

Groundwater Application Review Summary Form

Application # G- 18649

GW Reviewer Aaron Boucher Date Review Completed: 11/5/2018

Summary of GW Availability and Injury Review:

☐ Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

Summary of Potential for Substantial Interference Review:

☐ There is the potential for substantial interference per Section C of the attached review form.

Summary of Well Construction Assessment:

☐ The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).

MEMO

Nov. 5, 20 18

TO: Application G- 18649

FROM: GW: Aurora Boechner
(Reviewer's Name)

[illegible]

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 11/5/2018
 FROM: Groundwater Section Aurora C Bouchier
 SUBJECT: Application G- 18649 Reviewer's Name Supersedes review of na
 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: Kyle Spurlin County: Linn

A1. Applicant(s) seek(s) 2.228* cfs from 1 well(s) in the Willamette Basin,
Upper Willamette subbasin

A2. Proposed use Irrigation (75 acres) Seasonality: May – September

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	proposed	1	Alluvium	2.228*	12S/3W-9 SE-NE	780' N, 240' W fr E1/4 cor S 9**
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	275				300	18	+2-70		70-300			

Use data from application for proposed wells.

A4. **Comments:** *The application lists both 400 and 1000 gpm as the total maximum rate requested to irrigate 75 acres. This review evaluates against 1000 gpm.
 **The meets and bounds listed on the application map plot on a different portion of the property than shown in the imagery.

A5. ☒ **Provisions of the** Willamette 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: The proposed well (POA 1) is not within 1/4 mile of any perennial surface water features so pertinent basin rules (OAR 690-502-0240) do not apply.

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) 7N (annual measurement); Large Water-Use Reporting;
 - ii. ☐ The permit should be conditioned as indicated in item 2 below.
 - iii. ☐ The permit should contain special condition(s) as indicated in item 3 below;

- B2.
- a. ☐ **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;
 - b. ☐ **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;
 - c. ☐ **Condition** to allow groundwater production only from the _____ groundwater reservoir between approximately _____ ft. and _____ ft. below land surface;
 - d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

- B3. **Groundwater availability remarks:** _____
The proposed well is located in an area that contains fine-grained sediments (Willamette Silt) from land surface to a depth of 10-20 feet (Gannett et al., (1998) (referred to as the Lebanon Fan in Woodward et al., 1998). The alluvial fan deposits are composed of coarse- to fine-grained sediments up to >140 ft thick and are considered to be very productive aquifer system within the Willamette Valley. The aquifer is generally unconfined to semi-confined in the deeper zones and SWLs (both observed and reported on driller's logs) are typically within a 20 ft of land surface. The proposed well is located approximately equal distant from two long term water-level observations wells: LINN 7478 and LINN 10562. LINN 7478 (located approximately 3.8 miles to the northeast) and LINN (located approximately 3.8 miles to the southwest) both shows seasonal fluctuation of approximately 10 feet (see hydrograph below). Within 2 miles of the proposed well there are numerous new water rights, not all of which appear to have begun production.

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 of Lebanon Fan	☐	☒
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Almost all of the well logs in the area surrounding the location of the proposed well are greater than 30 feet deep. Many of the area well logs list a *Static Water Level* coincident with or a few feet above the zone at which water was first encountered, indicating unconfined to semi-confined conditions. Well logs listing deeper water bearing zones in also list *Static Water Levels* tens of feet above the water bearing zone, indicating greater confinement with depth. In general, in the Southern Willamette Valley the Willamette Silt does not act to confine the underlying aquifer (Conlon et al., 2005, page 13).

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	Calapooia River	250-260	~200	25,800	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: According to published groundwater elevation maps by Conlon et al. (2005) groundwater flows from this area northwest to the Calapooia and Willamette Rivers. Appropriation of water from the applicant's proposed well 1 would intersect water that would eventually flow into the Calapooia River. Smaller creeks in the immediate area are not perennial.

Water Availability Basin the well(s) are located within: Watershed ID: 76 [CALAPOOIA R > WILLAMETTE R – AB 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?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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: The applicant's proposed POAs are not within 1 mile of any perennial surface water.

