

# Groundwater Application Review Summary Form

Application # G- 18500

GW Reviewer DENNIS ORLOWSKI

Date Review Completed: 8/15/2017

## 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).*

**PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS**

TO: Water Rights Section Date 8/15/2017  
 FROM: Groundwater Section Dennis Orłowski  
Reviewer's Name  
 SUBJECT: Application G- 18500 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: Canby 170, LLC County: Clackamas

A1. Applicant(s) seek(s) 0.6734 cfs from one well(s) in the Willamette Basin,  
Molalla River subbasin

A2. Proposed use Nursery (6.219 ac), Domestic 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	CLAC 18025	1	Alluvium	0.6734	T4S/R1E-15 NW-SW	1413' N, 27' E fr SW cor S15

\* 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		44	7/16/1992	285	0-20	+1-285	225-285	125-185	300+		Air

Use data from application for proposed wells.

A4. **Comments:** The proposed POA, existing well CLAC 18025, is located in the Gribble Prairie/Marks Prairie region approximately 2.5 miles due south of Canby, Oregon.

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 POA, CLAC 18025, obtains groundwater from a confined aquifer, so the pertinent basin rules (OAR 690-502-0240) to not apply.

A6.  **Well(s) #** \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, tap(s) an aquifer limited by an administrative restriction.  
 Name of administrative area: \_\_\_\_\_  
 Comments: Not applicable.

**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) Medium water-use reporting, 7c (7-yrs measurements);
  - 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 POA, CLAC 18025, obtains groundwater from relatively thin sand and gravel beds beginning at about 40 ft deep (Willamette Aquifer), overlain by low-permeability silts and clays (Willamette Silt). The water-bearing sand and gravel beds are encased in a thicker sequence of silt and clay, with the former having a total cumulative thickness in the area of about 30-40 feet. The confined aquifer conditions indicate that pumping stresses will propagate outward in a broad but shallow cone of depression.

Within about one mile of the proposed POA are approximately 40 groundwater rights (mostly irrigation and nursery) with wells completed in the alluvial aquifer system. Reported yields for these wells range up to several hundred gpm, with most in the 150-300 gpm range. There are also exempt (domestic) wells in the area that also likely tap the alluvial aquifer.

Groundwater elevations in the area range from about 140-180 ft msl (Gannett and Caldwell, 1998; Conlon and others, 2005). For about a ten year period ending in 2005-2006, several area wells exhibited declining trends on the order of ~20 feet (see attached hydrograph). However, since that time groundwater levels have been fairly stable. Not exhibited by the available data are seasonal pumping ranges, but experience in similar settings suggests the range can be fairly high, from ~20-40 ft, so seasonal pumping interference is a concern.

These factors indicate that water for the proposed use is likely available within the capacity of the resource, but if a permit is granted the recommended permit conditions should be included to monitor and protect the resource and other groundwater rights in the area.

**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 (Willamette Aquifer)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Basis for aquifer confinement evaluation:** Proposed POA CLAC 18025 obtains groundwater from water-bearing sand and gravel deposits of the Willamette Aquifer, which has a cumulative thickness of about 30-40 ft in this area. The water-bearing deposits are overlain by 40-60 feet of low-permeability silts and clays of the Willamette Silt (Woodward and others, 1998). In the central Willamette Valley, Conlon and others (2005) report that fine-grained deposits (silt and clay) of 'more than 40 ft' thickness typically create confined conditions in the underlying water-bearing sand/gravel deposits. Furthermore, static groundwater levels in nearby wells are above the top of water-bearing units within the aquifer. These factors suggest that the proposed POA obtains groundwater from a 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?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Dove Creek	140-160	130-190	130	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Gribble Creek	140-160	130-160	4600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	3	Molalla River	140-160	130-140	8000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Basis for aquifer hydraulic connection evaluation:** Only a single groundwater level measurement from the original driller's log is available for Well 1/CLAC 18025. The USGS shows an estimated groundwater elevation in the alluvial aquifer near Well 1 of approximately 160 ft msl (Woodward and others, 1998; Conlon and others, 2005). However, additional data available since the development of the USGS maps suggests nearby groundwater elevations of ~140-150 ft msl.

Elevations for SW 1 and SW 2 were estimated for respective stream reaches within approximately one mile of Well 1. For SW 3 (> 1 mile), the estimated elevation range corresponds to a stream reach nearest Well 1.

