Groundwater Application Review Summary Form

Application # G- 18642 (Re-review)

GW Reviewer Ben Scandella, Jen Woody **Date Review Completed:** 5/20/19

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 5/20/2019

FROM: Groundwater Section Benjamin Scandella, Jen Woody
Reviewer's Name

SUBJECT: Application G-18642 Supersedes review of 12/21/2018
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: **JACKSON FAMILY INVESTMENTS III LLC** County: **YAMHILL**

A1. Applicant(s) seek(s) 0.120 CUBIC FOOT PER SECOND from 2 well(s) in the Willamette Basin, Middle Willamette 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	**YAMH 52323**	**2**	**CRB**	**0.127**	**3S/3W-23 NW-SW**	**1425' N, 40'E fr SW cor S 23**
2	**Proposed**	**3**	**CRB**	**0.111**	**3S/3W-23 SW-SW**	**1350'N, 40'E fr SW cor S 23**
3						
4						
5						

* 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	**700**	**347**	**329.8**	**03/13/2013**	**545**	**0-118**	**+2-118**	**0-545**	**465-485, 505-545**	**57.5**	**unknown**	**air**
2	**700**	**N/A**	**N/A**	**N/A**	**540**	**0-118**	**+2-118**	**Not specified**	**465-485', 505-545'**	**N/A**	**N/A**	**N/A**

Use data from application for proposed wells.

A4. **Comments:** The applicant proposed a well-specific rate of 57.5 gpm for YAMH 52323 and 50 gpm for the proposed well. The rate of 57.5 gpm is above the overall proposed maximum of 0.120 cfs (=53.9 gpm), so the well-specific rate evaluated for YAMH 52323 in this review is 53.9 gpm. Well construction the proposed well was not completely specified on the original application, but the applicant's agent submitted an amended p. 5 of the application showing the well construction information reproduced in the table above. YAMH 52323 is already authorized to withdraw 65 gpm under LL-1693, which had a FO issued on 4/17/2017, and 62 gpm under Certificate 87261. Therefore, for the purpose of evaluating potential impacts to streams, the combined rate of (62+65+54=) 181 gpm, or 0.403 cfs, was evaluated in this review. The original review on 12/21/2018 mis-identified the Water Availability Basin.

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 Columbia River Basalt Group (CRBG), so this rule is not activated.

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) **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 **118** ft. below land surface;

c. ☒ **Condition** to allow groundwater production only from **a single aquifer in the Columbia River Basalt Group** 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 new or deepened basalt well shall be cased and continuously sealed from land surface to a depth of at least 118 feet below land surface.
2. Each new or deepened 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 every such well shall be no greater than 190 feet. However, an open interval of greater than 190 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 new or deepened basalt well can be constructed to eliminate hydraulic connection between multiple aquifers 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 at the time of pump installation, pump repair or pump replacement. 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 new or deepened basalt 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 new or deepened basalt 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 each new or deepened basalt 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 wells will produce from one or more water-bearing zones in the Columbia River Basalt Group (CRBG), a series of lava flows with a composite thickness that ranges from 300 to 400 feet in this area (Conlon et al., 2005), and likely thicker on topographic high such as those on which the subject wells are located. 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.

The proposed use of 10 acre-feet per year at a maximum rate of 54 gallons per minute (gpm) is unlikely to create drawdown interference with nearby wells that prevents access to water. Nearby wells access a variety of water-bearing zones within the CRBG aquifer system. Well logs in T3S/R3W- Section 23 report yields ranging from 1 to 140 gpm, with a median yield of 30 gpm. Therefore, it is unlikely that YAMH 52323 will be able to withdraw at its fully-permitted rate of 181 gpm, especially given the yield of 57.5 gpm reported on the well log.

