

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date September 21, 2016

FROM: Groundwater Section Michael J Thoma
Reviewer's Name

SUBJECT: Application G- 18348 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: Jason Young, Arauco County: Linn

A1. Applicant(s) seek(s) 0.07 cfs from 2 well(s) in the Willamette Basin,
Mid-Willamette subbasin

A2. Proposed use Industrial Seasonality: year-round

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	LINN 59212	5091	Bedrock	0.07	10S/03W-33 NENW	102'S & 853'W of N ¼ cor S33
2	Proposed		Bedrock	0.07	10S/03W-33 NENW	188'S & 668'W of N ¼ cor S33
3						
4						

* 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	214	130	9	5/20/2010	345	0-60	+1-60	345	165-345	70		A
2	214	*			345							

Use data from application for proposed wells.

A4. **Comments:** *Well #2 is proposed with the same well depth as the existing Well #1 and the same bedrock aquifer. Special construction standards (see Section B2) should be attached to the permit to ensure the proposed well is completed in the same source.

A5. **Provisions of the Willamette (OAR 690-502)** _____ 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 100 ft. below land surface;
- c. Condition to allow groundwater production only from the consolidated bedrock groundwater reservoir between approximately 100 ft. and 1000 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:** There are no OWRD SWL data for the area from a well in the same aquifer as proposed by the applicant's wells so groundwater over-appropriation could not be determined. However there are also only a few permitted groundwater POAs in the immediate area and most other wells (> 90%) are less than 100 ft deep and likely producing mostly from the overlying sediment aquifer and not the deeper bedrock aquifer.

Regarding Conditions in B2: The applicant's existing well is cased and sealed to 60 ft BLS and into the consolidated bedrock aquifer (Eugene Fm). If properly sealed into this lower bedrock aquifer the proposed use should have little impact to the overlying alluvial aquifer system in which the majority of wells in the area are completed. Additionally, sealing into the bedrock aquifer should significantly reduce the efficiency of hydraulic connection to nearby Murder Cr (see comments in Section C6).

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	Bedrock of Eugene Fm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Bedrock of Eugene Fm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: SWL on the well log for the Well #1 (LINN 59212) is reported as > 100 ft above first water and the well log also reports approx. 15 ft of clay overlying the bedrock.
 The proposed well would be constructed similarly as the existing well and encounter similar conditions.

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	Willamette River	~200	170-173	3050	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Willamette River	~200	170-173	3200	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Murder Cr	~200	190-210	95	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Murder Cr	~200	190-210	160	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: Willamette R: The Willamette River is a large river that is likely the regional groundwater discharge area – even for the bedrock aquifer.

Murder Cr: The existing and proposed wells’ seal depth into the bedrock aquifer system underlying the alluvial sediment (which Murder Cr is incised into but not through) will likely create a very inefficient hydraulic connection to Murder Cr such that any impacts to Murder Cr flows by the proposed use would be insignificant, especially given the proximity to, and hydraulic connection to, the much larger Willamette River.

Water Availability Basin the well(s) are located within: Willamette R > Columbia R – AB Mill Cr at Gage 14191000

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"/>	MF183	1300	<input type="checkbox"/>	3620	<input type="checkbox"/>	~5%	<input type="checkbox"/>
2	1	<input type="checkbox"/>	<input type="checkbox"/>	MF183	1300	<input type="checkbox"/>	3620	<input type="checkbox"/>	~5%	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: Interference was calculated using the Hunt (2003) stream-depletion model with hydraulic parameters appropriate for this type of aquifer system (Herrera 2014).

