Approved: HE Z

MEMO

To: Kristopher Byrd, Well Construction and Compliance Section Manager

From: Travis Kelly, Well Construction Program Coordinator

Subject: Review of Water Right Application G-18960

Date: July 7, 2020

The attached application was forwarded to the Well Construction and Compliance Section by the Groundwater Section. Josh Hackett reviewed the application. Please see Josh's Groundwater Review and the Well Report.

Applicant's Well #1 (MARI 313): Based on a review of the Well Report, Applicant's Well #1 seems to protect the groundwater resource.

The construction of Applicant's Well #1 may not satisfy hydraulic connection issues.

Applicant's Well #2 (Proposed): Is a proposed well, therefore it cannot be reviewed for construction. Construction of the proposed well shall be completed in a manner that protects ground water resources as required under Oregon Administrative Rules 690-200 through 690-240. During construction of the well, specific attention should be paid to ensure sealing requirements are met and that the well does not commingle aquifers.

The proposed construction of Applicant's Well #2 may not satisfy hydraulic connection issues.

STATE OF OREGON

(1) OWNER:

Aurora

(3) TYPE OF WELL:

Driven

Bored

) CASING INSTALLED:

." Diam. fromft. to ...

LINER INSTALLED:

(6) PERFORATIONS:

Size of perforations

(7) SCREENS:

Manufacturer's Name

(8) WELL TESTS:

perature of water

Was pump installed?

Method of sealing strata off

Was well gravel packed?

Gravel placed from ...

Type of Water?

(9) CONSTRUCTION:

Well sealed from land surface to

Diameter of well bore below seal6.....

Amount of sealing material How was cement grout placed?

Diameter of well bore to bottom of seal .

Air test

Bailer test Artesian flow

Diam. Slot Size ..

Was a pump test made?

Yes No If yes, by whom?

Well seal-Material used ... Coment ... 5% Bentom te

Name

City

Rotary Air 🔼

Rotary Mud

WATER WELL REPORT (as required by ORS 537.765)

(2) TYPE OF WORK (check): Deepening

If abandonment, describe material and procedure in Item 12

П

Fredrick & Patricia Wilmes

Domestic

Irrigation Other:

... ft. to

10307 Mattieu Ln. N.E.

Reconditioning

Steel

Steel

260 ft.

perforations from ..

perforations from

below static level

Diam. Slot Size Set from ft. to ft. to

gal./min. with

gal./min. with

Well screen installed?

Yes
No

Threaded

Threaded

39 ft. Gauge

Perforated? X Yes

..... Set from ft. to ...

gal./min. with drill stem at 2110 ft.

Special standards:

10 in.

Drawdown is amount water level is lowered

ft. drawdown after

ft. drawdown after

Yes 🗌 No 🏗

Depth artesian flow encountered

(4) PROPOSED USE (check):

Industrial

☐ Grounding

Thermal:

Withdrawal

Gauge

perforations from ft. to ft

hrs.

hrs.

DLEASE TYPE	MAY 2 3 1984 WATER RESOURCES DEPT OF PRINT IN INK SALEM, ORLGON		cial use or	
State OR 97002	(10) LOCATION OF WELL by legs County Marion SE 1/4 NE 1/4 Township L S , Range , Range (Township is North or South) Tax Lot Lot Block Subdivision MAILING ADDRESS OF WELL (or nearest address) No Section 1.	of Section _ 1 W (Range is Eas	t or West)	of, WM.
D USE (check): Municipal Reinjection G	Static level 11.2 ft. below Artesian pressure lbs. pe (12) WELL LOG: Diameter of well below	w land surface er square incompleted to of materials t least one en	e. Date 5 h. Date 6 l well 2 s; and shortry for each	260 ft. w thickness ch change of
Plastic Welded	Top Soil Clay Rock Rock Water Bearing	From 0 1 2h 180	1 2h 180 260	3112
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(unbonded) Water Well Constructor Certification (if applicable):

Date well drilling machine moved off of well

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] (bonded) Water Well Constructor Certification: Issued by: Fidelity & Deposit Co Bond 9497479

Bonnelly Drilling Co.
(type or print name of Water Well Constructor) On behalf of ...

