Groundwater Review Summary Form

Application # G- 18329

GW Reviewer Aurora Bouchier **Date Review Completed:** Dec. 7, 2016

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:

[X] 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).

WATER RESOURCES DEPARTMENT

MEMO December 7, 2016

TO: **Application G-** 18329

FROM: **GW:** Aurora Bouchier
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ YES
The source of appropriation is within or above a Scenic Waterway

☒ NO

☐ YES
Use the Scenic Waterway condition (Condition 7J)

☒ NO

☐ Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.

☐ Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway.**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in _____ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date December 07, 2016
FROM: Groundwater Section Aurora C Bouchier
Reviewer's Name
SUBJECT: Application G- 18329 Supersedes review of na
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: **Robinson Farm LLC/Chris Robinson** County: **Yamhill**

A1. Applicant(s) seek(s) 1.69 cfs from 2 well(s) in the Willamette Basin, Yamhill subbasin

A2. Proposed use Nursery (67.6 acres) Seasonality: November - May

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 57192/57394	2	Alluvium	0.3119	5S/4W-7 SE-NE	2400' S, 85' W fr NE Cor S 7
2	YAMH 453	3	Alluvium	0.4456	5S/4W-8 SE-NW	890' S, 1520' E fr NE cor DLC 43
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	157	28	28	7/17/2015	105	0-42	+2-98	3-98	85-98	140*	na	A
2	153	68	25	1/7/1992	137	0-18	+2-137	Na	75-130	200	na	A

Use data from application for proposed wells.

A4. **Comments:** *The alteration log for proposed Well 2 (YAMH 57394) lists a yield of 60 gpm (air test)
Well 2 (YAMH 51729/57394) is authorized under T-11854 (GR Claim 2000) for a rate of 0.187 cfs for primary irrigation and 0.0135 cfs for supplemental irrigation. This right is currently owned by Robinson Farm LLC.
Well3 (YAMH 453) is authorized under Certificate 81063 for rate of 0.35 cfs for irrigation of 45 acres from March – October. This water rights is currently owned by Robinson Farm LLC.
The application lists well specific rates of 140 gpm (0.3119 cfs) and 200 gpm (0.4456 cfs) (respectively), however the well specific rates do not add up to the total maximum rate requested. Given the well yields listed on the well logs it is unlikely the wells will be capable of producing the requested rate of 1.69 cfs (758.5 gpm).

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 proposed wells are located greater than ¼ mile from a surface water body therefore the pertinent rules (OAR 690-502-0240) do not apply.

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: _____
Comments: _____

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

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

a. ☐ **is** over appropriated, ☐ **is not** over appropriated, *or* ☒ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;

b. ☐ **will not** *or* ☐ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;

c. ☐ **will not** *or* ☐ **will** likely to be available within the capacity of the groundwater resource; or

d. ☒ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
   i. ☒ The permit should contain condition #(s) **7N**;
   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:**

Nearby well logs show 40 to 60 feet of Willamette Silt which is underlain by 40 to 60 feet of sand and gravel layers interbedded with silt and clay layers. Gannett and Caldwell (1998) and Woodward et al. (1998) noted that the productive sand and gravel beds occurring throughout the sequence are separated layers of lower permeability silts and clay which progressively confine the deeper water-bearing zones. The water table occurs approximately 20-30 feet below land surface in this region (Conlon et al., 2005, Woodward et al., 1998, and the well logs for YAMH 57192 and YAMH 453).

State Observation Well 988 (YAMH 7310) is located approximately 1.7 miles southwest. The hydrograph of YAMH 7310 and other nearby wells show relatively stable long-term trends for alluvial wells in the vicinity of the proposed POAs with a seasonal variation of up to 40 feet. However, increased groundwater development in the area indicates a need for additional water-level monitoring (7N) if this permit is issued.

The groundwater review for T-11854 references an interference test conducted on a well (owned by McRae) located approximately 830 feet from YAMH 453. That test resulted in approximately 2 feet of drawdown after 3 hours of pumping. From this, potential interference after 120 days of pumping was estimated to be 10 to 20 feet. Since nearby wells are approximately 100 to 150 feet deep with depth to water ranging from 8 to 26 feet (varying seasonally) it was concluded that well to well interference should not bring the water level near the bottom of YAMH 453. The cone of depression at this location is expected to be broad and shallow, and well to well interference is not expected to prevent nearby water rights from receiving water.

