PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS

TO: Water Rights Section Date **August 27, 2009**

FROM: Ground Water/Hydrology Section **Karl C. Wozniak**
Reviewer's Name

SUBJECT: Application G- **17185** Supersedes review of **June 17, 2009**
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 ground water 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: **Kenneth A Rasmussen** County: **Marion**

A1. Applicant(s) seek(s) **0.668** cfs from **2** well(s) in the **North Santiam River** Basin, **Alder Creek** subbasin Quad Map: **Stout Mountain**

A2. Proposed use: **Nursery** 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	**1**	**1**	**Alluvium**	**0.668**	**9S/1E-16 SW/NW**	**150' N, 1800' W fr C1/4 cor, S 16**
2	**2**	**2**	**Alluvium**	**0.668**	**9S/1E-16 SW/SW**	**1420' S, 1340S' W fr C1/4 cor, S 16**
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	**567**				**60**	**0-18**	**0-60**		**50-60**			
2	**565**				**60**	**0-18**	**0-60**		**50-60**			

Use data from application for proposed wells.

A4. **Comments:** This re-review is in respose to a July 21, 2009 memo from Kerry Kavanagh in the Water Rights Section. The applicant has clarified that he is applying for a total of 300 gpm (0.668 cfs) from either or both wells for year-round nursery use on 50 acres of land. The proposed rate of 300 gpm is significantly less that the maximum we would allow for nursery use (1/40 cfs/acre for 50 acres is equal to 1.25 cfs or 561 gpm).

A5. ☒ **Provisions of the Willamette** Basin rules relative to the development, classification and/or management of ground water hydraulically connected to surface water ☒ **are**, *or* ☐ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: **Proposed well 1 will produce from unconfined alluvium, is within ¼-mile of Alder Creek and therefore is subject to OAR 690-502-0240.**

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: _____
Comments: _____

B. GROUND WATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data,** I have determined that ground water* 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 ground water 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 ground water 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 ground water resource; or

d. ☐ **will, if properly conditioned,** avoid injury to existing ground water rights or to the ground water 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 ground water production from no deeper than _____ ft. below land surface;

b. ☐ **Condition** to allow ground water production from no shallower than _____ ft. below land surface;

c. ☒ **Condition** to allow ground water production only from the **alluvial** ground water 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 Ground Water 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. **Ground water availability remarks:** The proposed wells are located within the Holocene floodplain of the North Santiam River. The area is underlain by 40-80 feet of alluvial sands and gravels that probably range from Pleistocene to Holocene in age. The upper sands and gravels are largely unconsolidated but cemented gravels and sands are noted at depth on some well logs. Nearby well logs indicate shallow water levels which are expected to fluctuate in phase with the stage of the North Santiam River. Well logs and geologic maps indicate that the alluvial sediments are underlain by by older, low-permeability Western Cascade rocks and volcaniclastic sediments. Water-level data is lacking in the area but water-level delines are unlikely because the aquifer is likely to have an efficient connection with the North Santiam River.

C. GROUND WATER/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**	☐	☒
2	**Alluvium**	☐	☒
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Geologic setting and sediment characteristics indicate that the valley-fill alluvium is generally unconfined.

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	**Alder Creek**			**750**	☐	☐	☒	☒	☐
1	2	**North Santiam River**			**3700**	☒	☐	☐	☐	☒
2	1	**Alder Creek**			**2300**	☒	☐	☐	☐	☒
2	2	**North Santiam River**			**2400**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Field observations indicate that the streambed of the North Santiam River is composed of unconsolidated sands and gravels equivalent to the materials that form the matrix of the alluvial aquifer adjacent to the river. This fact and shallow water levels reported on well logs in the area indicate a direct hydraulic connection between the aquifer and the river.

