

# Groundwater Application Review Summary Form

Application # G- 18535

GW Reviewer Aurora Bouchier Date Review Completed: 8/22/2017

## 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 August 22, 2017  
 FROM: Groundwater Section Aurora C Bouchier  
Reviewer's Name  
 SUBJECT: Application G- 18535 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: Susan and Andy Hermreck County: Crooked

A1. Applicant(s) seek(s) 1.14 cfs from 1 well(s) in the Deschutes Basin,  
Beaver – South Fork (Crooked River) subbasin (Paulina and Mud Springs quadrangles)

A2. Proposed use Irrigation (91.5 acres) Seasonality: April 1 – October 1

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    | CROO 2759 | 11                 | Basalt            | 1.14               | 16S/24E-31 SE-NW      | 1770' S, 70' W fr N1/4 cor S 31                                  |
| 2    |           |                    |                   |                    |                       |  |
| 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    | 3768             | 180                | 22         | 9-?-1975 | 392             | 0-25               | 0-25                  | --                   | --                           | 1200             | 50             | ?         |
|      |                  |                    |            |          |                 |                    |                       |                      |                              |                  |                |           |
|      |                  |                    |            |          |                 |                    |                       |                      |                              |                  |                |           |
|      |                  |                    |            |          |                 |                    |                       |                      |                              |                  |                |           |

Use data from application for proposed wells.

A4. **Comments:** The well is located near Alkali Creek, an intermittent tributary to Beaver Creek/Crooked Ricer. The well is constructed into water-bearing zones within basalt. The basalt is likely Picture Gorge Basalt.

CROO 2759 (Well #11) is authorized for 1.37 cfs under Certificate 64980. This review evaluates against the combined rate of the requested rate (1.14 cfs) and the authorized rate (1.37 cfs) for a total of 2.51 cfs.

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: The well is 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) 7B, 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:** Condition with 7B and 7N

A large amount of groundwater has been permitted in a relatively small area of the Paulina Basin. The sustainability of the resource in the area, given the new development, is unknown. The groundwater resource is likely relatively small (in area) within the Paulina Basin. Historically, there have been no State Observation Wells in the vicinity of the new development. Three wells in the immediate area (Alkali Flat), CROO 2757 and CROO 2758 (authorized under Certificate 89752) and CROO 2846 (authorized under Certificate 89751), have annual, March, static water-level permit conditions with water-level reporting beginning in 2010. The hydrographs of these wells indicates that the annual (March) static water has fluctuated by two to four feet with no persistent trend. One of these wells, CROO 2757, is now a State Observation Well with quarterly measurements collected by OWRD staff. The quarterly measurements at CROO 2757 may indicate an increase in the seasonal fluctuation, or at least may show the groundwater stress during drought with a lower than normal summer water-level in 2015 (see hydrograph below).

Alluvium, other sediments, and tuffaceous sedimentary rocks overly basalt in the Paulina Basin area. The basalt is likely vertically fractured to some degree, and ground water in the basalt may be hydraulically connected to the overlying sediments as evidenced by the numerous springs located along intermittent Alkali Creek. The canyon of Beaver Creek is locally cut in Picture Gorge Basalt, and likely provides an interconnection with surface water. This assertion appears to be corroborated by the pump test for CROO 2754 (deepened under CROO 2761) which shows a distinct leveling off of drawdown within the first 10-minurtes of pumping (see plot of pump test data below).

Note, it appears that in the immediate vicinity the only well for which pump tests have been conducted is CROO 2754, with pump test exemptions being granted for the other wells. Upon closer examination, it appears that CROO 2754 may be producing, at least in part, from a different source than the other wells (see hydrograph and lithologic comparison below). A pump test on CROO 2759, or similar well, should be required.

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

**Basis for aquifer confinement evaluation:** The well logs for wells in the immediate area (CROO 155, CROO 2846, CROO 2760, CROO 2757, CROO 2758, CROO 2759) indicate a water level 100 or more feet above the water-bearing zone at which it was first encountered.

