# Groundwater Application Review Summary Form

**Application # G-** 18737

**GW Reviewer** Travis Brown, Dennis Orlowski **Date Review Completed:** February 6, 2019

**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** February 6, 2019

**TO:** **Application** G- 18737

**FROM:** **GW:** Travis Brown, Dennis Orlowski
(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 February 6, 2019

FROM: Groundwater Section Travis Brown, Dennis Orlowski
Reviewer's Name

SUBJECT: Application G- 18737 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: **Joann and Bud Fawver** County: **Clackamas**

A1. Applicant(s) seek(s) 0.678[a] cfs from 1 well(s) in the Willamette River Basin, Molalla River-Pudding River subbasin

A2. Proposed use Nursery (27.1 acres) Seasonality: Year-round

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 | Proposed | 1[b] | Alluvium | 0.678[a] | 3S/1E-32 NE-NW | 50' S, 295' E fr fr SLY cor DLC 58 (1030' S, 1600' E fr NW cor S 32)[c] |

* 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 | 91[d] | | | | 150[c] | 0-18/50[c] | 0-150[c] | | TBD[c] | 304[a] | | |

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU is located approximately 0.4 miles west of the city of Canby, Oregon, in the plain between the Molalla and Pudding Rivers, near their confluence.

[a] In Section 3 of the Application for a Permit to Use Groundwater (Permit Application), the Applicant lists the Well Specific Rate as 250 gpm (0.557 cfs), but the Total Maximum Rate Requested is listed as 0.678 cfs (304 gpm). As there is only one proposed well listed, this well will be assessed at the Total Maximum Rate Requested of 0.678 cfs (304 gpm).

[b] The Water Right Application Map refers to the sole POA as both "Proposed Well 1" and "Proposed Well 3". Section 3 of the Permit Application refers to the POA simply as "WELL". It is assumed that "Well 1" is the correct designation and that there is only one POA for the application.

[c] Section-based metes and bounds location estimated from proposed well location on map and DLC-based metes and bounds.

[d] Well elevation estimated from land surface elevation at proposed well location (Watershed Sciences, 2009; USGS, 2013; WSI, 2015)

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 POA is greater than ¼-mile from the nearest stream or surface water source; therefore, per OAR 690-502-0240, the Relevant Willamette Basin rules do not apply.

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **N/A**
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 (annual measurement condition) and large water use (>0.5 cfs) reporting**;
   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:** The proposed POA is in a lowland of recent floodplain sediments between the Pudding and Molalla Rivers. These sediments underlie the area of interest to a depth of approximately 40 to 60 ft below land surface (bls). Beneath the recent floodplain sediments, fine-grained alluvial sediments containing thin beds of sand and gravel (known regionally as the "Willamette Confining Unit") extend to a depth of approximately 700 to 900 ft bls (Woodward et al., 1998).

Groundwater level data is available for several wells completed within alluvial sediments and located within the Pudding-Molalla River floodplain (CLAC 8794, CLAC 11979, and CLAC 12922; see attached Well Location Map). Reported annual high water levels (taken between February and April of each year) do not indicate consistent year-over-year declines, although the period of record is limited (see Groundwater Hydrograph, attached). CLAC 11979 in particular appears correlated to annual precipitation (and, presumably, consequent rates of recharge and stream discharge). This suggests an efficient connection between the local, alluvial aquifer and nearby surface water systems.

However, groundwater for the proposed use cannot be determined to be over-appropriated due to insufficient available data regarding rates of recharge and the current quantity of groundwater withdrawals from the local aquifer system.

## 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** | ☐ | ☒ |

**Basis for aquifer confinement evaluation:** For water wells identified in the nearby floodplain and completed to depths of less than 150 ft bls (the proposed depth for the POA in this application), the majority (7 out of 12) reported static water levels near or below the depth of the shallowest reported water-bearing zone, which indicates unconfined conditions (see OWRD Well Log Query, attached). The nearest known water well report (CLAC 12036) to the proposed POA reported a static water level of 7 ft bls, coincident with the top of the first loose gravel and boulder layer, indicating the aquifer tapped by the well is unconfined. Furthermore, the well log for CLAC 12036 did not indicate a significant confining unit above the first water-bearing zone. On this basis, the proposed POA well is also expected to be unconfined.

