

1 July, 2015

SUBJECT: Scenic Waterway Interference Evaluation

[illegible]

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 1 July 2015

FROM: Groundwater Section Gerald H. Grondin
Reviewer's Name

SUBJECT: Application G- 17990 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: Philip Hammak County: Lake

A1. Applicant(s) seek(s) (3,030) 6.75 cfs from 4 well(s) in the Goose-Summer Lakes Basin,
Tired Horse Lake watershed in the Summer Lake subbasin

A2. Proposed use Primary Irrigation (539.96 acres) Seasonality: 1 March to 31 October (245 days)

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	Not drilled yet	Well 1	Basalt or Basin-Fill	3.375	24S/22E-sec 27 ACB	NW cor of SW qtr of NE qtr S 27
2	Not drilled yet	Well 2	Basalt or Basin-Fill	3.375	24S/22E-sec 22 DCA	NW cor of SW qtr of SE qtr S 22
3	Not drilled yet	Well 3	Basalt or Basin-Fill	3.375	24S/22E-sec 22 CCA	NW cor of SW qtr of SW qtr S 22
4	Not drilled yet	Well 4	Basalt or Basin-Fill	3.375	24S/22E-sec 21 DCA	NW cor of SW qtr of SE qtr S 21

* 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	4565	?	295*	08/11/10*	P 400	P 0-40	P +2-400	?	P 200-400	P 1515	?	?
2	4565	?	295*	08/11/10*	P 400	P 0-40	P +2-400	?	P 200-400	P 1515	?	?
3	4565	?	295*	08/11/10*	P 400	P 0-40	P +2-400	?	P 200-400	P 1515	?	?
4	4565	?	295*	08/11/10*	P 400	P 0-40	P +2-400	?	P 200-400	P 1515	?	?

Use data from application for proposed wells.

A4. Comments: _____

The proposed total maximum rate (6.75 cfs, 3,030 gpm) and total maximum duty (1,620 ac-ft/yr) are what is typically allowed for 539.96 acres.

The application proposes allowing a specified maximum rate and duty at each individual well up to half of the total maximum rate and duty.

*The static groundwater level (SWL) measurement and date is based on the driller reported measurement related to nearby well LAKE 52262.

The wells are not drilled yet. The proposed aquifer is basalt or basin-fill. A recommended permit condition will be to limit all the proposed POA wells to obtain groundwater from the predominantly basin-fill unit or from the predominantly basalt-volcanic rock and sediment unit. Water well reports for other wells in the vicinity suggest the predominantly basin-fill unit thickness ranges from 30 to over 200 feet. The proposed POA wells will likely penetrate the predominantly basin-fill unit and enter some distance into the predominantly basalt-volcanic rock and sediment unit.

- A5. ☐ **Provisions of the 690-513-0060 (Summer lake Sub-basin)** Basin rules relative to the development, classification and/or management of ground water hydraulically connected to surface water ☐ **are**, or ☒ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: _____

The proposed well sites are from 14.3 to 15.5 miles northeast (outside) of the Fort Rock Groundwater Limited Area. However Note: limited available data indicates the proposed POA well is hydraulically connected to the Fort Rock Groundwater Limited Area. See part B3.

- A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **Fort Rock Groundwater Limited Area**
Comments: _____

The proposed POA well sites are from 14.3 to 15.5 miles northeast (outside) of the Fort Rock Groundwater Limited Area. Miller (1986) shows the proposed POA well locations as part of the northern down-gradient groundwater outflow to the Deschutes Basin from the Fort Rock Groundwater Limited Area. The state observation well within the Fort Rock Groundwater Limited area (well LAKE 284 = state obs. well 344) closest to the proposed POA well sites (about 21.5 miles away to the southwest) has a groundwater elevation of about 4,280 feet. Three existing wells closest to the proposed POA well sites appear to have driller reported static groundwater elevations of about 4268 to 4279 feet, an apparent difference of 1 to 12 feet from the state observation well.

