

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 05/11/2015  
 FROM: Groundwater Section Phillip I. Marcy / Michael J. Thoma  
Reviewer's Name  
 SUBJECT: Application G- 17924 Supersedes review of 12/30/2014  
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: J. C. Watson Company County: Malheur

A1. Applicant(s) seek(s) 2.67 cfs from 3 well(s) in the Owyhee Basin,  
Snake / Lower Owyhee subbasin Quad Map: Adrian

A2. Proposed use Supplemental Irrigation (380 acres) Seasonality: March 1 – October 31 (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 52787	1	Fluvial and lacustrine sed. of Idaho Group	0.89	21S/46E-16 SE NE	2560' S, 25' W from NE1/4 of S16
2	PROP	2		0.89	21S/46E-16 SE NW	1381'S, 3900' W from NE1/4 of S16
3	PROP	3		0.89	21S/46E-16 NE SW	2812'S, 3900'W from NE1/4 of S16
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	2430	135	135.6	10/18/2005	225	0-155	+2-225		165-215	400 / 150 <sup>b</sup>	32	Pump
2	2380	135 <sup>a</sup>	135 <sup>a</sup>		250	0-100	+2-160		160-250	400 <sup>b</sup>		
3	2430	135 <sup>a</sup>	135 <sup>a</sup>		250	0-100	+2-160		170-250	400 <sup>b</sup>		

Use data from application for proposed wells.

**A4. Comments:**

<sup>a</sup> Wells #2 and #3 are proposed. Based on similar construction with existing well and nearby wells (MALH 52787; MALH 52651), wells #2 and #3 will encounter similar conditions (first water, SWL, unconfined conditions) and sediments (lacustrine and fluvial sediments; stratified sand, gravel, and clay).

<sup>b</sup> The proposed well yields are 400 gpm for each well but the well log for MALH 52787 listed a yield of 150 gpm. The proposed well yields of 400 gpm are higher than what is encountered by nearby wells in similar sediments. Median well yield from logs in surrounding sections is 25 gpm with only a few >100 gpm and none > 300 gpm. These are mostly domestic wells (i.e., small diameter) but a recently drilled 12 in, 250 ft well (MALH 54147) with similar open interval as the proposed PODs yielded only 50 gpm. Therefore, 400 gpm may not be available from any single well.

A5.  **Provisions of the Owyhee (OAR 690-511)** 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 (**see B3**); or
- d.  **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
- i.  The permit should contain condition #(s) 7F (proposed well location); 7N - modified (annual measurement condition); 7P (well tag condition); 7T (measuring tube condition); "Large water use condition"
  - 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:**

**Regarding Appropriation:** There are few wells in the area that have long-term water level data. The closest is MALH 2147 which is > 4 mi to the north of the proposed PODs. This well shows stable long-term water levels (see Figure 4) but may not be representative of the area near the PODs.

**Regarding Injury:** Local well logs suggest that the aquifer utilized by MALH 52787 (Well 1 on application) is relatively thin (see logs MALH 54147, MALH 2248, MALH 52561). Recent pump test data collected from nearby MALH 54147 indicate transmissivity in this aquifer ranges from about 4,700 to 5,700 ft<sup>2</sup>/day, which can facilitate extensive drawdown in the vicinity of the pumping well in a leaky-confined system as described by Gannett (1990). A calculation of expected drawdown at MALH 54147 due to pumping at MALH 52787 was performed using the Theis non-equilibrium function (1941), resulting in a range of values from 5.19 to 28.56 feet (Figure 6). Due to the possibility of extensive drawdown, and limited thickness of the aquifer, a modified annual measurement condition should be applied to this permit should it be issued (see C6). Due to increased groundwater use in the area, and the size of the proposed use, the Water Resources Department wants to better monitor groundwater levels in the aquifer. Therefore, a special condition shall also be applied allowing the department access to nearby unused well MALH 52561 on the applicant's property.

**Regarding Capacity:** The existing well (MALH 52787) and proposed wells will produce from lacustrine and fluvial sediments assigned to the Glens Ferry formation by Ferns et al. (1993) and part of the Lake Idaho Group. These sediments consist mainly of lacustrine silt and clay but contain numerous lenses of mixed coarse sand and gravel deposits – which make up the most productive parts of the aquifer. Although considerable silt / clay layers may exist, the sediments are generally unconfined to leaky-confined based on first-water vs. SWL and according to Gannett (1990). Well yields in these sediments and within the same Township and Range as the proposed PODs range from < 10 to 300 gpm but 90% had yields <100 gpm. It is unlikely that the proposed new wells will yield 400 gpm with the proposed construction.

**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/gravel of Lake Idaho Group	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	“	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	“	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

**Basis for aquifer confinement evaluation:** Well log for Well #1 (MALH 52787) and nearby existing wells (MALH 53653, MALH 54147) show SWL similar to depths of water bearing zones. Additionally, Gannett (1990) determined that the aquifer system in the area is, in general, unconfined to leaky-confined.

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	2300	2190	7600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Snake River	2250	2190	11400	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Snake River	2300	2190	10600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Owyhee River	2300	2230	12500	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Owyhee River	2250	2230	8600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2	Owyhee River	2300	2230	8700	<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"/>

**Basis for aquifer hydraulic connection evaluation:** Well #1 is closer to the Snake R. which is east of the PODs and Wells #2 and #3 are closer to the Owyhee R., which is located west and north of the PODs (see Figure 3). The aquifer is unconfined to leaky-confined and limited head data imply that general groundwater flow is from west and south flowing north and east toward the Snake R. In general the aquifer in the vicinity of the PODs is probably more strongly connected to the Snake R. than the Owyhee R. as it is the regional groundwater discharge. However, as there is no WAB for the Snake R. and since the Owyhee R. has lower flows, interference with the Owyhee R. was investigated in C4a below.