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 | **Molalla River** | **80-75[a]** | **86-72[b]** | **1,515** | ☒ | ☐ | ☐ | ☐ | ☒ |
| 1 | 2 | **Pudding River** | **80-75[a]** | **82-72[b]** | **3,660** | ☒ | ☐ | ☐ | ☐ | ☒ |

**Basis for aquifer hydraulic connection evaluation:** Estimated groundwater elevations near the proposed POA are within the ranges of estimated surface water elevations in nearby streams. Furthermore, published maps of groundwater elevation in the alluvial aquifer indicate that local groundwater flows toward and discharges into the Molalla and Pudding Rivers (Woodward et al., 1998). This indicates hydraulic connection between the alluvial aquifer and nearby surface water sources.

[a] Groundwater elevation estimated from Woodward et al. (1998)

[b] Surface water elevations estimated from land surface elevations along applicable stream reaches (Watershed Sciences, 2009; USGS, 2013; WSI, 2015).

**Water Availability Basin the well(s) are located within:** SW 1: MOLALLA R > WILLAMETTE R – AT MOUTH
SW 2: PUDDING R > MOLALLA 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? |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | ☐ | ☐ | **IS69796A** | **100** | ☐ | **134** | ☐ | **<25%** | ☐ |
| 1 | 2 | ☐ | ☐ | **IS73532A** | **36** | ☒ | **67.90** | ☐ | **<<25%** | ☒ |

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: C3a: Both the Total Maximum Rate Requested (0.678 cfs) and the listed Well Specific Rate (250 gpm [0.557 cfs]) are in excess of 1 percent (0.36 cfs) of the rate of appropriation (36 cfs) for the applicable instream water right (ID IS73532A) for the Pudding River, to which the proposed aquifer is hydraulically connected. Therefore, per OAR 690-09-0040(4)(c), the proposed POA and allocation are assumed to have the potential to cause substantial interference (PSI) with SW 2 (Pudding River).**

Potential depletion of SW 1 (Molalla River) and SW 2 (Pudding River) was estimated using the Hunt 1999 model, since the aquifer in the area of interest is unconfined (Hunt, 1999). Hydraulic parameters used for the model were derived either from regional data or studies of the hydrogeologic regime (Price, 1967; OWRD Well Log Query Report; Pumping Test Reports) or are within a typical range of values for the applicable parameter within the hydrogeologic regime (Freeze and Cherry, 1979). Based on previous assessments of stream depletion due to groundwater pumping in this area (see Public Interest Review for Groundwater Application G-18146), the Molalla River in this area is understood to have a cobble substrate and the Pudding River is understood to have a fine-sand to muddy substrate; corresponding values of vertical hydraulic conductivity for the streambeds of these systems have been selected based either on regional studies (Conlon, 2003, 2005) or published generic values for the applicable streambed material (Freeze and Cherry, 1979). The pumping rate used in the analytical model (0.187 cfs) was derived by prorating the Total Annual Volume requested (135.5 acre-feet per year) over the proposed period of use (365 days per year).

The Hunt 1999 analytical model results indicate that depletion of (interference with) SW 1 is most likely to be less than 25 percent of the well discharge and that depletion of SW 2 is anticipated to be much less than 25 percent of the well discharge after 30 days of pumping (see Stream Depletion Analysis, attached).

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 | | | | | | | | | | | | | |
| **(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:** Because the proposed POA is to be completed in the unconfined, alluvial aquifer which is bounded on the east by the Molalla River and on the north and west by the Pudding River, it is unlikely that there will be significant impacts to surface water sources greater than one mile (i.e. beyond the radius of the Pudding and Molalla Rivers) from the proposed POA.

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:**

C1 (OAR 690-09-0040(1)): The proposed POA will produce groundwater from an unconfined alluvial aquifer.

C2 (OAR 690-08-0040(2)(3)): The proposed POA is determined to be hydraulically connected to and within 1-mile of SW 1 (Molalla River) and SW 2 (Pudding River).