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief:

(Dated)

no ...Type HP Plugs Size: location ft. Was a drive shoe used? 2 Yes No ☐ Yes No Did any strata contain unusable water? depth of strata ☐ Yes X No Size of gravel: ft. to ft.

19 8L

5-16

Groundwater Application Review Summary Form

Application # G- <u>18960</u>
GW Reviewer J. Hackett Date Review Completed: June 25, 2020
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:
\Box 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).

Version: 03/26/2020

WATER RESOURCES DEPARTMENT

MEM	O						<u>J</u> 1	une 25) <u>20</u>	
TO:		Applica	tion G-	<u> 18960</u>	<u>)</u>							
FROM	I:	GW:	J. Hack Reviewer									
SUBJI	ECT: So	cenic Wa	aterway	Interf	erence l	Evaluat	ion					
	YES NO		source o			is hydr	aulically	y connec	cted to a	a State S	Scenic	
	YES NO	Use	the Scer	nic Wate	erway C	Condition	ı (Cond	ition 7J))			
	interfer	S 390.8 ence with ence is d	h surfac	e water	that con					_		
_	interfered Departs propose	S 390.8 ence with ment is ed use in the fr	h surfac unable will me	e water to find easurab	that cor that the ly redu	ntributes ere is a p ace the	to a sce prepone surface	enic wat derance e water	erway; t e of evi d	therefor	re, the at the	
Calculai per crite	te the perc eria in 390	ON OF II centage of 0.835, do 1 unable to	consump ot fill in	tive use b the table	y month d but check	k the "una	ble" opti					
Waterv	vay by t	s permit he follov low is re	wing an								cenic use by v	which
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	-

Version: 03/26/2020

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO:	O: Water Rights Section ROM: Groundwater Section						Date Ju							
FKOM:	:	Ground	awater Se	ction		Darrian	rian's Mana	<u> </u>						
SUBJE	CT·	Applic	ation G- 1	.8960		Sune	vers Name ersedes	e revi	ew of					
BCDJL		пррпс	<u> </u>	.0700		Бир	cracaca	10 11	ew of		Ι	Date of Revi	ew(s)	
OAR 69 welfare, to determ the press	90-310-130 safety and mine whet umption co	0 (1) The description of the des	ne Departm n as describ presumption This revie	MPTION; Connent shall prepared in ORS 5 on is establish wis based u	sume that 37.525. De hed. OAR pon avail a	a proposed epartment s 690-310-14 ble inforn	d ground staff revi 40 allow nation a	ew g s the nd a	roundwater proposed us gency polici	applica se be m ies in pl	tions un odified ace at t	der OAR or conditi the time (690-310 oned to r	-140 neet
A. <u>GE</u> I	<u> VEKAL</u>	INFUE	<u>RMATIO</u>	<u>IN</u> : App	oncant s N	ame:	<u> Xauny La</u>	aytor	<u> </u>		(ounty: <u>N</u>	<u>tarion</u>	
A1.	Applican	t(s) seel	k(s) <u>0.13</u>	cfs from	2	well(s) in the _	7	Willamette					Basin,
						subbas	sin							
A2.	Proposed	use	Nurs	ery Irrigation	1	Seaso	nality: _	Yea	r - Round					
A3.	Well and	aquifer	data (atta	ch and num	ber logs fo	or existing	wells; n	nark	proposed v	vells as	such u	nder logi	d):	
Well	Logic	l	Applicant	's Propose	d Aquifer*	Propo Rate(c			Location))		n, metes a		
1	MARI 3	13	1		CRB	0.13	3		(T/R-S QQ-Q) 4S/1W-6 SE-NE		2250' N, 1200' E fr NW co 147' S, 54' W fr NE cor, SEN			E, S6
3	Propose	roposed 2 CRB 0.13 4S/1W-5 SW-NW		W	339' S,	144' W fr N	E cor, SEN	IE, S6						
4														
5 * Allowin	ım, CRB, B	o duo als												
* Alluvit	IIII, CKD, E	eurock												
Well	Well Elev ft msl	First Water ft bls	I II his	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casin Interva (ft)		Liner Intervals (ft)	Or So	rations creens ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	248	180	132.5	11/22/2019	260	0-39	0-39		3-260	180	-260	45	(11)	A
2	214				350 est	0-150 est	0-150	est		150-3	350 est			
Use data	from applic	cation fo	or proposed	wells.										
A4.	Commer	nts:												
A5. 🗵			e <u>Willan</u> groundwate	nette er hydraulica					s relative to $\mathbf{are}, or \boxtimes$		-			
	Commen	ts: <u>The</u>	e applica	such provisi nt's wells	will prod				_					o not
	appiy.													
A6. 🗆	Well(s) #			·,									tive restr	riction.
				a:										