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:
- ☐ The permit should contain condition #(s) _____;
 - ☐ The permit should be conditioned as indicated in item 2 below.
 - ☐ 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: _____

If a permit is issued, recommend conditions: 7B, 7F, 7K (modified), 7N, 7P, 7T, and the following

The “large” water use condition: (require a totalizing flow meter at each well. Each flow meter shall be located within 50 feet of the wellhead and adjacent to each flow meter shall be a clearly visible monument with a sign noting the flow meter. Lastly, require for every flow meter the reading, recording (monthly at minimum), and annual reporting of the flow meter data, all flow meters).

7K condition (well construction): “The proposed well(s) shall each be constructed to develop groundwater from either the predominantly basin fill unit or the underlying predominantly volcanic/sedimentary bedrock unit, but not both.

If the well(s) are to develop groundwater from the predominantly volcanic/sedimentary bedrock unit, the wells shall be continuously cased and continuously sealed a minimum of five (5) feet into the predominantly volcanic/sedimentary bedrock unit beneath the predominantly basin fill unit. The wells may not be completed in such a manner that they allow ground water to be developed from the overlying basin fill. If during well construction, it becomes apparent that the wells can be constructed to eliminate interference with nearby shallow wells or 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 well is constructed first and then the request made, requested modification will not be approved. The new well depth and construction specifications will be incorporated into any certificate issued for this permit.

If the well(s) are to develop groundwater from the predominantly basin fill unit, they may not be completed in such a manner that they allow groundwater to be developed from the underlying predominantly volcanic/sedimentary bedrock unit. If, during the course of drilling, the well penetrates through the predominantly basin fill unit into the predominantly volcanic/sedimentary bedrock unit, the lower part of the well below the basin fill shall be properly abandoned (sealed).”

Special Permit Condition (monitoring well): The permittee shall construct one (1) minimum six-inch diameter observation well to penetrate the same aquifer as the production wells. The observation well shall be located at the northwest corner of section 27 of Township 24 South, Range 22 East. The well shall meet the Department’s minimum well construction standards and shall be cased and sealed to the same depth as the production wells. The well shall be constructed for the purpose of instrumentation with continuous water-level monitoring equipment. The landowner or permittee shall provide access to Department staff to install and maintain the monitoring equipment. The well shall not be used for any other purpose while the Department is monitoring water levels. The well shall be completed prior to water use under the terms of any permit issued.

The surface geology at and around the proposed POA well sites was mapped by Walker and others (1967), Roche (1987) and most recently by Boschmann (2012). The surface geology at the proposed well sites is mapped as playa deposits (Qp) described as poorly consolidated fine sand, silt, and clay generally restricted to areas of active deposition in the interior of poorly drained basins with flat topography. Immediately east and north of the playa deposits alluvium (Qal) and older alluvium and colluvium (Qoa). The Qal is described as unconsolidated gravel, sand, and silt composed of rhyolite, obsidian, pumice, and basalt clasts that are sub-angular to rounded and poorly to moderately sorted. The Qoa is described as typically found on slope flanks and bases and composed of unconsolidated to poorly consolidated gravel, sand, and silt containing rhyolite, obsidian, pumice, and basalt clasts that are angular to rounded and generally unsorted; a thin and poorly developed soil covers the Qoa. These sedimentary deposits are bounded by various volcanic rock units that include plagioclase-olivine glomeropheric basalt (Tgb), plagioclase megaphyric basalt (Qpmb), plagioclase intergranular basalt (Tpib), basalt of Parmele Ridge (Tbpr), basaltic andesite (Tba), pyroclastic rhyolite (Tr3), felsite (Trlf), and other volcanic rock deposits. The geologic cross-section through the vicinity shows a thin layer of the playa deposits (Qp) overlying successive basalt layers (Qpmb, Tgb, and Tbpr) with intercalated basalt lava flows, sedimentary deposits, and tuffaceous rocks below the Qpmb, Tgb, and Tbpr.