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	**Alluvium**	☐	☒*
2	**Alluvium**	☒	☐
		☐	☐

Basis for aquifer confinement evaluation: *The well log for YAMH 57192 indicates unconfined conditions. However, this appears inconsistent with conditions normally found for wells with similar lithologies (this log indicates 57 feet of clay which is consistent with the mapped thickness of approximately 60 feet of Willamette Silt (Gannett and Caldwell., 1998) which generally acts to confine the alluvial aquifer). Upon further investigation, within Sections 7 & 8 there are 5 well logs, including YAMH 57192, which indicate unconfined conditions – all of which are drilled by the same driller. Other well logs in the area and published reports (Gannett and Caldwell., 1998) would indicate confined conditions. It is possible this well is producing from a confined source.

The well log for YAMH 453 indicates confined conditions.

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	**Salt Creek**	~129	100-115	2260	☒	☐	☐	☐	☒
2	1	**Salt Creek**	~128	100-115	1820	☒	☐	☐	☐	☒
1	2	**South Yamhill River**	~129	95-100	3500	☒	☐	☐	☐	☒
2	2	**South Yamhill River**	~128	95-100	4280	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: Published water-table maps indicate that groundwater in the alluvial aquifer flows toward, and discharges to, the South Yamhill River and its perennial tributaries (Woodward et al., 1998 Plate 1, and Conlon et al., 2005, Plate 1). Head data from YAMH 57192 and YAMH 453 and nearby wells corroborate this. However, there is a layer of low permeability Willamette Silt between the aquifer and the bottom of Salt Creek, so the connection is likely inefficient. The large distance between the wells and the South Yamhill River should likewise reduce the interference.
Water Availability Basin the well(s) are located within: 73562: SALT CR> S YAMHILL R- AT MOUTH, and potentially WAB 162: S YAMHILL R > YAMHILL R – AB COZINE 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	☐	☐	**IS 73562**	**0.4**	☒	**9.76**	☒	**<25%**	☒
2	1	☐	☐	**IS 73562**	**0.4**	☒	**9.76**	☒	**<25%**	☒
1	2	☐	☐	**IS 73556**	**15**	☒ ACB	**40.30**	☐	**<25%**	☒ ACB
2	2	☐	☐	**IS 73556**	**15**	☒ ACB	**40.30**	☐	**<25%**	☒ ACB

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: The well closest to the streams (YAMH 453 for the Salt Creek, and YAMH 57192 for the South Yamhill River) was modeled at the full proposed rate (not the stacked rate). The stream depletion at 30 days was estimated using the Hunt 2003 model. The presence of low permeability Willamette Silt between the aquifer and the beds of the streams result in an inefficient connection between the aquifer and Salt Creek. The large distance between the well and the river should result in low interference between the aquifer and the South Yamhill River. The stream depletion at 30 days is likely to be < 25%.

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													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(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:**

In the area surrounding the wells approximately 60 feet of Willamette Silt overly the alluvial aquifer (Gannett and Caldwell, 1998). The small streams are not completely incised through the Willamette Silt. In general, the silt has a low vertical hydraulic conductivity that will lower the efficiency the interchange of water between these streams and the alluvial aquifer. The South Yamhill River may penetrate the silt at this location. However, the large distance from the river to the wells should act to reduce interference.

References Used:

Application file: G-18329, and nearby G-15457 and T-11854

Conlon, Terrence D., Wozniak, Karl C., Woodcock, Douglas, Herrera, Nora B., Fisher, Bruce J., Morgan, David S., Lee, Karl K., and Hinkle, Stephen R., 2005, Ground-Water Hydrology of the Willamette Basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5168.

Gannett, Marshall W., and Caldwell, Rodney R., 1998, Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington: U. S. Geological Survey Professional Paper 1424-A.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Woodward, Dennis BG., Gannett, Marshall W., and Vaccaro, John J., 1998 Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington: U. S. Geological Survey Professional Paper 1424-B.

Nearby well logs and water level data, specifically: YAMH 57192/57394, YAMH 453, YAMH 7310, YAMH 57152, YAMH 54692, YAMH 54116, and YAMH 54068.

