

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 08/17/2016
 FROM: Groundwater Section Phillip I. Marcy
 SUBJECT: Application G- 18320 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: John & Kathryn Rohner County: Baker

A1. Applicant(s) seek(s) 4.0 cfs from 3 well(s) in the Powder Basin,
 _____ subbasin

A2. Proposed use Irrigation (200 acres) / Supplemental Irrigation (192.5 acres)
 Seasonality: March 1st – October 31st (245 days)

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	1	Alluvium	4.0	9S/39E-11 SW-NE	2020'S, 1510'W fr NW cor, S 12
2	Proposed	2	Alluvium	4.0	9S/39E-11 SE-NE	2380'S, 45'E fr NW cor, S 12
3	Proposed	3	Alluvium	4.0	9S/39E-11 SW-NE	1870'S, 1500'W fr NW cor, S 12
4						
5						

* 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	3394	NA	NA	NA	300	0-50	0-300	Unknown	Unknown	NA	NA	NA
2	3392	NA	NA	NA	300	0-50	0-300	Unknown	Unknown	NA	NA	NA
3	3394	NA	NA	NA	300	0-50	0-300	Unknown	Unknown	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** All three of the applicant's wells are proposed to produce from alluvium.

A5. **Provisions of the** _____ **Basin rules** relative to the development, classification and/or management of groundwater hydraulically connected to surface water **are**, or **are not**, activated by this application. (Not all basin rules contain such provisions.)

Comments: _____

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

Comments: _____

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

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

- a. is over appropriated, is **not** over appropriated, *or* **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. **will not** *or* **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c. **will not** *or* **will** likely to be available within the capacity of the groundwater resource; *or*
- d. **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
 - i. The permit should contain condition #(s) ;
 - 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 location for POA 2 on this application is 500 feet away from the authorized POA well for groundwater right Certificate 34416. All three of the POA wells on this application are proposed to produce from alluvium, which according to our conceptual understanding of this area, will also be within the same aquifer system as the authorized POA under Certificate 34416. At this distance, at a pumping rate of 4.0 cfs, the expected impacts due to pumping over the course of one irrigation season are greater than 100 feet (Figure 1). This projection was calculated using the time-drawdown method of Theis, with aquifer parameters determined from local pump tests. To avoid injuring nearby senior right holders, the applicant may consider producing from the deeper volcanic bedrock aquifer in the area. It will be important, however, to avoid drilling into older metasedimentary rocks mapped by Brooks and others (1976), as these rocks commonly yield little water.

If a permit is issued, the following conditions shall be applied:

7N – Annual Measurement; “Large Water Use Reporting”

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	Terrace and fan deposits (Qtg of Brooks, 1976)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Terrace and fan deposits (Qtg of Brooks, 1976)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Terrace and fan deposits (Qtg of Brooks, 1976)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: The geologic description of these terrace and fan deposit refers to them as “mixed grain sediments” of “clay to boulder” size grains (Brooks and others, 1976). In these poorly sorted materials, there exists no continuous barrier to vertical migration of groundwater. In addition, well logs in the area do not report head elevations that are significantly higher than the elevation at which water was first encountered, indicating that groundwater here is in equilibrium with atmospheric pressure. Deeper wells producing from “broken rock”, likely TRgb1 or Tb1 of Brooks and others (1976), are reported to have considerable artesian pressure, rising well above their respective production zones.

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	Settlers Creek	3380	3380	7000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Settlers Creek	3380	3380	5900	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Settlers Creek	3380	3380	7050	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: The close correspondence of groundwater and surface water elevations supports the idea that both are part of a larger, interconnected hydraulic system. Since there exists no laterally continuous barrier to vertical groundwater movement, it is likely that these elevations reflect the regional groundwater table in a discharge zone. Based on this conceptual model, it is expected that nearly all water produced from wells in the proposed aquifer system would otherwise be destined for local surface water drainages.

Water Availability Basin the well(s) are located within: Powder River > Snake River – Above Rock Creek (#30920327)

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

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

	SW #	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: This section does not apply.