As previously noted, the proposed POA well sites are from 14.3 to 15.5 miles northeast (outside) of the Fort Rock Groundwater Limited Area. Limited available data indicates the proposed POA well is hydraulically connected to the Fort Rock Groundwater Limited Area. Miller (1986) shows the proposed POA well locations as part of the northern down-gradient groundwater outflow to the Deschutes Basin from the Fort Rock Groundwater Limited Area. The state observation well within the Fort Rock Groundwater Limited area (well LAKE 284 = state obs. well 344) closest to the proposed POA well sites (about 21.5 miles away to the southwest) has a groundwater elevation of about 4,280 feet. Three existing wells closest to the proposed POA well sites appear to have driller reported static groundwater elevations of about 4268 to 4279 feet, an apparent difference of 1 to 12 feet from the state observation well. Currently, there is not enough data to compare seasonal and annual groundwater level trends. Applicant may want to put the file on administrative hold to allow data collection for trend analysis.

The proposed POA well sites are from 4 to 5 miles south (outside) of the Deschutes Scenic Waterway Area. Miller (1986) shows the proposed POA well locations as part of the northern down-gradient groundwater outflow to the Deschutes Basin (including the Deschutes Scenic Waterway Area) from the Fort Rock Groundwater Limited Area. The potential impact on Deschutes Basin water (including the Deschutes Scenic Waterway Area) is likely limited given Miller shows the groundwater gradient north of Glass Buttes increases significantly. That significant groundwater gradient increase likely relates to a change in the geologic deposits to much less permeable, much lower hydraulic conductivity deposits.

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	Basalt or Basin Fill	☐	☒
2	Basalt or Basin Fill	☐	☒
3	Basalt or Basin Fill	☐	☒
4	Basalt or Basin Fill	☐	☒
		☐	☐

Basis for aquifer confinement evaluation: _____

Available data indicates the groundwater is generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement.

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	Unnamed intermittent streams	4270	4565	2100	☐	☒	☐	☐	☒
2	1	Unnamed intermittent streams	4270	4565	3300	☐	☒	☐	☐	☒
3	1	Unnamed intermittent streams	4270	4565	5452	☐	☒	☐	☐	☒
4	1	Unnamed intermittent streams	4270	4570	6300	☐	☒	☐	☐	☒
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: _____

No perennial streams found in the area, only intermittent streams whose elevations are nearly 300 feet higher than the groundwater elevation at the proposed POA well site. These intermittent streams flow out of upland areas and appear to terminate at broader valley below.

Water Availability Basin the well(s) are located within: No water availability basin identified.

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	☐	☐	N.A.	N.A.	☐	N.A.	☐	N.A.	☐
2	1	☐	☐	N.A.	N.A.	☐	N.A.	☐	N.A.	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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:

No analysis. No hydraulic connection and no surface water availability data. At least one stream (intermittent) distance is less than one-mile from two of the proposed POA wells sites. No perennial streams found in the area, only intermittent streams whose elevations are nearly 300 feet higher than the groundwater elevation at the proposed POA well site. These intermittent streams flow out of upland areas and appear to terminate at broader valley below.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on its right side, suggesting it's resting on a surface.

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.

[illegible]

(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: _____

No analysis. No hydraulic connection and no surface water availability data. The streams (intermittent) distance is less more one-mile from two of the proposed POA wells sites. No perennial streams found in the area, only intermittent streams whose elevations are nearly 300 feet higher than the groundwater elevation at the proposed POA well site. These intermittent streams flow out of upland areas and appear to terminate at broader valley below.

[illegible]

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:
- ☐ The permit should contain condition #(s) _____;
 - ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. SW / GW Remarks and Conditions: _____

If a permit is issued, recommend conditions: 7B, 7F, 7K (modified), 7N, 7P, 7T, and the following

The "large" water use condition: (require a totalizing flow meter at each well. Each flow meter shall be located within 50 feet of the wellhead and adjacent to each flow meter shall be a clearly visible monument with a sign noting the flow meter. Lastly, require for every flow meter the reading, recording (monthly at minimum), and annual reporting of the flow meter data, all flow meters).