Water Availability Basin the well(s) are located within: N Santiam R > Santiam R – At Mouth (141)

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	☒	☐			☐	**627**	☐	**11**	☒
1	2	☐	☐	**MF141A**	**430**	☐	**627**	☐	**6**	☐
2	1	☐	☐			☐	**627**	☐	**3**	☐
2	2	☐	☐	**MF141A**	**430**	☐	**627**	☐	**21**	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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 Hunt (1999) model was used to estimate interference with Alder Creek. A 3-foot clogging layer was assumed with an hydraulic conductivity of 1 ft/ day. This was assumed to be appropriate for a small volume stream that that is likely to have a streambed lined by fine-grained sediments. The Jenkins model was used to estimate interference with the North Santiam River as the hydraulic connection between the stream and the aquifer is likely to be very efficient.

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													
		%	%	%	%	%	%	%	%	%	%	%	%
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: The cones of depression from the proposed wells are unlikely to extend beyond the local reaches of the North Santiam River as the hydraulic connection between the alluvial aquifer and the river is likely to be very efficient. Therefore, streams greater than 1 mile from the proposed wells are unlikely to be effected by pumping from the wells.

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 ground water 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:

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, 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, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A, 32p.

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

Jenkins, C.T., 1968, Techniques for computing rate and volume of stream depletion by wells: Ground Water, v. 6, no. 2, p. 37-46.

Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82p.

D. WELL CONSTRUCTION, OAR 690-200

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

D2. **THE WELL does not 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**:
- a. ☐ constitutes a health threat under Division 200 rules;
- b. ☐ commingles water from more than one ground water reservoir;
- c. ☐ permits the loss of artesian head;
- d. ☐ permits the de-watering of one or more ground water reservoirs;
- e. ☐ other: (specify) _____

D4. **THE WELL construction deficiency is described as follows:** _____

D5. **THE WELL**
- a. ☐ **was**, *or* ☐ **was not** constructed according to the standards in effect at the time of original construction or most recent modification.
- b. ☐ I don't know if it met standards at the time of construction.

D6. ☐ **Route to the Enforcement Section.** I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Enforcement Section and the Ground Water Section.