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
1	1	0 %	0 %	0 %	0 %	0.02 %	0.75 %	2.71 %	5.38 %	8.28 %	11.17 %	13.23 %	13.91 %
Well Q as CFS		0	0	0	0	2.228	2.228	2.228	2.228	2.228	0	0	0
Interference CFS		0	0	0	0	0.000	0.017	0.060	0.120	0.185	0.249	0.295	0.310
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.		0	0	0	0	0.000	0.017	0.060	0.120	0.185	0.249	0.295	0.310
(B) = 80 % Nat. Q		592.0	650.0	575.0	423.0	234.0	111.0	49.00	26.00	22.70	29.60	133.0	499.0
(C) = 1 % Nat. Q		5.92	6.50	5.75	4.23	2.34	1.11	0.49	0.26	0.227	0.296	1.33	4.99
(D) = (A) > (C)													
(E) = (A / B) x 100		0 %	0 %	0 %	0 %	0 %	0.015 %	0.122 %	0.462 %	0.819 %	0.841 %	0.222 %	0.062 %

(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: Impacts to the Calapooia River were evaluated using the Hunt (1999) analytical model for stream depletion by pumping. Ultimately, the high transmissivity and thickness of the aquifer and large distance between the proposed well and the river greatly reduces the potential for significant impacts.

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:
- ☐ The permit should contain condition #(s) _____;
 - ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** Impacts of pumping from the applicant's proposed well will be spread out over a large area and should have minimal impact to perennial surface water reaches.

References Used:

Application file G-18649 and nearby G-16924, G-17755, G-18110, and G18621

Conlon, T. D., Wozniak, K. C., Woodcock, D., Herrera, N.B., Fischer, B.J. Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-Water Hydrology of the Willamette Basin, Oregon: U. S. Geological Survey Scientific Investigations Report 2005-5168.

Gannett, Marshall W., and Caldwell, Rodney R., 1998, Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington: U. S. Geological Survey Professional Paper 1424-A.

Herra, N. B., Burns, E. R., and Conlon, T. D, 2014, Simulation of groundwater flow and the interaction of groundwater and surface water in the Willamette Basin and Central Willamette subbasin, Oregon: U.S. Geological Survey Scientific Investigations Report 2014-5136, 152 p., <http://dx.doi.org/10.3133/sir20155136>.

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

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

Woodward, Dennis G., Gannett, Marshall W., and Vaccaro, John J., 1998 Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington: U. S. Geological Survey Professional Paper 1424-B.

Nearby well logs and water level data.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: _____ Logid: _____

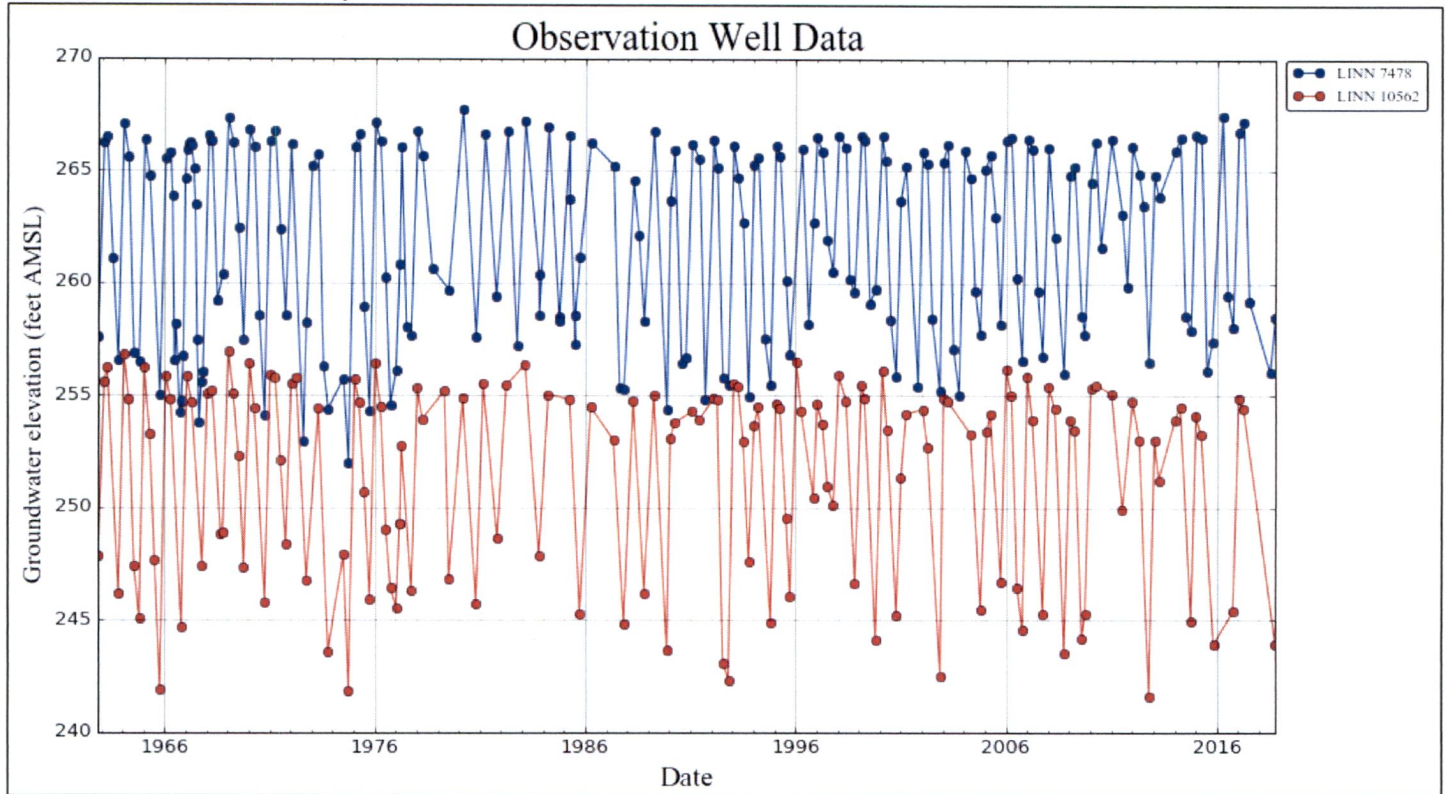
D2. **THE WELL does not appear to meet current well construction standards based upon:**

