

Groundwater Application Review Summary Form

Application # G- 18805 RR

GW Reviewer Amanda Bonebrake

Date Review Completed: 7/2/19

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 July 2, 2019

FROM: Groundwater Section Aurora C Bouchier
Reviewer's Name

SUBJECT: Application G- 18805 Supersedes review of June 14, 2019
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: Matthew & Jeanine Dunn County: Washington

A1. Applicant(s) seek(s) 0.009 cfs from 1 well(s) in the Willamette Basin,
Tualatin subbasin

A2. Proposed use irrigation* (1.0 acres) Seasonality: March 01 – 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	CRB*	0.022	3S/2W-2 NW-NW	330' S, 195' E fr NW cor S 2
2						

* 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	-770				Est 140	Est 0-80	Est 0-140		Est 105-140**			

Use data from application for proposed wells.

A4. **Comments:**

***Attachment B describes the water requested as needed to ensure adequate water for anticipated year-round nursery crop use. Page 5 of the application lists the use as irrigation from March 1 – October 31.**

The well will likely produce from the Columbia River Basalt (CRB). The site is located within the Chehalem Mountain Ground Water Limited Area (see A6). At this location the top of the uppermost basalt layer is highly weathered and is described on many well logs as 'red clay', 'sand', 'brown shale', 'brown clay', 'brown soft rock' or 'brown sandstone' (WASH 818, WASH 13210, WASH 13719, and YAMH 2001, YAMH 2019).

**The application lists a proposed perforated or screened interval of 35 feet, this review assumes it will be at/near the bottom of the borehole. In 2016 the applicants previously applied for a water right with their existing well WASH 13719. It was determined that WASH 13719 does not meet current well construction standards. This new application proposes a well that will have a similar total depth as WASH 13719. Since 2016 the Department has additional information which suggests the well construction as proposed in the application will not be appropriate. Please see section B3 for well construction requirements.

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 well is producing from unconfined to semi-confined, highly weathered basalt within ¼ mile of the bank of a stream or surface water source. The pertinent rules (OAR 690-502-0240) apply to unconfined alluvium, so it appears they are not activated by this application.

A6. ☒ **Well(s) #** 1, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction. Name of administrative area: Chehalem Mountain Groundwater Limited Area

Comments: According to OAR 690-502-0200, Groundwater in the basalt aquifers in the Chehalem Mountain Groundwater Limited Area is classified for exempt uses, irrigation, and rural residential fire protection systems only. Permits

may be issued, for a period not to exceed five years, for fire protection and for drip or equally efficient irrigation. The amount of water used for irrigation shall be further limited to one acre-foot per acre per year. Permits may be extended for additional five-year periods if the Director of the Water Resources Department finds that the groundwater resource can probably support the extended use.

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 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) 71 & 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:** _____
Special Conditions:

1. Groundwater production in the well shall be limited to a single aquifer in the Columbia River Basalt Group.
 - a. The well shall be continuously cased and continuously sealed into hard dense basalt at a depth of 75-100 feet below the local level of stream incision. Downstream, within a mile of the proposed well location the stream bed elevation of Chicken Creek and its tributaries reaches an elevation of approximately 360 feet above mean sea level (amsl). For the proposed well location, with a land surface of approximately 770 feet amsl, this means the well must be **continuously cased and continuously sealed into hard dense basalt at a depth of approximately 470-480 feet below land surface** to protect the surface water sources.
 - b. The well shall be continuously cased and continuously sealed to within 100 feet of the bottom of the open borehole. A larger open interval may be approved by the Department if the permittee can demonstrate to the Departments' satisfaction, using packer tests or other suitable methods, that the hydraulic heads of water-bearing zones in the proposed open interval are equivalent or that the open interval is part of a continuous zone of interconnected porous materials.
 - c. Following well completion, the well shall be thoroughly developed to remove cuttings and drilling fluids. A video log of the well shall be collected to demonstrate to the satisfaction of the Department that the well is only open to a single aquifer.
2. The well shall be equipped with a dedicated 3/4-inch diameter (minimum) water-level measurement tube, separate from other methods of measuring the water levels such as airlines or transducers. The annual water-level measurement required in the permit shall be measured through the measuring tube. When requested, access to the well shall be provided to Department staff in order to make water-level measurements.
3. All hydrologic, geologic, geochemical and video data collected shall be provided to OWRD in report and in electronic form specified by the Department.
4. **The permit should include relevant limitations of the Chehalem Mountain GWLA, including type of use, quantity of use, the 5-year time limit, and best management practices that maximize the efficiency of water use.**