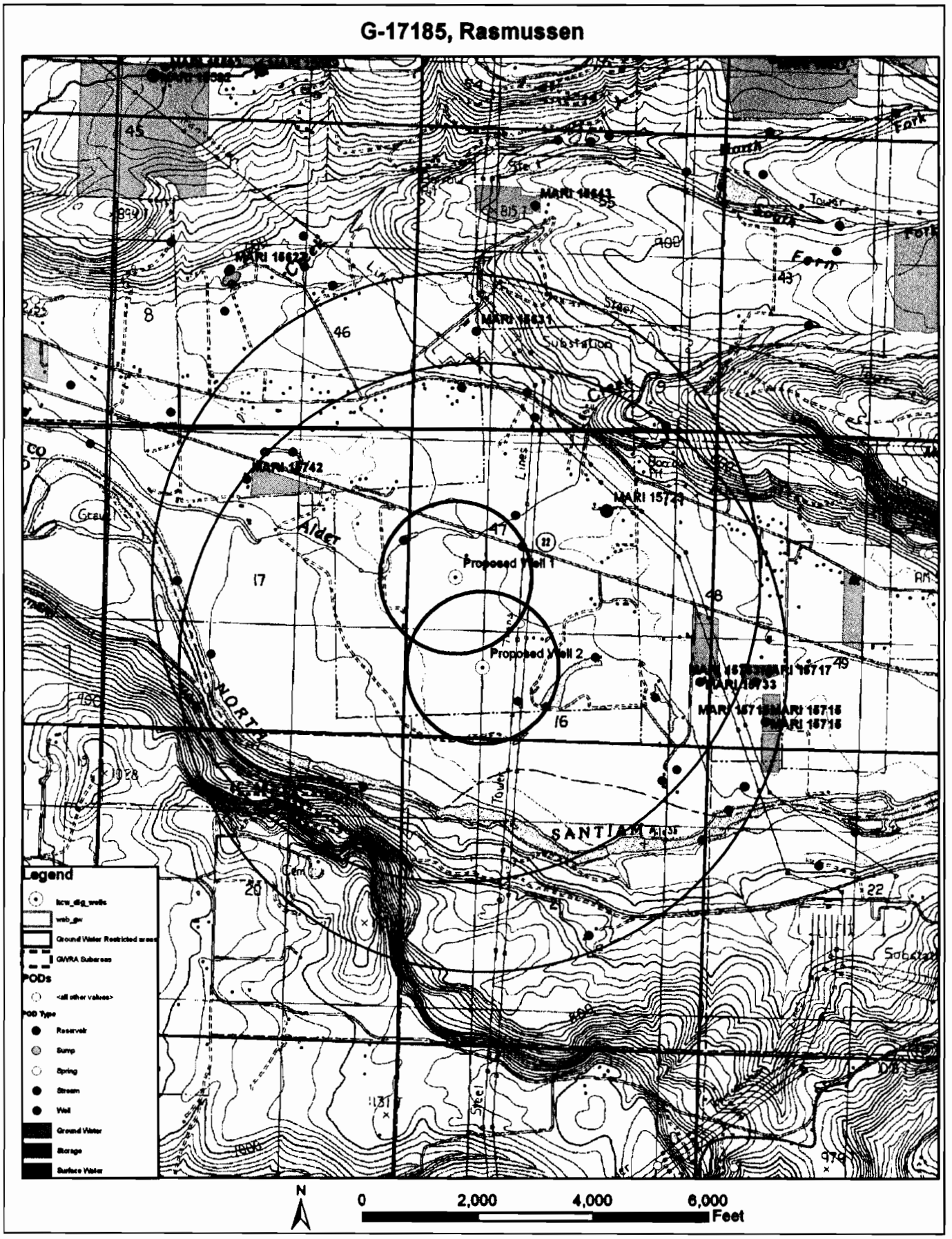
THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNEL

D7. ☐ Well construction deficiency has been corrected by the following actions: _____

_____ _____, 200____.
(Enforcement Section Signature)

D8. ☐ **Route to Water Rights Section (attach well reconstruction logs to this page).**

Well Location Map



Water Availability Tables

Detailed Report for Watershed ID #141

N SANTIAM R > SANTIAM R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 6/17/2009

Watershed ID #: 141 Exceedance Level: 80%

Date: 6/17/2009 Time: 1:57 PM

Water Availability Calculation

Monthly Streamflows in Cubic Feet per Second
Storage at 50% Exceedance in Acre-Feet

