PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date **November 20, 2015**

FROM: Groundwater Section **Michael J. Thoma**
Reviewer's Name

SUBJECT: Application G- **18148** 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: **Randal J. Brown** County: **Josephine**

A1. Applicant(s) seek(s) **0.033** cfs from **1** well(s) in the **Rogue** Basin, **E. Fk Illinois** subbasin

A2. Proposed use **Nursery (4.5 acres)** 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	PROP	1	Alluvium	0.033	11S/08W-11 NWNE	1220'S, 1476'W of NE cor S11

* 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	1435	-	30-40	-	140	0-20	0-120		100-120			

Use data from application for proposed wells.

A4. **Comments:** Well #1 is proposed; SWL is based on driller's logs for nearby wells and well construction information is what was reported on application.

A5. ☒ **Provisions of the** Rogue (OAR 690-515) 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) **7E (reference level); "Medium" 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:** The geology in the vicinity of the applicant's proposed POA consists of > 150 ft of coarse to fine alluvium material deposited by the Illinois River and its tributaries. Water levels are stable and have been over the past several years (see hydrograph for JOSE 53826 below). There are few existing groundwater rights in the area and none that pose immediate concern of interference but regardless, standard interference conditions should be applied.

*Medium water use reporting condition requiring installation of flowmeter is made by request of local watermaster's office

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**	☐	☒
		☐	☐

Basis for aquifer confinement evaluation: Without a well log the confinement of the well cannot be determined. Based on the geology of the area and the proposed seal depth of 20 ft it is likely the well will be producing from an unconfined to semi-confined aquifer.

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**	**E. Fk Illinois River**	**~1400**	**1380-1420**	**2050**	☒	☐	☐	☐	☒
1	**2**	**Althouse Slough**	**~1400**	**1380-1420**	**2170**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Based on well logs for wells in the area, alluvial material fills the valley to a depth of at least 150 ft bls and there is no clearly defined confining layer identified or interpreted.

Water Availability Basin the well(s) are located within: Althouse Cr > E Fk Illinois R – At Mouth (ID# 69810) **and also hydraulically connected to** E Fk Illinois R > Illinois R – At Mouth (ID# 70980)

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**	☐	☐	**IS70980**	**54**	☐	**41.50**	☐	**< 10%**	☐
1	**2**	☐	☐	**IS69810**	**34**	☐	**6.22**	☐	**< 10%**	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

Comments: The Hunt (1999) analytical model was used to determine percentage of interference with the nearest surface water (E. Fk Illinois R.). In reality, the impacts will be split between Althouse Slough and the E. Fk Illinois River and will be less in each stream than what is predicated by the model and presented in the above table.

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: _____

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													
(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)_____;

ii. ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** _____

References Used: _____

Hunt, B. 1999. *Unsteady Stream Depletion from Ground Water Pumping*. Journal of Hydrologic Engineering, Vol 8(1). 12-19