Remarks

The Chehalem Mountains are a monoclonal structure within the Tualatin Basin, composed primarily of CRB lavas. In places the ridges are capped with a layer of re-worked silt which overlies the basalts (the 'yellow clay' from 2 - 18 feet listed on the well log for WASH 13719). The top of the CRB is commonly weathered to a red clay (the 'red clay' from 18 - 40 feet listed on the log for WASH 13719) which ranges in thickness between several feet to more than 200 feet in the Tualatin Basin (Hart and Newcomb, 1965, from Conlon et al., 2005). The CRB lavas consist of a series of flood-basalt lavas; individual flows typically range between 40 to 100 feet thick, however the thickness is highly variable and may exceed 250 feet in some areas (Conlon et al., 2005). The CRB lavas are characterized by thin, often permeable, interflow zones separated by thick, low permeability flow interiors. Because the CRB lavas were generally emplaced as sheet flows, the water-bearing zones generally occur in sub-horizontal, tabular interflow zones separated into discrete water-bearing zones by the low-permeability flow interiors. Individual water-bearing zones in the basalts are likely to have sufficiently different pressures such that wells open to multiple zones will waste natural reservoir pressure through cross borehole flow (see hydrograph below showing wells completed to different zones which results in discrete water levels). This indicates a need for a special condition to prevent any reconstruction that would open the well to additional basalt aquifers.

Based on nearby well logs there appear to be at least two distinct basalt aquifers in this vicinity (see hydrograph below). Shallower wells (completed to elevations of approximately 600 feet or higher above sea level (asl)) have water elevations around approximately 760 feet asl (see WASH 13210, WASH 13719 and YAMH 2019 in the hydrograph and comparative lithology below). It appears that the local streams intersect this aquifer. Deeper wells have water elevations around approximately 500 feet asl (see WASH 3443, WASH 808 and WASH 2010 in the hydrograph and comparative lithology below). The applicant's well needs to be constructed so that it is only completed in the lower basalt aquifer to avoid hydraulic connection with the nearby streams.

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	CRB (highly weathered)	☒	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Deep wells in the CRBG typically develop water from confined aquifers. This is seen in nearby CRBG well logs report static water levels rise above the water-bearing zone, indicating a confined aquifer or series of aquifers.

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	Southern Unnamed Tributary to Chicken Creek	~500	360-690	920	☐	☒	☐	☐	☒
1	2	Northern Unnamed Tributary to Chicken Creek	~500	400-700	1710	☐	☒	☐	☐	☒
1	3	Baker Creek	~500	560-850	3150	☐	☒	☐	☐	☒
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: This assumes the well is constructed as outlined in Section B3. It is likely the deeper basalt aquifer may be hydraulically connected to Chicken Creek at some point along the creek. However, there is currently not sufficient information to determine precisely where, if so it appears to be greater than 1 mile distant from the proposed well location.

Water Availability Basin the well(s) are located within: 30201006: TUALATIN R > WILLAMETTE R – AT GAGE

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: _____

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													
(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:

Application files: G-18805, and nearby G-18273 and G-17533.

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.

Al-Eisa, A.M., 1981, The structure and stratigraphy of the Columbia River Basalt in the Chehalem Mountains, Oregon: Portland, Oregon, Portland State University, M.S. thesis, 67 p.

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.

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 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**

WATER AVAILABILITY TABLE															
watershed ID #: 30201006		TUALATIN R > WILLAMETTE R - AT GAGE 14207500										Exceedance Level: 80			
Time: 3:22 PM		Basin: WILLAMETTE										Date: 06/14/2019			