The estimated range of groundwater elevations at Well 1 is generally coincident with estimated surface water elevations for all three streams. Furthermore, water table maps for the area indicate that groundwater in the alluvial aquifer system either flows towards (gaining reaches) or away from (losing reaches) local streams. From these facts it is concluded that the alluvial aquifer system and local streams are hydraulically connected.

The depletion of local streams by proposed Well 1 will be attenuated, but not eliminated, by the low vertical hydraulic conductivity (permeability) of the Willamette Silt and other clays and silts that lie between the deeper sands and gravels and the stream beds. Net impacts will be small at the onset of pumping, but will increase with time until a new equilibrium between local recharge and discharge is reached. At that time depletion is expected to be relatively constant throughout the year.

**Water Availability Basin the well(s) are located within:**

SW1 and SW2: Molalla River > Willamette River – at mouth (WID 69796)

SW3: Molalla River > Willamette River – above Gribble Creek (WID 135)

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 checked="" type="checkbox"/>	<input type="checkbox"/>	IS69796A	100.00	<input type="checkbox"/>	134.00	<input type="checkbox"/>	<25%	<input checked="" type="checkbox"/>
1	2	<input type="checkbox"/>	<input type="checkbox"/>	IS69796A	100.00	<input type="checkbox"/>	134.00	<input type="checkbox"/>	<25%	<input type="checkbox"/>

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:** C3a: PSI was assumed for SW1 (Dove Creek/WID 69796) because the proposed POA, CLAC 18025, is less than 1/4 mile from SW1.

The Hunt 2003 analytical stream depletion model was used to estimate pumping interference at 30 days at SW1. Model results indicate that interference is expected to be less than 25% of the maximum allocated pumping rate at 30 days. The model was not applied to SW2 because it is within the same WAB and is several thousand feet farther away, and thus the estimated stream depletion would be significantly less than that estimated for SW1.

C3b: not applicable.

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: Not applicable.

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: \_\_\_\_\_

**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.**

**References Used:** Application file: G-18500

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.

Conlon, T.D., Lee, K.K., and Risley, J.R., 2003, Heat tracing in streams in the central Willamette Basin, Oregon, in Stonestrom, D.A. and Constantz, Jim, eds., Heat as a tool for studying the movement of groundwater near streams: U.S. Geological Survey Circular 1260, chapter 5, p. 29-34.

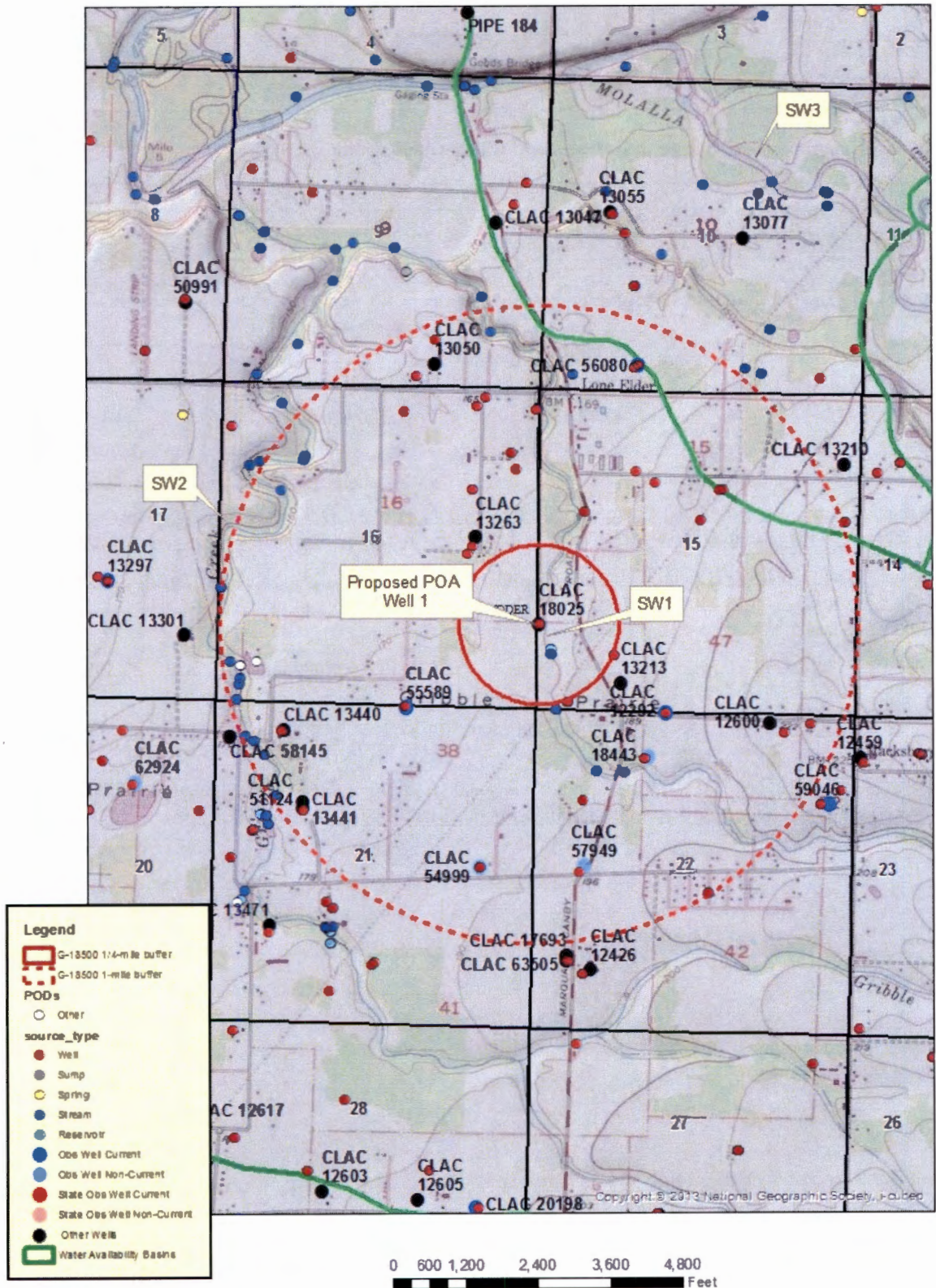
Gannett, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A, 32 p.