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** _____ **Logid:** _____

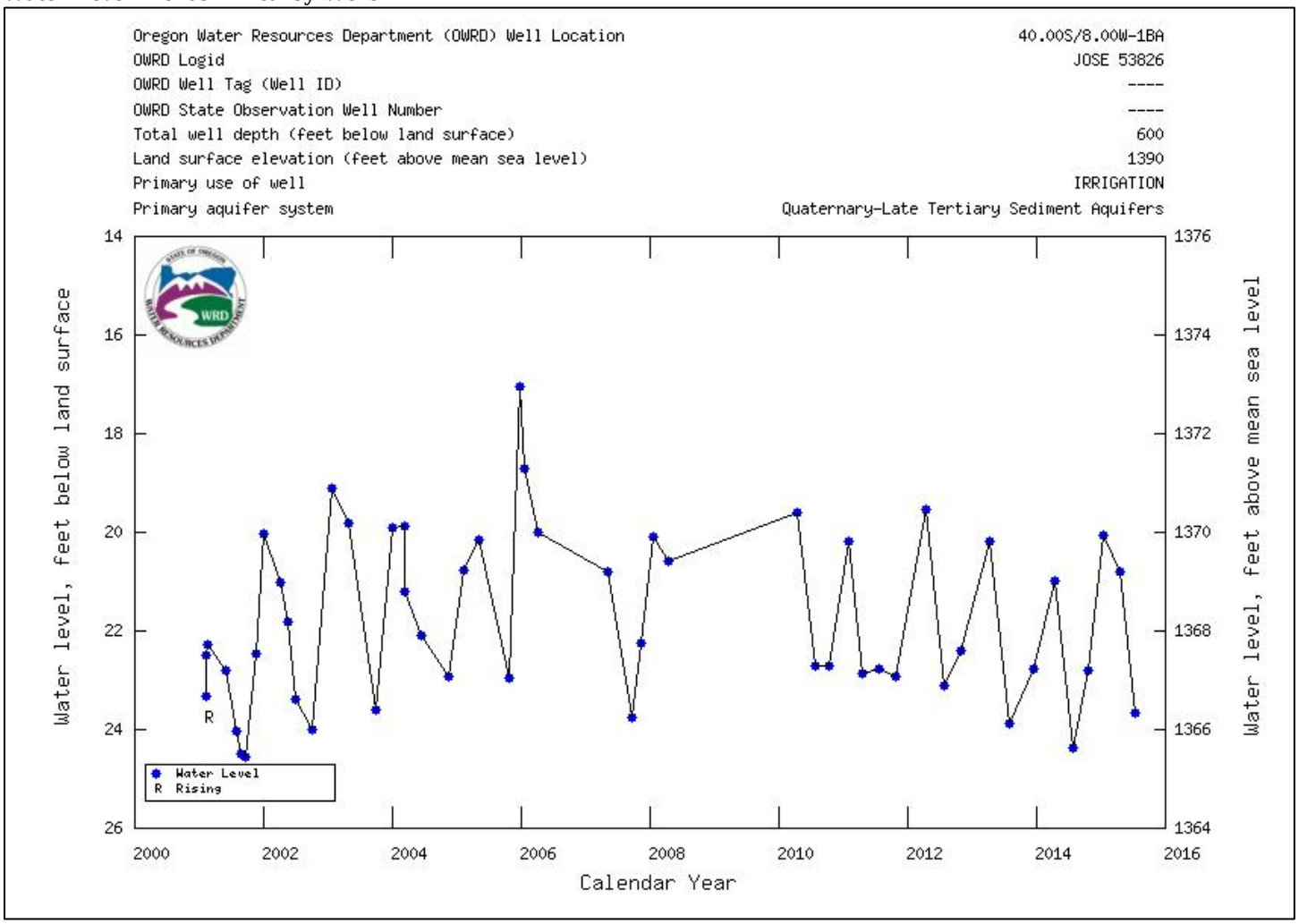
D2. **THE WELL does not appear to meet current well construction standards based upon:**

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-Level Trends in Nearby Wells



Water Availability Tables

ALTHOUSE CR > E FK ILLINOIS R - AT MOUTH
ROGUE BASIN

Water Availability as of 11/20/2015

Watershed ID #: 69810 (Map) Exceedance Level: 80%
Date: 11/20/2015 Time: 12:11 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	43.50	0.19	43.30	0.00	85.00	-41.70
FEB	73.60	0.23	73.40	0.00	85.00	-11.60
MAR	95.90	0.23	95.70	0.00	85.00	10.70
APR	87.70	0.31	87.40	0.00	85.00	2.39
MAY	46.20	0.34	45.90	0.00	85.00	-39.10
JUN	21.90	0.42	21.50	0.00	50.00	-28.50
JUL	11.70	0.52	11.20	0.00	34.00	-22.80
AUG	7.51	0.45	7.06	0.00	34.00	-26.90
SEP	6.22	0.34	5.88	0.00	50.00	-44.10
OCT	6.83	0.20	6.63	0.00	50.00	-43.40
NOV	11.00	0.14	10.90	0.00	85.00	-74.10
DEC	31.90	0.14	31.80	0.00	85.00	-53.20
ANN	47,500.00	213.00	47,200.00	0.00	49,000.00	10,900.00

E FK ILLINOIS R > ILLINOIS R - AT MOUTH
ROGUE BASIN

Water Availability as of 11/20/2015

Watershed ID #: 70980 (Map) Exceedance Level: 80%
Date: 11/20/2015 Time: 12:37 PM

