

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date November 9, 2015

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

SUBJECT: Application G- 18122 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: John Childs County: Clackamas

A1. Applicant(s) seek(s) 1.19 cfs from 6 well(s) in the Willamette Basin,
Middle Willamette subbasin

A2. Proposed use Supp Irr of 94.9 acres Seasonality: March 1 – October 31

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	1.19	T3S/R2E-27 NW-SE	2460' N, 2055' W fr SE cor S 27
2	Proposed	2	Alluvium	1.19	T3S/R2E-27 NW-SE	2200' N, 2475' w fr SE cor S 27
3	Proposed	3	Alluvium	1.19	T3S/R2E-27 NE-SW	2270' N, 2175' E fr SW cor S 27
4	Proposed	4	Alluvium	1.19	T3S/R2E-27 NE-SW	2210' N, 2435' E fr SW cor S 27
5	Proposed	5	Alluvium	1.19	T3S/R2E-27 SE_SW	1070' N, 1890' E fr SW cor S 27
6	Proposed	6	Alluvium	1.19	T3S/R2E-27 SE_SW	1215' N, 2070' E fr SW cor S 27

* 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	500				180	0-140	0-140		140-180			
2	503				180	0-140	0-140		140-180			
3	540				180	0-140	0-140		140-180			
4	527				180	0-140	0-140		140-180			
5	530				180	0-140	0-140		140-180			
6	533				180	0-140	0-140		140-180			

Use data from application for proposed wells.

A4. **Comments:** Each of the 6 wells is proposed. The wells will be constructed to develop water from water-bearing zones within the Troutdale Formation.

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 wells will be constructed to use a confined aquifer, so pertinent basin rules 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, 7T, and iii (see below);
 - 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 alluvial 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 applicant’s proposed wells are located in an area that contains low permeability saturated silt and clay from land surface to a depth of 20 - 40 ft (nearby well logs). In general, 100 - 200 ft of Boring Lava (Gannet and Caldwell, 1998 from Trimble, 1963) underlie the clay and silt, although the thickness can range from 50 ft far from vents to >600 ft near vents (Gannet and Caldwell, 1998 from Beeson et al., 1989b). The Boring lavas rest on the eroded surface of the Troutdale Formation (Gannet and Caldwell, 1998). The Troutdale Formation consists layers of weakly to moderately cemented pebble and cobble conglomerate with scattered thin lenses of medium to course sandstone (Evarts et al., 2013), along with layers of mudstone and claystone. The applicant’s proposed wells will be open to water bearing portions of the Troutdale Formation.

Limited groundwater data exists for the Troutdale Formation in this area (see hydrograph below). Given the geologic nature of the Troutdale Formation, it is likely that water-bearing zones are discontinuous and that the declines seen in CLAC 57020 may not be indicative of the groundwater in the area immediately surrounding the proposed wells. Annual static water level measurements (condition 7N) through a dedicated measuring tube (condition 7T) will enable better understanding of local groundwater conditions within the Troutdale Formation locally.

SPECIAL WELL CONSTRUCTION CONDITION: The wells must be continuously cased and continuously sealed into the alluvial aquifer of the Troutdale Formation. The wells must show static water levels which are lower in elevation than the surface water bodies within 1 mile (445 feet above mean sea level).

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	Troutdale Formation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Troutdale Formation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Troutdale Formation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Troutdale Formation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Troutdale Formation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Troutdale Formation	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: Water levels in nearby wells rise above the water-bearing zone at which they were encountered. This indicates a confined aquifer environment for those wells completed in the Troutdale Formation (CLAC 57020, and CLAC 61215).