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As previously noted, the proposed POA well sites are from 14.3 to 15.5 miles northeast (outside) of the Fort Rock Groundwater Limited Area. Limited available data indicates the proposed POA well is hydraulically connected to the Fort Rock Groundwater Limited Area. Miller (1986) shows the proposed POA well locations as part of the northern down-gradient groundwater outflow to the Deschutes Basin from the Fort Rock Groundwater Limited Area. The state observation well within the Fort Rock Groundwater Limited area (well LAKE 284 = state obs. well 344) closest to the proposed POA well sites (about 21.5 miles away to the southwest) has a groundwater elevation of about 4,280 feet. Three existing wells closest to the proposed POA well sites appear to have driller reported static groundwater elevations of about 4268 to 4279 feet, an apparent difference of 1 to 12 feet from the state observation well. Currently, there is not enough data to compare seasonal and annual groundwater level trends. Applicant may want to put the file on administrative hold to allow data collection for trend analysis.

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References Used: _____

Boschmann, Darrick E. 2012. Structural and volcanic evolution of the Glass Buttes Area, High Lava Plains, Oregon. Oregon State University Master of Science in Geology Thesis, November 29, 2012.

Gonthier, J.B. 1985, A description of aquifer units in eastern Oregon: USGS Water Resources Investigations Report 84-4095, 39 p., 4 plates.

Miller, D.W., 1984, Appraisal of ground-water conditions in the Fort Rock Basin, Lake County, Oregon: Oregon Water Resources Department, Open File Report, 157 p.

Miller, D.W., 1986, Appraisal of ground-water conditions in the Fort Rock Basin, Lake County, Oregon: Oregon Water Resources Department, Ground Water Report No. 31, 196 p and plates.

Morgan, D.S., 1988, Geohydrology and numerical model analysis of ground-water flow in the Goose Lake Basin, Oregon and California: USGS Water Resources Investigations Report 87-4058, 92 p.

Oregon Water Resources Department, 1989, Goose and Summer Lakes Basin report: OWRD Basin Report, 112 p.

Peterson, N.V. and McIntyre, J.R., 1970, The reconnaissance geology and mineral resources of eastern Klamath County and western Lake County, Oregon: DOGAMI Bulletin 66, 70 p.

Peterson, N.V., and Brown, D.E., 1980, Preliminary geology and geothermal resource potential of the Lakeview area, Oregon: DOGAMI Open-File Report O-80-09, 57 p., 1:62,500 maps.

Phillips, K.N. and VanDenburgh, A.S., 1971, Hydrology and geochemistry of Abert, Summer, and Goose Lakes, and other closed-basin lakes in south-central Oregon: USGS Professional Paper 502-B, 86p.

Roche, R.L. 1987. Stratigraphic and geochemical evolution of the Glass Buttes complex, Oregon. Portland State University.

Walker, G.W., 1963, Reconnaissance geologic map of the eastern half of the Klamath Falls (AMS) quadrangle, Lake and Klamath Counties, Oregon: USGS Mineral Investigations Field Studies Map MF-260.

Walker, G.W. and Reppening, C.A., 1965, Reconnaissance geologic map of the Adel quadrangle, Lake, Harney, and Malheur Counties, Oregon: USGS Miscellaneous Geologic Investigations Map I-446.

Walker, G.W., Peterson, N.V., and Greene, R.C. 1967. Reconnaissance geologic map of the east half of the Crescent Quadrangle, Lake, Deschutes, and Crook Counties, Oregon: USGS Miscellaneous Geologic Investigations Map I-493.

Waring, G.A., 1908, Geology and water resources of a portion of south-central Oregon: USGS Water Supply Paper 220, 85 p.

Wells, F.G., and Peck, D.L., 1961, Geologic map of Oregon west of the 121st meridian: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-325.

Goose and Summer Lakes Basin Program rules (OAR 690-513).

State observation well 344 (well LAKE 284).

Water well reports for area wells, particularly wells LAKE 76, LAKE 77, LAKE 51431, and LAKE 52262

Tired Horse Butte USGS quadrangle maps (1:24,000 scale)

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: 1, 2, 3, 4 Logid: None of the 4 wells are drilled yet

