

Groundwater Application Review Summary Form

Application # G- 18614

GW Reviewer Ben Scandella, Dennis Orbanstei Date Review Completed: 10/2/18

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 10/2/2018
 FROM: Groundwater Section Benjamin Scandella, Dennis Orlovski
 Reviewer's Name
 SUBJECT: Application G-18614 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: **CHRIS RAMSEY; FOXGLOVE PROPERTIES LLP**
 County: **YAMHILL**

- A1. Applicant(s) seek(s) 0.167 CUBIC FOOT PER SECOND from 1 well(s) in the Willamette Basin,
Yamhill subbasin
- A2. Proposed use IRRIGATION Seasonality: MARCH 1 THROUGH 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	PROP XXXX	3	CRB	0.167	4S/3W-4 NW-SW	150'S, 1500' E fr. W ¼ corn. S 4

* 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	580	N/A	N/A	N/A	375	Continuus 335 +/-	Proposed: 200 +/- Assumed: 335	Not specified	40' at the bottom +/-	N/A	N/A	N/A

Use data from application for proposed wells.

- A4. **Comments:** Applicant proposed, in a revised "Proposed Use" table submitted on 9/29/2018, a maximum casing depth of 200', shallower than the proposed seal depth of 335'. Such an arrangement is not consistent with well construction standards, so it was assumed for the purposes of this review that the casing extends from land surface to the bottom of the seal, at 335'.

The requested rate, 0.167 cfs = 75 gpm, is well within the allowable rate of 1.61 cfs for 129.1 acres at the allowed rate of diversion of 0.0125 cfs/ac. The requested annual volume of 75 AF is also well within the allowed 322.75 AF. Pumping at the requested rate continually would reach the requested annual volume within 226 days.

- 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: **690-502-0240** classifies use from unconfined alluvial aquifers. This application proposes use from a confined aquifer in the CRBG, so this rule is not activated.

- A6. Well(s) # _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction. Name of administrative area: _____
 Comments: N/A

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) 7I, Large Water Use Reporting Condition;
 - 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 335 ft. below land surface;
 - c. Condition to allow groundwater production only from the basalt 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. **SPECIAL CONDITIONS:**

1. Each basalt well shall be cased and continuously sealed from land surface to a depth of at least 335 feet below land surface, to reduce the chances of forming a hydraulic connection to nearby streams or interference with nearby wells.
2. Each basalt well shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the 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. However, 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.
3. 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 (including but not limited to SPECIAL CONDITIONS 1 and 2 above), the permittee can contact the Department Hydrogeologist for this permit or the Groundwater 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.
4. 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.

5. The applicant shall coordinate with the driller to ensure that drill cuttings are collected at 10-ft intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.
6. Copies of all geologic and hydrogeologic reports completed for the permittee during the development of the wells, including geophysical well logs and borehole video logs, 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.
7. Prior to using water on this permit, the permittee shall ensure that the well on this permit has an OWRD Well Identification Number (Well ID or Well tag number). If a well does not have a Well ID, the permittee shall apply for one from the Department. The Well ID shall be attached to the well and shall be used as a reference identification number for any correspondence regarding the well including any water use, water level, or pump test reports.

Groundwater availability remarks:

The applicant's proposed well will produce water from the Columbia River Basalt Group (CRBG), a series of lava flows with a composite thickness that ranges from 200 to 400 feet in this area (Conlon et al., 2005). Each flow is characterized by a series of internal features, including a thin rubble zone at the contact between flows and a thick, dense, low porosity and low permeability interior zone. In some cases, sedimentary layers were deposited during the time between basalt flow emplacements. A flow top, sedimentary interbed and flow bottom are collectively referred to as an interflow zone. Unconfined groundwater occurs near the weathered top of the basalts, but most water occurs in interflow zones at the contacts between lava flows. CRBG flow features result in a series of stacked, thin aquifers that are confined by dense flow interiors. The low permeability of the basalt flow interiors usually results in little connection between stacked aquifers, which generally results in tabular aquifers with unique water level heads.

Nearby well logs show typical yields of <50 gpm, with a median of 15 gpm out of 100 wells. The well logs for 2 of the applicant's other wells, YAMH 826 and YAMH 50117, show yields of 3 and 15 gpm, respectively. Therefore, it is unlikely that the proposed well will produce the requested rate of 75 gpm. Water level data from nearby basalt wells with similar water-bearing zones and static water level elevations show relatively stable trends (See Figure 1), suggesting that the resource is not yet over-appropriated. However, condition 7I (Willamette Basin Basalt Groundwater Condition) is recommended to monitor the resource.