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    | Beaver Creek                    | 3748           | ~3690          | 9,370         | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input checked="" type="checkbox"/> |
| 1    | 2    | Maupin Spring (Certificate 603) | 3748           | 3707           | 10,570        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input checked="" type="checkbox"/> |
|      |      |                                 |                |                |               | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input type="checkbox"/>            |
|      |      |                                 |                |                |               | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input type="checkbox"/>            |
|      |      |                                 |                |                |               | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                | <input type="checkbox"/>            |

**Basis for aquifer hydraulic connection evaluation:** The static water level on the drillers log for CROO 2759 is essentially coincident with intermittent Alkali Creek at the adjacent reach, and above Maupin Spring and Beaver Creek. However, Alkali Creek is not included for evaluation since available information indicates Alkali Creek is intermittent. Furthermore, surface water rights related to Alkali Creek are intended to capture runoff rather than live flow. Fractures in the basalt likely provide conduits for groundwater to daylight and form the mapped springs in the area. However, the fracture network does not appear pervasive enough to create enough hydraulic connection with the overlying sediments such that Alkali Creek flows perennially.

The canyon of Beaver Creek is locally cut in Picture Gorge Basalt, which likely provides an interconnection with surface water. This may be supported by the pump test for CROO 2754 (deepened under CROO 2761), which shows a distinct leveling off of drawdown within the first 10-minurtes of pumping (see plot of pump test data below).

**Water Availability Basin the well(s) are located within:** 70605 [BEAVER CR> 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? |
|------|------|--------------------------|--------------------------|-------------------------|------------------------------|--------------------------|------------------------|------------------------------|----------------------------|---|
|      |      | <input type="checkbox"/> | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|      |      | <input type="checkbox"/> | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|      |      | <input type="checkbox"/> | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|      |      | <input type="checkbox"/> | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|      |      | <input type="checkbox"/> | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

|  | SW # |  | Qw > 5 cfs?              | Instream Water Right ID | Instream Water Right Q (cfs) | Qw > 1% ISWR?            | 80% Natural Flow (cfs) | Qw > 1% of 80% Natural Flow? | Interference @ 30 days (%) | Potential for Subst. Interfer. Assumed? |
|--|------|--|--------------------------|-------------------------|------------------------------|--------------------------|------------------------|------------------------------|----------------------------|---|
|  |      |  | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|  |      |  | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|  |      |  | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |
|  |      |  | <input type="checkbox"/> |                         |                              | <input type="checkbox"/> |                        | <input type="checkbox"/>     |                            | <input type="checkbox"/>                |

**Comments:** The well is less than 1-mile from Alkali Creek. However, Alkali Creek is intermittent and therefore interference with Alkali Creek was not evaluated.

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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.

| <b>Non-Distributed Wells</b> |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Well                         | SW# | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|                              |     | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   |
| Well Q as CFS                |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Interference CFS             |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>Distributed Wells</b>     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 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             |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>(A) = Total Interf.</b>   |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>(B) = 80 % Nat. Q</b>     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>(C) = 1 % Nat. Q</b>      |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>(D) = (A) &gt; (C)</b>    |     |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>(E) = (A / B) x 100</b>   |     | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   | %   |

(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:**

The well is likely impacting surface water somewhere along Beaver Creek. However, an appropriate model for calculating stream interference is not readily available in basalt aquifer systems. Therefore, no estimate of stream interference at 30 days was included in table C4a.

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:**

If a permit is issued: condition with 7B, 7N, and 7J.

According to Watermaster Jeremy Giffin (personal communication 8/22/2017), calls are generally made on Beaver Creek in August, and in dry years calls are made in July or earlier. Additional impacts to Beaver Creek should be carefully considered.

**References Used:**

Application File: G-18535, and G-7642 (authorize use from CROO 2759), and files for nearby water right applications G-16592, G-17214, and G-17217.

Thayer, T. P. 1966. Geologic map of the Canyon City quadrangle, northeastern Oregon: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-447.

Gonthier, J.B. 1985. A description of aquifer units in eastern Oregon: U.S. Geological Survey Water Resources Investigations Report 84-4095, 39 p., maps.

Walker, G. W. (editor), 1990. Geology of the Blue Mountains region of Oregon, Idaho, and Washington; Cenozoic geology of the Blue Mountains region: U.S. Geological Survey Professional Paper 1437, 135 p.

Paulina, Maupin Butte, and Mud Spring quadrangle maps (USGS).