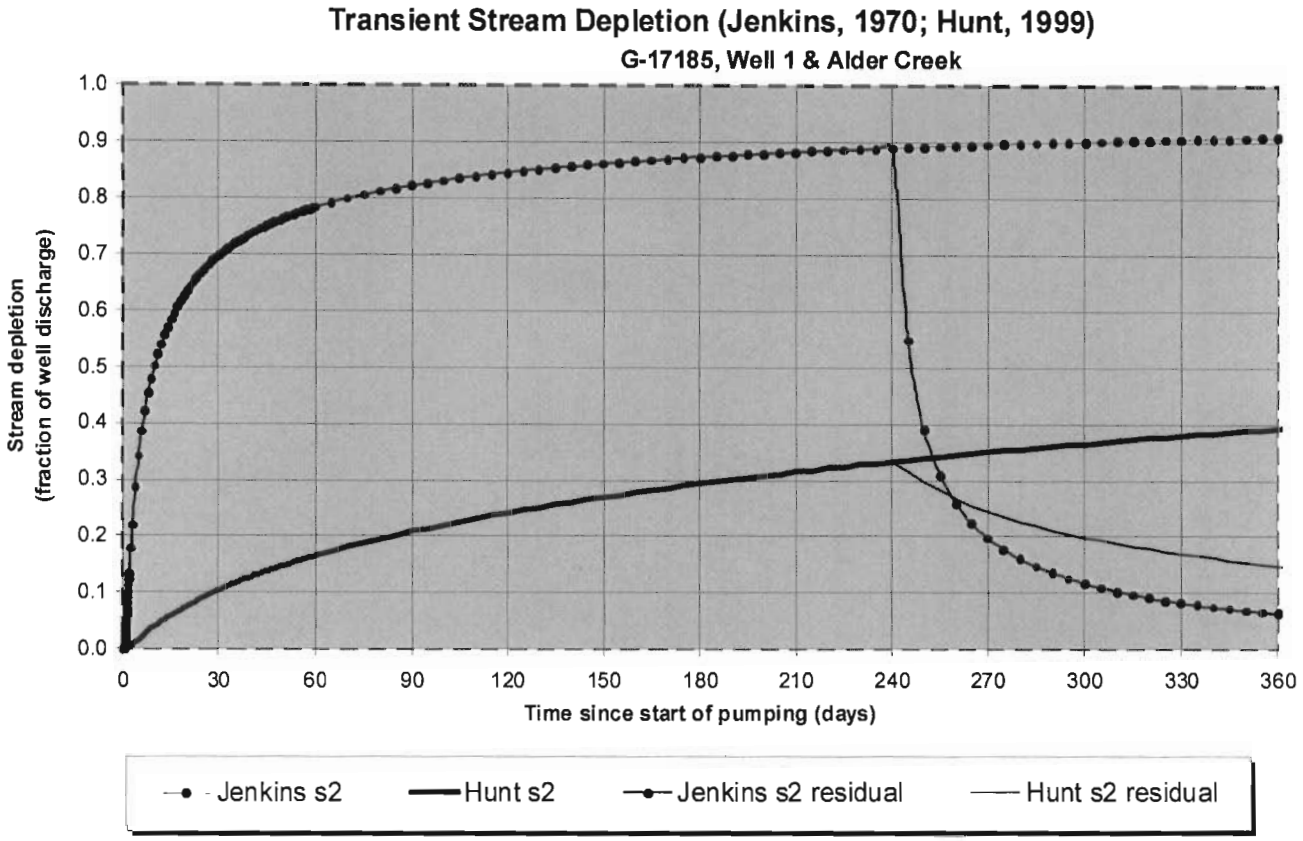
Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	2,330.00	482.00	1,850.00	0.00	430.00	1,420.00
FEB	2,670.00	1,490.00	1,180.00	0.00	430.00	752.00
MAR	2,540.00	1,320.00	1,220.00	0.00	430.00	792.00
APR	2,500.00	1,480.00	1,020.00	0.00	430.00	592.00
MAY	2,590.00	804.00	1,790.00	0.00	430.00	1,360.00
JUN	1,500.00	436.00	1,060.00	0.00	430.00	634.00
JUL	858.00	333.00	525.00	0.00	430.00	94.80
AUG	661.00	320.00	341.00	0.00	430.00	-88.50
SEP	627.00	297.00	330.00	0.00	430.00	-100.00
OCT	694.00	267.00	427.00	0.00	430.00	-2.79
NOV	1,380.00	268.00	1,110.00	0.00	430.00	682.00
DEC	2,540.00	269.00	2,270.00	0.00	430.00	1,840.00
STO	1,960,000.00	464,000.00	1,500,000.00	0.00	312,000.00	1,190,000.00

Detailed Report of Instream Flow Requirements

Instream Flow Requirements in Cubic Feet per Second

Application #	Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MF141A	APPLICATION	430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00
Maximum		430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00	430.00