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	Unnamed Tributary to Beaver Creek	~410-430	455-520	210	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Unnamed Tributary to Beaver Creek	~410-430	455-520	400	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Unnamed Tributary to Beaver Creek	~410-430	455-520	960	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	1	Unnamed Tributary to Beaver Creek	~410-430	455-520	650	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	1	Unnamed Tributary to Beaver Creek	~410-430	455-520	780	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	1	Unnamed Tributary to Beaver Creek	~410-430	455-520	700	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Beaver Creek	~410-430	~445-545	2,265	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Beaver Creek	~410-430	~445-545	2,770	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2	Beaver Creek	~410-430	~445-545	3,150	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	2	Beaver Creek	~410-430	~445-545	2,970	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	2	Beaver Creek	~410-430	~445-545	4,100	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	2	Beaver Creek	~410-430	~445-545	3,890	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: Groundwater levels for wells completed within the Boring lavas (static water levels ranging from 19-38 ft below land surface) are coincident with the surface water levels, indicating hydraulic connection (CLAC 17500, CLAC 16154, CLAC 16123, CLAC 16311, CLAC 16337 CLAC 16323, and CLAC 16333). However, well logs in the area report ~20-30 ft of clay overlying the upper most water-bearing zones, suggesting a relatively inefficient hydraulic connection between groundwater and surface water.

Static water levels for wells completed within the Troutdale Formation are lower in elevation than surface water levels and may display a falling head with well open interval depth (CLAC 57020 and CLAC 61215). The wells should have no efficient hydraulic connection to the surface water source AS LONG as the wells are continuously cased and continuously sealed into the Troutdale Formation

Water Availability Basin the well(s) are located within: 181: Willamette R> Columbia 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?
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<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.

Well	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"/>
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: The wells should have no efficient hydraulic connection to surface water sources AS LONG as the wells are continuously cased and continuously sealed into the Troutdale Formation. As a check, interference with nearby streams was estimated using the Hunt (2003) model. In the area, the Troutdale Formation lies beneath up to 180+ ft of Boring lava, which in turn lies beneath 20 - 30 ft of clay. The Troutdale Formation and the Boring lavas were modeled as a single unit with a hydraulic conductivity of High Cascade Volcanics (6-20 ft/d) (Conlon et al., 2005). Model parameters include a 20 ft aquitard saturated thickness with 3 ft of aquitard thickness below the stream. To be conservative, the full rate (1.19 cfs) was modeled at the well closest to a stream (well 1 at 210 ft from the unnamed tributary to Beaver Creek). The model indicates that at 30 days roughly 2% of water to the well will be supplied from the unnamed creek if the wells are not cased and sealed completely through the Boring lavas.

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: _____
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.
Evarts, R.C., O'Connor, J.E., and Tolan, T.L., 2013, Geologic Map of Washougal Quadrangle, Clark County, Washington, and Multnomah County, Oregon: U.S. Geological Survey Pamphlet to accompany Scientific Investigations Map 3257.
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.
OWRD Groundwater Database and well logs, particularly CLAC 57020, CLAC 61215, CLAC 17500, CLAC 16154, CLAC 16123, CLAC 16311, CLAC 16337, CLAC 16323, and CLAC 16333.
OWRD Groundwater Review for App G-17220.