**Water Availability Basin the well(s) are located within:** Owyhee R > Snake R – At Mouth (ID# 3111001). Although the wells are located within this WAB, as described on the preceding lines, they are also and perhaps more directly hydraulically connected to the Snake River through the regional groundwater flow system. The Snake River is not associated with a WAB.

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"/>

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:** None of the applicant's wells are within 1 mile of surface water so C3a and C3b do 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.

<b>Non-Distributed Wells</b>													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS				2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35		
Interference CFS				0.29	0.60	0.80	0.94	1.06	1.14	1.21	1.28	1.10	0.82
<b>Distributed Wells</b>													
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													
<b>(A) = Total Interf.</b>				0.29	0.60	0.80	0.94	1.06	1.14	1.21	1.28	1.10	0.82
<b>(B) = 80 % Nat. Q</b>				736	1360	1190	518	298	230	170	156	232	303
<b>(C) = 1 % Nat. Q</b>				7.4	13.6	11.9	5.2	3.0	2.3	1.7	1.6	2.3	3.0
<b>(D) = (A) &gt; (C)</b>				No	No	No	No	No	No	No	No	No	No
<b>(E) = (A / B) x 100</b>		%	%	0.04%	0.04%	0.07%	0.18%	0.36%	0.50%	0.71%	0.82%	0.47%	0.27%

(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:** The full annual duty (380 x 3 =1140 af) divided by the period of use (245 d) was used to determine the average well pumping rate (2.35 cfs). The Hunt (1999) model was used to evaluate impacts to the Owyhee River under the "worst-case" scenario, which was considering the full rate produced from the closest well to the river, leaky-confined conditions, and using conservative parameters. This model and these results also assume that there will be no interference to the Snake River, which is of similar distance to the wells and so would likely absorb some of the impacts from pumping. **Even under this worst-case scenario, interference is < 1 % of flows in the Owyhee R. and so will not trigger PSI.** PSI to the Snake River was not modeled but historic low flow values in the Snake R. are much greater than 1% of the full rate (see Figure 2) and so PSI would not be triggered under any amount of interference.

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:**

The three proposed PODs are located on a sloping plain extending out from the sedimentary and volcanic uplands near the Owyhee Reservoir and sloping northeast toward the Owyhee and Snake Rivers (Figure 3). There is limited groundwater data available in this area but these data and the department's conceptual model suggests that groundwater flow mimics topography and flows out of the uplands east toward the Snake River and north-northeast toward the lowest section of the Owyhee River. The proposed PODs are within the Owyhee R. WAB but there is a 200-400 ft ridge separating the PODs and the Owyhee R. at the shortest distance between the proposed PODs and the river. It is more likely that the wells are more directly hydraulically connected to the Snake R. owing to this ridge and general groundwater flow direction. However, impacts and PSI were still evaluated for the Owyhee R. and the model results indicate no PSI under a worst-case scenario (i.e., full rate from one well, using the well closest to the river, conservative parameters, impacting only the Owyhee R.). Impacts and PSI to the Snake R. are also not substantial as minimum daily discharge from the past 36 years in the Snake River at Nyssa (USGS Gage #13213100) is 4240 cfs (Figure 2). 1 % of this minimum flow (42.4 cfs) is far greater than the full rate requested on the application so there will not be PSI with the Snake R. under any amount of interference.

If issued, this permit should contain the following standard permit conditions: 7F-proposed well location condition; 7P-well tag condition; 7T-measuring tube condition

**Modified Condition 7N** – The water user shall discontinue the use of, or reduce the rate or volume of withdrawal from, the well(s) if any of the following events occur:

- A. Annual water-level measurements reveal an average water-level decline of **two or more feet per year for three consecutive years**; or
- B. Annual water-level measurements reveal a water level decline of **6 or more feet** in fewer than five consecutive years; or
- C. Annual water-level measurements reveal a water-level decline of **10 or more feet**; or
- D. Hydraulic interference leads to a decline of **10 or more feet** in any neighboring well with senior priority.

**Special Condition:** If a permit is issued, the applicant shall grant the Water Resources Department access to unused well MALH 52561 for use as a monitoring well.

**References Used:**

Gannett, M. W. 1999. Hydrogeology of the Ontario Area Malheur County, Oregon. Oregon Water Resources Dept. Ground Water Report No. 34. 39p.

Ferns, M.L., H.C. Brooks, J.G. Evans, M.L. Cummings. 1993. Geologic map of the Vale 30x60 minute quadrangle, Malheur County, Oregon and Owyhee County, Idaho. Oregon Dept. of Geology and Mineral Industries Geological Map Series 77.

Hunt, B., 1999, Unsteady stream depletion from ground water pumping: Ground Water, v. 37, no. 1, p. 98-102

Theis, C.V., 1941, The Effect of a Well on the Flow of a Nearby Stream: Am. Geophysical Union Trans., v.22, pt. 3, p. 734-738.

Pump test data obtained from GSI Water Solutions for MALH 54147.