- a. ☐ review of the well log; _____;
- b. ☐ field inspection by _____;
- c. ☐ report of CWRE _____;
- d. ☐ other: (specify) _____

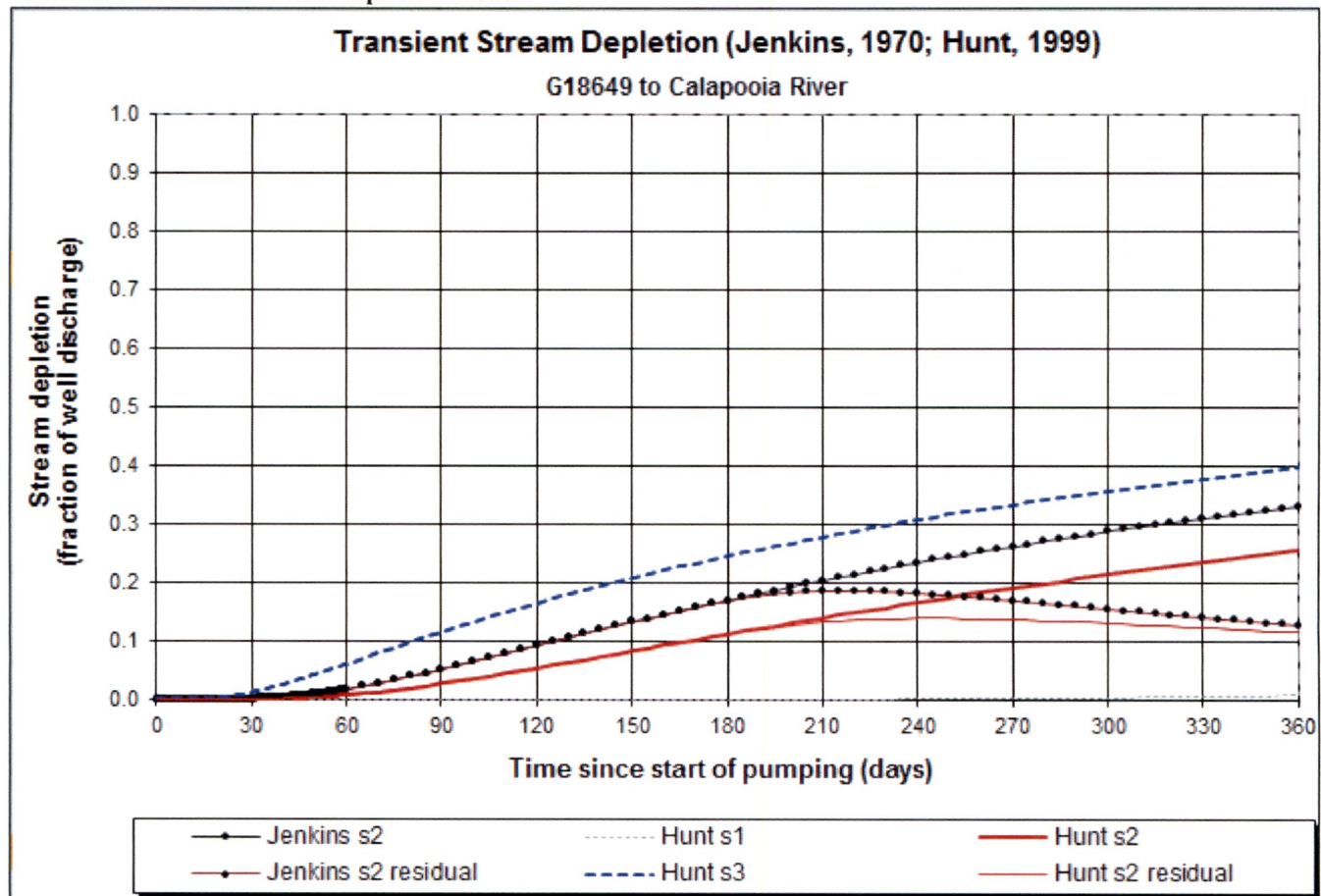
D3. **THE WELL construction deficiency or other comment is described as follows:** _____D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.****Water Availability Tables**