C3a (OAR 390-09-0040(4): The Total Maximum Rate Requested (0.678 cfs) is greater than 1 percent (0.36 cfs) of the rate of appropriation (36 cfs) for the applicable instream water right (ID IS73532A) for SW 2 (Pudding River). **Per OAR 690-09-0040(4)(c), the potential for substantial interference (PSI) is assumed on this basis.**

**References Used:**

Application: G-18737 and G-18146

Pumping Test Reports: CLAC 12040 and CLAC 62322

Conlon, T.D., Lee, K.K., and Risley, J.R., 2003, Heat tracing in streams in the central Willamette Basin, Oregon, in Stonestrom, D.A. and Constantz, Jim, eds., Heat as a tool for studying the movement of groundwater near streams: U.S. Geological Survey Circular 1260, chapter 5, p. 29-34.

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, B.J., Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-water hydrology of the Willamette Basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5168.

Freeze, R.A. and Cherry, J.A., 1979, *Groundwater*, Prentice Hall: Englewood Cliffs, New Jersey, 604 p.

Hunt, B., 1999, Unsteady stream depletion from groundwater pumping: Ground Water,v. 37, no. 1, p. 98-102.

United States Geological Survey, 2013, National Elevation Dataset (NED) [DEM geospatial data]. 1/9th arc-second, updated 2013.

United States Geological Survey, 2017, *Redland quadrangle, Oregon* [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, Virginia.

Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Willamette Valley Phase I, Oregon, Portland, OR, December 21.

WSI, 2015, OLC Metro 2014: Final Delivery, Portland, OR, May 8.

