

WATER RESOURCES DEPARTMENT MEMO

April 6, 2016

TO: Application G- 18213
FROM: Phillip Marcy - Groundwater Section
SUBJECT: Scenic Waterway Interference Evaluation

YES
[X] NO
The source of appropriation is within or above a Scenic Waterway

YES
[X] NO
Use the Scenic Waterway condition (condition 7J)

Per ORS 390.835, the Groundwater Section is able to calculate groundwater interference with surface water that contributes to a Scenic Waterway. The calculated interference distribution is provided below.

Per ORS 390.835, the Groundwater Section is unable to calculate groundwater 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 flows necessary to maintain the free-flowing character of a scenic waterway.

DISTRIBUTION OF INTERFERENCE

Calculate interference as the monthly fraction of the annual consumptive use and fill in the table below. If interference cannot be calculated, per criteria in 390.839, do not fill in the table but check the "unable" option above, thus informing the Water Rights Section that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in the Scenic Waterway by the following amounts, expressed as a proportion of the annual consumptive use pumped from the well.

Monthly Fraction of Annual Consumptive Use

Table with 12 columns: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec. All cells are empty.

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 03/22/2016
 FROM: Groundwater Section Phillip I. Marcy
Reviewer's Name
 SUBJECT: Application G- 18213 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: Sage Ridge Place, LLC County: Malheur

- A1. Applicant(s) seek(s) 0.78 cfs from 1 well(s) in the Malheur Basin,
 _____ subbasin
- A2. Proposed use Irrigation (8.50 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	MALH 3021	1	Sand and Gravel	0.78	18S/47E-4 NW-NW	1065'S, 1055'E fr NW cor S 4
2						
3						
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	2186	45	30	04/14/1994	70	0-18	+1-62	NA	52-62	50	0	Bailer

Use data from application for proposed wells.

- A4. **Comments:** Well was originally drilled for domestic use, **reported yield** does not meet proposed pumping rate.

- A5. **Provisions of the Malheur (690-510)** 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 POA is unlikely to produce at the proposed pumping rate (350 GPM) based upon the reported yield on well log report MALH 3021 (50 GPM). Few wells in this area produce greater than 100 GPM (see attached chart of area well yields), regardless of their age and completed depth. To achieve the proposed rate of appropriation, the applicant will likely need to drill addition wells, or a single replacement well with a higher yield. **If a permit is issued as proposed, the applicant will need to file a permit amendment with the Department if any future changes are made regarding changes to the authorized point of appropriation.** This includes adding points of appropriation, or replacement of the authorized POA.

Groundwater elevations in the area remain stable (see attached hydrograph).

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	Sand and gravel overlying Glenns Ferry Fmn.	<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"/>

Basis for aquifer confinement evaluation: There is no evidence of a confining layer above the production zone. "Brown sandy clay" reported between 8-41' BLS is moderately transmissive, and allows groundwater to discharge from underlying sands and gravels toward the surface. Microscopic examination of this material reveals this unit is composed of crystal and lithic fragments and contains very little actual clay (Gannett, 1990).

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	Snake River	2,156	2,143	4,380	<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"/>
						<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 proposed POA well produces from unconfined sands and gravels within 1 mile of the Snake River, whose surface water elevation in the nearest reach is coincident with groundwater elevation within the well.

Water Availability Basin the well(s) are located within: Malheur River > Snake River – At 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	<input type="checkbox"/>	<input type="checkbox"/>	NA	NA	<input type="checkbox"/>	83.80	<input type="checkbox"/>	1.08	<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: Using the model of Hunt (2003), after 30 days, it is estimated that about 1% of groundwater pumped at the proposed POA location will result from interference with the Snake River (see attached).

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													
(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: Model parameters for aquifer conductivity, aquitard conductivity, and storativity were provided by Gannett (1990). Saturated thicknesses of aquifer and aquitard units were provided by local well logs. Impacts were calculated using the proposed rate, which is far greater than the likely yield of the proposed POA well.

