

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date December 22, 2015

FROM: Groundwater Section Aurora C Bouchier / Ken Lite
Reviewer's Name

SUBJECT: Application G- 18147 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: Kenneth Burbank County: Deschutes

A1. Applicant(s) seek(s) 2.67 cfs from 4 well(s) in the Deschutes Basin,
Lower Crooked subbasin

A2. Proposed use irrigation (320 acres) Seasonality: March 1 – 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	PROPOESD	1	Tertiary Volcanic	2.67	20S/17E-19 SW-NW	3211' N, 635' E fr SW cor S 19
2	PROPOESD	2	Tertiary Volcanic	2.67	20S/17E-19 SW-SW	627' N, 620' E fr SW cor S 19
3	PROPOESD	3	Tertiary Volcanic	2.67	20S/17E-30 SW-NW	1996' S, 628' E fr NW cor S 30
4	PROPOESD	4	Tertiary Volcanic	2.67	20S/17E-30 SW-SW	671' N, 624' E fr SW cor S 30
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	4424				400-600	18-20						
2	4399				400-600	18-20						
3	4431				400-600	18-20						
4	4411				400-600	18-20						

Use data from application for proposed wells.

A4. **Comments:** The wells will likely be constructed into Tertiary lava. Regional groundwater flow is towards the northwest, with the nearest likely downgradient discharge area (gaining reach of the Crooked River) at a distance of about 40 miles.

A5. ☒ **Provisions of the** Deschutes 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: Wells will be located outside the USGS Deschutes Groundwater Study area.

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, 7T;
 - 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:** _____

There are no nearby State Observation Wells. The nearest State Observation Well within the same basin with a likely similar response is DESC 53516, located about 20 miles to the east-southeast (see map below). It has been monitored periodically since 1993. Overall, DESC 53516 shows a downward trend throughout the period of record. This trend is consistent with climate cycles. Since 1993, the water level has dropped about 5.75 feet, likely, mostly as a result of decreased recharge. Two additional State Observation wells (LAKE 240, ~28 miles to the south-southeast and LAKE 504, ~28 miles to the south-southwest) located in the upper margin of the Goose & Summer Lakes Basin show a similar downward trend, likely also mostly as a result of decreased recharge (see hydrograph below), speaking to the effects of the climatic cycle in a larger region.

The applicant is requesting a maximum pumping rate of 1200 gpm from any single well. A review of well logs in the southern third of T19S/R16E and T19S/R17E, and all of T20S/R16E, T20S/R17, T21S/R16S and T21S/R17S indicates the highest reported yield is 50 gpm (DESC 59382) and the lowest yield is 0 gpm (DESC 58566, see attached table). The lack of nearby high-yield wells raises some questions regarding the sustainability of pumping at the requested rate at the POAs.

In general, local hydrologic and geologic data are sparse; available data suggest the groundwater resource may have difficulty providing the requested amount. If a permit is issued, it should include the following special conditions which are intended to assess the capacity of the resource and provide subsurface geologic information.

SPECIAL CONDITION 1) The Groundwater section of OWRD must be notified 10-days prior to the beginning of activity of the construction of the first well.

SPECIAL CONDITION 2) Each well with a pump shall be equipped with a dedicated ¾-inch diameter (minimum) water-level measurement tube, separate from other methods of measuring the water level such as airlines or transducers. The annual water level measurement required in the permit (condition 7N) shall be measured through the measuring tube.

Data Collection

For special conditions 3 and 4, data collection shall be supervised by an Oregon registered geologist.

SPECIAL CONDITION 2) Drill cuttings shall be collected at the permitted wells and any test holes. Samples shall be collected at ten-foot intervals and at changes in lithology.

SPECIAL CONDITION 3) At least one long-term aquifer test shall be conducted to examine interference with nearby users, aquifer boundaries, the ability of the wells to supply the requested amount, and aquifer properties. A data collection plan shall be submitted for Department approval before testing. The test shall be conducted at a constant rate for a minimum of 72-hours. Water level drawdown and recovery measurements shall be made in the pumped well and should be made in at least one additional well.

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	Tertiary volcanics	☐	☒
2	Tertiary volcanics	☐	☒
3	Tertiary volcanics	☐	☒
4	Tertiary volcanics	☐	☒
		☐	☐

Basis for aquifer confinement evaluation: The water-bearing zones may be locally semi-confined because of the spatial variability in permeability inherent to the lava flows.

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	Dry River	~4000	4310	13000	☐	☒	☐	☐	☒
2	1	Dry River	~4000	4310	15500	☐	☒	☐	☐	☒
3	1	Dry River	~4000	4310	17500	☐	☒	☐	☐	☒
4	1	Dry River	~4000	4310	20000	☐	☒	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: The local groundwater elevation (based on static water level reported on the well log for DESC 6485) is below the elevation of the nearest reach of Dry River.