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

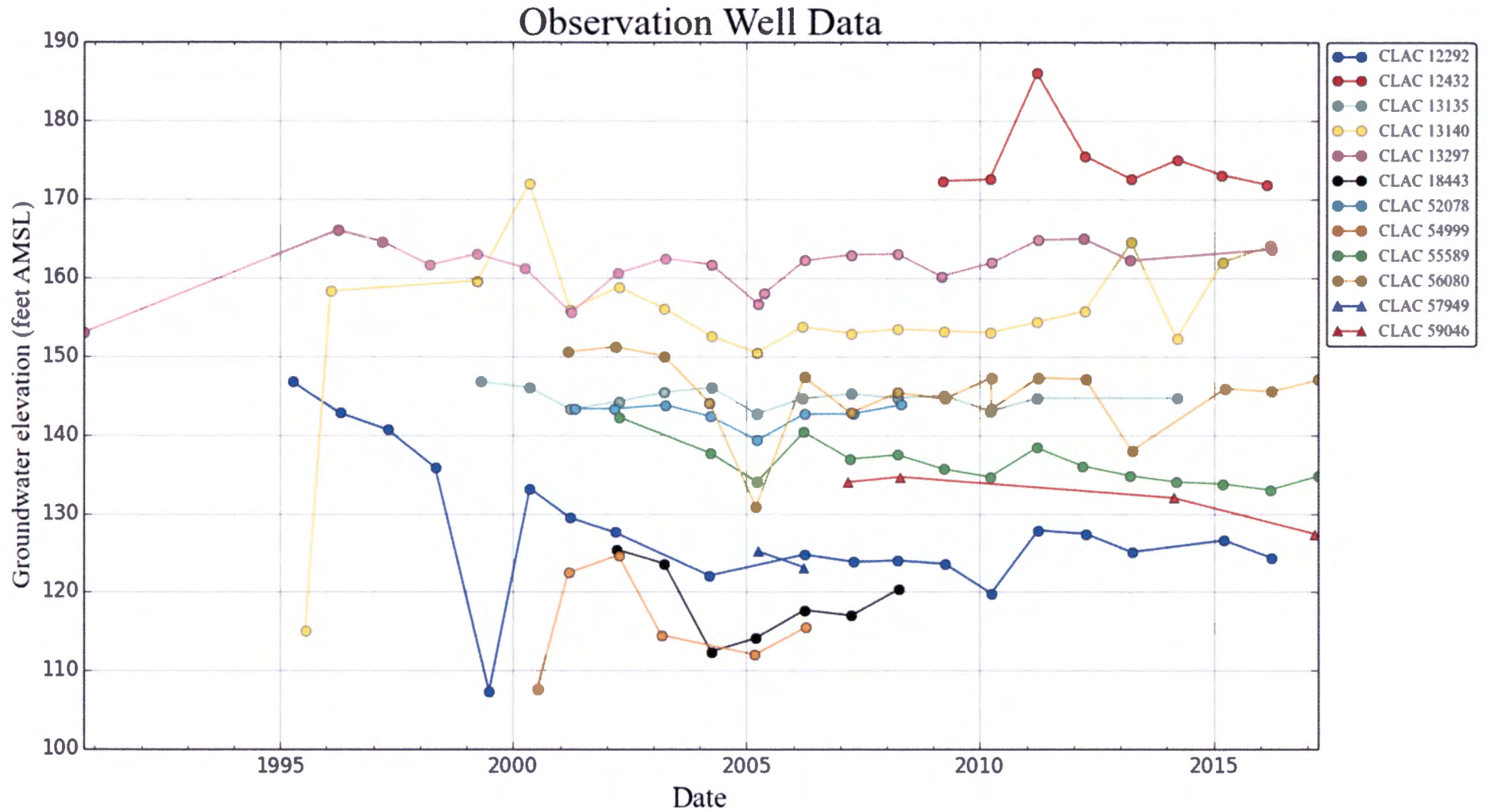
Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82 p.