A number of nearby wells access water-bearing zones between 200 and 300 feet below land surface (for example, YAMH 50307, about 1/3 mile to the SW), and the proposed special condition requiring casing and seal to 335 feet will reduce the likelihood of injury to these water users. Other nearby wells are completed between 300 and 500 feet below land surface, suggesting that the water-bearing zones accessed by Well #1 may still be shared by other groundwater users. Using aquifer parameters appropriate for the basalts, it can be shown that the cone of depression from a pumped well can produce measureable impacts at a distance of 1 mile within minutes. Therefore, hydraulic interference with nearby wells, springs, and streams will likely occur rapidly once pumping begins if nearby streams and wells are connected to the same aquifer that is open in the well. For these reasons, the potential for the proposed use to interfere with senior groundwater rights, both permitted and exempt, is significant. To protect existing users, condition 7I (Willamette Basin Basalt Groundwater Condition) is recommended.

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

Basis for aquifer confinement evaluation: According to the well logs in almost all nearby wells, static water levels rise above water-bearing zones, indicating the aquifer is 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)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Miller Creek	280-350	115-730	1370	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Unnamed Trib. to Yamhill R.	280-350	250-585	3550	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	3	Henry Creek	280-350	290-490	4330	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: The range of likely water level elevations in the proposed well was inferred based on elevations measured in well YAMH 50117, which is nearby and with similar construction so that it likely accesses the same water-bearing zone as proposed well. This groundwater elevation range is coincident with elevations of SW 1, 2, and 3 within 1 mile of the proposed well, suggesting hydraulic connection. The water-bearing zones may be directly intersected by streams, and nearby mapped faulting may also provide a pathway for vertical connectivity. The proposed casing and seal depth and recommended well construction conditions will reduce the likelihood of hydraulic connection by allowing access to only deeper water-bearing zones, which are less likely to have an efficient hydraulic connection to the streams.

Water Availability Basin the well(s) are located within: Watershed ID # 30200801: YAMHILL R > WILLAMETTE R - AT MOUTH. Watershed ID # 182: WILLAMETTE R > COLUMBIA R - AB MOLALLA R. Watershed ID# 188: YAMHILL R > WILLAMETTE R - AB PALMER CR.

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 type="checkbox"/>	<input type="checkbox"/>	IS73547A	31.70	<input type="checkbox"/>	56.50	<input type="checkbox"/>	*	<input type="checkbox"/>
1	2	<input type="checkbox"/>	<input type="checkbox"/>	MF182A	1500.00	<input type="checkbox"/>	3830.00	<input type="checkbox"/>	*	<input type="checkbox"/>
1	3	<input type="checkbox"/>	<input type="checkbox"/>	IS73549A	31.00	<input type="checkbox"/>	56.30	<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.

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?
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Comments: *There is no appropriate model to estimate streamflow depletion from pumping in CRBG interflow zones that are incised by streams. Therefore, the percentage of interference at 30 days is not calculated.

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: N/A

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.

US Geological Survey Topographic Map, Dundee Quadrangle. _____

OWRD water level and well log databases, including reported water levels, accessed 9/28/2018.

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 #: 30200801
Time: 10:16 AM

YAMHILL R > WILLAMETTE R - AT MOUTH
Basin: WILLAMETTE

Exceedance Level: 80
Date: 09/17/2018

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	1,840.00	67.90	1,770.00	0.00	31.70	1,740.00
FEB	2,070.00	65.70	2,000.00	0.00	31.70	1,970.00
MAR	1,760.00	41.50	1,720.00	0.00	31.70	1,690.00
APR	1,060.00	49.60	1,010.00	0.00	31.70	979.00
MAY	523.00	66.20	457.00	0.00	31.70	425.00
JUN	232.00	88.60	143.00	0.00	31.70	112.00
JUL	108.00	112.00	-3.96	0.00	31.70	-35.70
AUG	66.90	99.50	-32.60	0.00	31.70	-64.30
SEP	56.50	64.40	-7.95	0.00	31.70	-39.60
OCT	72.50	17.00	55.50	0.00	31.70	23.80
NOV	462.00	38.60	423.00	0.00	31.70	392.00
DEC	1,670.00	64.70	1,610.00	0.00	31.70	1,570.00
ANN	1,180,000	46,900	1,130,000	0	23,000	1,110,000