Water Availability Basin the well(s) are located within: 30530501: DRY RIVER> CROOKED R- AT MOUTH

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?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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: _____

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: _____

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:** _____

References Used: _____
 Application files for: G-18147; and G-17065, including the original groundwater review (2008) and the re-review (2010).

USGS Quadrangle Maps for Millican SE and Brother SW.

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: US Geological Survey, Miscellaneous Geologic Investigations Map I-493.

Well reports for DESC 6485 (nearby well); DESC 53516, LAKE 240, and LAKE 504 (State Observation Wells).

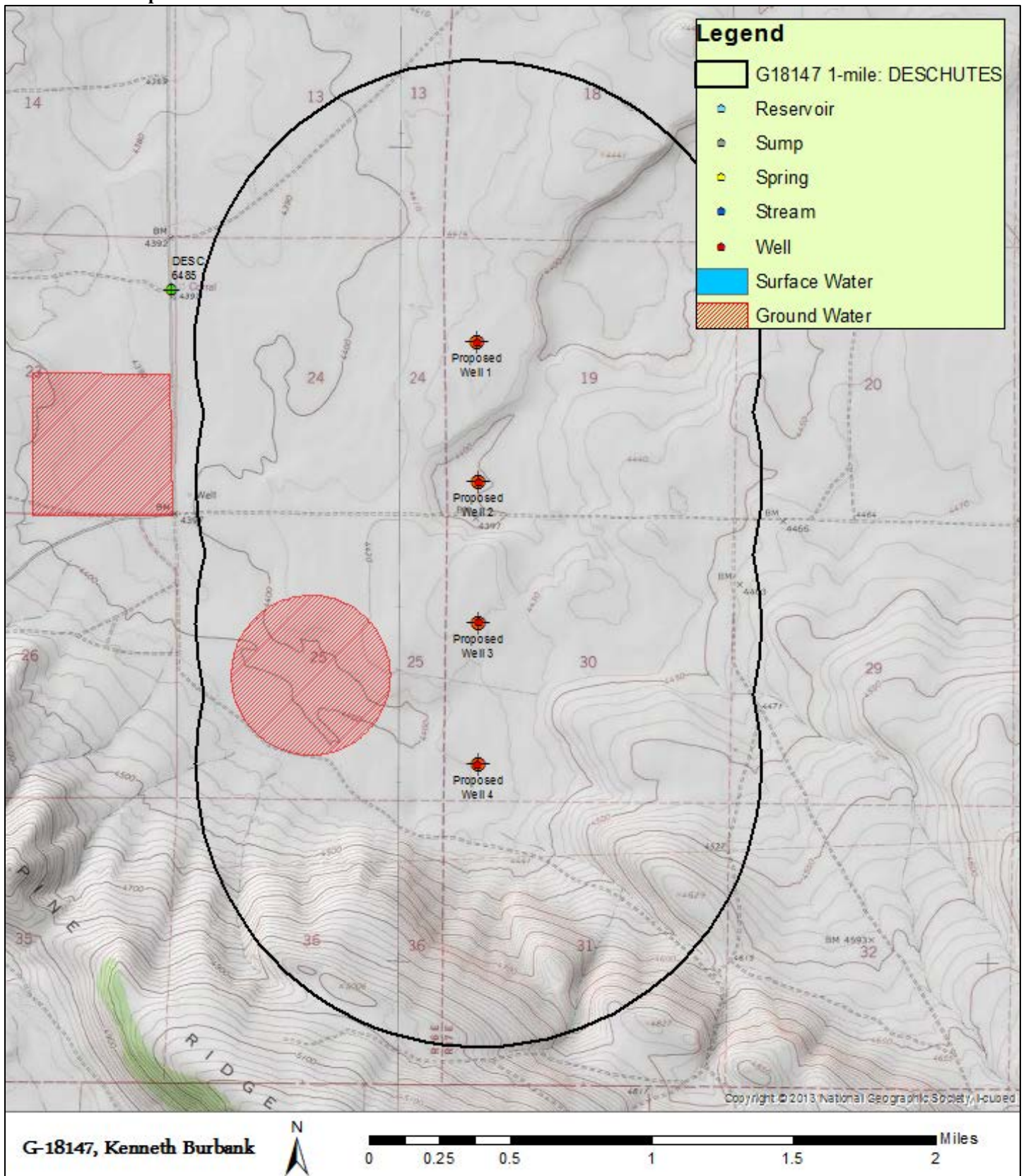
D. WELL CONSTRUCTION, OAR 690-200D1. **Well #:** _____ **Logid:** _____D2. **THE WELL does not appear to meet current well construction standards based upon:**