Well Location Map

# Application G-18500 Canby 170, LLC T4S, R1E Section 15



Water-Level Trends in Nearby Wells (Static Only)





**Water Availability Tables**

Oregon Water Resources Department  
Water Availability Analysis

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### Water Availability Analysis Detailed Reports

MOLALLA R > WILLAMETTE R - AT MOUTH  
WILLAMETTE BASIN

Water Availability as of 8/11/2017

Watershed ID # 69798 [\(Map\)](#) Exceedance Level 80%   
Date 8/11/2017 Time 9:20 AM

- 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	1,670.00	153.00	1,720.00	0.00	500.00	1,220.00
FEB	2,010.00	143.00	1,870.00	0.00	500.00	1,370.00
MAR	1,830.00	111.00	1,720.00	0.00	500.00	1,220.00
APR	1,530.00	64.60	1,450.00	0.00	500.00	945.00
MAY	927.00	95.00	832.00	0.00	500.00	332.00
JUN	431.00	116.00	315.00	0.00	500.00	-185.00
JUL	204.00	180.00	24.30	0.00	200.00	-176.00
AUG	139.00	151.00	12.00	0.00	100.00	-112.00
SEP	134.00	80.00	54.00	0.00	150.00	-96.00
OCT	188.00	38.30	150.00	0.00	450.00	300.00
NOV	637.00	78.60	558.00	0.00	500.00	58.40
DEC	1,700.00	148.00	1,550.00	0.00	500.00	1,050.00
ANN	1,320,000.00	83,200.00	1,240,000.00	0.00	295,000.00	967,000.00

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### Water Availability Analysis Detailed Reports

MOLALLA R > WILLAMETTE R - AB GRIBBLE CR  
WILLAMETTE BASIN

Water Availability as of 8/11/2017

Watershed ID # 135 [\(Map\)](#) Exceedance Level 80%   
Date 8/11/2017 Time 9:21 AM