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

SALT CR > S YAMHILL R - AT MOUTH
Basin: WILLAMETTE

Watershed ID #: 73562
Time: 10:34 AM

Exceedance Level: 80
Date: 11/21/2016

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	154.00	17.70	137.00	0.00	0.40	136.00
FEB	168.00	15.30	153.00	0.00	0.40	152.00
MAR	143.00	12.80	130.00	0.00	0.40	130.00
APR	75.10	5.21	69.90	0.00	0.40	69.50
MAY	43.90	6.13	37.80	0.00	0.40	37.40
JUN	27.30	14.50	12.90	0.00	0.40	12.50
JUL	18.30	17.80	0.53	0.00	0.40	0.13
AUG	12.90	14.20	-1.29	0.00	0.40	-1.69
SEP	9.76	7.14	2.62	0.00	0.40	2.22
OCT	10.00	1.18	8.84	0.00	0.40	8.44
NOV	22.40	4.15	18.30	0.00	0.40	17.90
DEC	107.00	16.30	90.70	0.00	0.40	90.30
ANN	92,900	7,990	85,000	0	290	84,700

DETAILED REPORT OF INSTREAM REQUIREMENTS

SALT CR > S YAMHILL R - AT MOUTH

Watershed ID #: 73562
Time: 10:34 AM

Basin: WILLAMETTE
Date: 11/21/2016

Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
		Monthly values are in cfs.											
IS73562A	CERTIFICATE	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.40	0.4
MAXIMUM		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

S YAMHILL R > YAMHILL R - AB COZINE CR

Watershed ID #: 162
Time: 12:22 PM
Basin: WILLAMETTE
Exceedance Level: 80
Date: 12/07/2016

Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
JAN	1,290.00	29.80	1,260.00	0.00	15.00	1,250.00
FEB	1,470.00	28.00	1,440.00	0.00	15.00	1,430.00
MAR	1,260.00	20.00	1,240.00	0.00	15.00	1,230.00
APR	764.00	15.20	749.00	0.00	15.00	734.00
MAY	378.00	23.90	354.00	0.00	15.00	339.00
JUN	171.00	44.20	127.00	0.00	15.00	112.00
JUL	79.00	66.70	12.30	0.00	15.00	-2.65
AUG	47.70	55.70	-8.05	0.00	15.00	-23.00
SEP	40.30	34.20	6.10	0.00	15.00	-8.90
OCT	53.80	9.37	44.40	0.00	15.00	29.40
NOV	363.00	14.90	348.00	0.00	15.00	333.00
DEC	1,220.00	28.10	1,190.00	0.00	15.00	1,180.00
ANN	847,000	22,400	825,000	0	10,900	815,000