Version: 03/26/2020

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

B1.	Bas	sed 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.	\square will not or \square 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.	\square will not or \square 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.
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):
В3.	Gro	oundwater availability remarks:
	The	e applicant's wells produce from water-bearing zones in the Columbia River Basalt Group (CRBG), a
		ies of lava flows with a composite thickness of at least 500 feet in the area. Although unconfined
		bundwater occurs near the surface of the basalts in outcrop areas, most water occurs in confined after that occupy thin rubble zones (interflow zones) at the contacts between lava flows. The interiors
		the basalt flows generally have low porosity and permeability and act as confining beds. This
		ometry generally produces a stack of thin aquifers (interflow zones) separated by thick confining beds
	(flo	ow interiors). The low permeability of the basalt flow interiors probably limits the natural vertical
	cor	nnection between overlying aquifers.
	The	e applicant's wells are located in an area that has been experiencing rising water levels in the basalt

aquifer system since April of 2002 when the City of Wilsonville switched from groundwater to surface water as their primary drinking water source (Conlon and others, 2005). Prior to the changeover, groundwater levels in the basalts were declining over a broad area. Since the changeover, water levels have been rising throughout the same area. Levels have risen at least 10 feet in one nearby well, MARI

Application G-18960

Page

5

50403 (see attached hydrograph). This suggests that basalt ground-water supplies should be adequate for the new use as long as the City of Wilsonville does not fully exercise its basalt water rights in the future. Our understanding is the city plans to maintain its current basalt water rights as an emergency backup supply and as an alternative supply to meet peak summer demands. If the city begins using their basalt wells regularly in the future, groundwater levels are likely to decline in the vicinity of the applicant's wells.

The wells are located just over 1/4 -mile outside of the Sherwood-Dammasch-Wilsonville Ground Water Limited Area. The southern boundary of the limited area was established as the middle of the channel of the Willamette River, probably based on an assumption that the Willamette River was a flow boundary in the basalt ground-water system. However, this is clearly not the case since pumping from the City of Wilsonville's basalt wells has been shown to cause impacts on both sides of the river. This indicates that pumping from the wells will likely affect the basalt aquifer system on both sides of the river, including portions within the limited area.

Special Conditions:

- 1. Each basalt well shall be open to a single aquifer of the Columbia River Basalt Group (CRBG) and shall meet applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval in each well shall be no greater than 100 feet. An open interval of greater than 100 feet may be allowed if substantial evidence of a single aquifer completion can be demonstrated to the satisfaction of the Department Hydrogeologists, using information from a video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval.
- 2. If during well construction, it becomes apparent that the well can be constructed to eliminate interference with hydraulically connected streams in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Ground Water/Hydrology Section Manager to request approval of such construction. The request shall be in writing and shall include a rough well log and a proposed construction design for approval by the Department. The request can be approved only if it is received and reviewed prior to placement of any permanent casing and sealing material. If the request is made after casing and seal are placed, the requested modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.
- 3. A dedicated water-level measuring tube shall be installed in each well. The measuring tube shall meet the standards described in OAR 690-215-0060. When requested, access to the wells shall be provided to Department staff in order to make water-level measurements.
- 4. The applicant shall coordinate with the driller to ensure that drill cuttings are collected at 10-foot intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.