Water levels in wells located higher on the hill and to the West show relatively stable trends (see Figures 2 and 3), while wells located to the East (YAMH 50854, YAMH 4548, and YAMH 121) show evidence of long-term decline. YAMH 52323 (YAMH 52323) is among the former group and has shown relatively stable water levels for the entire period of record, from 2000-2018. Given the nearby location nearly identical proposed construction for the proposed well, it is expected to access the same water-bearing zones and show similar water levels to YAMH 52323. The two water-bearing zones in YAMH 52323 appear to be hydraulically connected, given their identical water levels in the well log, and they are likely also connected with water-bearing zones accessed by nearby wells (see Figures 1 and 4). However, the proposed magnitude of development is not expected to cause injurious well-to-well interference with neighbors or long-term water level decline. Water use and water level monitoring conditions are recommended to protect existing users.

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 Group (CRBG) Aquifer**	☒	☐
2	**Columbia River Basalt Group (CRBG) Aquifer**	☒	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: According to nearby well logs, 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? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	1	**Harvey Creek**	**375-385**	**140-650**	**2000**	☒	☐	☐	☐	☒
2	1	**Harvey Creek**	**375-385**	**140-650**	**1965**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Groundwater levels were estimated using the range of measurements reported in YAMH 52323 since 2006, and surface water elevations represent the range of elevations within 1 mile of the wells. Water-bearing zones are reported in the confined interflow zones of the CRBG. These water-bearing zones are coincident with or above perennial reaches of Harvey Creek within a mile. The creeks have incised through several hundred feet of the Grande Ronde Basalt Formation of the CRBG. Groundwater from the uplands likely discharges to surface water, providing baseflow or spring flow to sustain nearby perennial reaches of the creek.

Water Availability Basin the well(s) are located within: Watershed ID 30200707: Chehalem Creek > Willamette River > Columbia River. Also within 1 mile is Watershed ID 182: WILLAMETTE R > COLUMBIA R - AB MOLALLA R.

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	☐	☐			☐	**0.39**	☒	*	☒
2	1	☐	☐			☐	**0.39**	☒	*	☒
		☐	☐			☐		☐		☐

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: YAMH 52323 is already authorized to withdraw 65 gpm under LL-1693, which had a FO issued on 4/17/2017, and 62 gpm under Certificate 87261. Therefore, for the purpose of evaluating potential impacts to streams, the combined rate of (62+65+54=) 181 gpm, or 0.403 cfs, was evaluated in this review. This combined rate is significantly higher than 1% of the 80% natural flow in the Chehalem Creek WAB (0.0039 cfs, ≈ 1.8 gpm), so PSI was assumed for both wells.
*There is no appropriate model to estimate streamflow depletion from pumping in CRBG interflow zones that are incised by streams or discharge to point sources such as springs. 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													
		%	%	%	%	%	%	%	%	%	%	%	%
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: 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.

Reidel, S.P., Johnson, V.G., and Spane, F.A., 2002, Natural gas storage in basalt aquifers of the Columbia Basin, Pacific Northwest USA—A guide to site characterization: Richland, Wash., Pacific Northwest National Laboratory, 277 p.

US Geological Survey Topographic Map, Dundee Quadrangle.

OWRD water level database, includes reported water levels, accessed 12/18/2018.

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
Water Availability as of 10/19/2004 for
CHEHALEM CR > WILLAMETTE R - AT MOUTH

Watershed ID #: 30200707 Basin: WILLAMETTE Exceedance Level: 80
Time: 15:19 Date: 10/19/2004