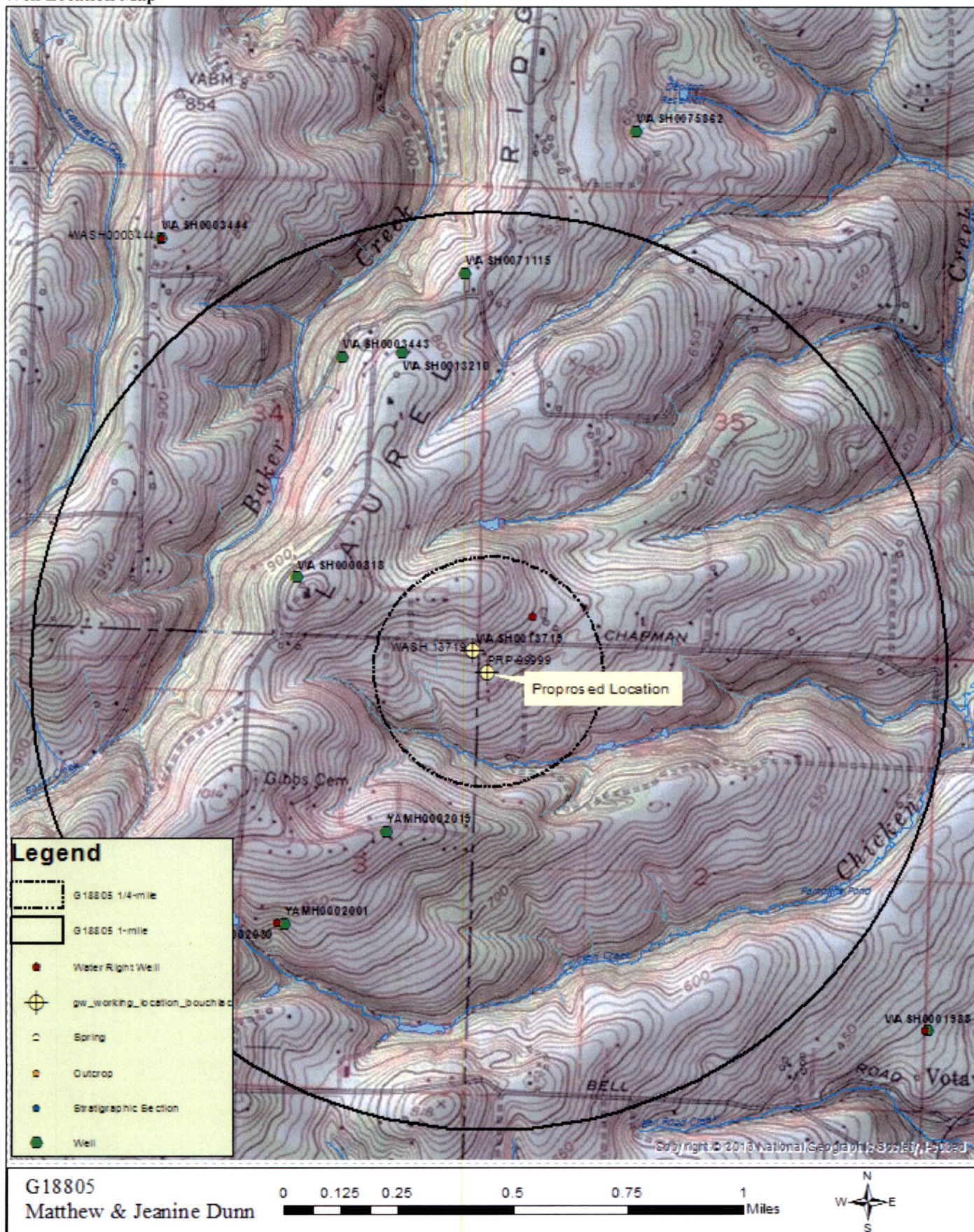
# watershed															
Nest ID Number	Stream Name	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	STOR	

1	181 WILLAMETTE R > COLUMBIA R - AT MOUTH	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
2	175 TUALATIN R > WILLAMETTE R - AT MOUTH	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	YES	
3	30201006 TUALATIN R > WILLAMETTE R - AT GAGE 14207500	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	YES	