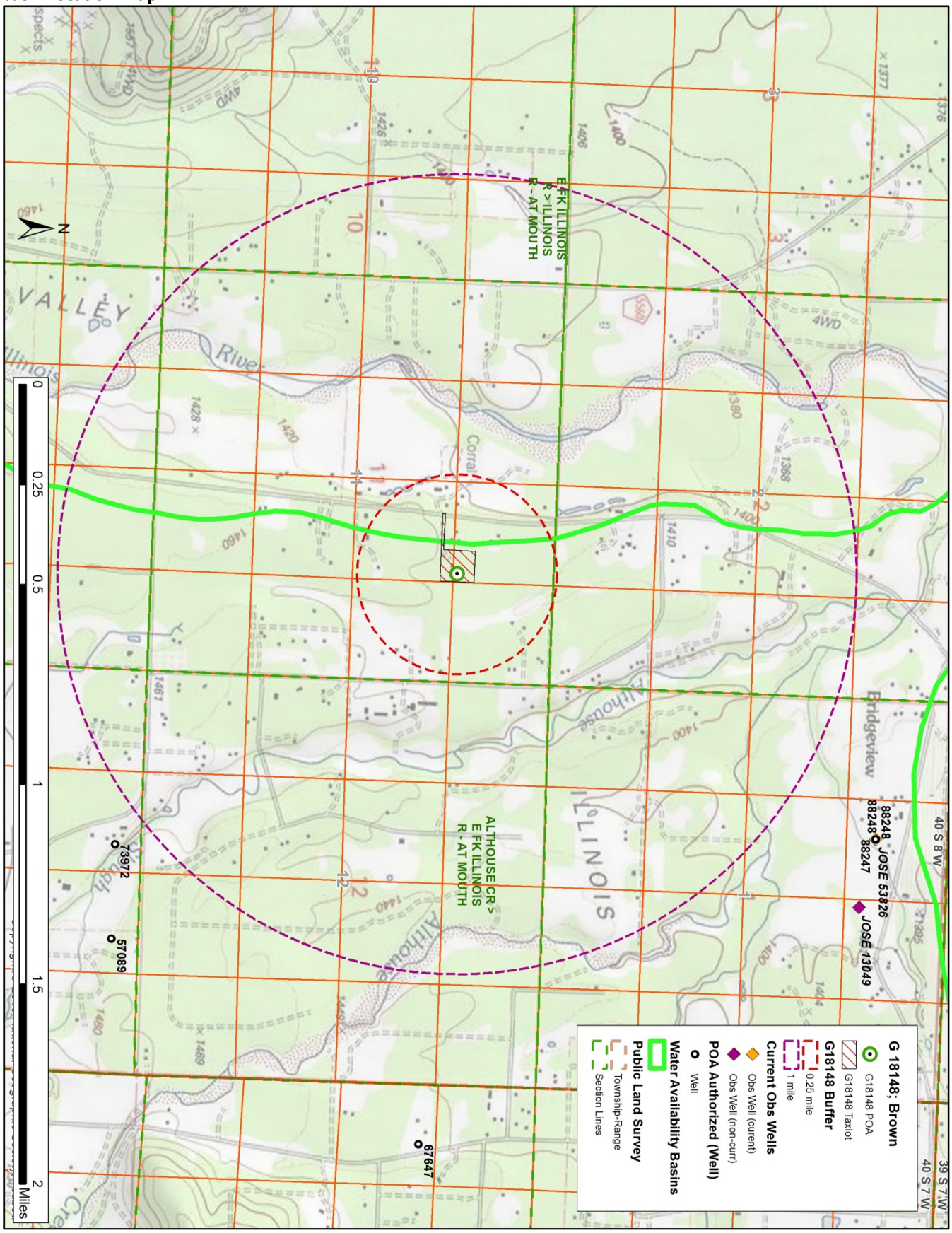
Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations
Water Rights | Watershed Characteristics