## 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:** _____

_____

_____

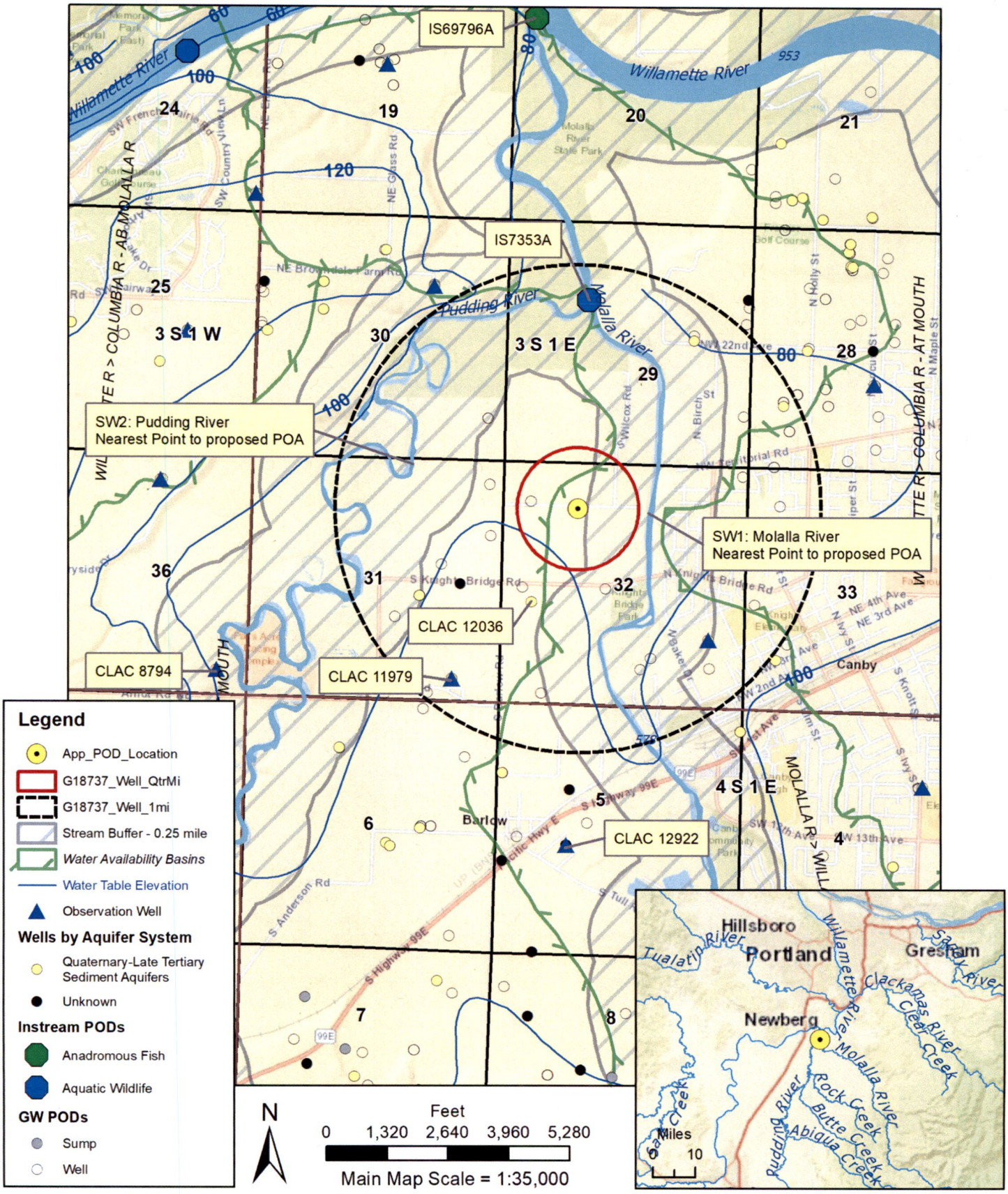
_____

_____

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

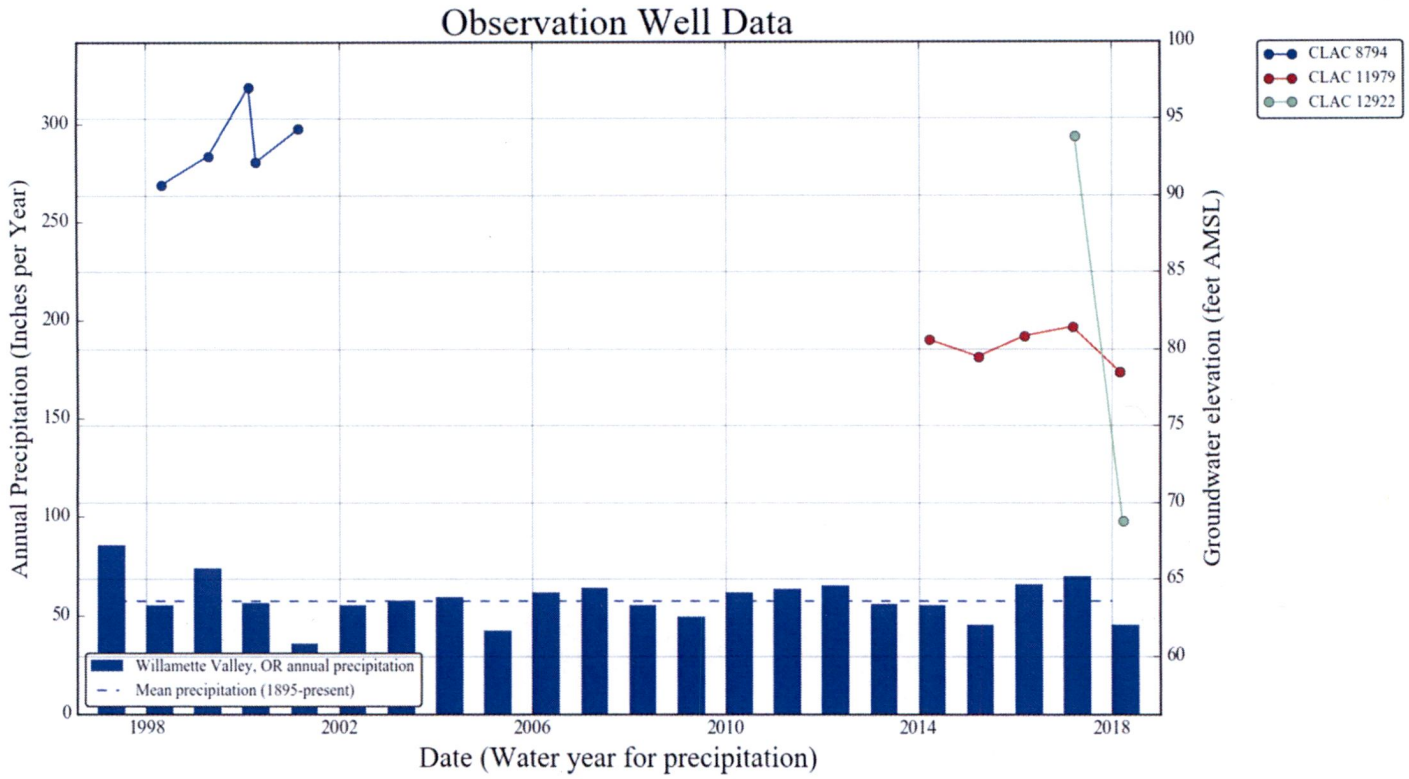
**Well Location Map**

# G-18737 Fawver

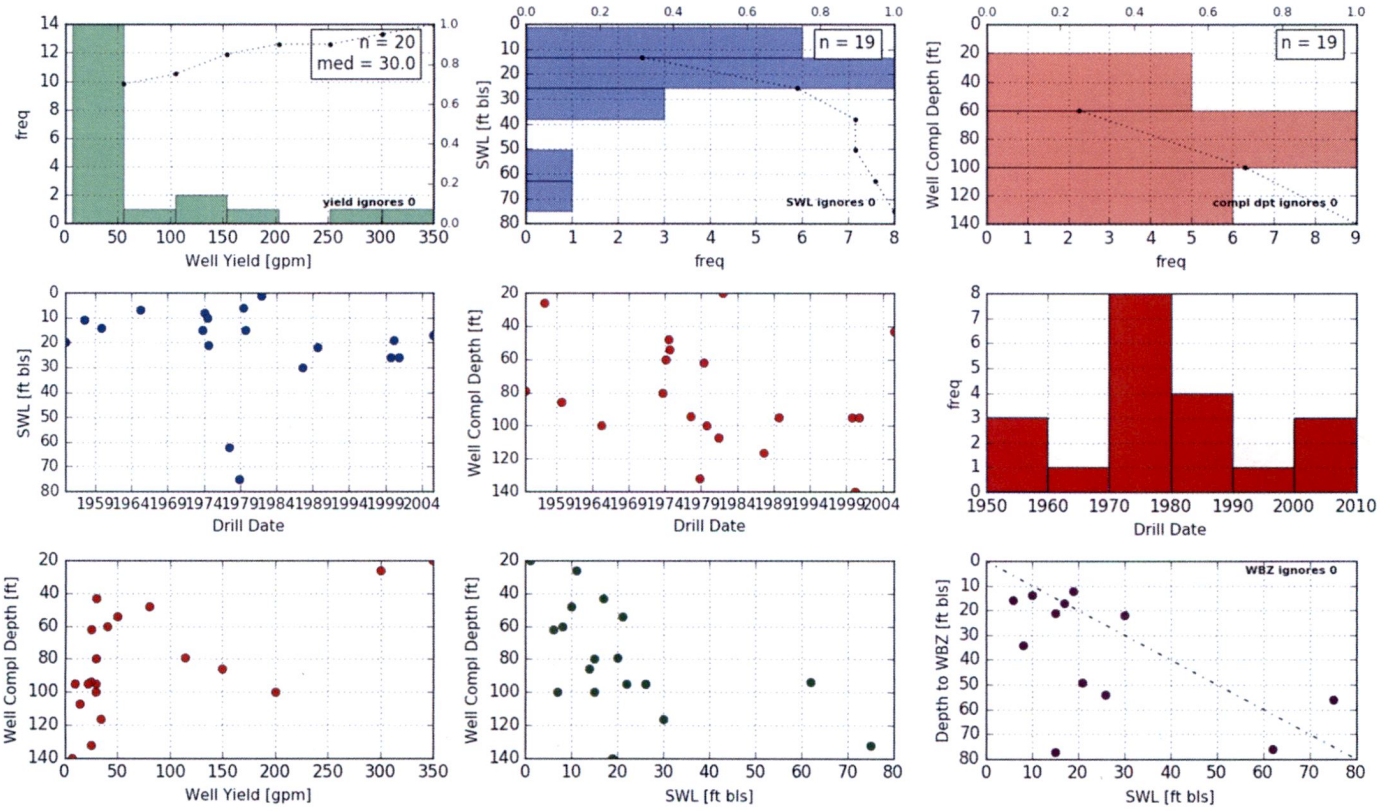



Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

**Groundwater Hydrograph – Annual High Water Level Trends in Nearby Wells**




**OWRD Well Log Query – Statistics for Reported Wells within Pudding-Molalla River Floodplain Less Than 150 ft Deep**



**Water Availability Tables**

# Water Availability Analysis
## Detailed Reports

PUDDING R > MOLALLA R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 2/4/2019

