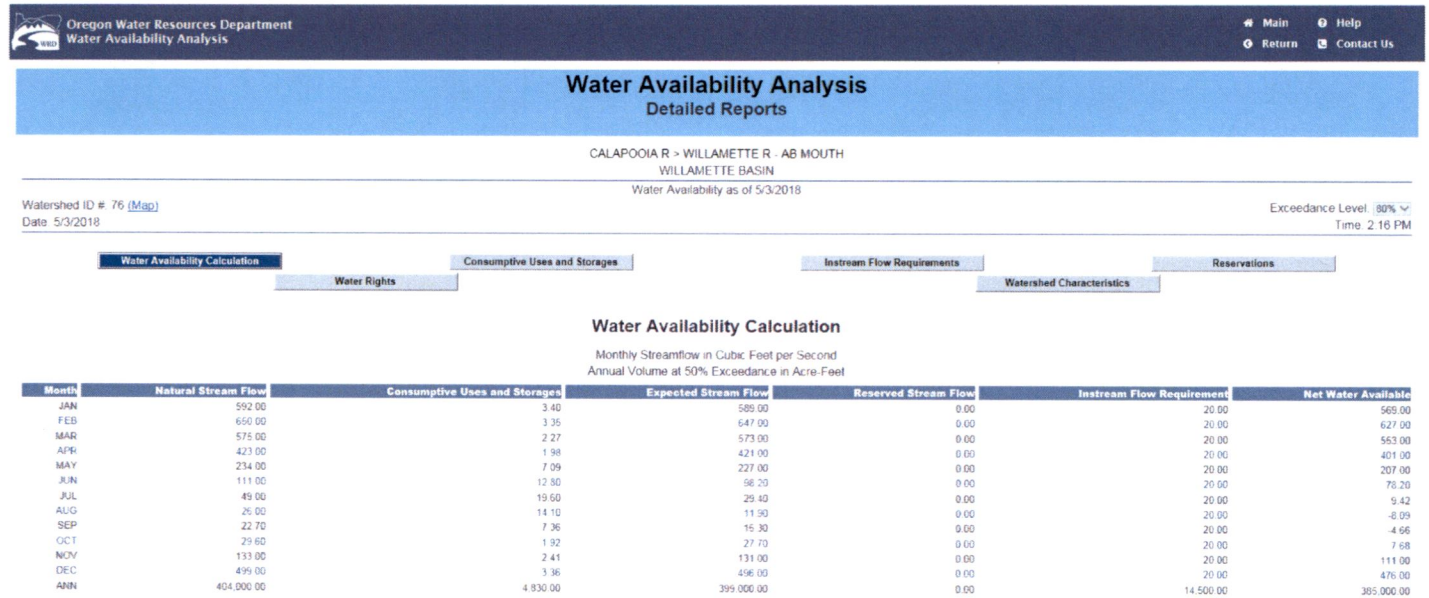
Well Location Map

G-18591 William Radke

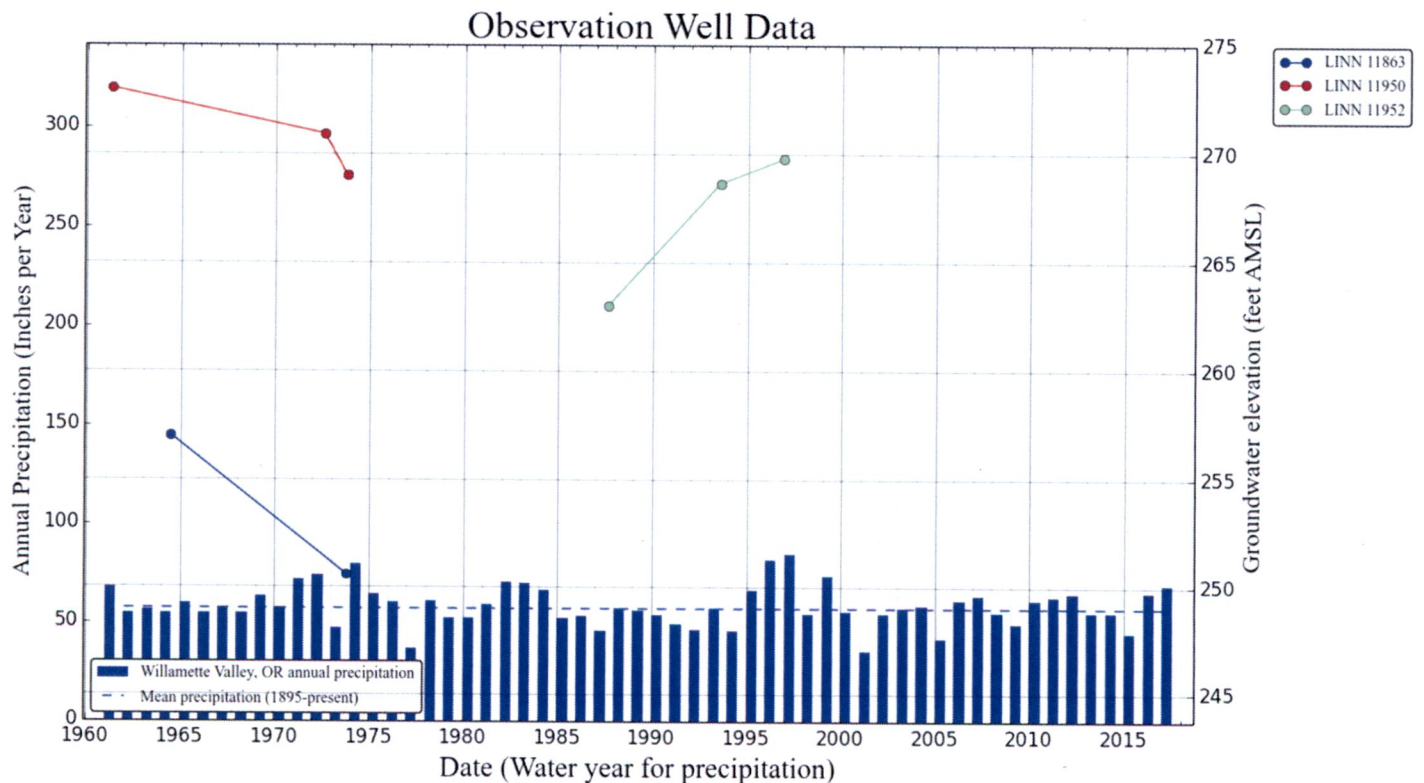
T13S, R3W, Sections 16 and 21



Water Availability Tables



Water-Level Trends in Nearby Wells



Hunt 2003 Stream Depletion Model Summary – Well 1, SW 1

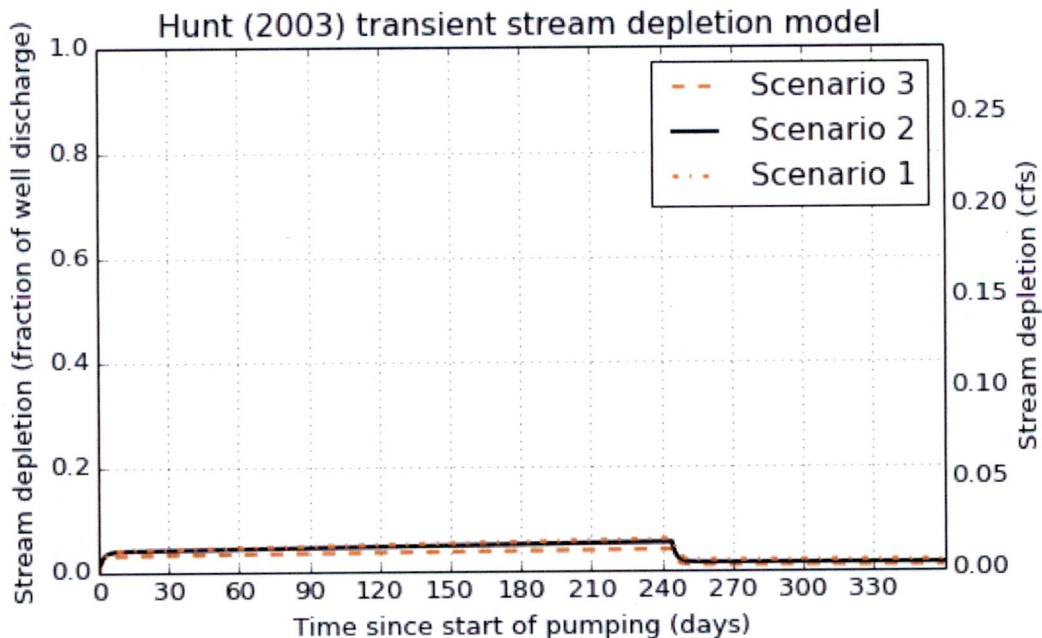
76 PyHunt stream depletion analysis tool

Application type: G
 Application number: 18591
 Well number: 1
 Stream Number: 1
 Pumping rate (cfs): 0.287
 Pumping duration (days): 244.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	980	980	980	ft
Aquifer transmissivity	T	300	1000	3000.0	ft ² /day
Aquifer storativity	S	.001	0.001	0.001	-
Aquitard vertical hydraulic conductivity	Kva	0.01	0.01	0.01	ft/day
Aquitard saturated thickness	ba	25	25	25	ft
Aquitard thickness below stream	babs	3.0	3.0	3.0	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	30	30	30	ft

Stream depletion for Scenario 2:

Days	30	60	90	120	150	180	210	240	270	300	330	360
Depletion (%)	4	4	4	5	5	5	5	5	1	1	1	1
Depletion (cfs)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.00	0.00	0.00	0.00



Hunt 2003 Stream Depletion Model Summary – Well 2, SW 1

74 PyHunt stream depletion analysis tool

Application type: G
 Application number: 18591
 Well number: 2
 Stream Number: 1
 Pumping rate (cfs): 0.287
 Pumping duration (days): 244.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	1335	1335	1335	ft
Aquifer transmissivity	T	300	1000	3000.0	ft ² /day
Aquifer storativity	S	.001	0.001	0.001	-
Aquitard vertical hydraulic conductivity	Kva	0.01	0.01	0.01	ft/day
Aquitard saturated thickness	ba	25	25	25	ft
Aquitard thickness below stream	babs	3.0	3.0	3.0	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	30	30	30	ft

Stream depletion for Scenario 2:

Days	30	60	90	120	150	180	210	240	270	300	330	360
Depletion (%)	3	3	4	4	4	4	4	4	1	1	1	1
Depletion (cfs)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00