DETAILED REPORT OF INSTREAM REQUIREMENTS

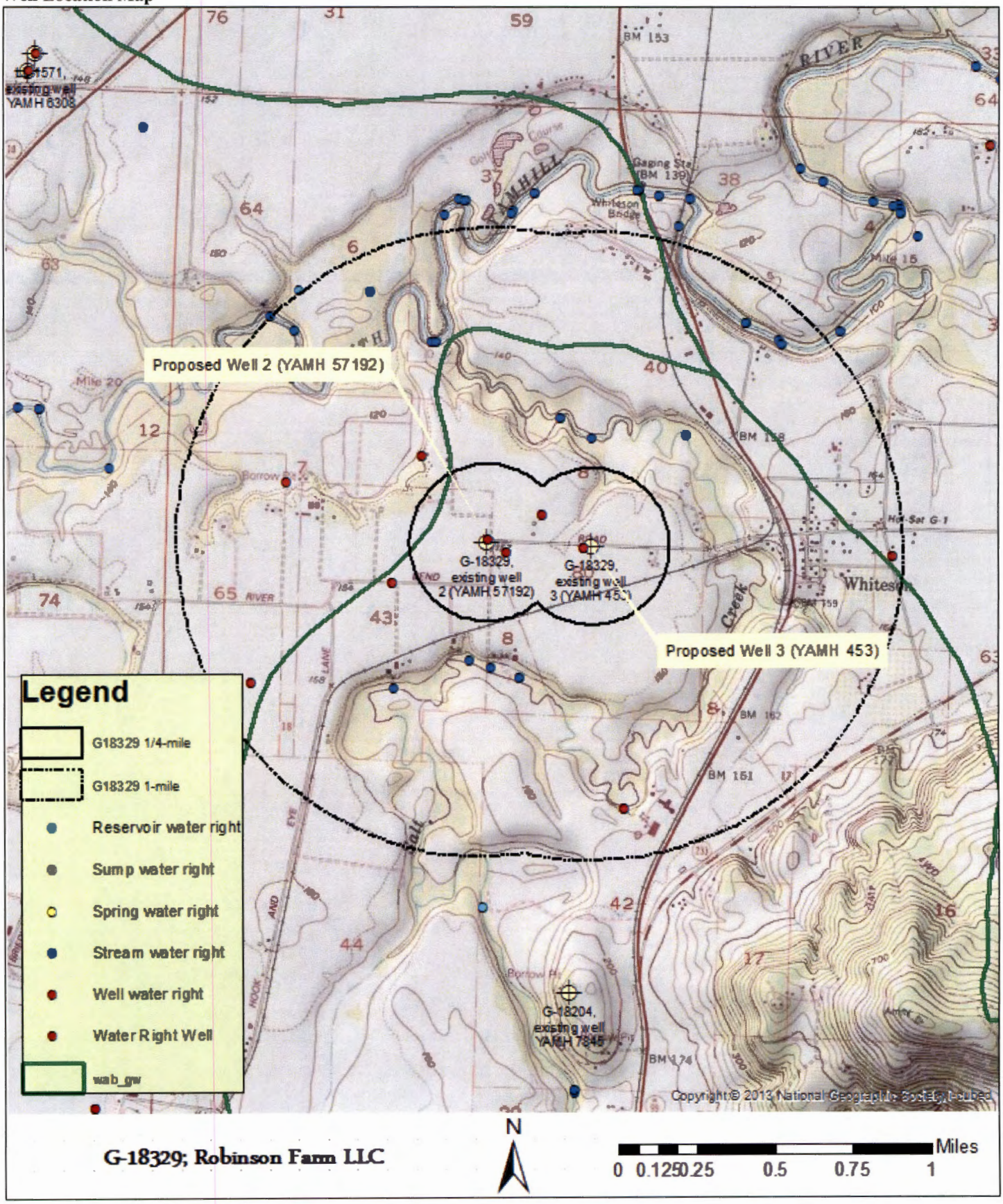
S YAMHILL R > YAMHILL R - AB COZINE CR

Watershed ID #: 162
Time: 2:14 PM
Basin: WILLAMETTE
Date: 12/07/2016

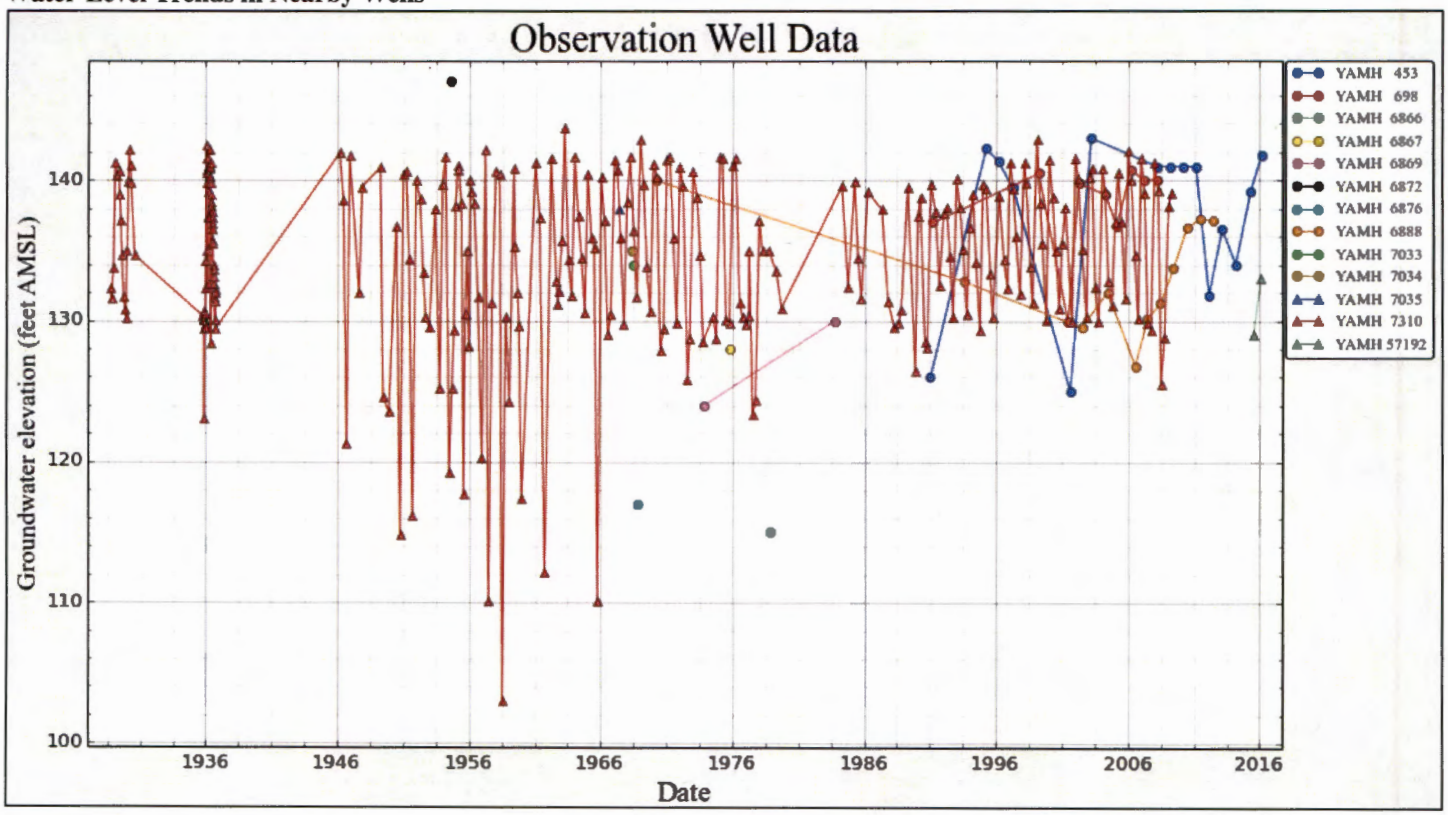
Monthly values are in cfs.

Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MF162A	CERTIFICATE	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.00	15.0
IS73556A	CERTIFICATE	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.20	14.2
IS73557A	CERTIFICATE	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.70	12.7
IS73558A	CERTIFICATE	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.00	12.0
IS73559A	CERTIFICATE	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.50	10.5
MAXIMUM		15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0

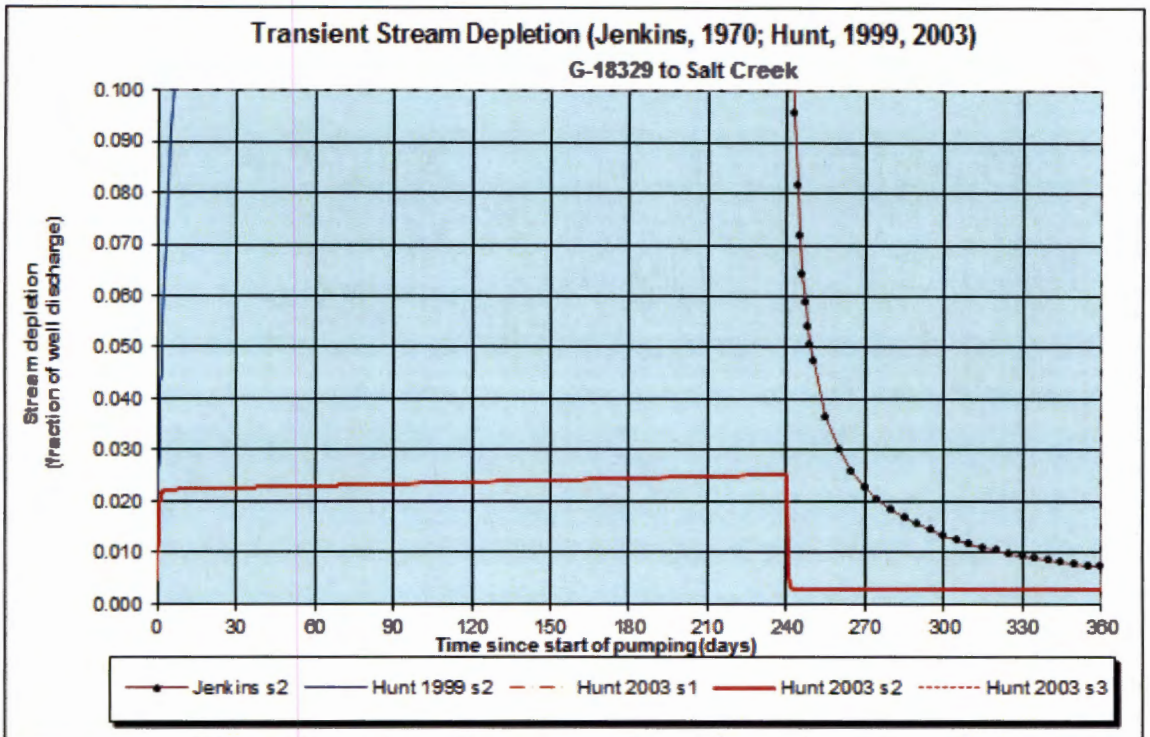
Well Location Map



Water-Level Trends in Nearby Wells

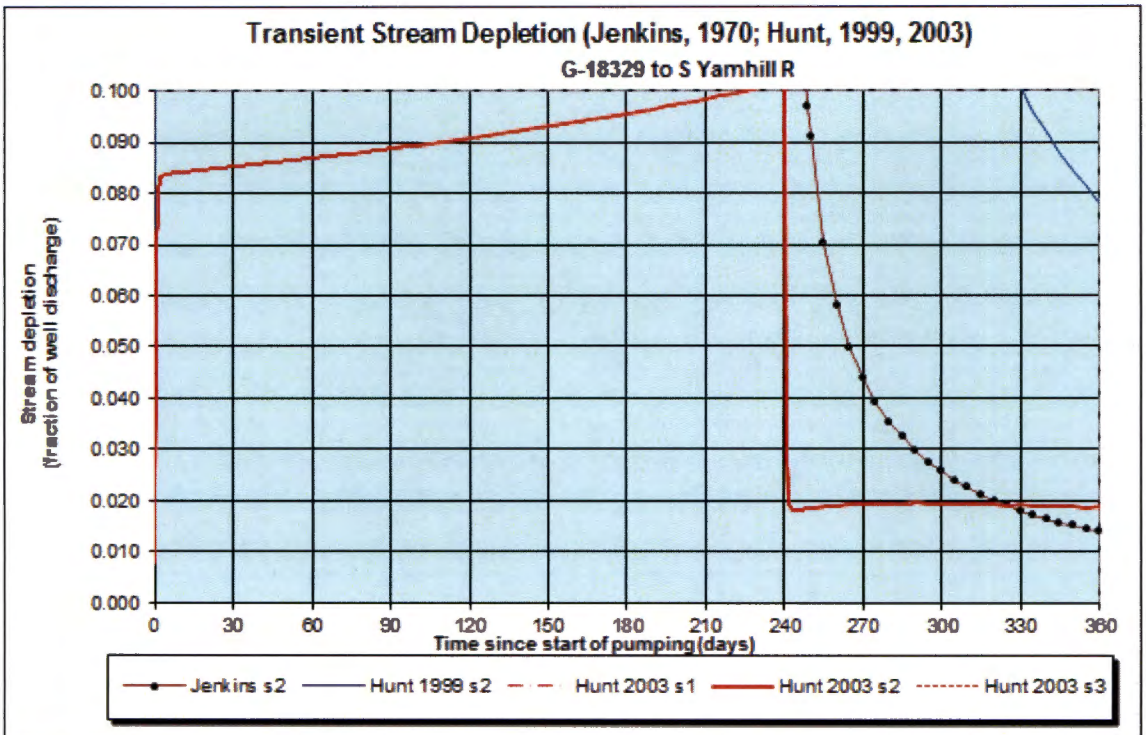


Stream Interference



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 240 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	96.6%	97.6%	98.0%	98.3%	98.5%	98.6%	98.7%	98.8%	2.3%	1.3%	0.9%	0.7%
H SD 1999	21.8%	29.0%	33.8%	37.5%	40.5%	42.9%	45.0%	46.9%	26.7%	21.0%	17.5%	15.1%
H SD 2003	2.26%	2.30%	2.34%	2.38%	2.41%	2.45%	2.49%	2.53%	0.30%	0.30%	0.30%	0.30%
Qw, cfs	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671
H SD 99, cfs	0.365	0.485	0.566	0.627	0.676	0.717	0.753	0.784	0.447	0.351	0.293	0.252