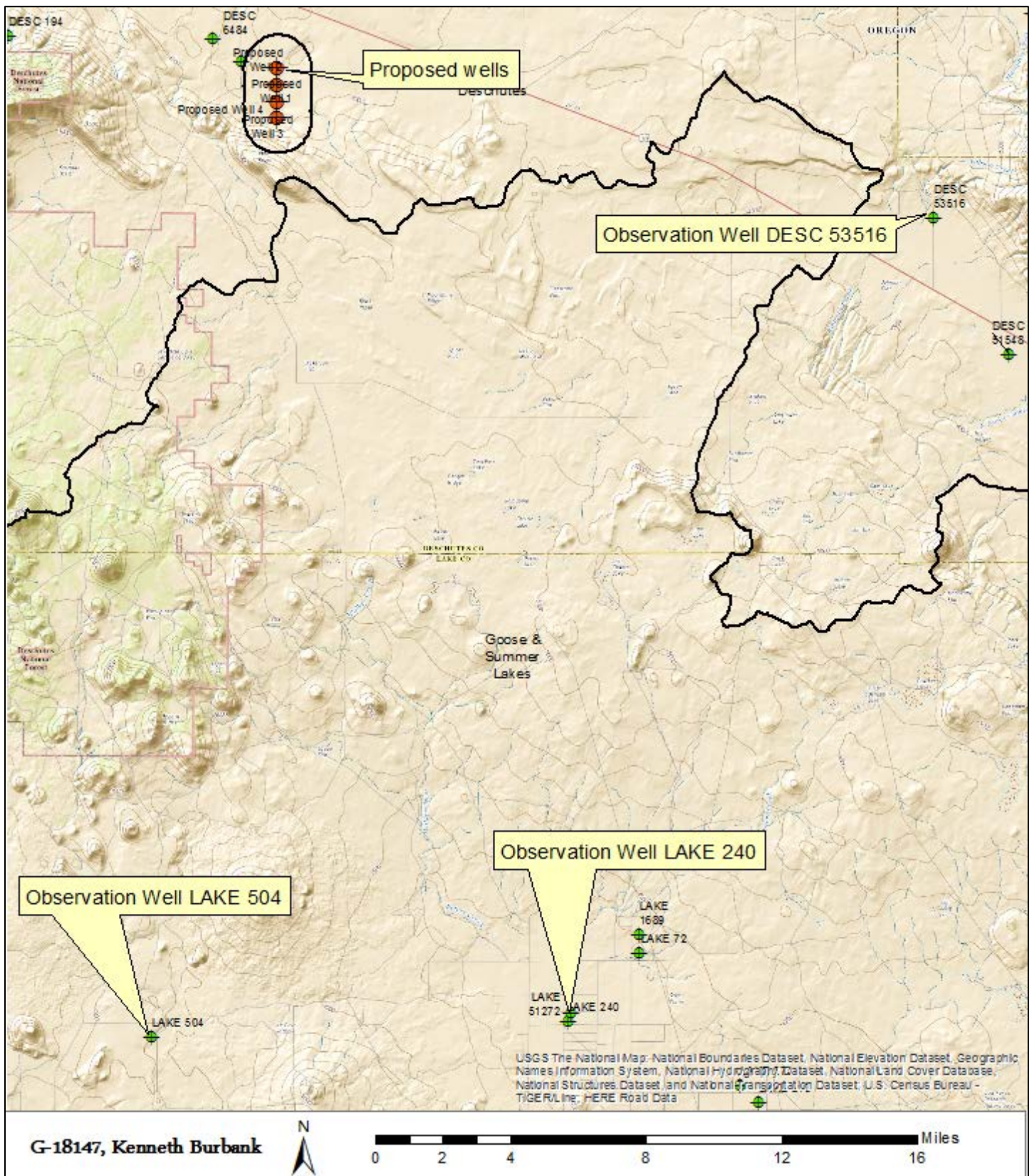
- a. ☐ review of the well log;
 b. ☐ field inspection by _____;
 c. ☐ report of CWRE _____;
 d. ☐ other: (specify) _____