**D. WELL CONSTRUCTION, OAR 690-200**

D1. Well #: \_\_\_\_\_ Logid: \_\_\_\_\_

D2. **THE WELL does not appear to meet current well construction standards based upon:**

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

D3. **THE WELL construction deficiency or other comment is described as follows:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

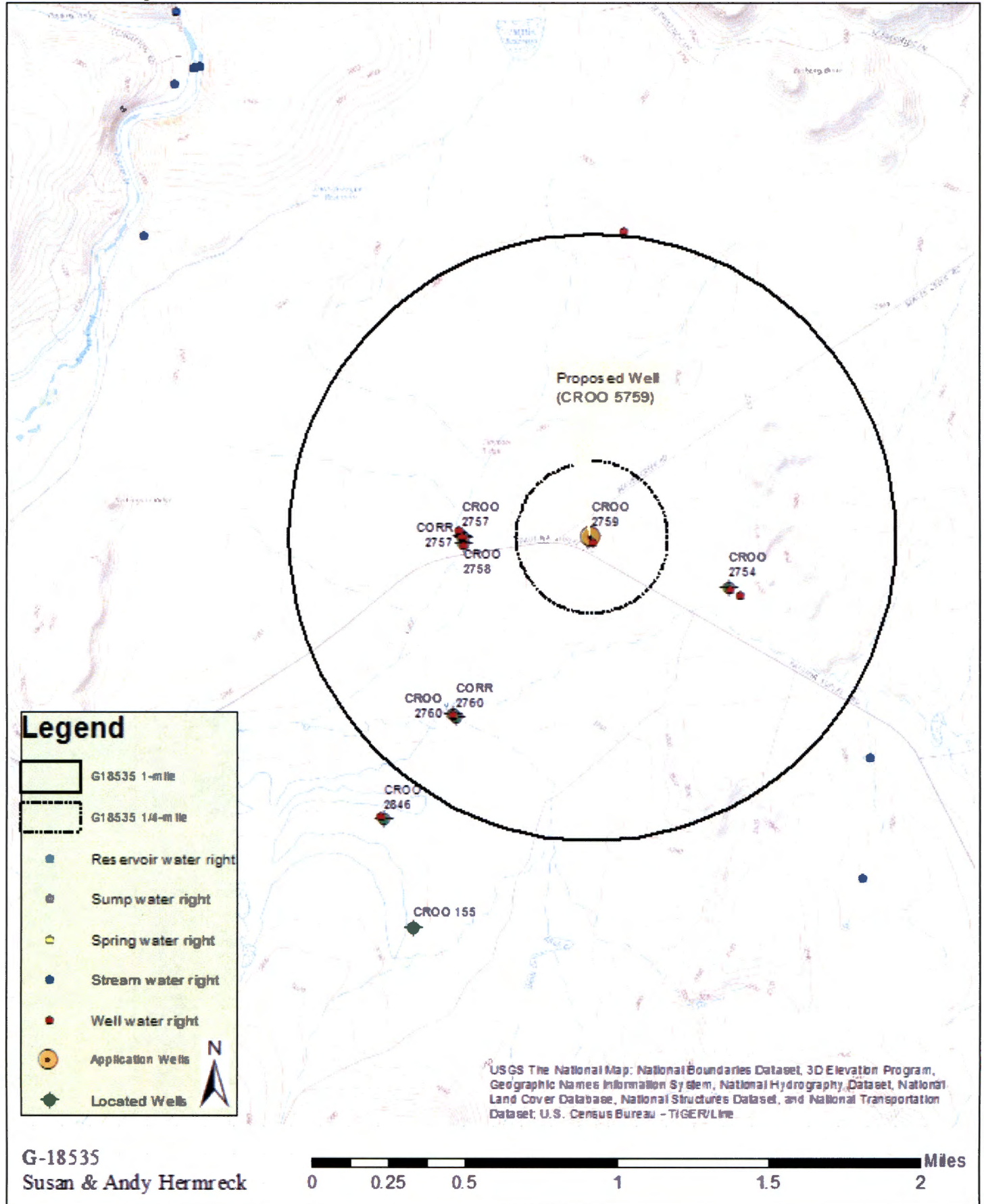
D4.  **Route to the Well Construction and Compliance Section for a review of existing well construction.**