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

**Water Availability Calculation**

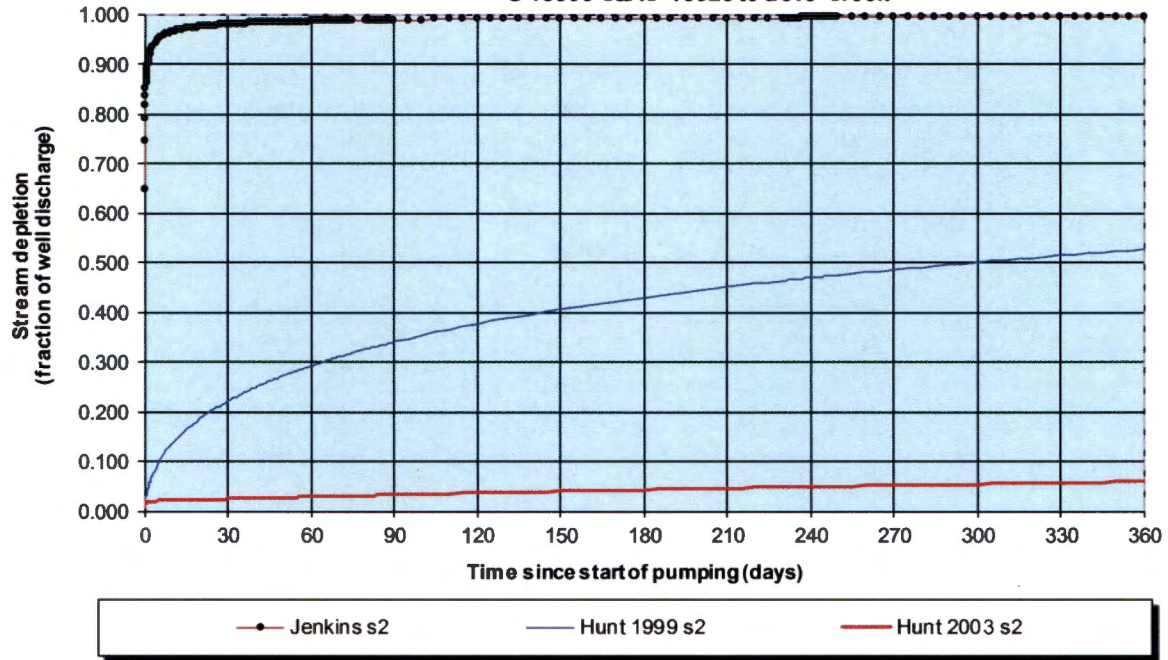
Monthly Streamflow in Cubic Feet per Second  
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	694.00	3.65	690.00	0.00	60.00	630.00
FEB	701.00	3.52	697.00	0.00	60.00	637.00
MAR	714.00	3.22	711.00	0.00	60.00	651.00
APR	685.00	3.72	681.00	0.00	60.00	621.00
MAY	495.00	10.10	485.00	0.00	60.00	425.00
JUN	221.00	14.40	207.00	0.00	60.00	147.00
JUL	97.60	24.70	72.90	0.00	60.00	12.90
AUG	67.00	20.20	46.80	0.00	60.00	-13.20
SEP	65.10	0.80	56.30	0.00	60.00	-3.70
OCT	103.00	3.31	99.70	0.00	60.00	39.70
NOV	306.00	3.15	303.00	0.00	60.00	243.00
DEC	569.00	3.77	665.00	0.00	60.00	605.00
ANN	560,000.00	6,230.00	554,000.00	0.00	43,500.00	511,000.00

Hunt 2003 Stream Depletion Model Results

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999, 2003)

G-18500 CLAC 18025 to Dove Creek



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	97.9%	98.5%	98.8%	98.9%	99.1%	99.1%	99.2%	99.3%	99.3%	99.3%	99.4%	99.4%
H SD 1999	22.1%	29.2%	34.0%	37.6%	40.5%	43.0%	45.1%	46.9%	48.5%	50.0%	51.3%	52.6%
H SD 2003	2.46%	2.89%	3.29%	3.66%	4.00%	4.33%	4.63%	4.93%	5.20%	5.47%	5.72%	5.96%
Qw, cfs	0.673	0.673	0.673	0.673	0.673	0.673	0.673	0.673	0.673	0.673	0.673	0.673
H SD 99, cfs	0.149	0.197	0.229	0.253	0.273	0.289	0.304	0.316	0.327	0.337	0.346	0.354
H SD 03, cfs	0.017	0.019	0.022	0.025	0.027	0.029	0.031	0.033	0.035	0.037	0.039	0.040

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	365	365	365	days
Perpendicular from well to stream	a	130	130	130	ft
Well depth	d	100	100	100	ft
Aquifer hydraulic conductivity	K	1	10	50	ft/day
Aquifer saturated thickness	b	40	40	40	ft
Aquifer transmissivity	T	40	400	2000	ft <sup>2</sup> /day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	0.1	0.1	0.1	ft/day
Aquitard saturated thickness	ba	40	40	40	ft
Aquitard thickness below stream	babs	35	35	35	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft
Streambed conductance (lambda)	sbc	0.057143	0.057143	0.057143	ft/day
Stream depletion factor	sdf	0.422500	0.042250	0.008450	days
Streambed factor	sbf	0.185714	0.018571	0.003714	
input #1 for Hunt's Q_4 function	t'	2.366864	23.668639	118.343195	
input #2 for Hunt's Q_4 function	K'	1.056250	0.105625	0.021125	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	0.185714	0.018571	0.003714	