**Well Logs Attached:**

MALH 52787

MALH 52561

MALH 54147

MALH 2248

**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:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

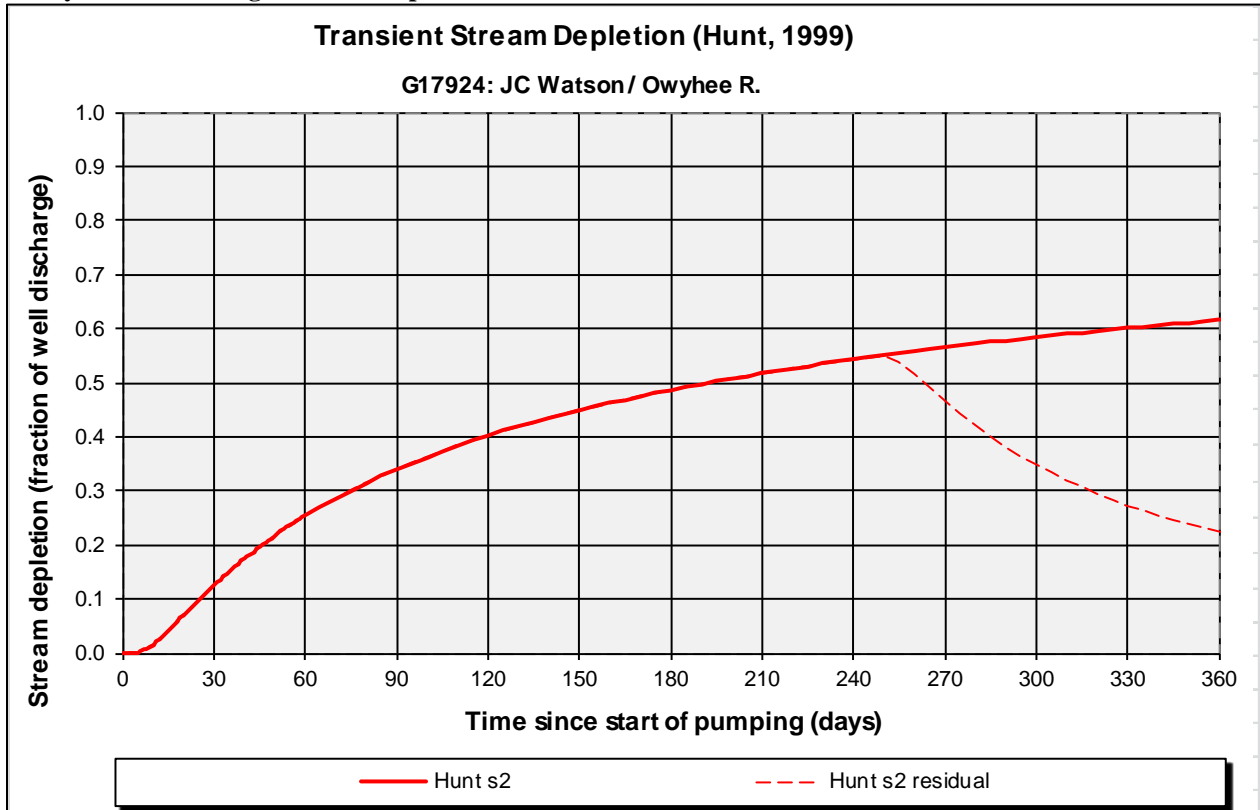
D4.  **Route to the Well Construction and Compliance Section for a review of existing well construction.**

**Water Availability Tables**

Below is the Water Availability Table for the Owyhee River. The Snake River is not associated with a WAB but minimum daily discharge for the Snake River at Nyssa (USGS gage #13213100) is shown in Figure 2.

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 31111001			OWYHEE R > SNAKE R - AT MOUTH		Exceedance Level: 80	
Time: 11:51 AM			Basin: OWYHEE		Date: 12/30/2014	
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	264.00	714.00	-450.00	0.00	0.00	-450.00
FEB	636.00	1,090.00	-453.00	79.40	0.00	-532.00
MAR	736.00	1,440.00	-707.00	380.00	0.00	-1,090.00
APR	1,360.00	1,750.00	-390.00	459.00	0.00	-849.00
MAY	1,190.00	2,210.00	-1,020.00	79.20	0.00	-1,100.00
JUN	518.00	1,890.00	-1,370.00	0.00	0.00	-1,370.00
JUL	298.00	1,500.00	-1,200.00	0.00	0.00	-1,200.00
AUG	230.00	1,310.00	-1,080.00	0.00	0.00	-1,080.00
SEP	170.00	875.00	-705.00	0.00	0.00	-705.00
OCT	156.00	460.00	-304.00	0.00	0.00	-304.00
NOV	232.00	396.00	-164.00	0.00	0.00	-164.00
DEC	303.00	569.00	-266.00	0.00	0.00	-266.00
ANN	694,000	857,000	106,000	60,000	0	45,800

**Figure 1: Hunt (1999) model results for stream depletion between the nearest proposed POD and the Owyhee R. assuming the full rate produced from this well.**



**Output for Hunt Stream Depletion, Scenerio 2 (s2):**

Days	30	60	90	120	150	180	210	240	270	300	330	360
Hunt SD s2	0.13	0.25	0.34	0.40	0.45	0.49	0.52	0.54	0.47	0.35	0.27	0.22
Qw, cfs	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350
H SD s2, cfs	0.29	0.60	0.80	0.94	1.06	1.14	1.22	1.28	1.10	0.82	0.64	0.52

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	2.35	<b>2.35</b>	2.35	cfs
Distance to stream	a	8600	<b>8600</b>	8600	ft
Aquifer hydraulic conductivity	K	5.5	<b>5.5</b>	500	ft/day
Aquifer thickness	b	200	<b>200</b>	200	ft
Aquifer transmissivity	T	1100	<b>1100</b>	100000	ft <sup>2</sup> /day
Aquifer storage coefficient	S	0.001	<b>0.001</b>	0.001	
Stream width	ws	150	<b>150</b>	150	ft
Streambed hydraulic conductivity	Ks	0.1	<b>0.05</b>	0.05	ft/day
Streambed thickness	bs	10	<b>20</b>	10	ft
Streambed conductance	sbc	1.5	<b>0.375</b>	0.75	ft/day
Stream depletion factor (Jenkins)	sdf	67.24	<b>67.24</b>	0.74	days
Streambed factor (Hunt)	sbf	11.73	<b>2.93</b>	0.06	