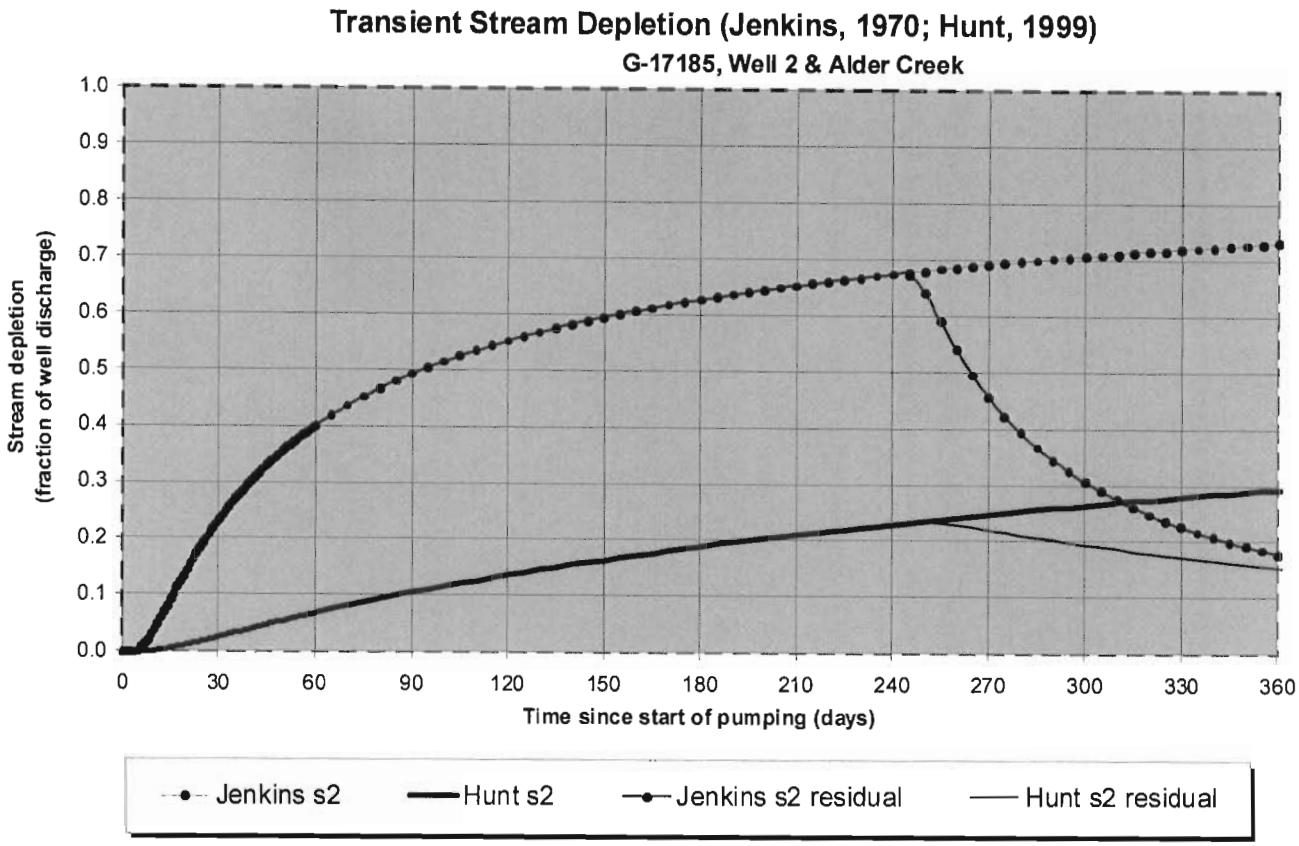
Stream Depletion Estimates



Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 240 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668
Jenk SD %	0.699	0.784	0.823	0.846	0.862	0.874	0.884	0.891	0.199	0.118	0.084	0.065
Jen SD cfs	0.467	0.524	0.550	0.565	0.576	0.584	0.590	0.595	0.133	0.079	0.056	0.043
Hunt SD %	0.106	0.167	0.210	0.243	0.271	0.295	0.316	0.334	0.245	0.200	0.171	0.150
Hunt SD cfs	0.071	0.111	0.140	0.162	0.181	0.197	0.211	0.223	0.164	0.133	0.114	0.100