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:**

If a permit is issued, it shall contain the following special condition: "Large Water use Reporting".

The use proposed within application G18213 is unlikely to injure nearby groundwater users, or substantially interfere with surface waters at the proposed rate.

References Used:

Gannett, M.W. 1990, Hydrogeology of the Ontario Area, Malheur County, Oregon: Oregon Water Resources Department Groundwater Report No. 34.

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

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) _____

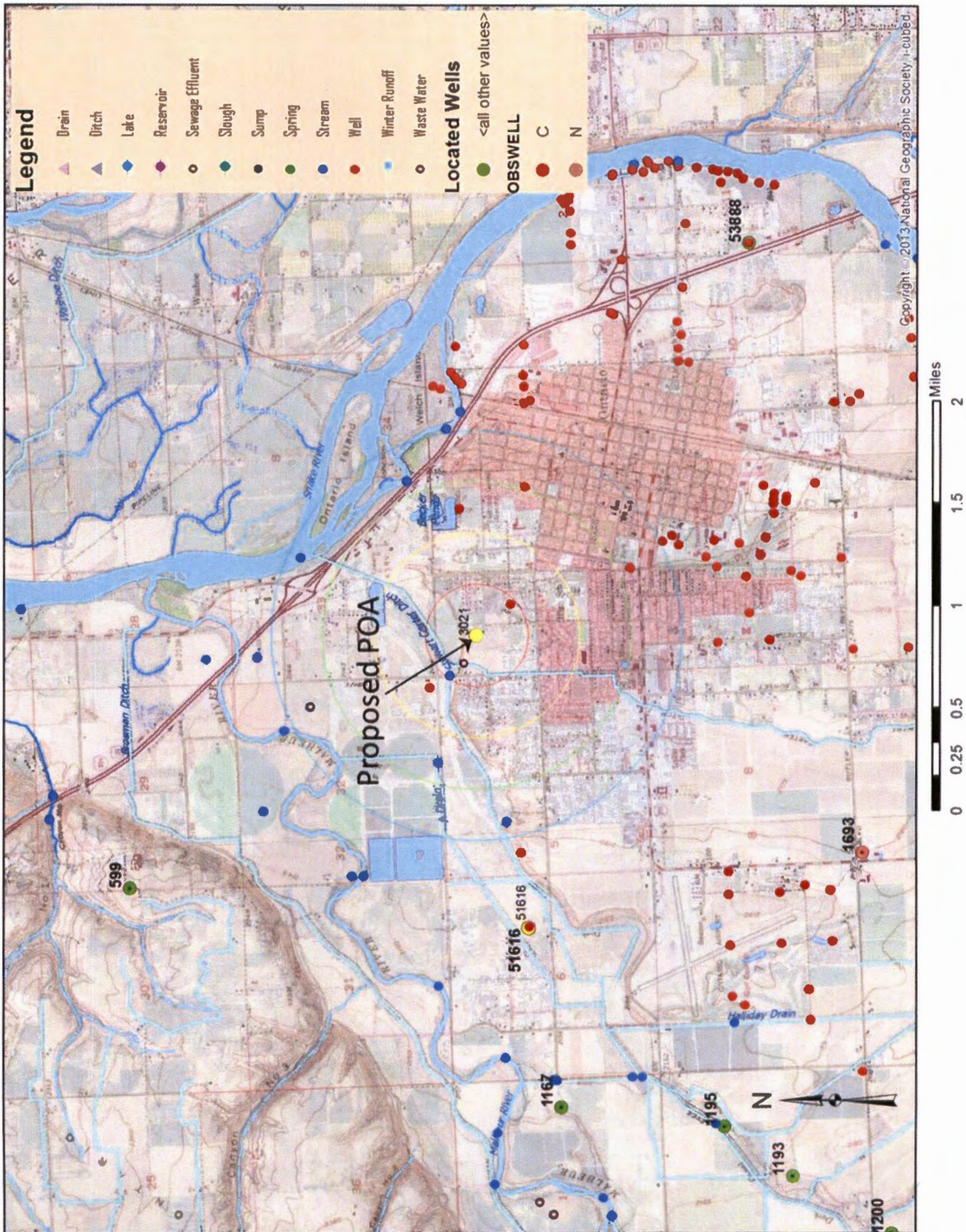
D3. **THE WELL construction deficiency or other comment is described as follows:** _____