**Water Availability Tables**

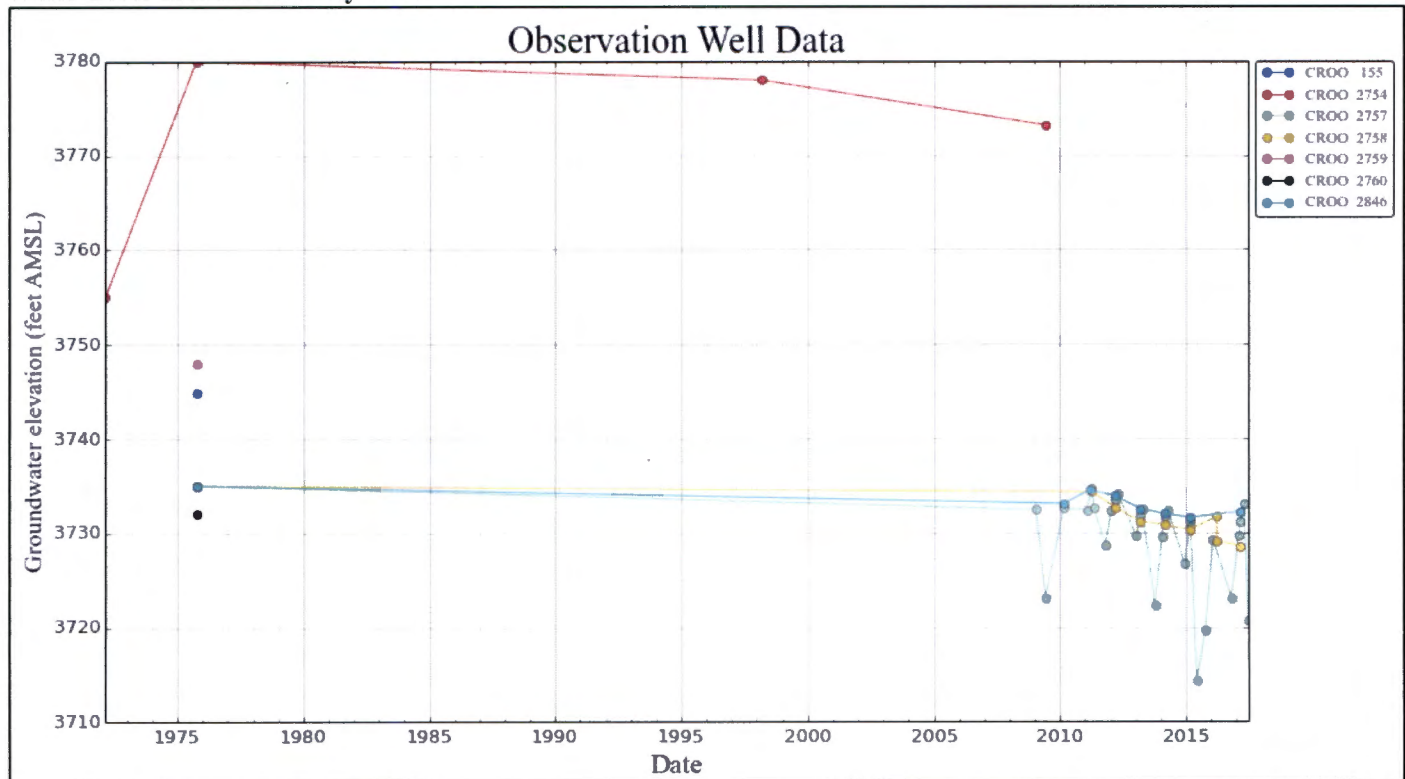
| DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION                                  |                     |  |                      |                      |  |                     |
|--|---------------------|--|----------------------|----------------------|--|---------------------|
| Watershed ID #: 70605<br>Time: 3:07 PM   |                     | BEAVER CR > CROOKED R - AT MOUTH<br>Basin: DESCHUTES |                      |                      | Exceedance Level: 80<br>Date: 08/16/2017 |                     |
| Month  | Natural Stream Flow | Consumptive use and Storage                          | Expected Stream Flow | Reserved Stream Flow | Instream Requirements                    | Net water Available |
| Monthly values are in cfs.<br>Storage is the annual amount at 50% exceedance in ac-ft. |                     |  |                      |                      |  |                     |
| JAN  | 19.80               | 1.09   | 18.70                | 0.00                 | 34.00                                    | -15.30              |
| FEB  | 45.00               | 2.21   | 42.80                | 0.00                 | 50.00                                    | -7.21               |
| MAR  | 100.00              | 14.40  | 85.60                | 0.00                 | 84.00                                    | 1.55                |
| APR  | 137.00              | 40.10  | 96.90                | 0.00                 | 84.00                                    | 12.90               |
| MAY  | 97.80               | 95.00  | 2.78                 | 0.00                 | 84.00                                    | -81.20              |
| JUN  | 76.70               | 77.10  | -0.41                | 0.00                 | 80.40                                    | -80.80              |
| JUL  | 23.50               | 22.20  | 1.27                 | 0.00                 | 25.30                                    | -24.00              |
| AUG  | 10.90               | 11.30  | -0.39                | 0.00                 | 11.50                                    | -11.90              |
| SEP  | 11.50               | 11.70  | -0.17                | 0.00                 | 12.20                                    | -12.40              |
| OCT  | 7.53                | 5.72   | 1.81                 | 0.00                 | 13.30                                    | -11.50              |
| NOV  | 10.20               | 0.38   | 9.82                 | 0.00                 | 14.10                                    | -4.28               |
| DEC  | 15.70               | 0.72   | 15.00                | 0.00                 | 32.80                                    | -17.80              |
| ANN  | 61,400              | 17,100   | 44,400               | 0                    | 31,700                                   | 22,200              |



