WATER RESOURCES DEPARTMENT

MEMO August 19, 2015

TO: **Application G-** 18082

FROM: **GW:** Phillip Marcy
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ YES
The source of appropriation is within or above a Scenic Waterway
☒ NO

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

☐ 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 _____ 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 **08/19/2015**

FROM: Groundwater Section **Phillip I. Marcy / Ivan K. Gall**
Reviewer's Name

SUBJECT: Application G- **18082** 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: **Terry and Linda Inscoe** County: **Baker**

A1. Applicant(s) seek(s) **1.667** cfs from **3** well(s) in the **Powder** Basin, **North Powder** subbasin

A2. Proposed use: **Irrigation: Primary (100 acres); Supplemental (100 acres)**
Seasonality: **March 1st – October 1st (Supplementary – 214 days); October 2nd – October 31st (Primary – 29 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	1.667	7S/39E-6 SW-NW	1590'S, 150'E fr NW cor S 6
2	Proposed	2	Alluvium	1.667	7S/39E-6 SW-NW	1700'S, 160'E fr NW cor S 6
3	Proposed	3	Alluvium	1.667	7S/39E-6 SW-NW	1625'S, 930'E fr NW cor S 6
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	3403	?	?	?	200±	0-45	0-200	?	50-200	?	?	None
2	3403	?	?	?	200±	0-45	0-200	?	50-200	?	?	None
3	3395	?	?	?	200±	0-45	0-200	?	50-200	?	?	None

Use data from application for proposed wells.

A4. **Comments:** Surface elevations are derived from proposed well locations. The applicant states the desire to produce the entire proposed rate from a single well if possible, but is applying to drill up to three wells if the desired yield is not achieved.

A5. ☒ **Provisions of the** Powder (690-509) 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) **7C, 7T, "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:** Groundwater elevations have remained fairly stable for several decades in the greater Baker Valley for areas and aquifer systems in which we have adequate data (see attached hydrographs). With the diminished surface water supply in recent years, effects from the resulting increase in demand for groundwater shall be monitored closely, and development of new groundwater appropriations shall be approached with caution.

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 (Likely Qtg of Brooks, 1976)**	☒	☐
2	**Alluvium (Likely Qtg of Brooks, 1976)**	☒	☐
3	**Alluvium (Likely Qtg of Brooks, 1976)**	☒	☐

Basis for aquifer confinement evaluation: Based on the proposed construction, wells drilled in this area will likely encounter a confining sequence of clays or clays mixed with other materials within the uppermost 200 feet. These fine-grained deposits may not be laterally extensive however, and so confinement may be highly localized, providing connection to surface waters through complex flow paths. The elevated head measurements in wells completed into these terrace and alluvial fan deposits (Qtg of Brooks and others, 1976), as compared to the elevations of their respective water-bearing zones, suggest this is likely an area of regional discharge.

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	**North Powder River**	**3380±**	**3380**	**2440**	☒	☐	☐	☐	☐
2	1	**North Powder River**	**3380±**	**3380**	**2540**	☒	☐	☐	☐	☐
3	1	**North Powder River**	**3380±**	**3380**	**2560**	☒	☐	☐	☐	☐
1	2	**Warm Springs Creek**	**3380±**	**3380**	**2900**	☒	☐	☐	☐	☐
2	2	**Warm Springs Creek**	**3380±**	**3380**	**2800**	☒	☐	☐	☐	☐
3	2	**Warm Springs Creek**	**3380±**	**3380**	**2775**	☒	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: The water-bearing zones within these wells likely have some degree of local confinement, with diffuse and inefficient connection to local streams. The North Powder Valley is underlain by terrace and alluvial fan deposits, composed of unconsolidated sands, gravels, and cobbles, intermixed with clays and silts (Brooks, et al., 1976). The sedimentary materials observed have all of the characteristics of a stream deposit and none of the usual characteristics of a lake deposit. They consist of cross-bedded, poorly sorted, fine and coarse sand with some stringers of fine gravel and clay (Trauger, 1951). With the complex stratigraphic relationship of materials deposited in differing geologic settings and having variable transmissivity, there is unlikely to be a continuous confining bed that prevents the vertical migration of groundwater.