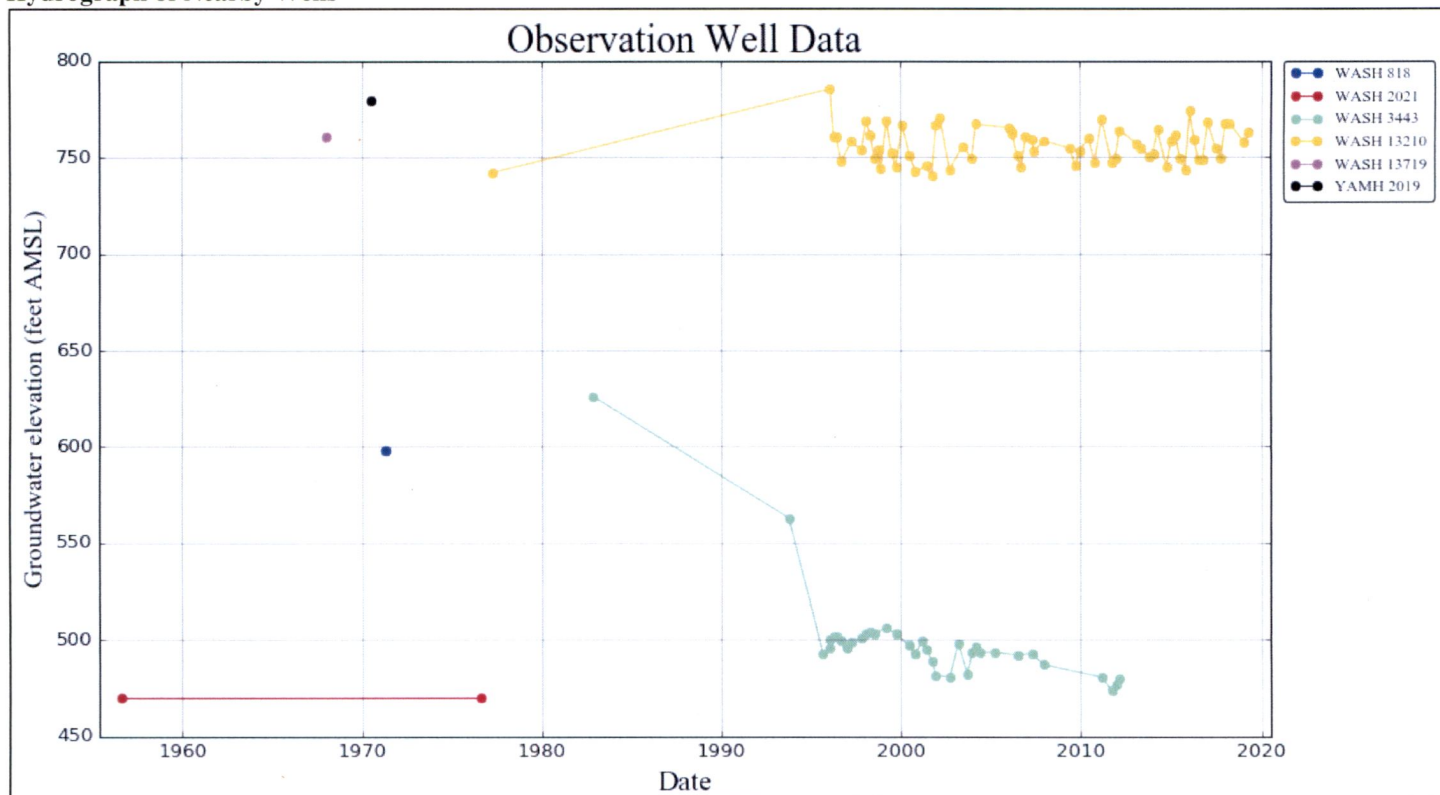
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 30201006		TUALATIN R > WILLAMETTE R - AT GAGE 14207500				Exceedance Level: 80
Time: 3:23 PM		Basin: WILLAMETTE				Date: 06/14/2019
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	1,290.00	491.00	799.00	0.00	250.00	549.00
FEB	1,640.00	551.00	1,090.00	0.00	250.00	839.00
MAR	1,300.00	413.00	887.00	0.00	250.00	637.00
APR	833.00	311.00	522.00	0.00	250.00	272.00
MAY	407.00	205.00	202.00	0.00	250.00	-47.60
JUN	191.00	185.00	6.41	0.00	130.00	-124.00
JUL	90.30	227.00	-137.00	0.00	100.00	-237.00
AUG	68.60	195.00	-126.00	0.00	100.00	-226.00
SEP	46.80	149.00	-102.00	0.00	94.50	-197.00
OCT	52.00	73.10	-21.10	0.00	100.00	-121.00
NOV	183.00	244.00	-60.70	0.00	250.00	-311.00
DEC	967.00	472.00	495.00	0.00	250.00	245.00
ANN	913,000	211,000	716,000	0	137,000	601,000

DETAILED REPORT OF INSTREAM REQUIREMENTS													
Watershed ID #: 30201006		TUALATIN R > WILLAMETTE R - AT GAGE 14207500								Basin: WILLAMETTE			
Time: 3:24 PM										Date: 06/14/2019			
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly values are in cfs.													
MF173A	CERTIFICATE	30.0	30.0	30.0	30.0	30.0	20.0	20.0	15.0	15.0	30.0	30.00	30.0
MF174B	APPLICATION	30.0	30.0	30.0	30.0	30.0	20.0	20.0	15.0	15.0	30.0	30.00	30.0
MF175B	APPLICATION	250.0	250.0	250.0	250.0	250.0	130.0	40.0	30.0	25.0	90.0	250.00	250.0
IS73538B	CERTIFICATE	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.5	100.0	100.00	100.00	100.0
S86703A	PERMIT	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.80	2.8
S86704B	PERMIT	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.40	10.4
MAXIMUM		250.0	250.0	250.0	250.0	250.0	130.0	100.0	100.0	94.5	100.0	250.0	250.0

Well Location Map



Hydrograph of Nearby Wells



Comparative Lithology