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:** _____

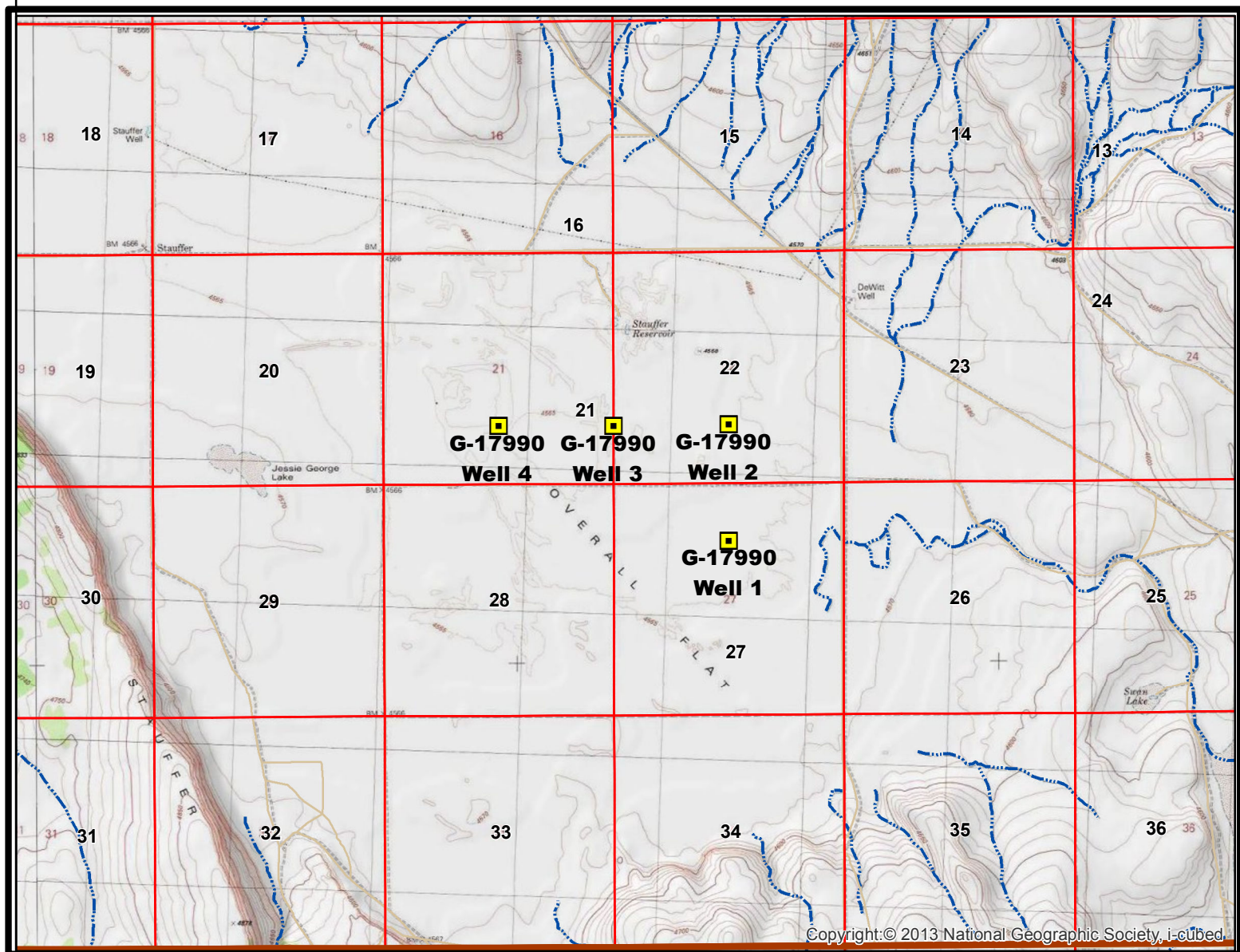
D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Surface Water Availability Tables: none for this area

Well Location Map: see attached

Water-Level Trends in Nearby Wells: currently none for this area

Groundwater Permit Application G-17990 Hamak Corporation.