**Figure 2: Minimum daily discharge in Snake River near Nyssa**

00060, Discharge, cubic feet per second,												
Minimum of daily mean values for each day for 36 - 38 years of record in, ft3/s (Calculation Period 1974-10-01 -> 2014-09-30)												
Day of month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7,470	7,850	7,640	6,560	5,080	4,930	4,480	4,900	5,630	7,100	7,770	7,490
2	7,670	7,250	7,450	5,640	5,080	4,800	4,760	4,900	5,440	6,790	7,960	7,590
3	7,490	7,610	7,570	5,310	5,060	4,880	4,690	4,930	5,530	6,540	8,100	7,470
4	7,520	7,380	7,550	5,820	5,290	4,640	4,700	4,790	5,430	6,810	7,830	7,850
5	7,240	6,930	7,670	5,840	5,560	4,510	4,680	4,750	5,550	6,680	7,890	7,640
6	7,610	7,350	7,540	5,450	5,430	4,250	4,800	4,760	5,750	6,900	8,170	7,990
7	7,340	7,590	7,560	5,250	5,350	4,240	4,980	4,530	5,940	7,260	8,240	7,590
8	7,600	7,370	7,500	5,130	5,700	4,820	4,900	4,600	6,020	7,720	7,600	7,400
9	7,670	7,600	7,360	5,290	5,500	4,800	4,800	4,740	6,620	7,480	7,560	6,950
10	7,340	7,360	7,540	5,270	5,300	4,500	4,920	4,820	5,900	7,890	8,030	7,240
11	7,660	7,690	7,460	5,250	5,200	4,580	5,030	4,840	6,150	7,800	7,850	7,390
12	7,540	7,570	6,790	5,680	5,400	4,460	4,940	4,850	6,340	8,010	7,700	7,290
13	7,310	7,480	6,800	5,840	5,510	4,740	4,840	4,910	6,340	8,150	7,980	7,300
14	7,420	7,490	6,490	5,660	5,670	5,010	4,920	4,880	6,540	8,090	7,590	7,110
15	7,110	7,350	6,480	5,460	5,410	5,110	4,860	4,880	7,040	8,360	7,410	7,300
16	7,470	7,530	6,500	6,050	5,520	5,020	4,960	4,810	7,180	7,800	8,060	7,250
17	7,350	7,520	6,590	5,300	5,480	5,170	4,900	5,030	6,900	7,650	7,810	7,180
18	7,580	7,550	6,570	5,410	5,490	4,980	4,960	5,070	6,990	8,340	7,940	7,470
19	6,820	7,110	6,520	5,530	5,420	4,820	4,980	4,980	6,600	8,280	7,990	7,300
20	7,560	7,190	6,620	5,740	5,400	5,160	4,700	5,430	7,300	8,240	7,690	7,390
21	7,320	7,410	6,730	5,670	5,440	5,250	4,650	5,160	6,750	8,000	7,510	7,280
22	7,490	7,620	6,710	6,230	5,520	5,300	4,590	4,890	6,550	8,180	7,360	7,770
23	7,520	7,210	6,700	5,980	5,660	4,700	4,520	5,030	6,810	7,690	7,760	7,950
24	7,530	7,480	6,720	6,350	5,630	4,920	4,550	5,630	7,090	7,780	7,390	7,710
25	7,330	7,580	6,630	6,520	5,640	4,480	4,580	5,610	6,720	7,900	7,760	7,660
26	7,160	7,610	6,660	6,450	5,300	4,720	5,110	5,490	6,900	8,030	7,780	7,710
27	7,400	7,470	6,840	5,620	5,370	4,650	5,120	5,520	7,250	7,700	7,540	7,460
28	7,610	7,760	6,770	5,680	5,170	4,780	5,160	5,710	7,650	6,970	7,710	7,550
29	7,120	7,630	6,800	5,560	4,900	4,660	4,920	5,600	7,620	7,480	7,370	7,750
30	7,640		6,580	5,280	4,860	4,520	5,010	5,500	7,640	7,460	7,860	7,670
31	7,430		6,560		4,860		5,030	5,340		7,400		7,520

Canyon County, Idaho  
 Hydrologic Unit Code 17050115  
 Latitude 43°52'34", Longitude 116°58'57" NAD83  
 Drainage area 58,700 square miles  
 Contributing drainage area 58,700 square miles  
 Gage datum 2,170 feet above NGVD29

**Output formats**

[HTML table of all data](#)

[Tab-separated data](#)

[Reselect output format](#)



