PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date **December 2, 2015**

FROM: Groundwater Section **Aurora C Bouchier**
Reviewer's Name

SUBJECT: Application G- **18139** 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: **James M. Warn** County: **Clackamas**

A1. Applicant(s) seek(s) **0.67** cfs from **1** well(s) in the **Willamette** Basin, **Molalla-Pudding** subbasin

A2. Proposed use **domestic & irrigation 6.219 acre** Seasonality: **Apr-Oct for irrigation, year round for dom.**

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	CLAC 18025	1	Alluvium	0.67 (300 gpm)	T4S/R1E-15 NW-SW	1413'N, 27'W fr SW cor S 15
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	170	37	44	7/16/1992	300	0-20	+1-230	225-285	125-185	~300		air

Use data from application for proposed wells.

A4. **Comments:** Well has been used since July 16, 1992 for irrigation of crops sold at market. Applicant has owned the property since October 2006 and the use of water for domestic and irrigation has been continuous since that time.

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: Well 1 (CLAC 18025) is located within ¼-mile from a surface water body, however it produces from a confined aquifer, so the pertinent 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) **7C**;
   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 area around the applicant's well (CLAC 18025) is underlain by approximately 40-50 feet of Willamette Silt which is underlain by a series of sand and gravel beds interbedded with silts and clays. The water table occurs near land surface in the Willamette Silt, which acts as a regional confining unit (Gannet and Caldwell, 1998, and Woodward et al., 1998). The Willamette Silt forms a broad terrace. Local streams cut progressively through the terrace until they flow into the Willamette River at an elevation of approximately 55 feet above mean sea level.

Observations from nearby wells (CLAC 12292, CLAC 18443, CLAC 54999, CLAC 55589 and CLAC 56080) indicate relatively stable long-term trends for alluvial wells in the immediate vicinity of CLAC 18025 (see attached hydrograph).

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: Sand and gravel layers are overlain by 30-60 feet of clay and silt in this area. The static water level reported on the well log for CLAC 18025 is above the water-bearing zone, indicating a confined system.

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**	**Dove Creek**	**~160**	**130-190**	**120**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: General knowledge indicates that groundwater in the alluvial aquifer flows towards, and discharges into, perennial streams.

Water Availability Basin the well(s) are located within: 69796: Molalla R > Willamette R- at 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?
1	**1**	☒	☐	**IS69796**	**100.00**	☐	**134.00**	☐	**<25%**	☒
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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: Interference at 30 days was estimated using the Hunt 2003 model. The presence of low permeability Willamette Silt between the aquifer and the streambed results in an inefficient connection between the aquifer and the stream, therefore the interference at 30 days is much less than 25%. However, stream depletion will increase over time until all of the pumped water is reduced stream flow.

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:

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:

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.

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

Woodward, Dennis BG., 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, especially well logs for: CLAC 18025, and water levels for: CLAC 12292, CLAC 18443, CLAC 54999, CLAC 55589 and CLAC 56080.

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

MOLALLA R > WILLAMETTE R - AT MOUTH

Watershed ID #: 69796 Basin: WILLAMETTE Exceedance Level: 80
Time: 4:05 PM Date: 11/30/2015

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	1,870.00	155.00	1,720.00	0.00	500.00	1,220.00
FEB	2,010.00	145.00	1,870.00	0.00	500.00	1,370.00
MAR	1,830.00	116.00	1,710.00	0.00	500.00	1,210.00
APR	1,530.00	89.30	1,440.00	0.00	500.00	941.00
MAY	927.00	99.10	828.00	0.00	500.00	328.00
JUN	431.00	119.00	312.00	0.00	500.00	-188.00
JUL	204.00	183.00	21.10	0.00	200.00	-179.00
AUG	139.00	154.00	-15.20	0.00	100.00	-115.00
SEP	134.00	83.30	50.70	0.00	150.00	-99.30
OCT	188.00	41.70	146.00	0.00	450.00	-304.00
NOV	637.00	79.80	557.00	0.00	500.00	57.20
DEC	1,700.00	150.00	1,550.00	0.00	500.00	1,050.00
ANN	1,320,000	85,400	1,240,000	0	295,000	966,000