H SD 03, cfs	0.038	0.038	0.039	0.040	0.040	0.041	0.042	0.042	0.005	0.005	0.005	0.005

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	750.00	750.00	750.00	gpm
Time pump on (pumping duration)	tpon	240	240	240	days
Perpendicular from well to stream	a	1820	1820	1820	ft
Well depth	d	137	137	137	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer saturated thickness	b	60	60	60	ft
Aquifer transmissivity	T	3000	3000	3000	ft*ft/day
Aquifer storativity or specific yield	S	0.0001	0.0001	0.0001	
Aquitard vertical hydraulic conductivity	Kva	0.01	0.01	0.01	ft/day
Aquitard saturated thickness	ba	60	60	60	ft
Aquitard thickness below stream	babs	10	10	10	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	50	50	50	ft
Streambed conductance (lambda)	sbc	0.050000	0.050000	0.050000	ft/day
Stream depletion factor	sdf	0.110413	0.110413	0.110413	days
Streambed factor	sbf	0.030333	0.030333	0.030333	
input #1 for Hunt's Q_4 function	t'	9.056877	9.056877	9.056877	
input #2 for Hunt's Q_4 function	K'	0.184022	0.184022	0.184022	
input #3 for Hunt's Q_4 function	epsilon'	0.000500	0.000500	0.000500	
input #4 for Hunt's Q_4 function	lamda'	0.030333	0.030333	0.030333	