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

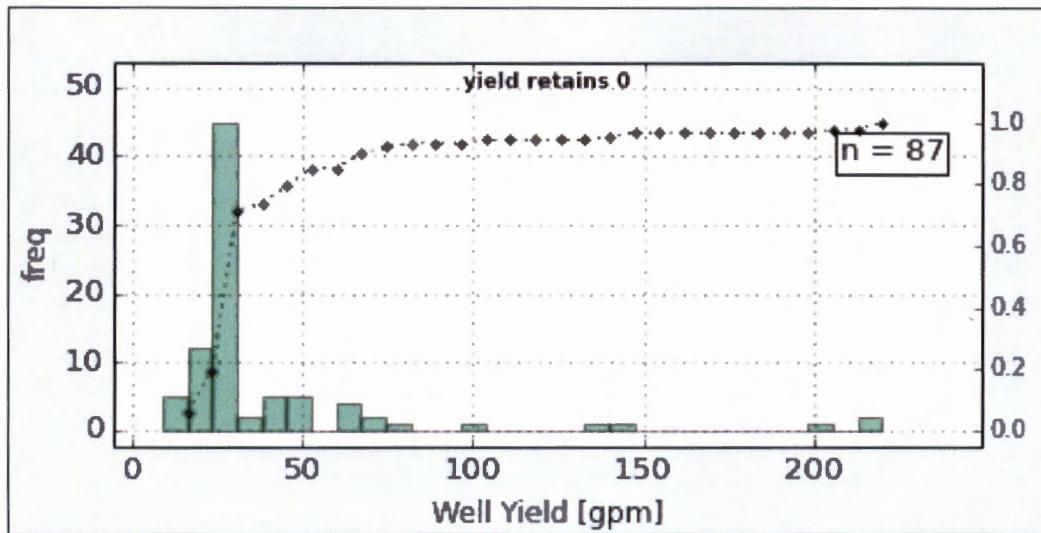
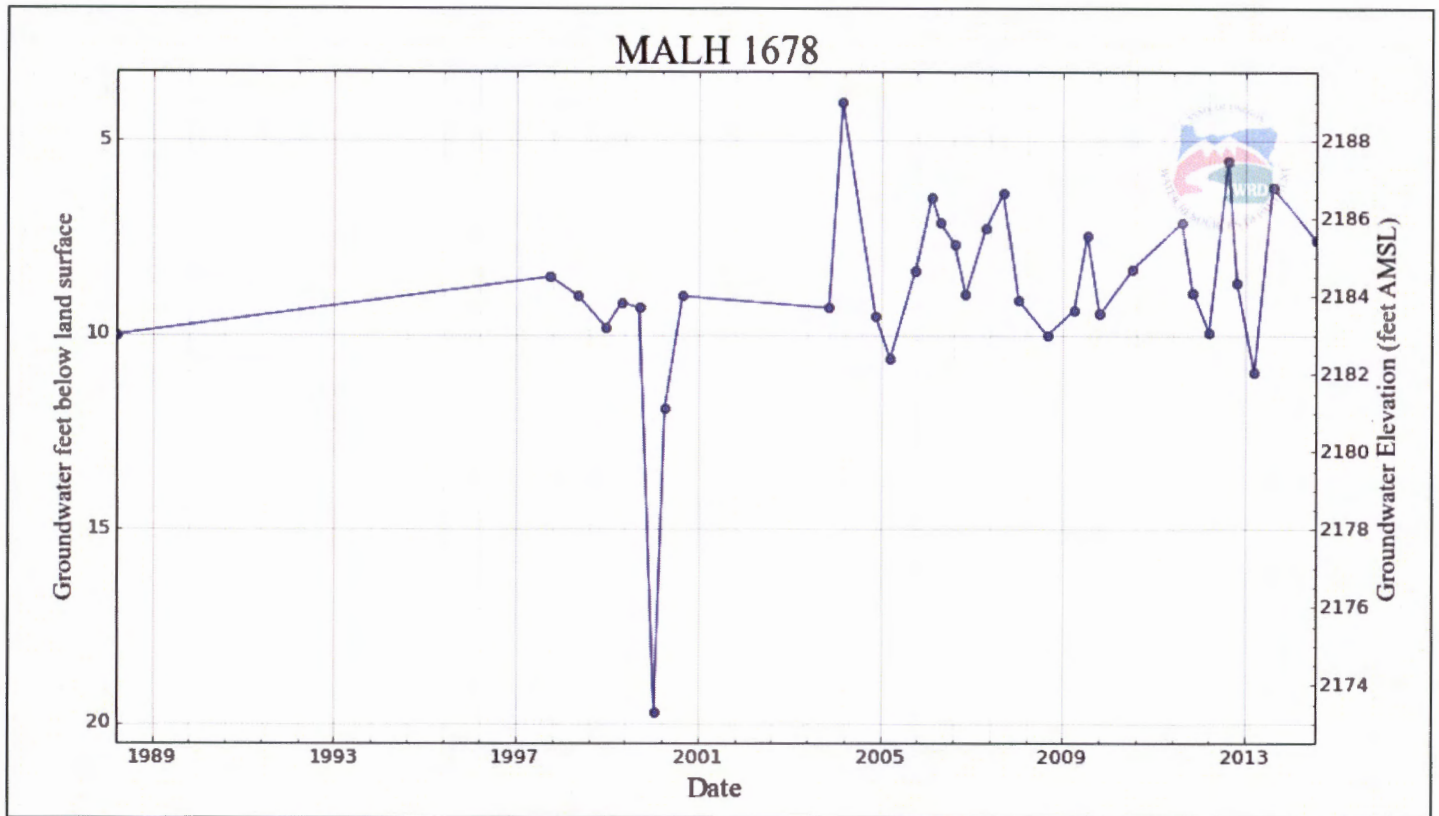
Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 31011701		MALHEUR R > SNAKE R - AT MOUTH			Exceedance Level: 80	
Time: 1:48 PM		Basin: MALHEUR			Date: 03/22/2016	
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	154.00	427.00	-273.00	0.00	0.00	-273.00
FEB	267.00	626.00	-359.00	0.00	0.00	-359.00
MAR	467.00	911.00	-444.00	329.00	0.00	-774.00
APR	780.00	1,060.00	-278.00	470.00	0.00	-748.00
MAY	524.00	957.00	-433.00	0.00	0.00	-433.00
JUN	324.00	857.00	-533.00	0.00	0.00	-533.00
JUL	150.00	686.00	-536.00	0.00	0.00	-536.00
AUG	99.90	540.00	-440.00	0.00	0.00	-440.00
SEP	83.80	376.00	-292.00	0.00	0.00	-292.00
OCT	106.00	209.00	-103.00	0.00	0.00	-103.00
NOV	135.00	223.00	-87.90	0.00	0.00	-87.90
DEC	132.00	297.00	-165.00	0.00	0.00	-165.00
ANN	338,000	432,000	29,500	48,200	0	0