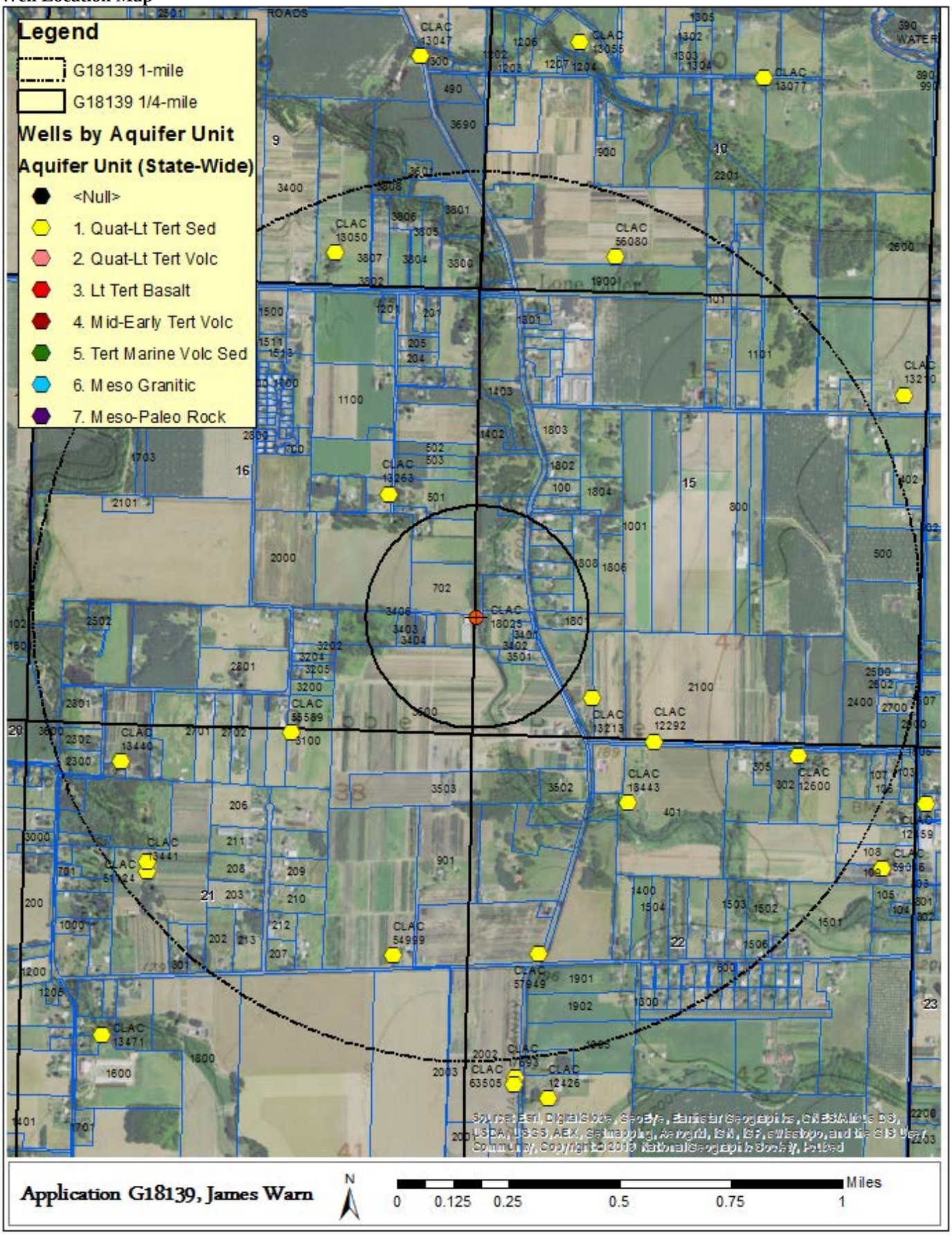
DETAILED REPORT OF INSTREAM REQUIREMENTS