Water Availability Basin the well(s) are located within: Powder R > Snake R – AB UNN STR (72191), N Powder R > Powder R – At Mouth (Both WABs within 1 mile of wells)

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	☐	☐	**None**	**None**	☐	**25.6**	☒		☒
2	1	☐	☐	**None**	**None**	☐	**25.6**	☒		☒
3	1	☐	☐	**None**	**None**	☐	**25.6**	☒		☒
1	2	☐	☐	**None**	**None**	☐	**65.9**	☒		☒
2	2	☐	☐	**None**	**None**	☐	**65.9**	☒		☒
3	2	☐	☐	**None**	**None**	☐	**65.9**	☒		☒

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: Potential for Substantial Interference (PSI) is triggered for all three of the proposed wells in respect to their projected impacts on either North Powder River or Warm Springs Creek due to the pumping rate being greater than 1% of the 80% exceedance rate in each WAB (Water Availability Basin). This evaluation is necessary due to the high probability of hydraulic connection to these two streams within 1 mile. The proposed construction of the wells into alluvium within the valley will likely facilitate interference with these surface waters, and therefore alternate construction may be necessary to avoid triggering PSI.

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													
		%	%	%	%	%	%	%	%	%	%	%	%
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.												
(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: This section does not apply.

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:**

Modified Condition 7K: "The well(s) may not be completed in such a manner that (they) allow groundwater to be developed from alluvium. Instead, the wells shall be constructed to produce only from the volcanic aquifer underlying the alluvium, at an estimated depth of between 300 and 500 feet below land surface. To ensure development from the volcanic aquifer, each well shall be **continuously sealed and continuously cased** to a minimum of 10 feet into competent volcanic rock.

Due to the complex geometry of the Tertiary volcanic and older rocks forming the basement of the Baker Valley (see attached nearby logs), and since the development of these wells may be costly, the drilling of a test hole is recommended to assess the depth to bedrock and to give an accurate estimate of yield from these volcanic rocks at this location.

References Used:

Trauger, F.D. (1951). Ground-Water Resources of Baker Valley, Baker County, Oregon. Portland, Oregon: United States Geological Survey

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 (see attached)

Application file G 18082.

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

N POWDER R > POWDER R - AT MOUTH
Basin: POWDER

Watershed ID #: 72188
Time: 11:55 AM

Exceedance Level: 80
Date: 08/11/2015

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	27.70	5.96	21.70	0.00	12.00	9.74
FEB	29.80	7.77	22.00	0.00	20.00	2.03
MAR	35.60	7.66	27.90	0.00	25.00	2.94
APR	65.20	42.60	22.60	0.00	25.00	-2.40
MAY	162.00	209.00	-47.00	0.00	25.00	-72.00
JUN	159.00	257.00	-97.50	0.00	25.00	-123.00
JUL	57.30	114.00	-56.30	0.00	20.00	-76.30
AUG	29.90	32.90	-3.00	0.00	12.00	-15.00
SEP	25.60	19.10	6.46	0.00	12.00	-5.54
OCT	27.40	6.40	21.00	0.00	12.00	9.00
NOV	30.80	7.76	23.00	0.00	12.00	11.00
DEC	28.00	5.93	22.10	0.00	12.00	10.10
ANN	64,600	43,300	22,500	0	12,800	11,600