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 76		CALAPOOIA R > WILLAMETTE R - AB MOUTH			Exceedance Level: 80	
Time: 4:30 PM		Basin: WILLAMETTE			Date: 11/02/2018	
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	592.00	3.37	589.00	0.00	20.00	569.00
FEB	650.00	3.32	647.00	0.00	20.00	627.00
MAR	575.00	2.24	573.00	0.00	20.00	553.00
APR	423.00	1.95	421.00	0.00	20.00	401.00
MAY	234.00	18.30	216.00	0.00	20.00	196.00
JUN	111.00	12.80	98.20	0.00	20.00	78.20
JUL	49.00	19.60	29.40	0.00	20.00	9.42
AUG	26.00	14.10	11.90	0.00	20.00	-8.09
SEP	22.70	7.36	15.30	0.00	20.00	-4.66
OCT	29.60	1.92	27.70	0.00	20.00	7.68
NOV	133.00	2.39	131.00	0.00	20.00	111.00
DEC	499.00	3.33	496.00	0.00	20.00	476.00
ANN	404,000	5,500	398,000	0	14,500	384,000

Water-Level Trends in Nearby Wells



Results of Hunt-1999 Stream Depletion Model



Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 150 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	2.228	2.228	2.228	2.228	2.228	2.228	2.228	2.228	2.228	2.228	2.228	2.228
Jenk SD s2 %	0.08	1.74	5.21	9.25	13.24	16.88	18.61	18.21	16.96	15.49	14.08	12.79
Jen SD s2 cfs	0.002	0.039	0.116	0.206	0.295	0.376	0.415	0.406	0.378	0.345	0.314	0.285
Hunt SD s2 %	0.02	0.75	2.71	5.38	8.28	11.17	13.23	13.91	13.71	13.11	12.34	11.55
Hunt SD s2 cfs	0.000	0.017	0.060	0.120	0.185	0.249	0.295	0.310	0.306	0.292	0.275	0.257

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	2.228	2.228	2.228	cfs
Distance to stream	a	25800	25800	25800	ft
Aquifer hydraulic conductivity	K	10	70	200	ft/day
Aquifer thickness	b	140	140	140	ft
Aquifer transmissivity	T	1400	9800	28000	ft*ft/day
Aquifer storage coefficient	S	0.01	0.01	0.01	
Stream width	ws	100	100	100	ft
Streambed hydraulic conductivity	Ks	0.2	0.2	0.2	ft/day
Streambed thickness	bs	5	5	5	ft
Streambed conductance	sbc	4	4	4	ft/day
Stream depletion factor (Jenkins)	sdf	4754.571429	679.2244898	237.7285714	days
Streambed factor (Hunt)	sbf	73.71428571	10.53061224	3.685714286	