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:** _____

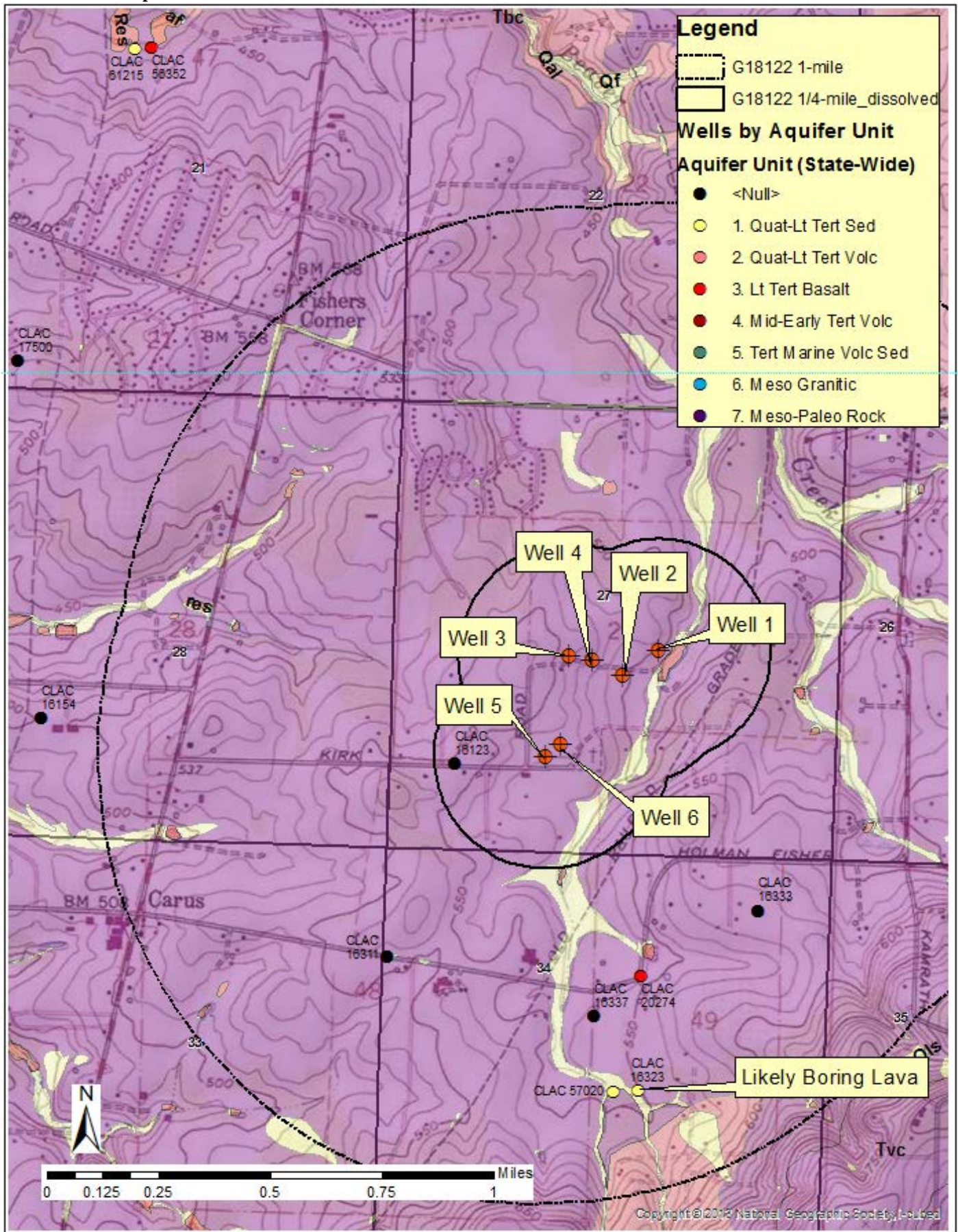
D4. **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 181		WILLAMETTE R > COLUMBIA R - AT MOUTH			Exceedance Level: 80	
Time: 2:51 PM		Basin: WILLAMETTE			Date: 11/03/2015	
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	27,500.00	2,760.00	24,700.00	0.00	1,500.00	23,200.00
FEB	30,000.00	8,030.00	22,000.00	0.00	1,500.00	20,500.00
MAR	28,500.00	7,590.00	20,900.00	0.00	1,500.00	19,400.00
APR	25,400.00	7,200.00	18,200.00	0.00	1,500.00	16,700.00
MAY	20,700.00	4,450.00	16,200.00	0.00	1,500.00	14,700.00
JUN	11,000.00	2,420.00	8,580.00	0.00	1,500.00	7,080.00
JUL	6,280.00	2,370.00	3,910.00	0.00	1,500.00	2,410.00
AUG	4,890.00	2,120.00	2,770.00	0.00	1,500.00	1,270.00
SEP	4,930.00	1,760.00	3,170.00	0.00	1,500.00	1,670.00
OCT	5,990.00	732.00	5,260.00	0.00	1,500.00	3,760.00
NOV	12,700.00	1,020.00	11,700.00	0.00	1,500.00	10,200.00
DEC	24,800.00	1,410.00	23,400.00	0.00	1,500.00	21,900.00
ANN	19,700,000	2,510,000	17,200,000	0	1,090,000	16,100,000

DETAILED REPORT OF INSTREAM REQUIREMENTS													
Watershed ID #: 181		WILLAMETTE R > COLUMBIA R - AT MOUTH										Basin: WILLAMETTE	
Time: 2:51 PM												Date: 11/03/2015	
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly values are in cfs.													
MF181A	APPLICATION	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0
	MAXIMUM	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0

Well Location Map



Water-Level Trends in Nearby Wells