Figure 3: Location Map

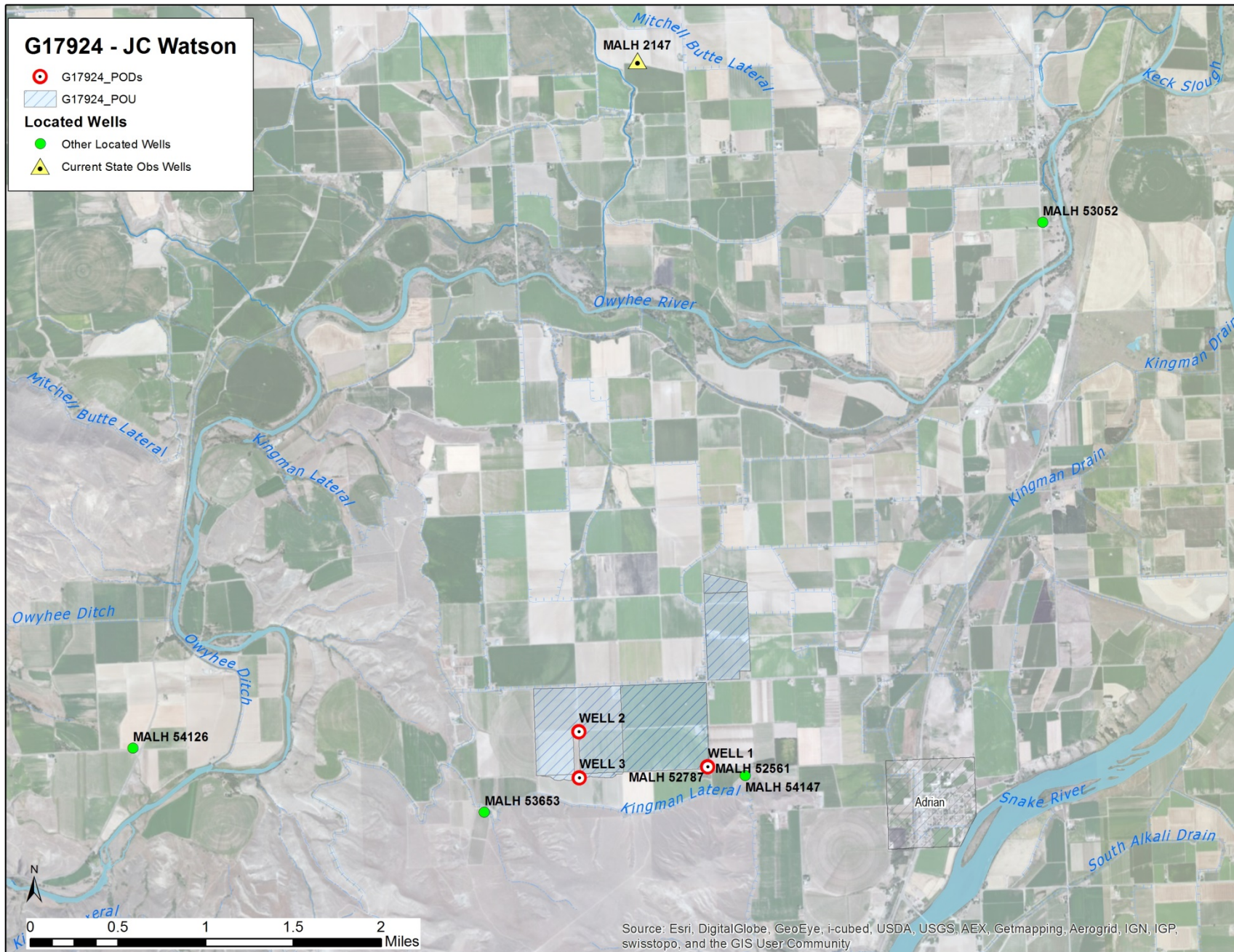
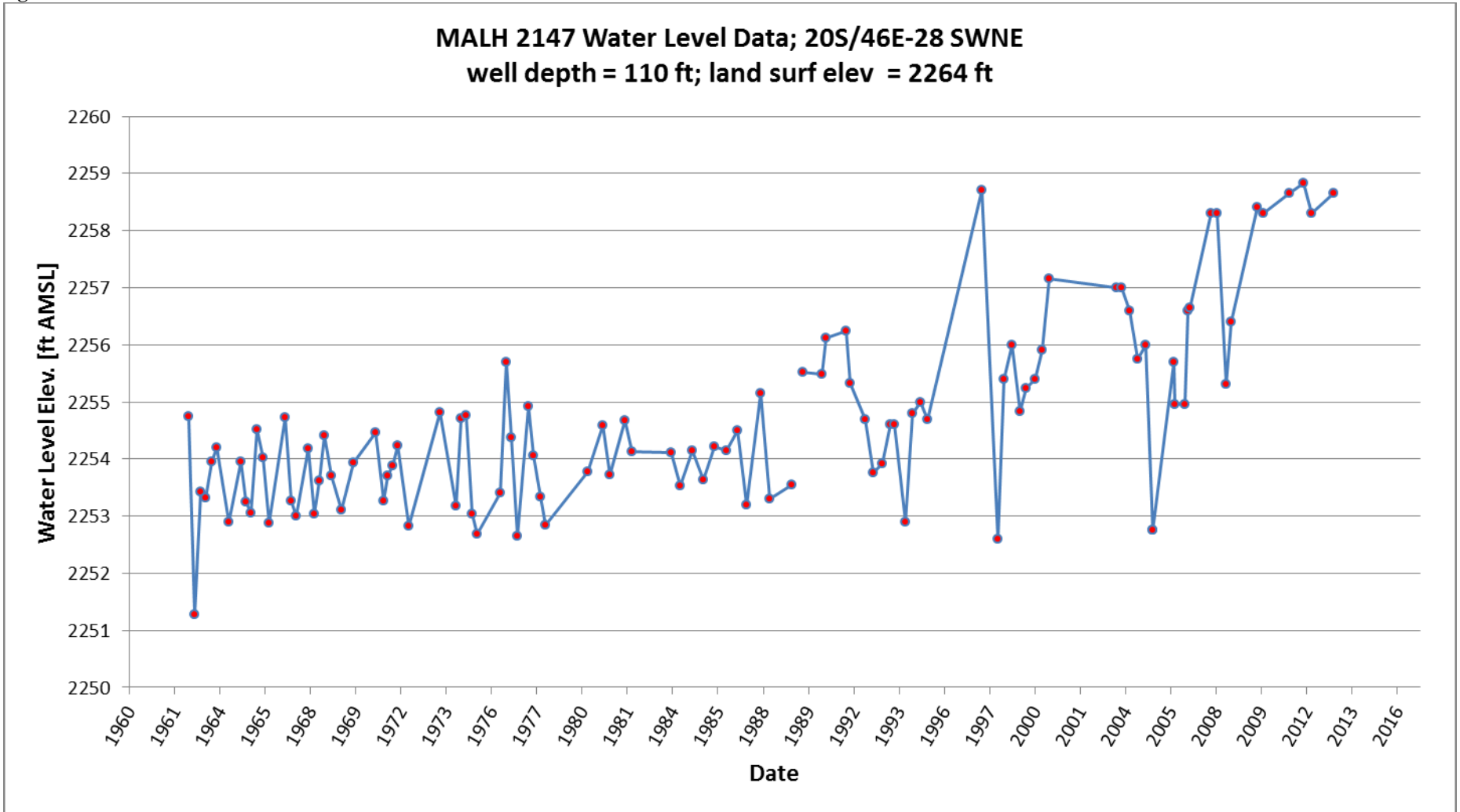