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	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
Well Q as CFS		0.0	0.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	0.0	0.0
Interference CFS		0.012	0.016	0.0	0.0	0.0	0.0	0.001	0.002	0.003	0.005	0.007	0.010
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													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.		0.012	0.016	0.0	0.0	0.0	0.0	0.001	0.002	0.003	0.005	0.007	0.010
(B) = 80 % Nat. Q		36.9	58.7	99.8	213	300	163	42.0	17.6	12.6	15.4	25.2	34.9
(C) = 1 % Nat. Q		.37	.59	1.0	2.1	3.0	1.6	.42	.18	.13	.15	.25	.35
(D) = (A) > (C)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(E) = (A / B) x 100		.032 %	.027 %	0 %	0 %	0 %	0 %	.002 %	.011 %	.024 %	.032 %	.028 %	.029 %

(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: Expected impacts to Settlers Creek due to pumping at the proposed POA location closest to the stream were calculated using the model of Hunt (2003). Aquifer parameters were assigned based upon available pump test data from this area, with standard values for streambed thickness and permeability based upon the geomorphology and vigor of the stream (see attached model output). Model results conclude that within the first year of pumping, expected impacts to surface water at the given distance are minimal, due to the presence of fine-grained sediments underlying the stream channel.

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:** Based on our current understanding, the upper portions of Baker Valley are part of a single groundwater reservoir, including surface water and shallow well discharge. Hydraulic connection between wells and streams may vary based on location and distribution of fine-grained sediments in the subsurface. While little information is available on the deeper volcanic aquifer system, well log reports from wells completed into volcanics indicate confined conditions, and likely an inefficient connection to surface waters.

References Used:

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

Brooks, H.C., McIntyre, J.R., and Walker, G.W. Geologic Map of the Oregon Part of the Baker 1 degree by 2 degree Quadrangle/GMS 7. Scale 1:250,000. State of Oregon Department of Geology and Mineral Industries, 1976.

Local well logs, local pump tests, application file G18320.