Well Location Map



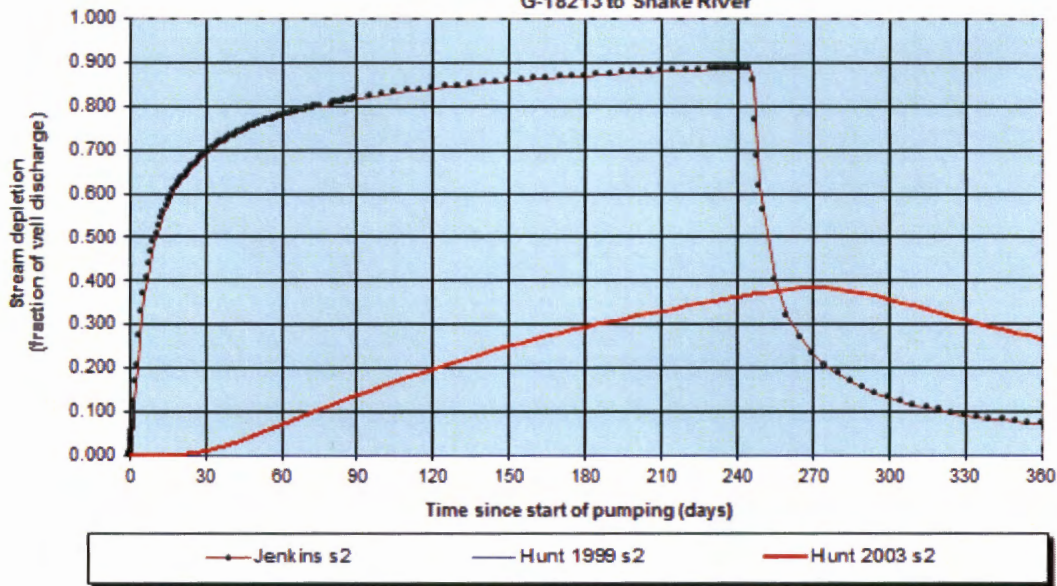
Water-Level Trends in Nearby Wells



Well yields in the area surrounding the proposed POA seldom reach greater than 100 GPM. Plotted here are wells within one mile of the applicant's well, with stated yields reported on driller's logs.

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999, 2003)

G-18213 to Snake River



Output for Stream Depletion, Scenerio 2 (s2):													Time pump on (pumping duration) = 245 days												
Days	30	60	90	120	150	180	210	240	270	300	330	360	JSD	68.9%	77.7%	81.7%	84.2%	85.8%	87.0%	88.0%	88.8%	23.3%	13.2%	9.2%	7.0%
H SD 1999	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	
H SD 2003	1.08%	7.00%	13.86%	19.94%	#####	#####	#####	33.16%	#####	#####	#####	31.05%	#####												
Qw, cfs	0.780	0.780	0.780	0.780	0.780	0.780	0.780	0.780	0.780	0.780	0.780	0.780													
H SD 99, cfs	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####													
H SD 03, cfs	0.008	0.055	0.108	0.156	0.196	0.230	0.259	0.284	0.301	0.279	0.242	0.209													

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.78	0.78	0.78	cfs
Time pump on (pumping duration)	tpon	245	245	245	days
Perpendicular from well to stream	a	4380	4380	4380	ft
Well depth	d	70	70	70	ft
Aquifer hydraulic conductivity	K	500	500	500	ft/day
Aquifer saturated thickness	b	20	20	20	ft
Aquifer transmissivity	T	10000	10000	10000	ft ² /day
Aquifer storativity or specific yield	S	0.005	0.005	0.005	
Aquitard vertical hydraulic conductivity	Kva	10	20	30	ft/day
Aquitard saturated thickness	ba	25	25	25	ft
Aquitard thickness below stream	babs	5	5	5	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	500	500	500	ft
Streambed conductance (lambda)	sbc	1000.000000	2000.000000	3000.000000	ft/day
Stream depletion factor	sdf	9.592200	9.592200	9.592200	days
Streambed factor	sbf	438.000000	876.000000	1314.000000	
input #1 for Hunt's Q_4 function	t'	0.104251	0.104251	0.104251	
input #2 for Hunt's Q_4 function	K'	767.376000	1534.752000	2302.128000	
input #3 for Hunt's Q_4 function	epsilon'	0.025000	0.025000	0.025000	
input #4 for Hunt's Q_4 function	lamda'	438.000000	876.000000	1314.000000	

Hunt (2003) model run predicting impacts to Snake River using full pumping rate from POA of 0.78 CFS for 245 days.