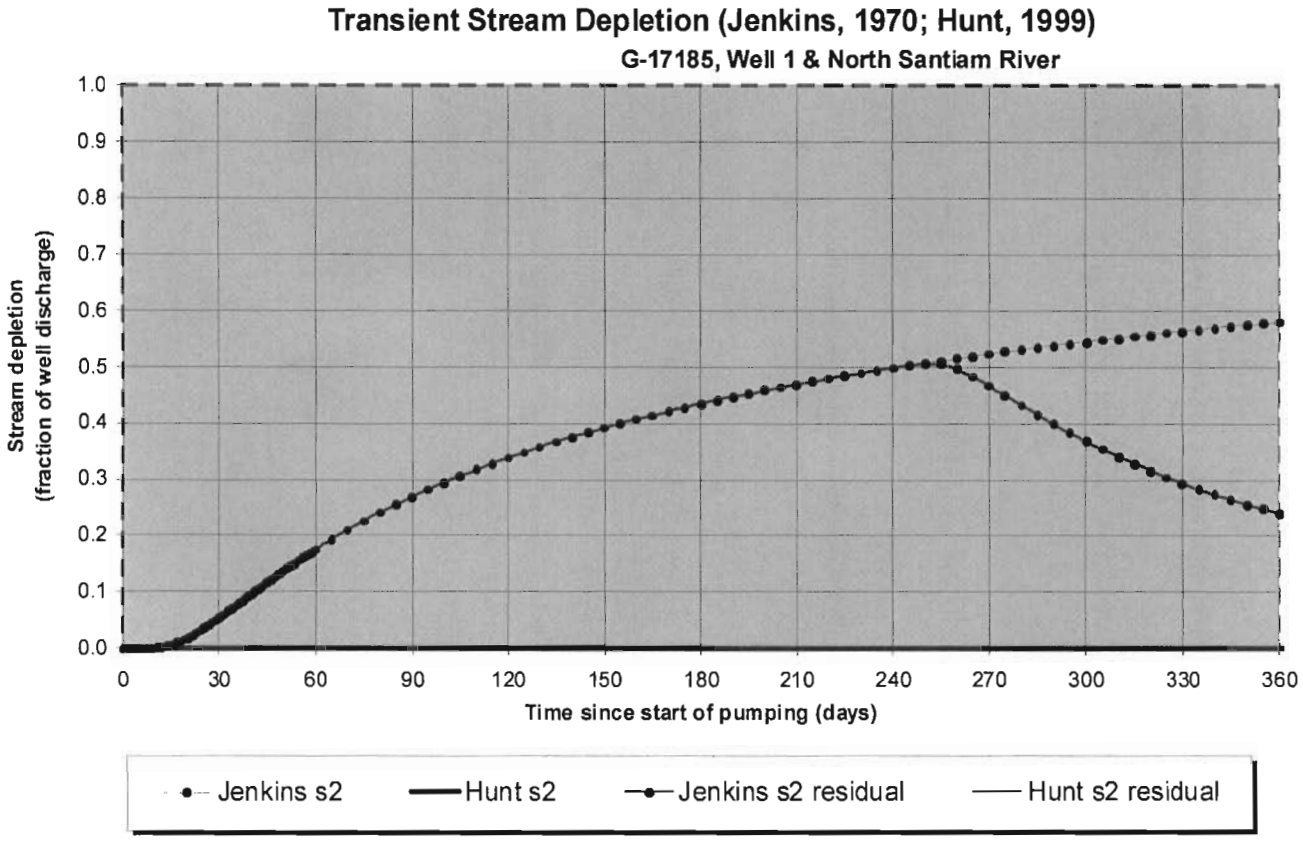
Parameters:		**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**
Net steady pumping rate	Qw	0.668	0.668	0.668	cfs
Distance to stream	a	750	750	750	ft
Aquifer hydraulic conductivity	K	100	250	500	ft/day
Aquifer thickness	b	50	50	50	ft
Aquifer transmissivity	T	5000	12500	25000	ft*ft/day
Aquifer storage coefficient	S	0.2	0.2	0.2	
Stream width	ws	10	10	10	ft
Streambed hydraulic conductivity	Ks	1	1	1	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	3.333333333	3.333333333	3.333333333	ft/day
Stream depletion factor (Jenkins)	sdf	22.5	9	4.5	days
Streambed factor (Hunt)	sbf	0.5	0.2	0.1	



Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 240 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668
Jenk SD %	0.235	0.401	0.493	0.553	0.595	0.628	0.653	0.675	0.457	0.306	0.227	0.179
Jen SD cfs	0.157	0.268	0.329	0.369	0.398	0.419	0.437	0.451	0.305	0.205	0.152	0.120
Hunt SD %	0.027	0.070	0.107	0.138	0.166	0.190	0.211	0.231	0.222	0.195	0.173	0.156
Hunt SD cfs	0.018	0.046	0.071	0.092	0.111	0.127	0.141	0.154	0.148	0.131	0.116	0.104

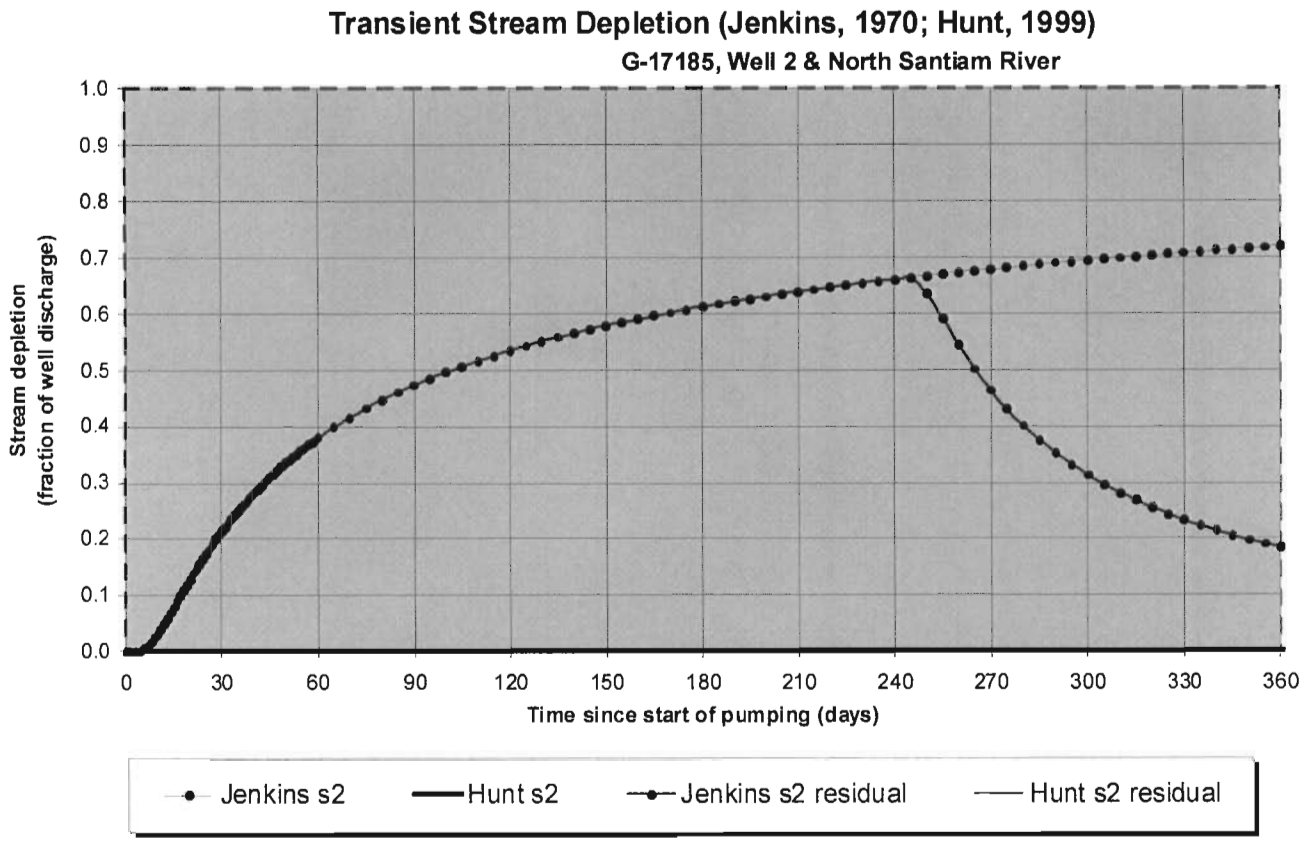
Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.668	0.668	0.668	cfs
Distance to stream	a	2300	2300	2300	ft
Aquifer hydraulic conductivity	K	100	250	500	ft/day
Aquifer thickness	b	50	50	50	ft
Aquifer transmissivity	T	5000	12500	25000	ft*ft/day
Aquifer storage coefficient	S	0.2	0.2	0.2	
Stream width	ws	10	10	10	ft
Streambed hydraulic conductivity	Ks	1	1	1	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	3.333333333	3.333333333	3.333333333	ft/day
Stream depletion factor (Jenkins)	sdf	211.6	84.64	42.32	days
Streambed factor (Hunt)	sbf	1.533333333	0.613333333	0.306666667	



Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 240 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668
Jenk SD %	0.056	0.177	0.270	0.339	0.393	0.435	0.470	0.499	0.468	0.369	0.295	0.242
Jen SD cfs	0.037	0.118	0.180	0.227	0.262	0.291	0.314	0.334	0.313	0.247	0.197	0.162
Hunt SD %	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Hunt SD cfs	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.668	0.668	0.668	cfs
Distance to stream	a	3700	3700	3700	ft
Aquifer hydraulic conductivity	K	100	250	500	ft/day
Aquifer thickness	b	50	50	50	ft
Aquifer transmissivity	T	5000	12500	25000	ft*ft/day
Aquifer storage coefficient	S	0.2	0.2	0.2	
Stream width	ws	300	300	300	ft
Streambed hydraulic conductivity	Ks	10	10	10	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	1000	1000	1000	ft/day
Stream depletion factor (Jenkins)	sdf	547.6	219.04	109.52	days
Streambed factor (Hunt)	sbf	740	296	148	



Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 240 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668
Jenk SD %	0.215	0.381	0.474	0.535	0.579	0.613	0.639	0.661	0.464	0.314	0.234	0.185
Jen SD cfs	0.144	0.254	0.317	0.358	0.387	0.409	0.427	0.442	0.310	0.210	0.157	0.124
Hunt SD %	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Hunt SD cfs	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!

Parameters:		**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**
Net steady pumping rate	Qw	0.668	0.668	0.668	cfs
Distance to stream	a	2400	2400	2400	ft
Aquifer hydraulic conductivity	K	100	250	500	ft/day
Aquifer thickness	b	50	50	50	ft
Aquifer transmissivity	T	5000	12500	25000	ft*ft/day
Aquifer storage coefficient	S	0.2	0.2	0.2	
Stream width	ws	300	300	300	ft
Streambed hydraulic conductivity	Ks	10	10	10	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	1000	1000	1000	ft/day
Stream depletion factor (Jenkins)	sdf	230.4	92.16	46.08	days
Streambed factor (Hunt)	sbf	480	192	96	