Month	Natural Stream Flow	CU + Stor Prior to 1/1/93	CU + Stor After 1/1/93	Expected Stream Flow	Reserved Stream Flow	Instream Water Rights	Net Water Available
1	101.00	3.11	0.00	97.90	0.00	0.00	97.90
2	115.00	2.97	0.00	112.00	0.00	0.00	112.00
3	80.60	2.20	0.00	78.40	0.00	0.00	78.40
4	33.00	1.31	0.00	31.70	0.00	0.00	31.70
5	14.90	1.87	0.00	13.00	0.00	0.00	13.00
6	8.48	3.14	0.00	5.34	0.00	0.00	5.34
7	2.13	4.69	0.00	-2.56	0.00	0.00	-2.56
8	0.59	3.87	0.00	-3.28	0.00	0.00	-3.28
9	0.39	2.26	0.00	-1.87	0.00	0.00	-1.87
10	3.05	0.61	0.00	2.44	0.00	0.00	2.44
11	11.50	0.90	0.00	10.60	0.00	0.00	10.60
12	66.20	2.44	0.00	63.80	0.00	0.00	63.80
Stor	48900	1770	0	47300	0	0	47300

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

WILLAMETTE R > COLUMBIA R - AB MOLALLA R
Watershed ID #: 182 Basin: WILLAMETTE Exceedance Level: 80
Time: 11:15 AM Date: 12/19/2018

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	1,650.00	2,180.00	0.00	1,500.00	685.00
SEP	3,890.00	1,390.00	2,500.00	0.00	1,500.00	998.00
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	960.00	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