Output for Stream Depletion, Scenerio 2 (s2):	Time pump on (pumping duration) = 240 days											
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	93.4%	95.3%	96.2%	96.7%	97.1%	97.3%	97.5%	97.7%	4.4%	2.6%	1.8%	1.4%
H SD 1999	64.7%	73.5%	77.9%	80.6%	82.5%	83.9%	85.0%	85.9%	22.0%	13.8%	10.0%	7.8%
H SD 2003	8.52%	8.69%	8.87%	9.07%	9.30%	9.55%	9.84%	10.15%	1.95%	1.94%	1.93%	1.88%
Qw, cfs	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671	1.671
H SD 99, cfs	1.081	1.229	1.301	1.347	1.378	1.402	1.421	1.436	0.368	0.231	0.168	0.130
H SD 03, cfs	0.142	0.145	0.148	0.152	0.155	0.160	0.164	0.170	0.033	0.032	0.032	0.031

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	750.00	750.00	750.00	gpm
Time pump on (pumping duration)	tpon	240	240	240	days
Perpendicular from well to stream	a	3500	3500	3500	ft
Well depth	d	137	137	137	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer saturated thickness	b	60	60	60	ft
Aquifer transmissivity	T	3000	3000	3000	ft*ft/day
Aquifer storativity or specific yield	S	0.0001	0.0001	0.0001	
Aquitard vertical hydraulic conductivity	Kva	0.01	0.01	0.01	ft/day
Aquitard saturated thickness	ba	60	60	60	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	100	100	100	ft
Streambed conductance (lambda)	sbc	0.333333	0.333333	0.333333	ft/day
Stream depletion factor	sdf	0.408333	0.408333	0.408333	days
Streambed factor	sbf	0.388889	0.388889	0.388889	
input #1 for Hunt's Q_4 function	t'	2.448980	2.448980	2.448980	
input #2 for Hunt's Q_4 function	K'	0.680556	0.680556	0.680556	
input #3 for Hunt's Q_4 function	epsilon'	0.000500	0.000500	0.000500	
input #4 for Hunt's Q_4 function	lamda'	0.388889	0.388889	0.388889	

Elev. 157

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

YAMH 57192

8/6/2015

WELL I.D. LABEL# L 119327
START CARD # 1027208
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D. 2930
First Name _____ Last Name _____
Company ROBINSON FARM LLC
Address POB 100
City AMITY State OR Zip 97101

(2) TYPE OF WORK

[X] New Well [ ] Deepening [ ] Conversion [ ] Alteration (complete 2a & 10) [ ] Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other _____

(4) PROPOSED USE

[ ] Domestic [X] Irrigation [ ] Community
[ ] Industrial/ Commericial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other _____

(5) BORE HOLE CONSTRUCTION

Special Standard [ ] (Attach copy)
Depth of Completed Well 98.00 ft.

BORE HOLE

Dia	From	To
12	0	42
10	42	98
8	98	105

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	42	31	S
		Calculated	28	
		Calculated		

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other POUR/PROBE/HYDRATE
Backfill placed from 98 ft. to 105 ft. Material CAVING GRAVEL
Filter pack from _____ ft. to _____ ft. Material _____ Size _____
Explosives used: [ ] Yes Type _____ Amount _____

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
(•)	( )	8	[X]	2	98	.25	(•)	( )	[X]	[ ]
( )	( )		[ ]				( )	( )	[ ]	[ ]
( )	( )		[ ]				( )	( )	[ ]	[ ]
( )	( )		[ ]				( )	( )	[ ]	[ ]
( )	( )		[ ]				( )	( )	[ ]	[ ]

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s) _____
Temp casing [X] Yes Dia 12 From 0 To 6

(7) PERFORATIONS/SCREENS

Perforations Method drive down
Screens Type _____ Material _____

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Perf	Casing	8	85	96	.2	1	300	

(8) WELL TESTS: Minimum testing time is 1 hour

( ) Pump ( ) Bailer (•) Air ( ) Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
140		98	4