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

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

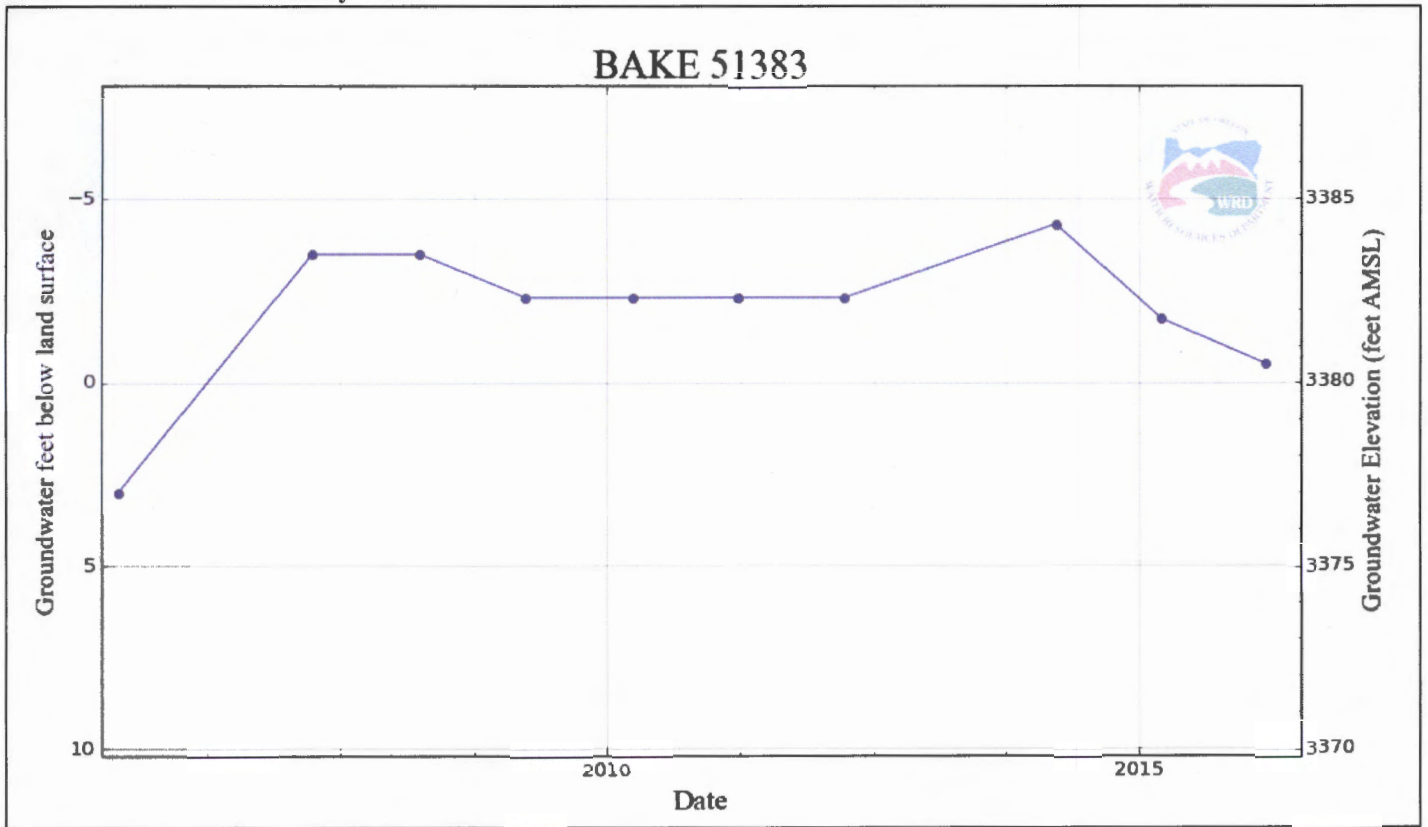
Watershed ID #: 30920327
Time: 2:54 PM

POWDER R > SNAKE R - AB ROCK CR
Basin: POWDER

Exceedance Level: 80
Date: 08/18/2016

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	36.90	79.20	-42.30	0.76	25.00	-68.00
FEB	58.70	94.90	-36.20	1.08	30.00	-67.30
MAR	99.80	168.00	-67.80	2.07	40.00	-110.00
APR	213.00	242.00	-29.30	34.20	40.00	-103.00
MAY	300.00	429.00	-129.00	9.07	40.00	-179.00
JUN	163.00	521.00	-358.00	0.00	40.00	-398.00
JUL	42.00	321.00	-279.00	0.00	25.00	-304.00
AUG	17.60	238.00	-220.00	0.00	25.00	-245.00
SEP	12.60	195.00	-183.00	0.00	25.00	-208.00
OCT	15.40	76.50	-61.10	0.26	25.00	-86.30
NOV	25.20	61.60	-36.40	0.40	25.00	-61.80
DEC	34.90	72.80	-37.90	0.58	25.00	-63.50
ANN	114,000	151,000	18,200	2,900	22,000	7,430

Water-Level Trends in Nearby Wells



Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		245		d	
Radial distance from pumped well:	r		500.00		ft	Q conversions
Pumping rate	Q		1795.3		gpm	1,795.32 gpm
Hydraulic conductivity	K	5	10	15	ft/day	4.00 cfs
Aquifer thickness	b		50		ft	240.02 cfm
Storativity	S_1		0.01000			345,623.10 cfd
	S_2		0.00100			7.93 af/d
Transmissivity Conversions	T_ft2pd	250	500	750	ft ² /day	
	T_ft2pm	0.1736	0.3472	0.5208	ft ² /min	
	T_gpdft	1,870	3,740	5,610	gpd/ft	