Figure 1. Well Location Map

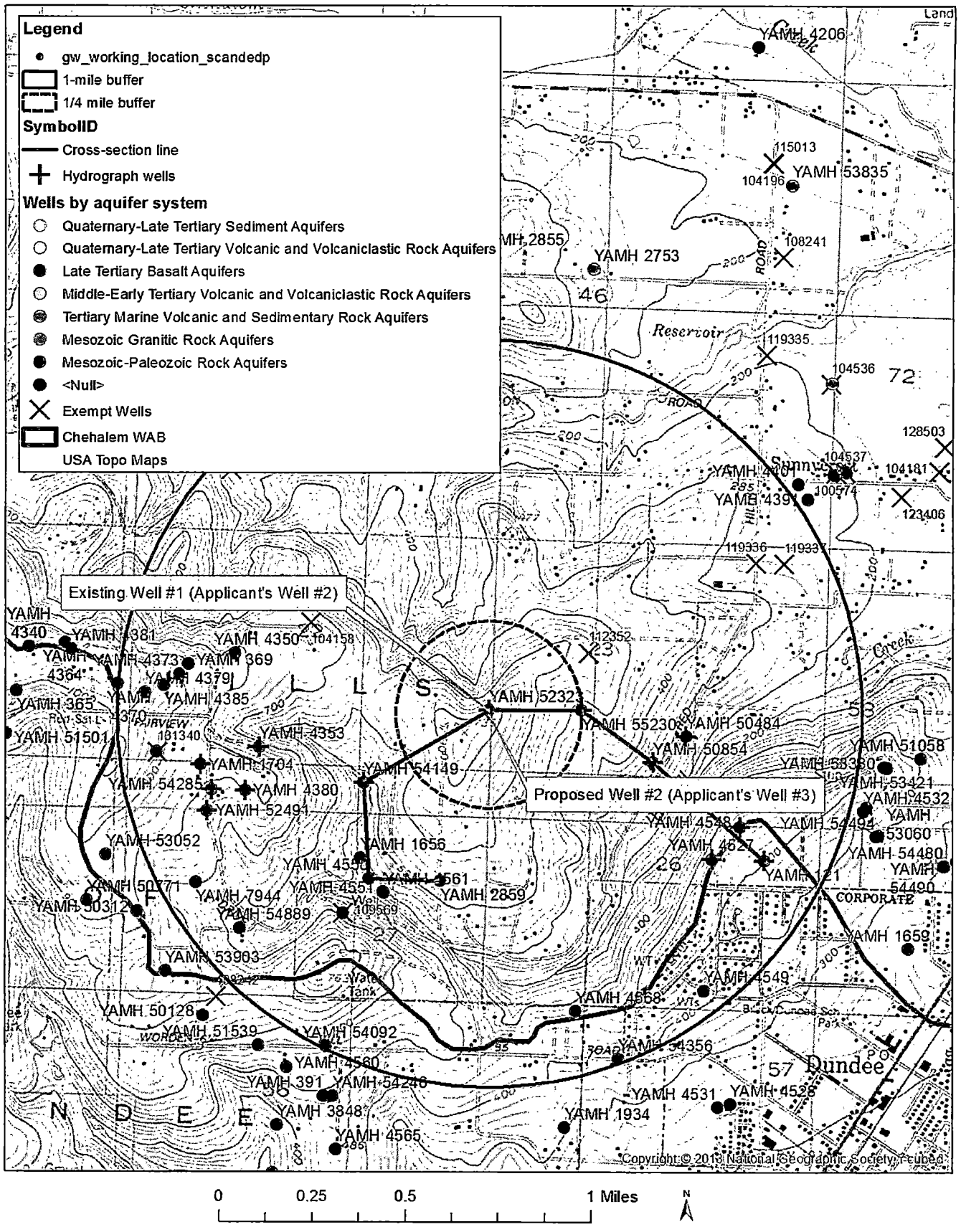

Figure 2. Water levels in Nearby Wells

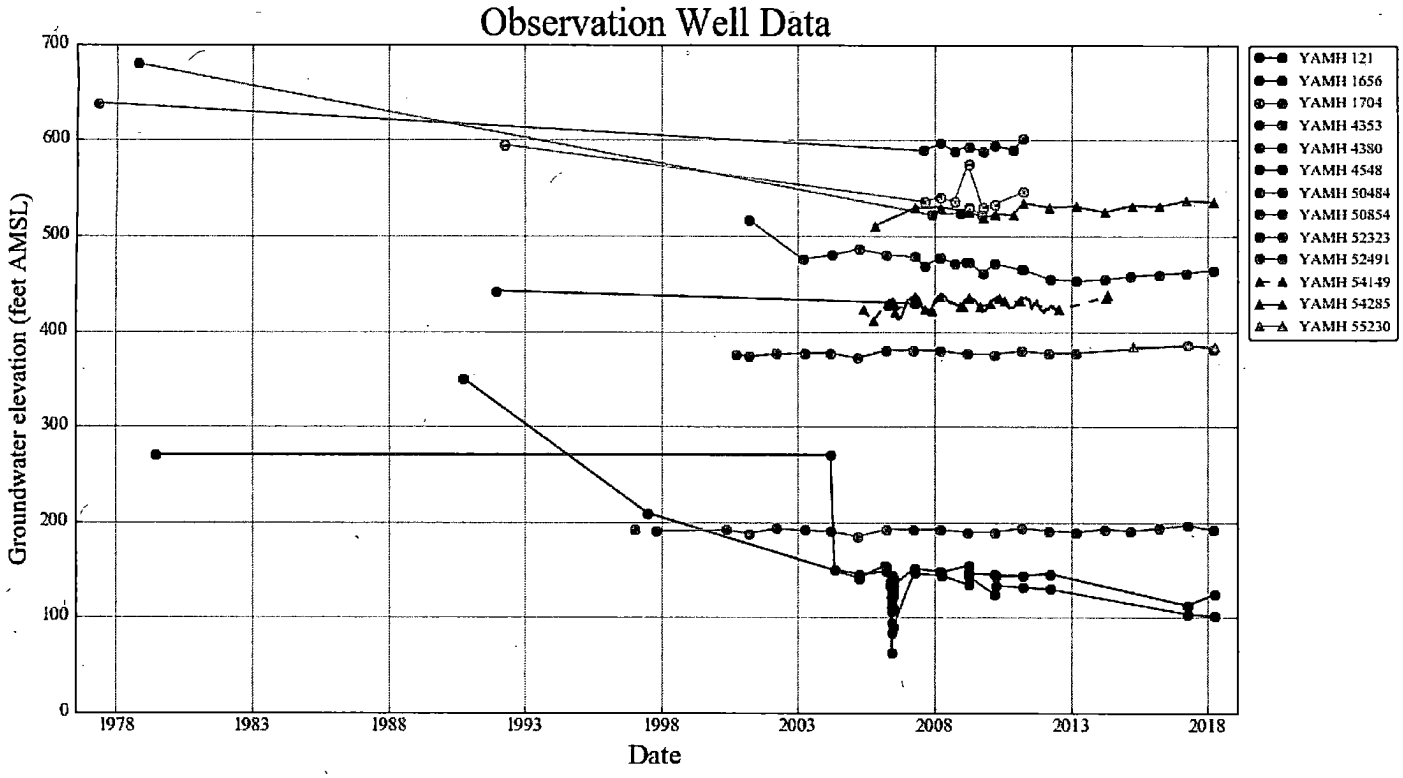

Figure 3. Water levels in nearby wells, focusing on a subset of the wells in the near vicinity of YAMH 52323.