Temperature 54 °F Lab analysis [ ] Yes By _____
Water quality concerns? [ ] Yes (describe below) TDS amount 148 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County YAMHILL Twp 5.00 S N/S Range 4.00 W E/W WM
Sec 7 SE 1/4 of the NE 1/4 Tax Lot 100
Tax Map Number _____ Lot _____
Lat ° ' " or _____ DMS or DD
Long ° ' " or _____ DMS or DD
( ) Street address of well (•) Nearest address
NONE, NEXT TO 9950 SW RIVERBEND RD, MCMINNVILLE

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			[ ]	
Completed Well	7/17/2015		[ ]	28

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 28.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
7/17/2015	28	105	140			28

(11) WELL LOG

Ground Elevation _____

Material	From	To
top soil	0	6
clay, brown	6	23
clay blue gray w/occ fine sand	23	63
sand, black w/some gray clay	63	72
sand, w/occ fine/med gravel in clay	72	84
gravel, poorly sorted w/sand in clay	84	104
claystone, dark gray	104	105

Date Started 7/16/2015 Completed 7/17/2015

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number _____ Date _____

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1438 Date 7/20/2015

Signed DAVID PAYSINGER (E-filed)

Contact Info (optional) bluewaterdrilling.com 503 868 7878

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

YAMH 57394
2/25/2016

WELL I.D. LABEL# L 119327
START CARD # 1029606
ORIGINAL LOG # YAMHILL 57192

(1) LAND OWNER
Owner Well I.D. 2977
First Name _____ Last Name _____
Company ROBINSON FARM LLC
Address POB 100
City AMITY State OR Zip 97101

(2) TYPE OF WORK
☐ New Well ☐ Deepening ☐ Conversion
☒ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION
	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:						○	○		

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD
☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other _____

(4) PROPOSED USE
☐ Domestic ☒ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other _____

(5) BORE HOLE CONSTRUCTION
Special Standard ☐ (Attach copy)
Depth of Completed Well 98.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/lbs
8	0	98					
					Calculated		
					Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other _____
Backfill placed from _____ ft. to _____ ft. Material _____
Filter pack from 60 ft. to 98 ft. Material 3/8" Size pea gravel
Explosives used: ☐ Yes Type _____ Amount _____

(5a) ABANDONMENT USING UNHYDRATED BENTONITE
Proposed Amount Actual Amount

(6) CASING/LINER
Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	●	6		3	98	SCH 40	○	●	☒	
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s) _____
Temp casing ☐ Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS
Perforations Method circular saw
Screens Type _____ Material _____

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Perf	Liner	6	82	97	6	0.1	196	

(8) WELL TESTS: Minimum testing time is 1 hour
○ Pump ○ Bailer ◉ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
60		97	4.5

Temperature 54 °F Lab analysis ☐ Yes By _____
Water quality concerns? ☐ Yes (describe below) TDS amount 148 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
County YAMHILL Twp 5.00 S N/S Range 4.00 W E/W WM
Sec 7 SE 1/4 of the NE 1/4 Tax Lot 100
Tax Map Number _____ Lot _____
Lat ° ' " or _____ DMS or DD
Long ° ' " or _____ DMS or DD
○ Street address of well ◉ Nearest address
NONE, NEXT TO 9950 SW RIVERBEND RD, MCMINNVILLE

(10) STATIC WATER LEVEL
	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration	2/10/2016			24
Completed Well	2/10/2016			24

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG
Ground Elevation _____

Material	From	To

Date Started 2/10/2016 Completed 2/10/2016

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
License Number _____ Date _____
Signed _____

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
License Number 1438 Date 2/11/2016
Signed DAVID PAYSINGER (E-filed)
Contact Info (optional) bluewaterdrilling.com 503 868 7878

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

WATER SUPPLY WELL REPORT - continuation page

YAMH 57394

2/25/2016

WELL I.D. LABEL# L	119327
START CARD #	1029606
ORIGINAL LOG #	YAMHILL 57192

(2a) PRE-ALTERATION

Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

Material	From	To	Amt	sacks/lbs

Water Quality Concerns

From	To	Description	Amount	Units

(5) BORE HOLE CONSTRUCTION

BORE HOLE Dia	From	To

SEAL Material	From	To	Amt	sacks/lbs
		Calculated		
		Calculated		
		Calculated		
		Calculated		

FILTER PACK

From	To	Material	Size

(10) STATIC WATER LEVEL

SWL Date	From	To	Est Flow	SWL(psi)	+ SWL(ft)

(11) WELL LOG

Material	From	To

(6) CASING/LINER

Casing Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Comments/Remarks

Install liner and redevelop with air