5. If any geologic and hydrogeologic reports are completed for the permittee during the development of
the wells, including geophysical well logs and borehole video logs, then copies of the reports shall be
provided to the Department. Except for borehole video logs, two paper copies, or a single electronic
copy, shall be provided of each report. Digital tables of any data shall be provided upon request.

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	Columbia River Basalt		
2	Columbia River Basalt	⊠	

Basis for aquifer confinement evaluation: General experience in the CRBG indicates that most aquifers in the basalt are confined.

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)		Hydrau Conne NO A	•	Potentia Subst. Int Assum YES	erfer.
1	1	Willamette River	115	63	1350	\boxtimes				⊠
1	2	Ryan Creek	115	63-100	4700	X				\boxtimes
2	1	Willamette River	115	63	1600	X				\boxtimes
2	2	Ryan Creek	115	63-100	4750	X				\boxtimes

Basis for aquifer hydraulic connection evaluation: The applicant's existing well (MARI 313) is sealed to a depth of 39 feet bls. This corresponds to an elevation of 209' AMSL. Although vertical hydraulic conductivities in the basalts are very low, the Willamette River and Ryan Creek have potentially eroded through the upper portion of the basalt column and could be in direct contact with water bearing zones. In fact, the driller's log for MARI 313 notes water-bearing zones starting at approximately 180 feet bls. This depth corresponds to an elevation of 68 feet AMSL and is coincident with the elevation of the Willamette River. The applicant's proposed well will be sealed to a depth of 150 feet bls. This corresponds to an elevation of 64' AMSL. Water-bearing zones in this well will likely be connected to both streams.

C3a. **690-09-040** (4): Evaluation of stream impacts for <u>each well</u> that has been determined or assumed to be **hydraulically** connected and less than 1 mile from a surface water (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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 \boxtimes box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < 1/4 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			MF 182A	1500.00		3830.00		*	
1	2			n/a			3830.00		*	

ſ	2	1		MF 182A	1500.00	3830.00	*	
	2	2		n/a		3830.00	*	

Application G-18960

Date: June 25, 2020 Pag

8

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 with nearby streams could not be calculated because an appropriate model does not exist.

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.

	stributed												
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												
Interfere	nce CFS												
Distrib	ıted Well	ls											
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												
Interfere	nce CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												
Interfere	nce CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												
Interfere	nce CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												
Interfere	nce CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												
Interfere	nce CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
	as CFS												
Interfere	nce CFS												
(A) = Tot	tal Interf.												
(B) = 80	% Nat. Q												
(C) = 1	% Nat. Q												
(D) = (A	A) > (C)	√											
$(\mathbf{E}) = (\mathbf{A} / \mathbf{E})$		%	%	%	%	%	%	%	%	%	%	%	%

	total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as (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.	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 and others, 2005, Ground-water hydrology of the Willamette Basin, Oregon: U.S Geological Survey Scientific Investigations Report 2005-5168.
	Geological Survey Scientific Investigations Report 2005-5168.
	Geological Survey Scientific Investigations Report 2005-5168. Gannett and Caldwell, 1998, Geologic framework of the Willamette lowland aquifer system, Oregon and
	Geological Survey Scientific Investigations Report 2005-5168.
	Geological Survey Scientific Investigations Report 2005-5168. Gannett and Caldwell, 1998, Geologic framework of the Willamette lowland aquifer system, Oregon and

Date: June 25, 2020

9

Page

Application G-18960

D. WELL CONSTRUCTION, OAR 690-200

D1.	Well #:	: Logid:	
D2.	THE W	VELL does not appear to meet current well construction standards based upon:	
	a. 🗆	review of the well log;	
	b. 🗆	field inspection by	
	c. \square	report of CWRE	;
	d. 🗆	other: (specify)	
D3.	THE W	VELL construction deficiency or other comment is described as follows:	
D4. [Route	e to the Well Construction and Compliance Section for a review of existing well construction.	