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"/>

Comments: _____

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		No surface water sources beyond 1 mile were evaluated											
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

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

Basis for impact evaluation: _____

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

- C5. **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:
- i. The permit should contain condition #(s) **see Section B2**;
 - ii. The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** The applicant's proposed wells would be producing from an aquifer that has been found to be hydraulically connected to surface water at a distance of < 1 mile. However, the department is unable to find sufficient evidence that the proposed use will have the Potential for Substantial Interference per OAR 690-009

References Used:

Herrera, N. B., Burns, E. R., and T. D. Conlon. 2014. *Simulation of Groundwater Flow and the Interaction of Groundwater and Surface Water in the Willamette Basin and Central Willamette Subbasin, Oregon.* USGS Scientific Investigations Report 2014-5136.

Hunt, B. 2003. *Unsteady Stream Depletion when Pumping from a Semiconfined Aquifer.* Journal of Hydrologic Engineering. Vol 8(1), pp 12-19

McClaghry, J. D., T. J. Wiley, M. L. Ferns, and I. P Madin. 2010. *Digital Geologic Map of the Southern Willamette Valley, Benton, Lane, Linn, Marion, and Polk Counties, Oregon.* Oregon Dept. of Geology and Mineral Industries. Open File Report O-10-13.

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

WILLAMETTE R > COLUMBIA R - AB MILL CR AT GAGE 14191000

WILLAMETTE BASIN

Water Availability as of 9/21/2016

Watershed ID #: 183 [\(Map\)](#)

Exceedance Level: 80%

Date: 9/21/2016

Time: 12:17 PM

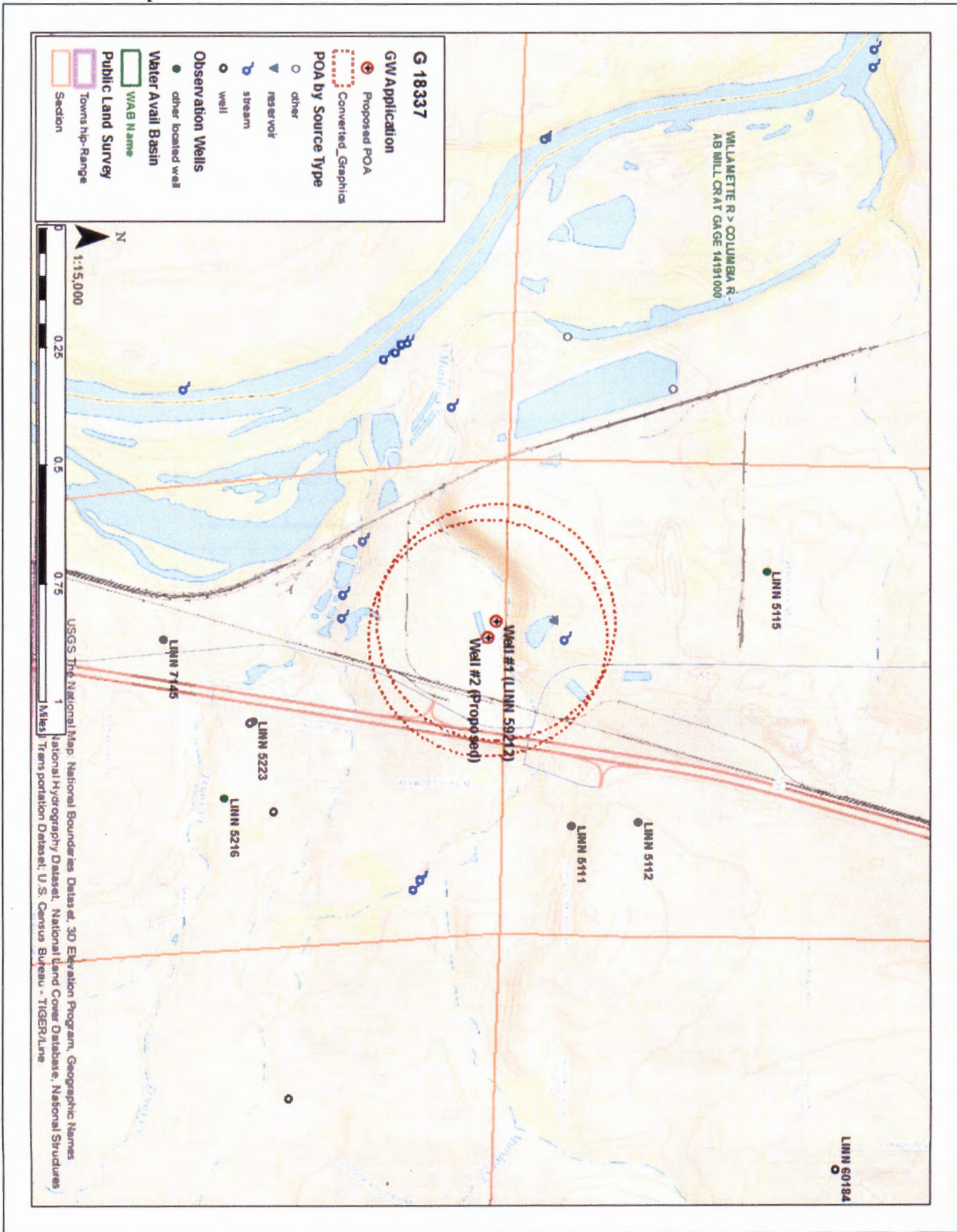
Water Availability Calculation	Consumptive Uses and Storages	Instream Flow Requirements	Reservations
Water Rights		Watershed Characteristics	