Water Availability Calculation

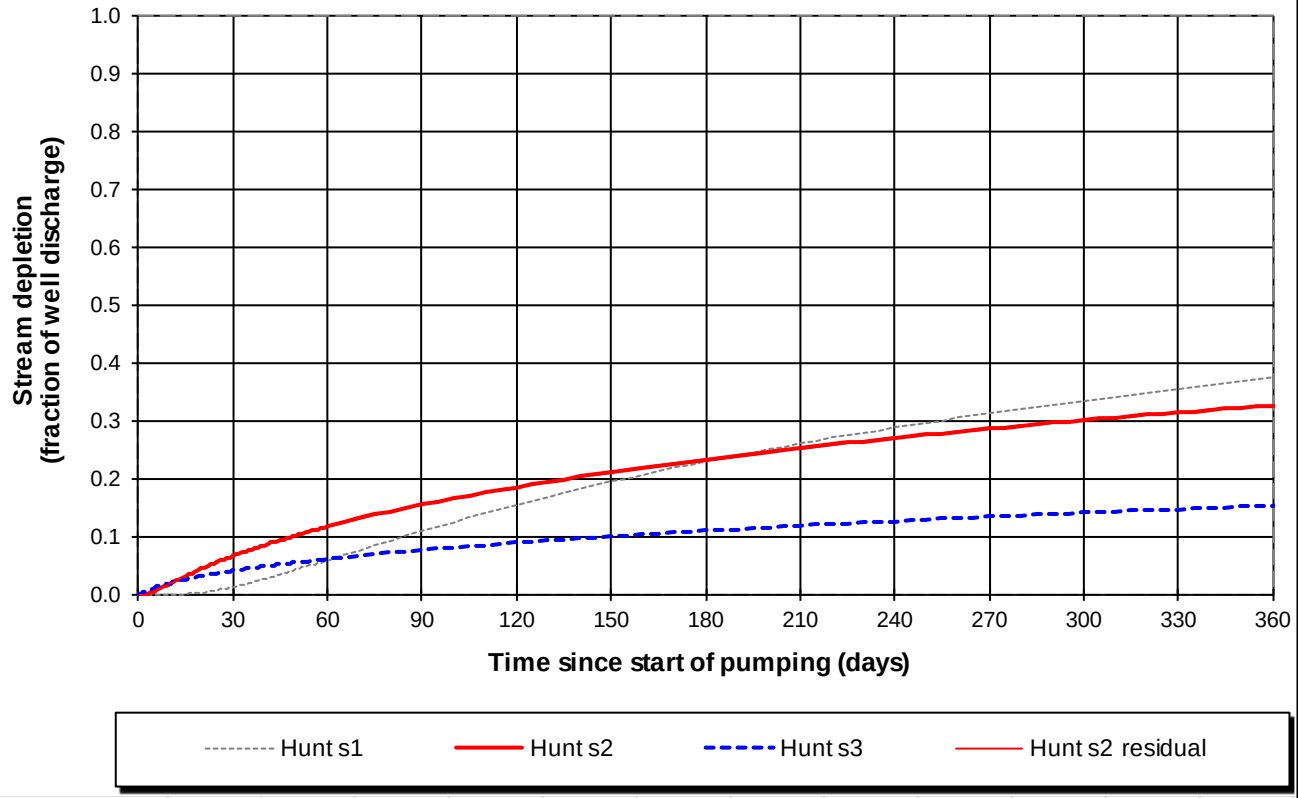
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	342.00	4.20	338.00	0.00	135.00	203.00
FEB	535.00	4.36	531.00	0.00	135.00	396.00
MAR	556.00	4.40	552.00	0.00	135.00	417.00
APR	498.00	8.94	489.00	0.00	135.00	354.00
MAY	317.00	11.70	305.00	0.00	135.00	170.00
JUN	139.00	14.80	124.00	0.00	80.00	44.20
JUL	66.30	18.60	47.70	0.00	60.00	-12.30
AUG	46.10	15.90	30.20	0.00	54.00	-23.80
SEP	41.50	11.60	29.90	0.00	70.00	-40.10
OCT	47.70	6.00	41.70	0.00	100.00	-58.30
NOV	102.00	3.51	98.50	0.00	135.00	-36.50
DEC	290.00	4.01	286.00	0.00	135.00	151.00
ANN	330,000.00	6,540.00	323,000.00	0.00	78,900.00	249,000.00

Well Location Map



Results of Stream Depletion Model



Output for Hunt Stream Depletion, Scenerio 2 (s2):						Time pump on = 365 days						
Days	**30**	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033
Jenk SD s2 %	**55.40**	67.56	73.26	76.73	79.13	80.91	82.30	83.43	84.36	85.16	85.84	86.44
Jen SD s2 cfs	0.018	0.022	0.024	0.025	0.026	0.027	0.027	0.028	0.028	0.028	0.028	0.029
Hunt SD s2 %	**6.65**	11.73	15.51	18.55	21.11	23.32	25.28	27.03	28.62	30.08	31.41	32.65
Hunt SD s2 cfs	0.002	0.004	0.005	0.006	0.007	0.008	0.008	0.009	0.009	0.010	0.010	0.011

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.033	**0.033**	0.033	cfs
Distance to stream	a	2050	**2050**	2050	ft
Aquifer hydraulic conductivity	K	10	**100**	1000	ft/day
Aquifer thickness	b	200	**200**	200	ft
Aquifer transmissivity	T	2000	**20000**	200000	ft*ft/day
Aquifer storage coefficient	S	0.1	**0.1**	0.1	
Stream width	ws	50	**50**	50	ft
Streambed hydraulic conductivity	Ks	0.1	**0.1**	0.1	ft/day
Streambed thickness	bs	2	**2**	2	ft
Streambed conductance	sbc	2.5	**2.5**	2.5	ft/day
Stream depletion factor (Jenkins)	sdf	210.13	**21.01**	2.10	days
Streambed factor (Hunt)	sbf	2.56	**0.26**	0.03	