Figure 4: MALH 2147 Water Level Data



**Thisis Time-Drawdown Worksheet** v.3.00  
 Calculates Thisis 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 30, 2014

Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		245		d	
Radial distance from pumped well:	r		1120.00		ft	
Pumping rate	Q		2.7		cfs	1,211.76 gpm
Hydraulic conductivity	K	50	100	150	ft/day	2.70 cfs
Aquifer thickness	b		100		ft	162.00 cfm
Storativity	S_1		0.10000			233,280.00 cfd
	S_2		0.00100			5.36 af/d
Transmissivity Conversions	T_ft2pd	5,000	10,000	15,000	ft <sup>2</sup> /day	
	T_ft2pm	3.4722	6.9444	10.4167	ft <sup>2</sup> /min	
	T_gpd/ft	37,400	74,800	112,200	gpd/ft	

**Recalculate** Use the Recalculate button if recalculation is set to manual

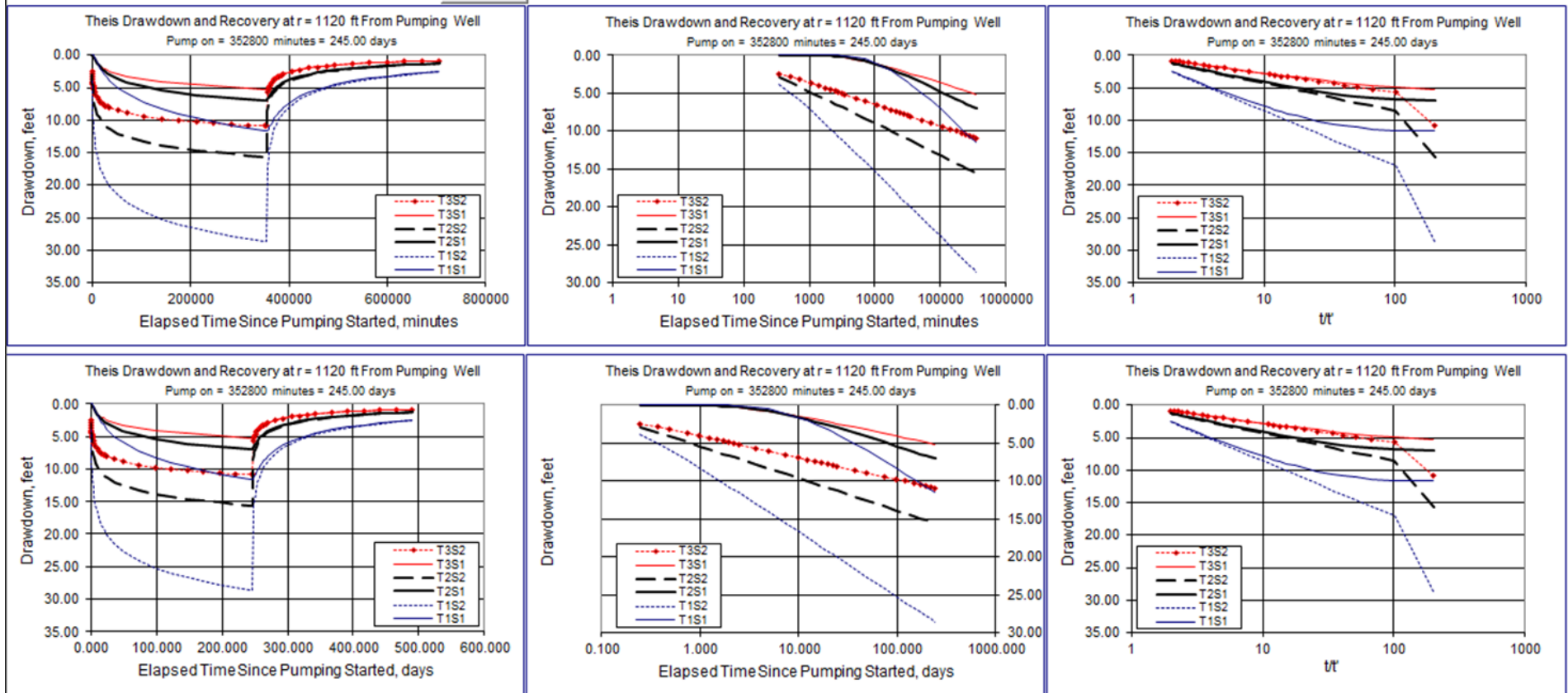


Figure 6- The calculated effects of pumping MALH 52787 at the maximum requested rate on application G-17924 on nearby MALH 54147. Estimated interference at the neighboring well ranges from 5.19 feet to 28.56 feet under a range of possible aquifer conditions.

Relevant Well Logs

**RECEIVED** 52787  
 NOV 16 2005  
 WATER RESOURCES DEPT

STATE OF OREGON  
 WATER SUPPLY WELL REPORT  
 (as required by ORS 537.765)

WELL I.D. # L 66040  
 START CARD # 172219

Instructions for completing this report are on the back of this form.