MOLALLA R > WILLAMETTE R - AT MOUTH

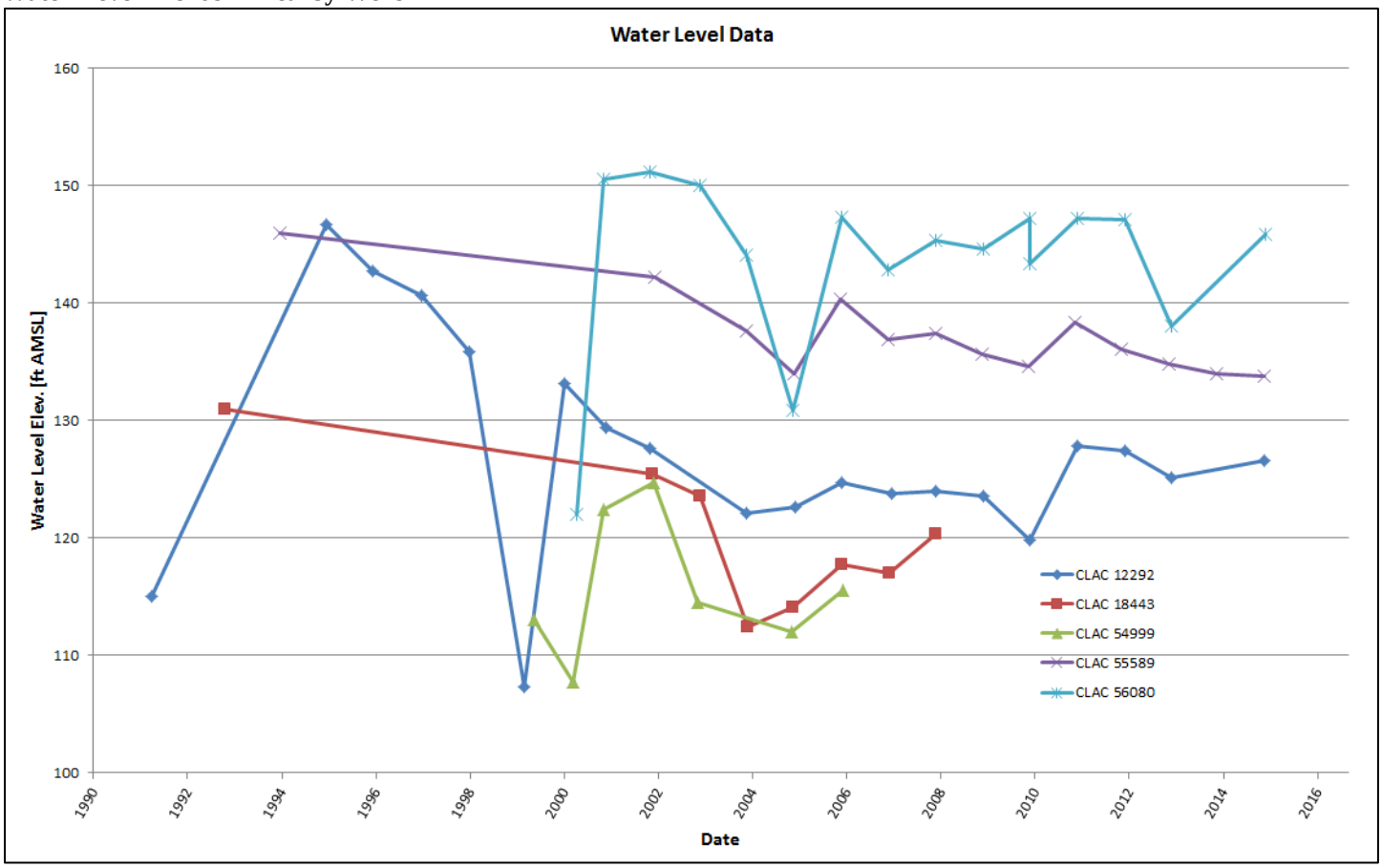
Watershed ID #: 69796 Basin: WILLAMETTE
Time: 4:05 PM Date: 11/30/2015

Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
		Monthly values are in cfs.											
IS69796A	CERTIFICATE	500.0	500.0	500.0	500.0	500.0	500.0	200.0	100.0	150.0	450.0	500.00	500.0
MAXIMUM		500.0	500.0	500.0	500.0	500.0	500.0	200.0	100.0	150.0	450.0	500.0	500.0