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**

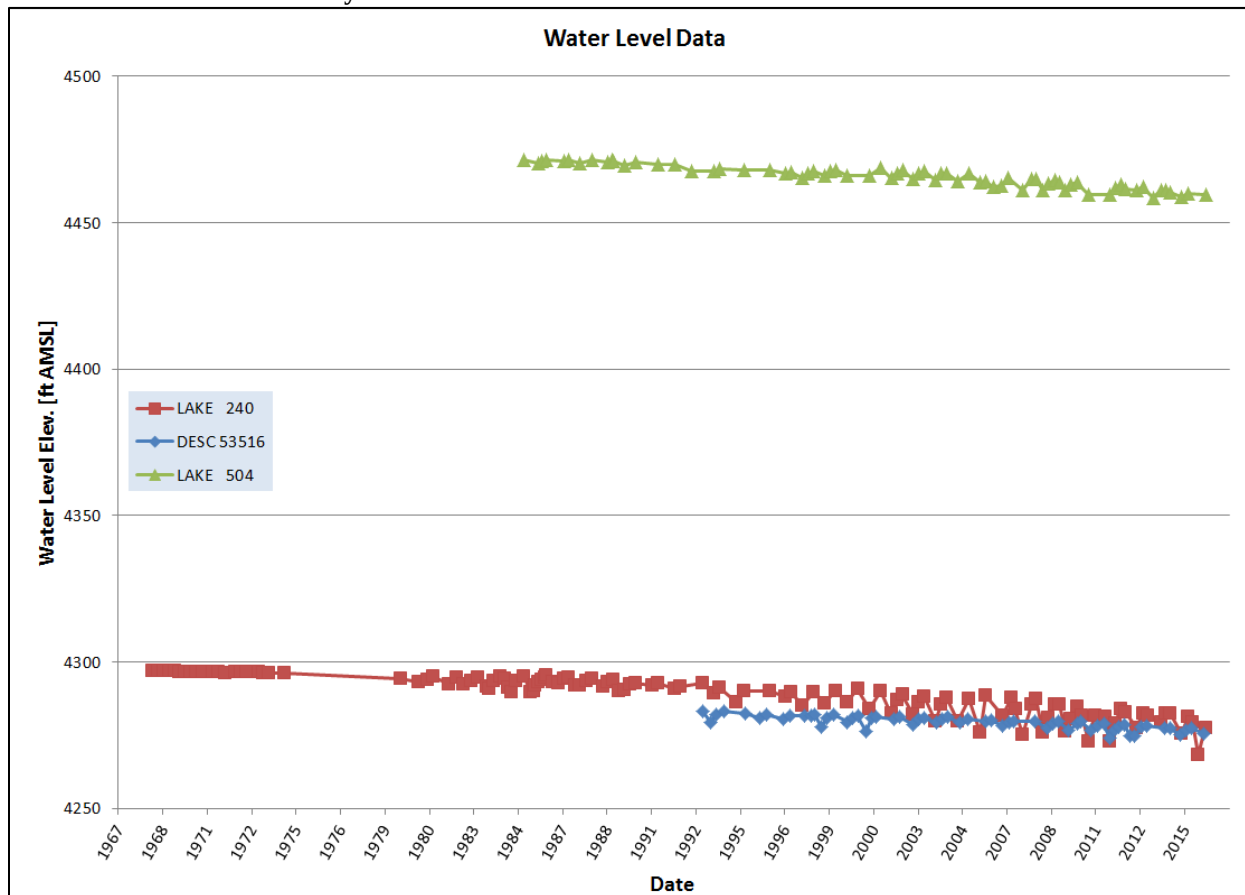
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 30530501		DRY R > CROOKED R - AT MOUTH			Exceedance Level: 80	
Time: 9:03 AM		Basin: DESCHUTES			Date: 12/21/2015	
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	0.00	1.22	-1.22	0.00	0.00	-1.22
FEB	0.00	1.34	-1.34	0.00	0.00	-1.34
MAR	0.00	1.22	-1.22	0.00	0.00	-1.22
APR	0.00	3.31	-3.31	0.00	0.00	-3.31
MAY	0.00	5.47	-5.47	0.00	0.00	-5.47
JUN	0.00	6.52	-6.52	0.00	0.00	-6.52
JUL	0.00	6.59	-6.59	0.00	0.00	-6.59
AUG	0.00	6.59	-6.59	0.00	0.00	-6.59
SEP	0.00	5.94	-5.94	0.00	0.00	-5.94
OCT	0.00	2.65	-2.65	0.00	0.00	-2.65
NOV	0.00	1.26	-1.26	0.00	0.00	-1.26
DEC	0.00	1.22	-1.22	0.00	0.00	-1.22
ANN	0	2,620	0	0	0	0

Well Location Maps





Water-Level Trends in Nearby Wells



Well Log Information of Nearby Wells

	Test Type	Yield (gpm)	Drawdown (feet)	Test Length (hours)	Well Depth (feet)
CROO	2897	Bailer	5	10	150
DESC	225	Air	15	0	570
DESC	5755	Bailer	4	0	875
DESC	5757	Air	15	1	505
DESC	6480	Bailer	3	0	442
DESC	6481	Bailer	5	0	445
DESC	6482	Bailer	5	0	445
DESC	6483				507
DESC	6484	Pump	5		274
DESC	6485	Pump	16	0	540
DESC	50747	Pump	4	140	249
DESC	52142	Air	20	1	610
DESC	53693	Air	16	1	600
DESC	54733	Air	15	1	545
DESC	58210	Air	35	1	565
DESC	58566	Air	0	1	800
DESC	59253	Air	8	1	435
DESC	59382	Air	50	1	676