**(1) LAND OWNER** Well Number \_\_\_\_\_  
 Name CITY OF ADRIAN  
 Address P.O. BOX 226  
 City ADRIAN State OR Zip 97901

**(2) TYPE OF WORK**  New Well  
 Deepening  Alteration (repair/recondition)  Abandonment  Conversion

**(3) DRILL METHOD**  
 Rotary Air  Rotary Mud  Cable  Auger  Cable Mud  
 Other REVERSE

**(4) PROPOSED USE**  
 Domestic  Community  Industrial  Irrigation  
 Thermal  Injection  Livestock  Other

**(5) BORE HOLE CONSTRUCTION** Special Construction:  Yes  No  
 Depth of Completed Well 225 ft.  
 Explosives used:  Yes  No Type \_\_\_\_\_ Amount \_\_\_\_\_

BORE HOLE		SEAL	
Diameter	From To	Material	From To
18	0 225	BENTONITE CEMENT	0 15
			15 155
			155 225

Sacks or Pounds 3200 #  
9 YRDS

How was seal placed: Method  A  B  C  D  E  
 Other \_\_\_\_\_  
 Backfill placed from \_\_\_\_\_ ft. to \_\_\_\_\_ ft. Material \_\_\_\_\_  
 Gravel placed from 135 ft. to 190 ft. Size of gravel #8-12 SAND  
#10-20 SAND

**(6) CASING/LINER**

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
8	12	165	.322	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	215	225	.322	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Liner: \_\_\_\_\_

Drive Shoe used  Inside  Outside  None  
 Final location of shoe(s) N/A

**(7) PERFORATIONS/SCREENS**  
 Perforations Method \_\_\_\_\_  
 Screens Type WIRE WRAP Material S.S.

From	To	Slot Size	Number	Diameter	Telephone size	Casing	Liner
165	190	.030		8		<input checked="" type="checkbox"/>	<input type="checkbox"/>
190	215	.030		8		<input type="checkbox"/>	<input type="checkbox"/>

**(8) WELL TESTS: Minimum testing time is 1 hour**  
 Pump  Bailer  Air  Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
150 gpm	32	188	4 HRS

Temperature of water 61 Depth Artesian Flow Found \_\_\_\_\_  
 Was a water analysis done?  Yes  By whom \_\_\_\_\_  
 Did any strata contain water not suitable for intended use?  Too little  
 Salty  Muddy  Odor  Colored  Other \_\_\_\_\_  
 Depth of strata: \_\_\_\_\_

**(9) LOCATION OF WELL (legal description)**  
 County MALHEUR  
 Tax Lot DONATED TO CITY #150  
 Township 21 N of 46 E of W W M  
 Section 16 NE 1/4 SE 1/4  
 Lat \_\_\_\_\_ ' \_\_\_\_\_ " or \_\_\_\_\_ (degrees or decimal)  
 Long \_\_\_\_\_ ' \_\_\_\_\_ " or \_\_\_\_\_ (degrees or decimal)  
 Street Address of Well (or nearest address) 1/2 MILE SOUTH  
ON CLOVER LANE OFF MENDIOLA

**(10) STATIC WATER LEVEL**  
135'8" ft. below land surface. Date 10/18/05  
 \_\_\_\_\_ ft. below land surface. Date \_\_\_\_\_  
 Artesian pressure \_\_\_\_\_ lb. per square inch Date \_\_\_\_\_

**(11) WATER BEARING ZONES**  
 Depth at which water was first found 135'

From	To	Estimated Flow Rate	SWL

ALL SAND + GRAVELS BELOW  
135'

**(12) WELL LOG** Ground Elevation \_\_\_\_\_

Material	From	To	SWL
TOP SOIL	0	3	
HARD CLAY	3	14	
SAND, SM GRAVEL	14	32	
FINE-COARSE SAND	32	109	
FINE-COARSE SAND, PEA GRAVEL	109	141	
BROWN CLAY	141	153	
BEN CLAY, FINE SAND	153	161	
SAND, GRAVEL	161	180	
FINE SAND, SOFT SANDSTONE	180	183	
FINE-COARSE SAND, PEA GRAVEL	183	221	
BLUE SAND, SANDSTONE	221	225	

Date Started 9-26-05 Completed 10-20-05

**(unbonded) Water Well Constructor Certification**  
 I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.  
 WWC Number 1673 Date 11-09-05  
 Signed Floris Chantz

**(bonded) Water Well Constructor Certification**  
 I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.  
 WWC Number 1500 Date 11-09-05  
 Signed [Signature]

ORIGINAL - WATER RESOURCES DEPARTMENT FIRST COPY - CONSTRUCTOR SECOND COPY - CUSTOMER 06/16/2004

MALH 52561

STATE OF OREGON  
WATER SUPPLY WELL REPORT  
(as required by ORS 537.765)

WELL I.D. # L. 66035  
START CARD # W141885

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number \_\_\_\_\_  
Name CITY OF ADRIAN  
Address PO BOX 226  
City ADRIAN State OR Zip 97101

(9) LOCATION OF WELL by legal description:  
County MALHEUR Latitude \_\_\_\_\_ Longitude \_\_\_\_\_  
Township 21 N or S Range 46 E or W. W.M.  
Section 16 NE 1/4 NE 1/4  
Tax Lot 4500 Lot \_\_\_\_\_ Block \_\_\_\_\_ Subdivision \_\_\_\_\_  
Street Address of Well (or nearest address) CLOVER LANE

(2) TYPE OF WORK  
 New Well  Deepening  Alteration (repair/recondition)  Abandonment

(10) STATIC WATER LEVEL:  
130 ft. below land surface. Date 12-22-04  
Artesian pressure \_\_\_\_\_ lb. per square inch. Date \_\_\_\_\_

(3) DRILL METHOD:  
 Rotary Air  Rotary Mud  Cable  Auger  
 Other \_\_\_\_\_

(11) WATER BEARING ZONES:  
Depth at which water was first found 130'

(4) PROPOSED USE:  
 Domestic  Community  Industrial  Irrigation  
 Thermal  Injection  Livestock  Other \_\_\_\_\_

(5) BORE HOLE CONSTRUCTION:  
Special Construction approval  Yes  No Depth of Completed Well 240 ft.  
Explosives used  Yes  No Type \_\_\_\_\_ Amount \_\_\_\_\_

From	To	Estimated Flow Rate	SWL
<u>130'</u>	<u>240'</u>		

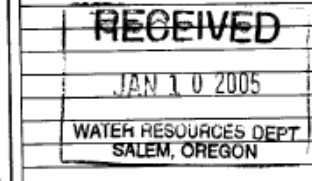
HOLE		SEAL		Sacks or pounds
Diameter	From To	Material	From To	
<u>12"</u>	<u>0</u> <u>30</u>	<u>BENTONITE</u>	<u>0</u> <u>30</u>	<u>900</u>
<u>6"</u>	<u>30</u> <u>240</u>			