### Well Location Map

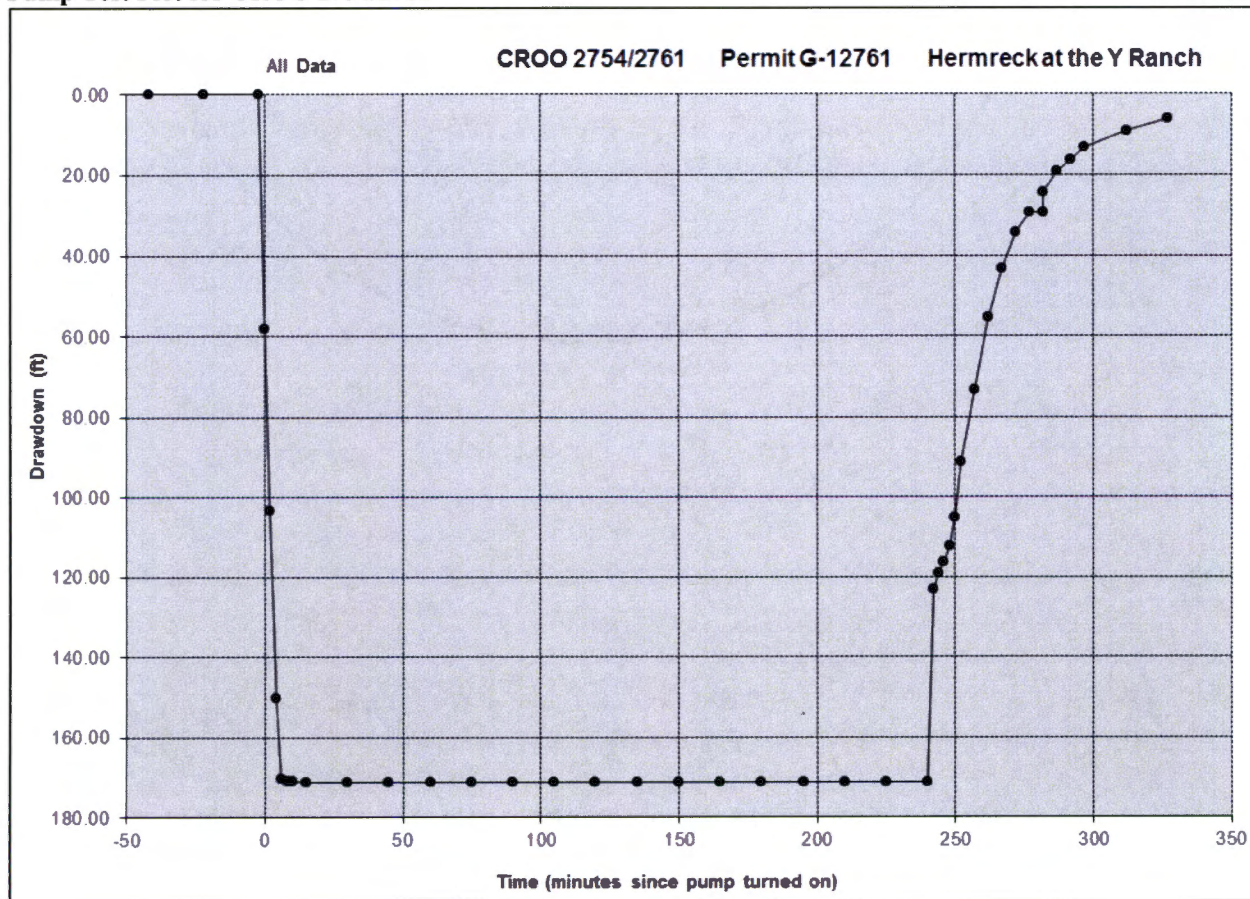


### Water-Level Trends in Nearby Wells



Note: Wells CROO 2757, CROO 2758, and CROO 2846 were drilled by the same driller and all completed during the month of September 1975.

### Pump Test Plot for CROO 2754/2761



**Lithologic Comparison of Local Wells (and image for locations)**