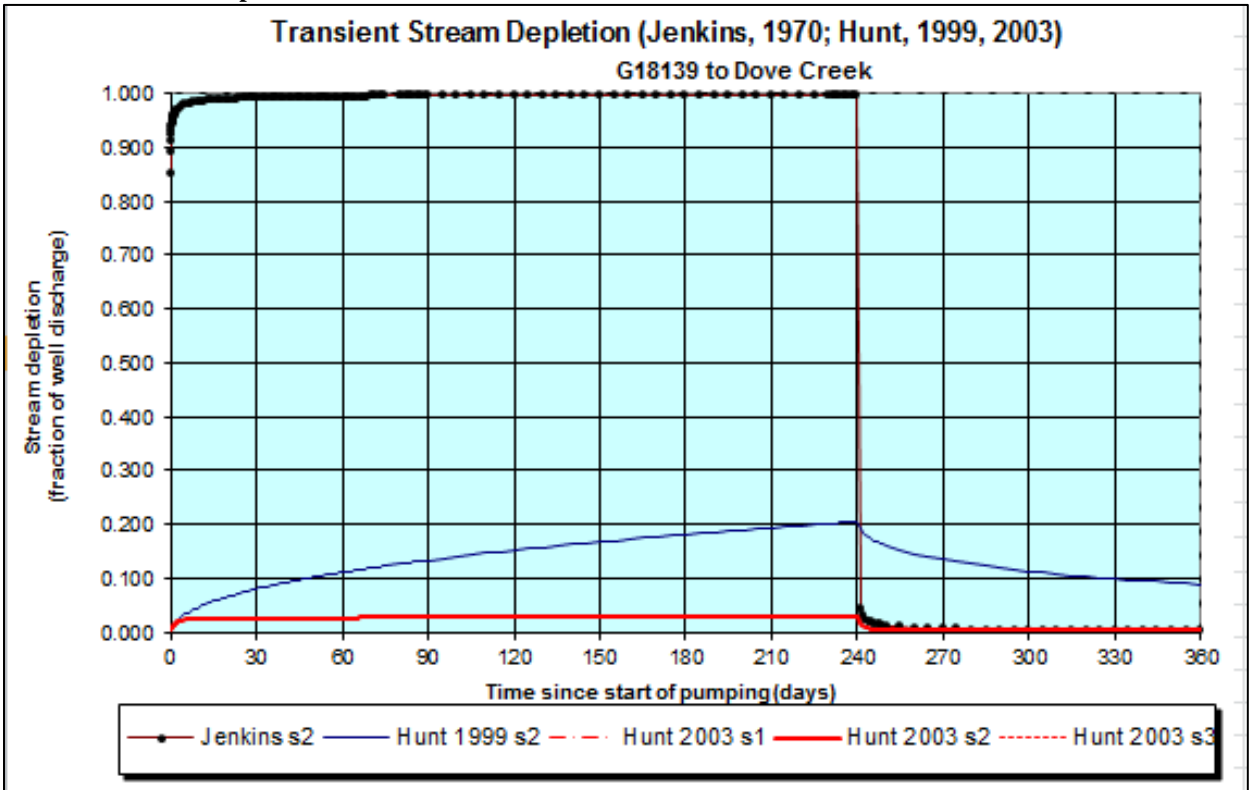
Well Location Map



Water-Level Trends in Nearby Wells



Transient Stream Depletion



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 240 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	99.1%	99.4%	99.5%	99.6%	99.6%	99.6%	99.7%	99.7%	0.6%	0.3%	0.2%	0.2%
H SD 1999	8.1%	11.1%	13.4%	15.2%	16.8%	18.2%	19.4%	20.5%	13.5%	11.3%	10.0%	9.0%
H SD 2003	2.68%	2.73%	2.77%	2.82%	2.87%	2.92%	2.97%	3.01%	0.38%	0.38%	0.37%	0.37%
Qw, cfs	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670
H SD 99, cfs	0.054	0.075	0.090	0.102	0.113	0.122	0.130	0.137	0.090	0.076	0.067	0.060
H SD 03, cfs	0.018	0.018	0.019	0.019	0.019	0.020	0.020	0.020	0.003	0.003	0.003	0.002

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.67	0.67	0.67	cfs
Time pump on (pumping duration)	tpon	240	240	240	days
Perpendicular from well to stream	a	120	120	120	ft
Well depth	d	285	285	285	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer saturated thickness	b	40	40	40	ft
Aquifer transmissivity	T	2000	2000	2000	ft*ft/day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	0.01	0.01	0.01	ft/day
Aquitard saturated thickness	ba	40	40	40	ft
Aquitard thickness below stream	babs	5	5	5	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft
Streambed conductance (lambda)	sbc	0.040000	0.040000	0.040000	ft/day
Stream depletion factor	sdf	0.007200	0.007200	0.007200	days
Streambed factor	sbf	0.002400	0.002400	0.002400	
input #1 for Hunt's Q_4 function	t'	138.888889	138.888889	138.888889	
input #2 for Hunt's Q_4 function	K'	0.001800	0.001800	0.001800	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	0.002400	0.002400	0.002400	