(12) WELL LOG:  
Ground Elevation \_\_\_\_\_

How was seal placed: Method  A  B  C  D  E  
 Other Dry Pour  
Backfill placed from \_\_\_\_\_ ft. to \_\_\_\_\_ ft. Material \_\_\_\_\_  
Gravel placed from \_\_\_\_\_ ft. to \_\_\_\_\_ ft. Size of gravel \_\_\_\_\_

Material	From	To	SWL
<u>TOP SOIL</u>	<u>0</u>	<u>3</u>	<u>-</u>
<u>SAND</u>	<u>3</u>	<u>10</u>	<u>-</u>
<u>BROWN CLAY</u>	<u>10</u>	<u>31</u>	<u>-</u>
<u>SAND, CLAY, FEA GRAVEL MIX</u>	<u>31</u>	<u>100</u>	<u>-</u>
<u>GRAVELS</u>	<u>100</u>	<u>210</u>	<u>130</u>
<u>GRAVELS, CEMENTED SAND</u>	<u>210</u>	<u>240</u>	

(6) CASING/LINER:  
Diameter From To Gauge Steel Plastic Welded Threaded  
Casing: 6" 12 217 250      
Liner: \_\_\_\_\_



Final location of shoe(s) 217'

(7) PERFORATIONS/SCREENS:  
 Perforations Method AIR PERFORATOR  
 Screens Type \_\_\_\_\_ Material \_\_\_\_\_  
From To Slot size Number Diameter Telephone size Casing Liner  
160 200 3/8" 4 4000 6"

Date started 12-20-04 Completed 12-22-04

(8) WELL TESTS: Minimum testing time is 1 hour  
 Pump  Bailer  Air  Flowing Artesian  
Yield gal/min 90 gpm Drawdown 151' Drill stem at \_\_\_\_\_ Time 2 hr.

(unbonded) Water Well Constructor Certification:  
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.  
Signed David M. [Signature] WWC Number 1818 Date 1-6-05

Temperature of water 59 Depth Artesian Flow Found \_\_\_\_\_  
Was a water analysis done?  Yes By whom \_\_\_\_\_  
Did any strata contain water not suitable for intended use?  Too little  
 Salty  Muddy  Odor  Colored  Other \_\_\_\_\_  
Depth of strata: \_\_\_\_\_

(bonded) Water Well Constructor Certification:  
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.  
Signed [Signature] WWC Number 1506 Date 1-6-05

MALH 54147

MALH 54147

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

WELL LABEL # L 85263
START CARD # 1023167

(1) LAND OWNER Owner Well I.D.
First Name Last Name
Company City of Adrian
Address P.O. Box 226
City Adrian State OR Zip 97901

(2) TYPE OF WORK [X] New Well [ ] Deepening [ ] Conversion
[ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD
[ ] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud
[X] Reverse Rotary [ ] Other

(4) PROPOSED USE [ ] Domestic [ ] Irrigation [X] Community
[ ] Industrial/ Commercial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION Special Standard [ ] Attach copy
Depth of Completed Well 250 ft.

Table with columns: Dia, From, To, Material, SEAL, From, To, Amt, sacks/lbs. Row 1: 20, 0, 250, Cement, 0, 190, 20, 1.88

How was seal placed: Method [ ] A [ ] B [X] C [ ] D [ ] E

Backfill placed from 190 ft. to 195 ft. Material Bentonite

Filter pack from 195 ft. to 250 ft. Material Sand Size 8/12

Explosives used: [ ] Yes Type Amount

(6) CASING/LINER table with columns: Casing, Liner, Dia, From, To, Gauge, Stil, Plstc, Wid, Thrd. Includes rows for 12, 2, 207, 375 and 12, 247, 250, 375.

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s)
Temp casing [ ] Yes Dia From To

(7) PERFORATIONS/SCREENS table with columns: Perfor/S, Casing/Screen, Liner, Dia, From, To, Scrn/slot width, Slot length, # of slots, Tele/ pipe size. Includes rows for 12, 207, 237, 035 and 12, 237, 247, 025.

(8) WELL TESTS: Minimum testing time is 1 hour

Table for well tests with columns: Pump, Yield gal/min, Drawdown, Drill stem/Pump depth, Duration (hr). Row 1: 50, 9, 205, 12.

Temperature 62 °F Lab analysis [ ] Yes By

Water quality concerns? [ ] Yes (describe below)

Table for water quality concerns with columns: From, To, Description, Amount, Units.

(9) LOCATION OF WELL (legal description)
County MALHEUR Twp 21 S N/S Range 46 E E/W WM
Sec 15 NW 1/4 of the SW 1/4 Tax Lot 700
Tax Map Number Lot
Lat " " or 43.74366 DMS or DD
Long " " or -117.091796 DMS or DD
[ ] Street address of well [X] Nearest address

East of Clover Lane 1000'

(10) STATIC WATER LEVEL Date SWL(psi) + SWL(ft)
Existing Well / Predeepening
Completed Well 07-01-2014 151
Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES table with columns: SWL, Date, From, To, Est Flow, SWL(psi), + SWL(ft). Includes rows for 06-16-2014, 06-17-2014, 06-17-2014, 06-18-2014.

(11) WELL LOG table with columns: Material, From, To. Includes rows for Sandy Loam, Medium to coarse sand, Soft sandstone, clay mix, etc.

RECEIVED BY OWRD RECEIVED BY OWR
AUG 21 2014 JUL 21 2014

Date Started 06-16-2014 Completed 07-02-2014 SALEM, OR SALEM, OR

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
License Number Date
Password: (if filing electronically)
Signed

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
License Number 1585 Date 07-14-2014
Password: (if filing electronically)
Signed
Contact Info (optional)