Water Availability Calculation

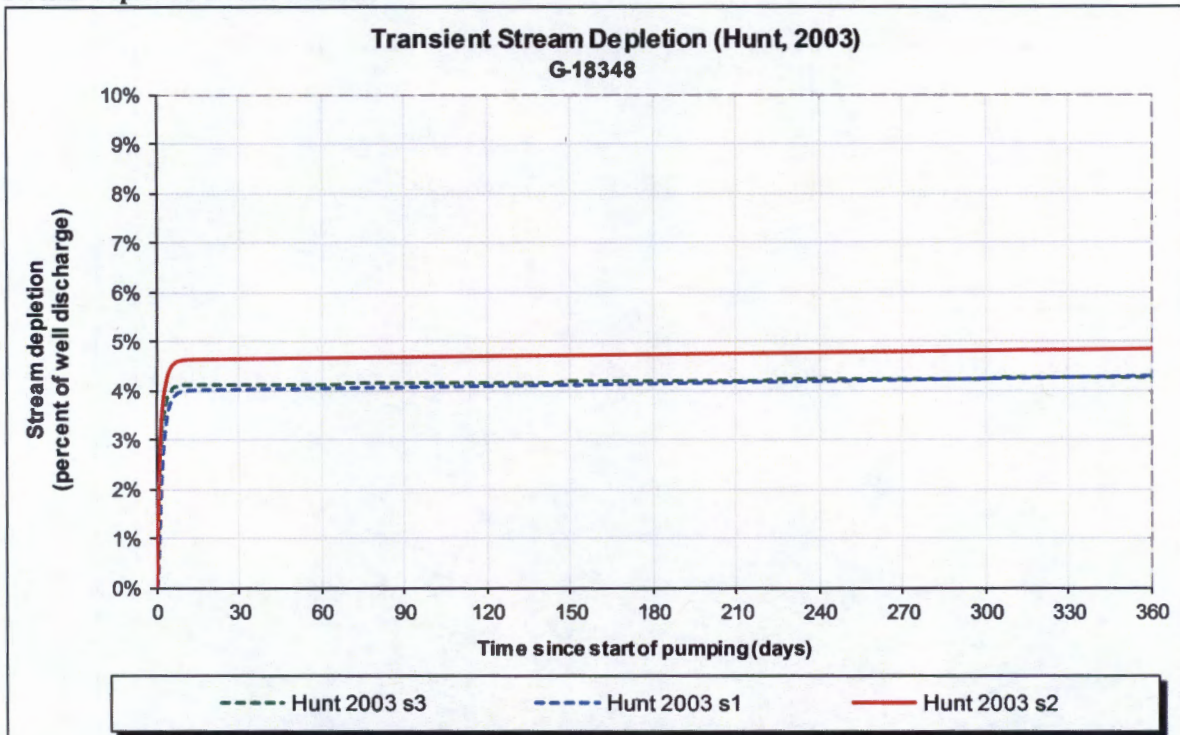
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	18,400.00	2,240.00	16,200.00	0.00	1,300.00	14,900.00
FEB	20,100.00	7,420.00	12,700.00	0.00	1,300.00	11,400.00
MAR	19,600.00	7,210.00	12,400.00	0.00	1,300.00	11,100.00
APR	18,000.00	6,870.00	11,100.00	0.00	1,300.00	9,830.00
MAY	15,500.00	4,160.00	11,300.00	0.00	1,300.00	10,000.00
JUN	8,310.00	1,690.00	6,620.00	0.00	1,300.00	5,320.00
JUL	4,710.00	1,440.00	3,270.00	0.00	1,300.00	1,970.00
AUG	3,620.00	1,330.00	2,290.00	0.00	1,300.00	993.00
SEP	3,680.00	1,150.00	2,530.00	0.00	1,300.00	1,230.00
OCT	4,650.00	743.00	3,910.00	0.00	1,300.00	2,610.00
NOV	9,400.00	851.00	8,550.00	0.00	1,300.00	7,250.00
DEC	16,700.00	909.00	15,800.00	0.00	1,300.00	14,500.00
ANN	13,500,000.00	2,150,000.00	11,300,000.00	0.00	942,000.00	10,400,000.00