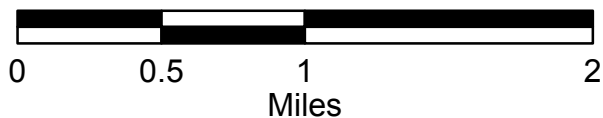
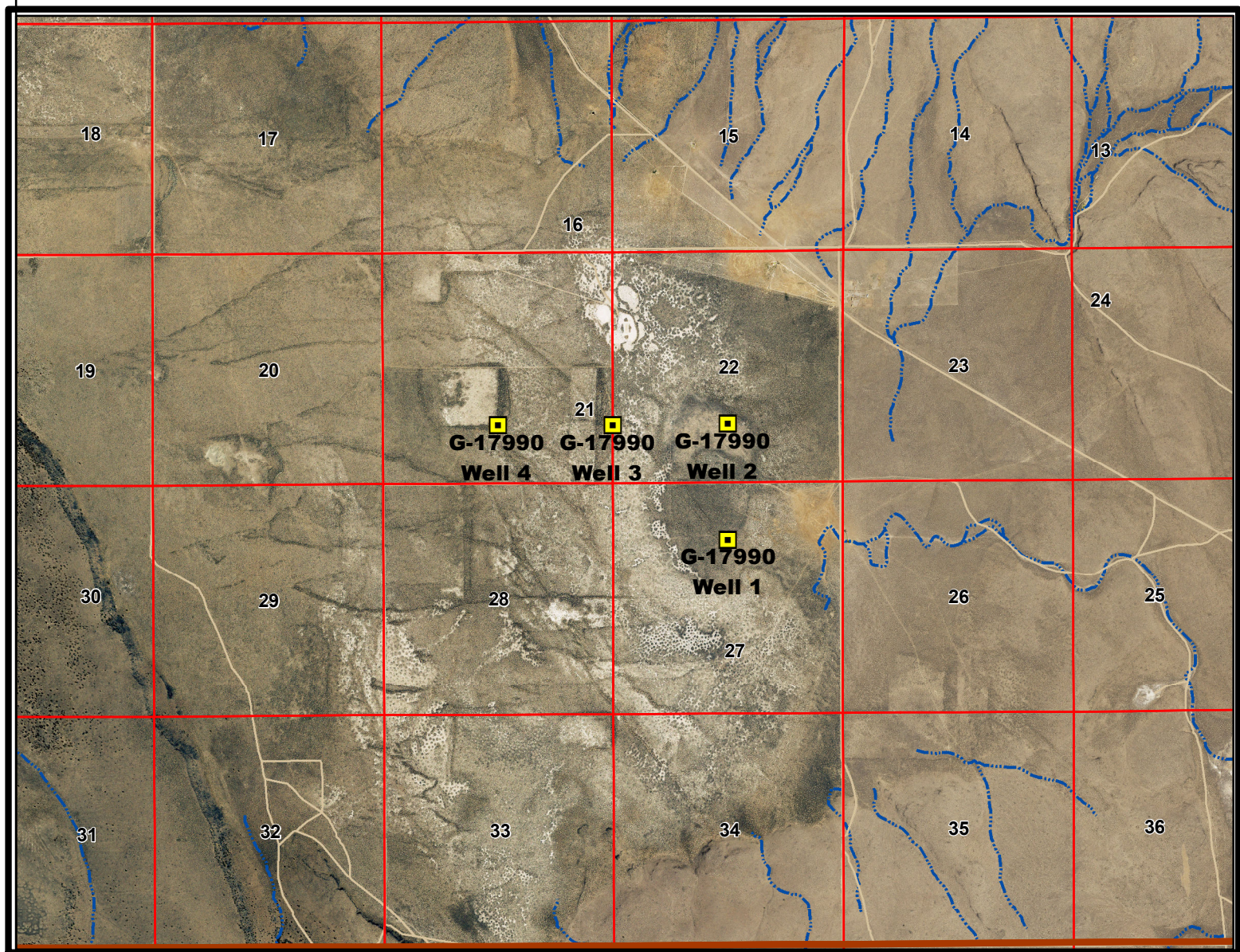


Yellow = Application Noted Well(s)
Red = Other Existing or Proposed Wells

Blue and Other = surface water rights



Groundwater Permit Application G-17990 Hamak Corporation.



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Oregon Water Resources Department (OWRD) Well Location

25.00S/19.00E-31DCX

OWRD Logid

LAKE 284

OWRD Well Tag (Well ID)

OWRD State Observation Well Number

344

Total well depth (feet below land surface)

225

Land surface elevation (feet above mean sea level)

Primary use of well

Primary aquifer system