Water Availability Tables

Water Availability Analysis **Detailed Reports**

WILLAMETTE R > COLUMBIA R - AB MOLALLA R WILLAMETTE BASIN

Water Availability as of 6/18/2020

Watershed ID #: 182 (Map) Date: 6/18/2020 Time: 10:57 AM

80% Exceedance Level:

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	21,400.00	2,300.00	19,100.00	0.00	1,500.00	17,600.00
FEB	23,200.00	7,480.00	15,700.00	0.00	1,500.00	14,200.00
MAR	22,400.00	7,260.00	15,100.00	0.00	1,500.00	13,600.00
APR	19,900.00	6,920.00	13,000.00	0.00	1,500.00	11,500.00
MAY	16,600.00	4,260.00	12,300.00	0.00	1,500.00	10,800.00
JUN	8,740.00	1,980.00	6,760.00	0.00	1,500.00	5,260.00
JUL	4,980.00	1,810.00	3,170.00	0.00	1,500.00	1,670.00
AUG	3,830.00	1,650.00	2,180.00	0.00	1,500.00	680.00
SEP	3,890.00	1,390.00	2,500.00	0.00	1,500.00	995.00
OCT	4,850.00	757.00	4,090.00	0.00	1,500.00	2,590.00
NOV	10,200.00	890.00	9,310.00	0.00	1,500.00	7,810.00
DEC	19,300.00	973.00	18,300.00	0.00	1,500.00	16,800.00
ANN	15,200,000.00	2,250,000.00	13,000,000.00	0.00	1,090,000.00	11,900,000.0

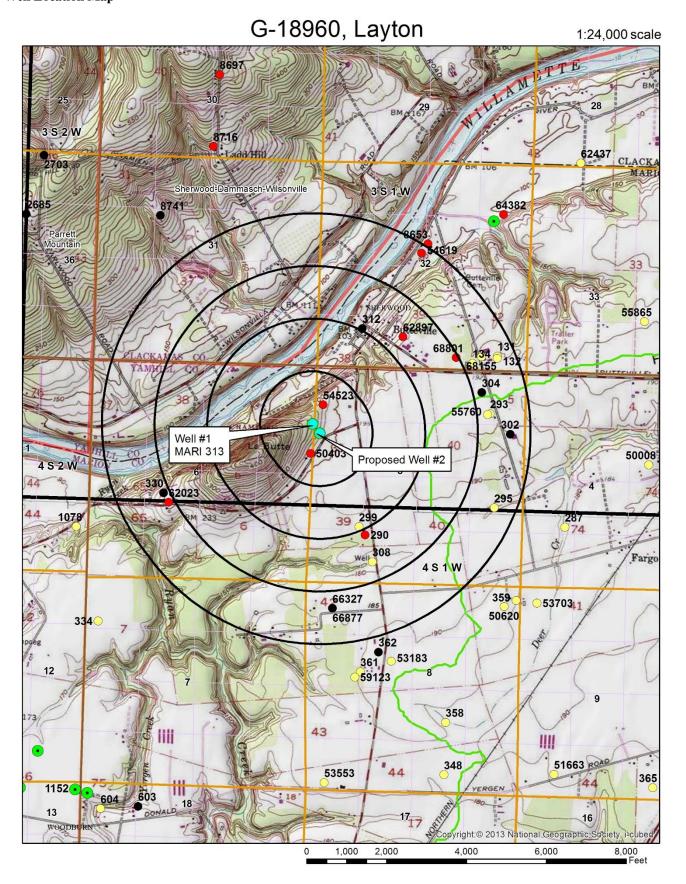
Detailed Report of Instream Flow Requirements

Instream Flow Requirements in Cubic Feet per Second

Applicatio n #			Feb										
MF182A	APPLICATI ON	1,500. 00											
Maximum		1,500. 00											

Date: June 25, 2020

Well Location Map



Water-Level Trends in Nearby Wells