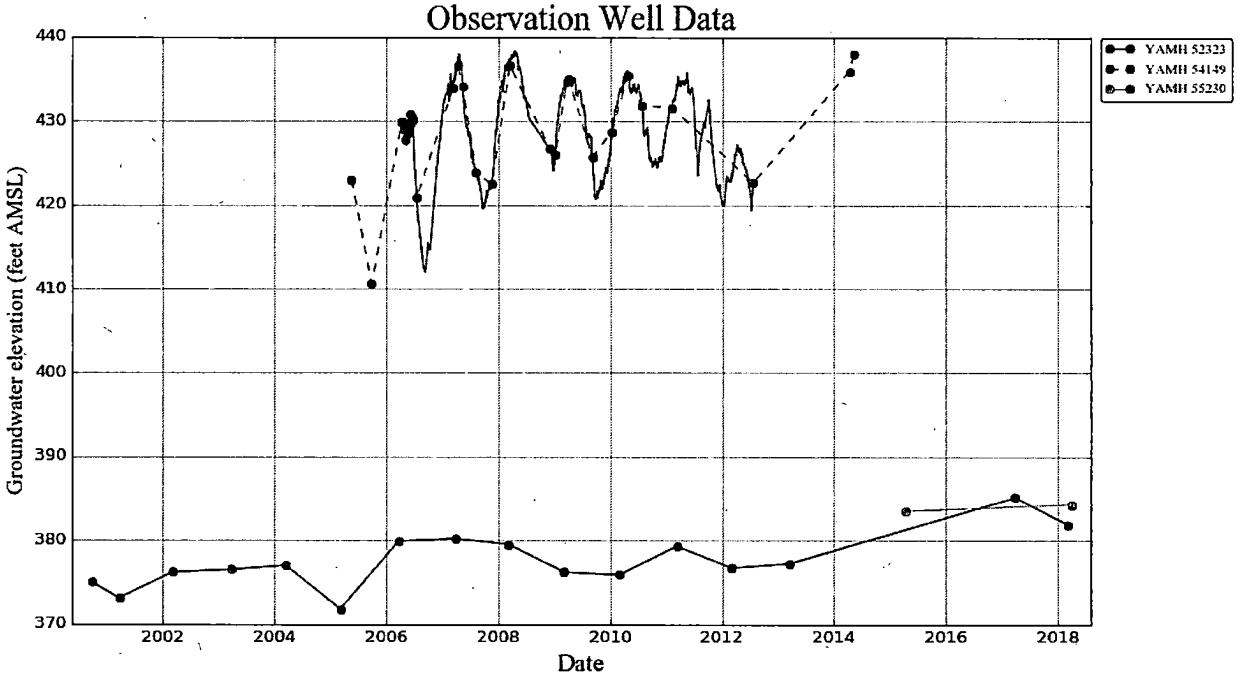

Figure 4. Lithographic cross-section of selected wells (YAMH 2859, YAMH 4550, YAMH 54149, YAMH 52323, YAMH 55230, YAMH 50854, and YAMH 121, reading from left to right).