Well Location Map



Stream-depletion Model Results



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 365 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	90.1%	93.0%	94.3%	95.0%	95.6%	95.9%	96.2%	96.5%	96.7%	96.9%	97.0%	97.1%
H SD 1999	27.8%	37.0%	42.8%	47.0%	50.3%	53.0%	55.2%	57.2%	58.8%	60.3%	61.6%	62.8%
H SD 2003	4.64%	4.66%	4.68%	4.69%	4.71%	4.73%	4.75%	4.77%	4.79%	4.80%	4.82%	4.84%
Qw, cfs	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
H SD 99, cfs	0.019	0.026	0.030	0.033	0.035	0.037	0.039	0.040	0.041	0.042	0.043	0.044
H SD 03, cfs	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.07	0.07	0.07	cfs
Time pump on (pumping duration)	tpon	365	365	365	days
Perpendicular from well to stream	a	3050	3050	3050	ft
Well depth	d	350	350	350	ft
Aquifer hydraulic conductivity	K	1	5	10	ft/day
Aquifer saturated thickness	b	200	200	200	ft
Aquifer transmissivity	T	200	1000	2000	ft*ft/day
Aquifer storativity or specific yield	S	0.0001	0.0001	0.0001	
Aquitard vertical hydraulic conductivity	Kva	0.001	0.001	0.001	ft/day
Aquitard saturated thickness	ba	20	20	20	ft
Aquitard thickness below stream	babs	10	10	10	ft
Aquitard porosity	n	0.3	0.3	0.3	
Stream width	ws	450	450	450	ft
Streambed conductance (lambda)	sbc	0.045	0.045	0.045	ft/day
Stream depletion factor	sdf	4.651	0.930	0.465	days
Streambed factor	sbf	0.686	0.137	0.069	
input #1 for Hunt's Q_4 function	t'	2.15E-01	1.07E+00	2.15E+00	
input #2 for Hunt's Q_4 function	K'	2.33E+00	4.65E-01	2.33E-01	
input #3 for Hunt's Q_4 function	epsilon'	3.33E-04	3.33E-04	3.33E-04	
input #4 for Hunt's Q_4 function	lamda'	6.86E-01	1.37E-01	6.86E-02	