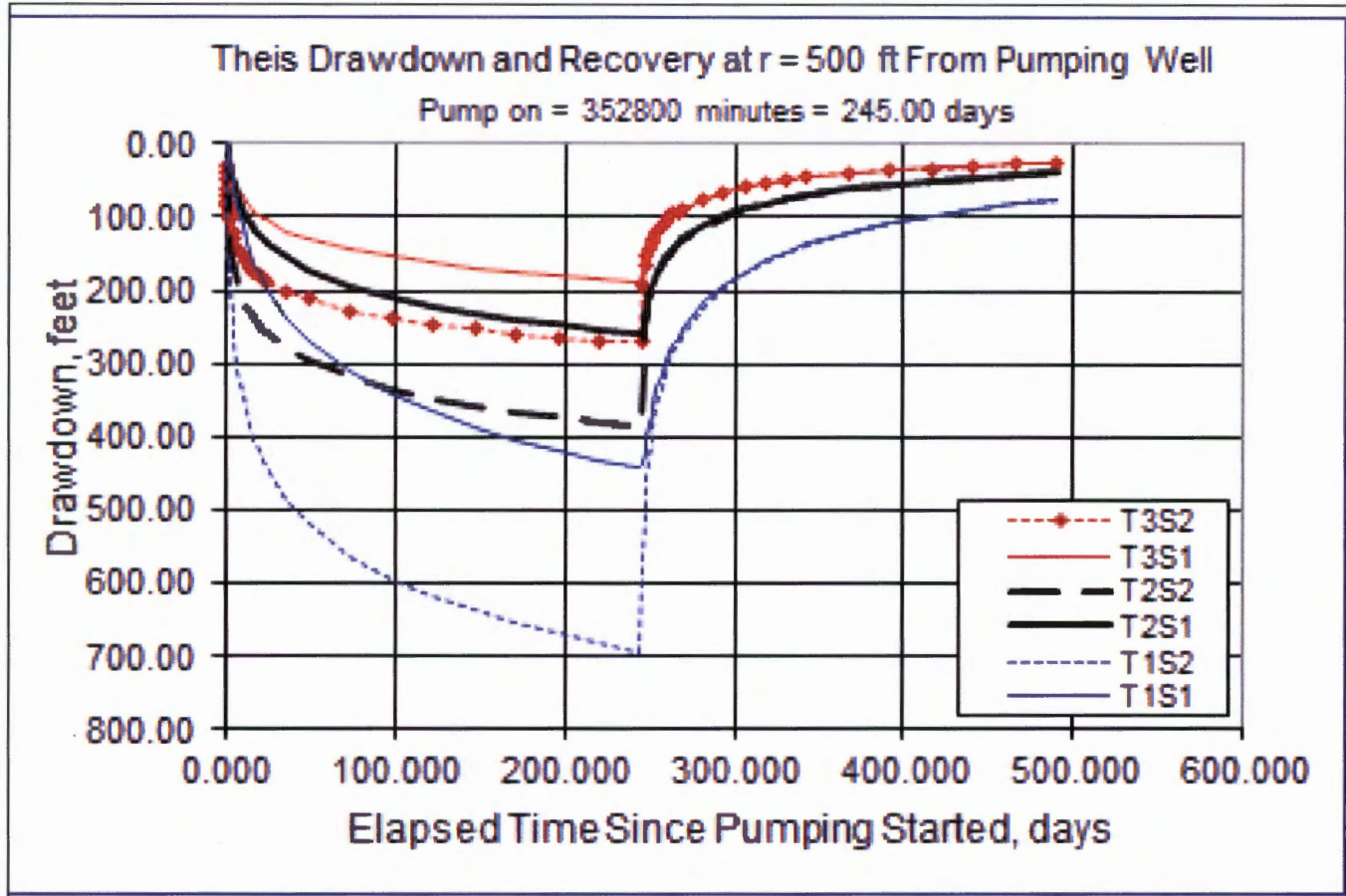


Figure 1: A Theis time-drawdown calculation predicts that impacts at the closest neighboring groundwater POA will be greater than 100 feet of drawdown over a period of 245 days at 4.0 cfs.