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

Watershed ID #: 182
Time: 5:12 PM

WILLAMETTE R > COLUMBIA R - AB MOLALLA R
Basin: WILLAMETTE

Exceedance Level: 80
Date: 10/01/2018

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	21,400.00	2,290.00	19,100.00	0.00	1,500.00	17,600.00
FEB	23,200.00	7,470.00	15,700.00	0.00	1,500.00	14,200.00
MAR	22,400.00	7,250.00	15,200.00	0.00	1,500.00	13,700.00
APR	19,900.00	6,900.00	13,000.00	0.00	1,500.00	11,500.00
MAY	16,600.00	4,240.00	12,400.00	0.00	1,500.00	10,900.00
JUN	8,740.00	1,970.00	6,770.00	0.00	1,500.00	5,270.00
JUL	4,980.00	1,800.00	3,180.00	0.00	1,500.00	1,680.00
AUG	3,830.00	1,640.00	2,190.00	0.00	1,500.00	687.00
SEP	3,890.00	1,390.00	2,500.00	0.00	1,500.00	1,000.00
OCT	4,850.00	745.00	4,100.00	0.00	1,500.00	2,600.00
NOV	10,200.00	878.00	9,320.00	0.00	1,500.00	7,820.00
DEC	19,300.00	961.00	18,300.00	0.00	1,500.00	16,800.00
ANN	15,200,000	2,250,000	13,000,000	0	1,090,000	11,900,000

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

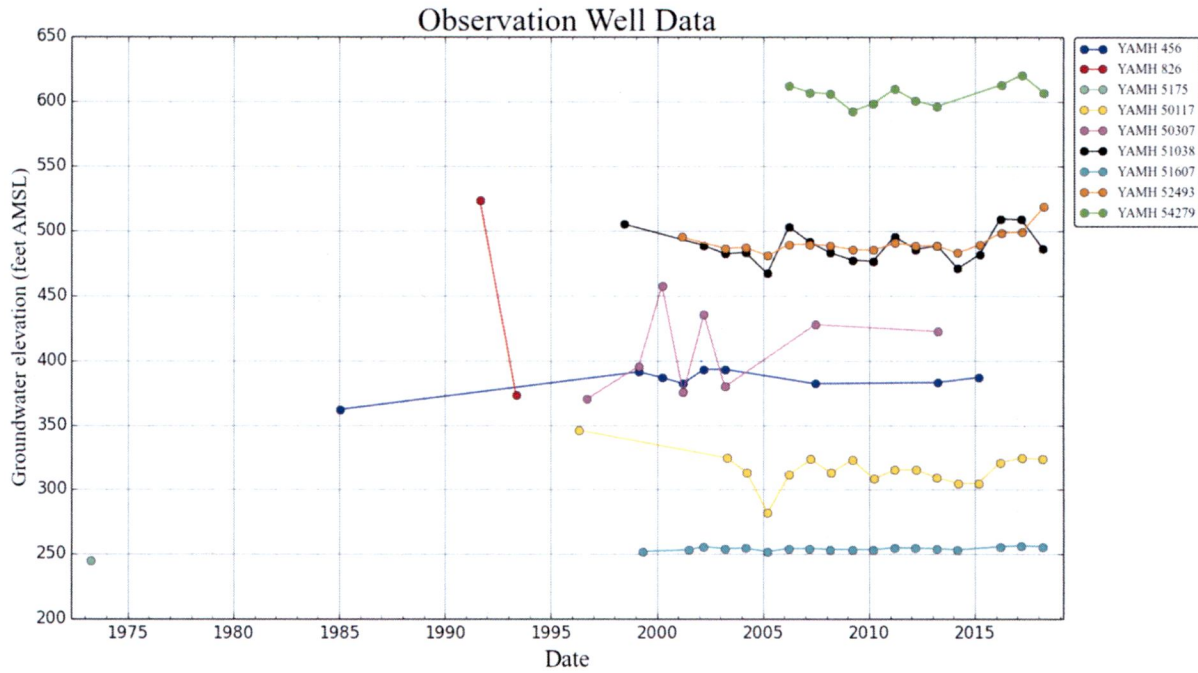
watershed ID #: 188
Time: 5:13 PM

YAMHILL R > WILLAMETTE R - AB PALMER CR
Basin: WILLAMETTE

Exceedance Level: 80
Date: 10/01/2018

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	1,780.00	59.30	1,720.00	0.00	31.00	1,690.00
FEB	2,010.00	57.20	1,950.00	0.00	31.00	1,920.00
MAR	1,710.00	35.40	1,670.00	0.00	31.00	1,640.00
APR	1,030.00	42.50	988.00	0.00	31.00	957.00
MAY	512.00	56.50	456.00	0.00	31.00	425.00
JUN	229.00	77.10	152.00	0.00	31.00	121.00
JUL	107.00	97.20	-9.78	0.00	31.00	-21.20
AUG	66.60	86.40	-19.80	0.00	31.00	-50.80
SEP	56.30	56.00	0.31	0.00	31.00	-30.70
OCT	72.70	15.70	57.00	0.00	31.00	26.00
NOV	465.00	32.10	433.00	0.00	31.00	402.00
DEC	1,640.00	56.40	1,580.00	0.00	31.00	1,550.00
ANN	1,150,000	40,600	1,100,000	0	22,500	1,080,000

Figure 1: Water-Level Trends in Nearby Wells



Well location map for G-18614 - Domaine Serene. T4S/R3W S4