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

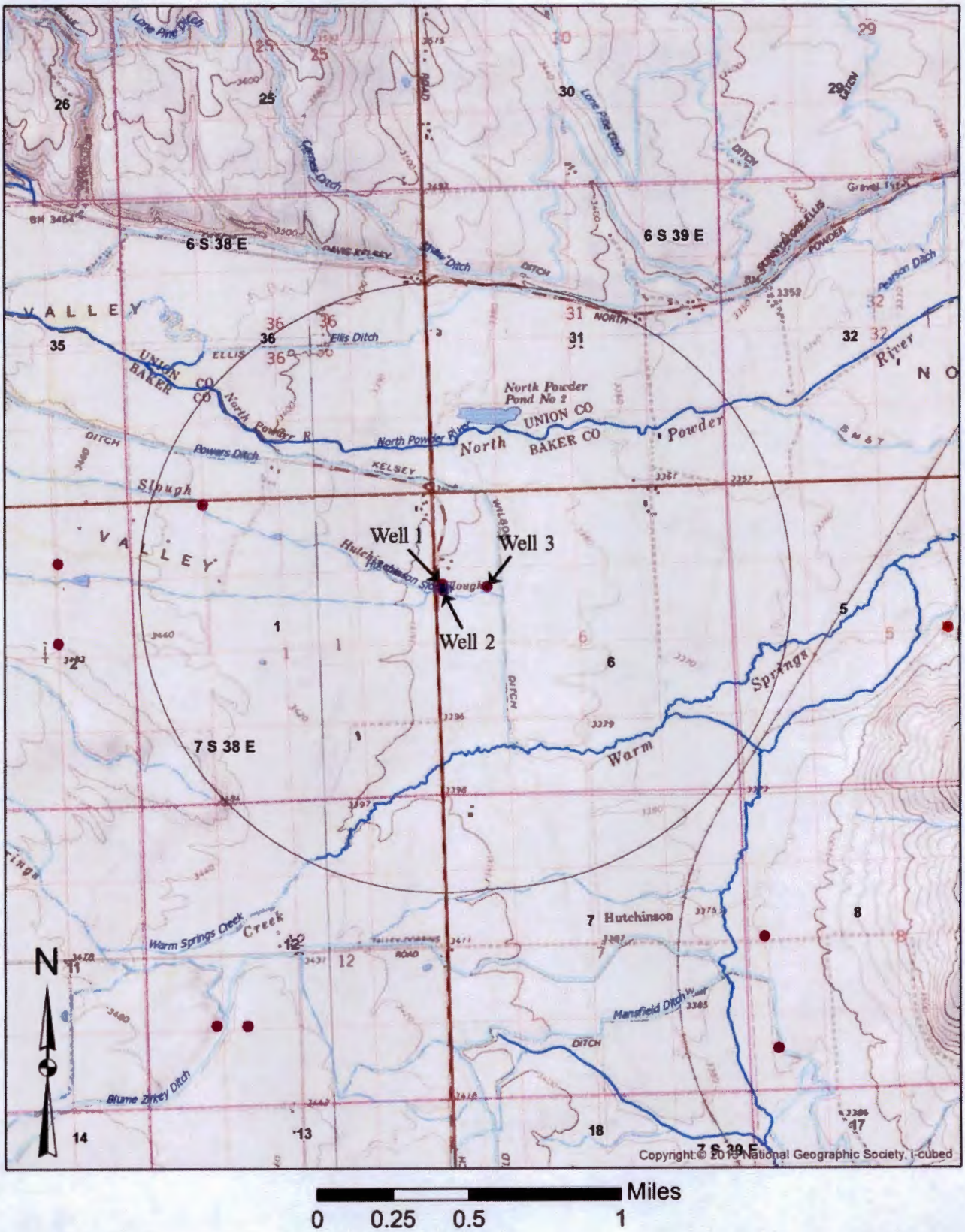
POWDER R > SNAKE R - AB UNN STR
Basin: POWDER

Watershed ID #: 72191
Time: 11:47 AM

Exceedance Level: 80
Date: 08/11/2015

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	65.90	89.00	-23.10	0.00	25.00	-48.10
FEB	103.00	108.00	-5.34	21.30	30.00	-56.60
MAR	203.00	193.00	10.10	62.40	40.00	-92.30
APR	456.00	352.00	104.00	259.00	40.00	-196.00
MAY	714.00	844.00	-130.00	153.00	40.00	-323.00
JUN	593.00	995.00	-402.00	0.00	40.00	-442.00
JUL	204.00	530.00	-326.00	0.00	25.00	-351.00
AUG	107.00	313.00	-206.00	0.00	25.00	-231.00
SEP	72.70	240.00	-167.00	0.00	25.00	-192.00
OCT	70.30	90.20	-19.90	0.00	25.00	-44.90
NOV	75.10	71.30	3.82	0.00	25.00	-21.20
DEC	77.90	82.90	-5.00	0.00	25.00	-30.00
ANN	241,000	236,000	47,100	29,900	22,000	4,150

Well Location Map



Water-Level Trends in Nearby Wells