Watershed ID #: 69998 (Map)
Date: 2/4/2019

Exceedance Level: 80%
Time: 12:28 PM

Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations | Water Rights | Watershed Characteristics

### Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

| Month | Natural Stream Flow | Consumptive Uses and Storages | Expected Stream Flow | Reserved Stream Flow | Instream Flow Requirement | Net Water Available |
|---|---|---|---|---|---|---|
| JAN | 1,120.00 | 128.00 | 992.00 | 0.00 | 80.00 | 912.00 |
| FEB | 1,260.00 | 119.00 | 1,140.00 | 0.00 | 80.00 | 1,060.00 |
| MAR | 1,080.00 | 86.30 | 994.00 | 0.00 | 80.00 | 914.00 |
| APR | 834.00 | 59.80 | 774.00 | 0.00 | 80.00 | 694.00 |
| MAY | 448.00 | 56.40 | 392.00 | 0.00 | 80.00 | 312.00 |
| JUN | 231.00 | 79.30 | 152.00 | 0.00 | 60.00 | 91.70 |
| JUL | 111.00 | 124.00 | -13.20 | 0.00 | 50.00 | -63.20 |
| AUG | 71.60 | 102.00 | -30.30 | 0.00 | 40.00 | -70.30 |
| SEP | 67.90 | 58.20 | 9.75 | 0.00 | 40.00 | -30.30 |
| OCT | 91.50 | 13.30 | 78.20 | 0.00 | 60.00 | 18.20 |
| NOV | 364.00 | 53.70 | 310.00 | 0.00 | 80.00 | 230.00 |
| DEC | 1,010.00 | 123.00 | 887.00 | 0.00 | 80.00 | 807.00 |
| ANN | 748,000.00 | 60,500.00 | 688,000.00 | 0.00 | 48,900.00 | 644,000.00 |

# Water Availability Analysis
## Detailed Reports

MOLALLA R > WILLAMETTE R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 2/4/2019

Watershed ID #: 69796 (Map)
Date: 2/4/2019

Exceedance Level: 80%
Time: 12:28 PM

Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations | Water Rights | Watershed Characteristics

### Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

| Month | Natural Stream Flow | Consumptive Uses and Storages | Expected Stream Flow | Reserved Stream Flow | Instream Flow Requirement | Net Water Available |
|---|---|---|---|---|---|---|
| JAN | 1,870.00 | 153.00 | 1,720.00 | 0.00 | 500.00 | 1,220.00 |
| FEB | 2,010.00 | 143.00 | 1,870.00 | 0.00 | 500.00 | 1,370.00 |
| MAR | 1,830.00 | 111.00 | 1,720.00 | 0.00 | 500.00 | 1,220.00 |
| APR | 1,530.00 | 84.80 | 1,450.00 | 0.00 | 500.00 | 945.00 |
| MAY | 927.00 | 95.30 | 832.00 | 0.00 | 500.00 | 332.00 |
| JUN | 431.00 | 116.00 | 315.00 | 0.00 | 500.00 | -185.00 |
| JUL | 204.00 | 180.00 | 23.80 | 0.00 | 200.00 | -176.00 |
| AUG | 139.00 | 151.00 | -12.40 | 0.00 | 100.00 | -112.00 |
| SEP | 134.00 | 80.30 | 53.70 | 0.00 | 150.00 | -96.30 |
| OCT | 188.00 | 38.40 | 150.00 | 0.00 | 450.00 | -300.00 |
| NOV | 637.00 | 78.80 | 558.00 | 0.00 | 500.00 | 58.20 |
| DEC | 1,700.00 | 148.00 | 1,550.00 | 0.00 | 500.00 | 1,050.00 |
| ANN | 1,320,000.00 | 83,500.00 | 1,240,000.00 | 0.00 | 295,000.00 | 967,000.00 |

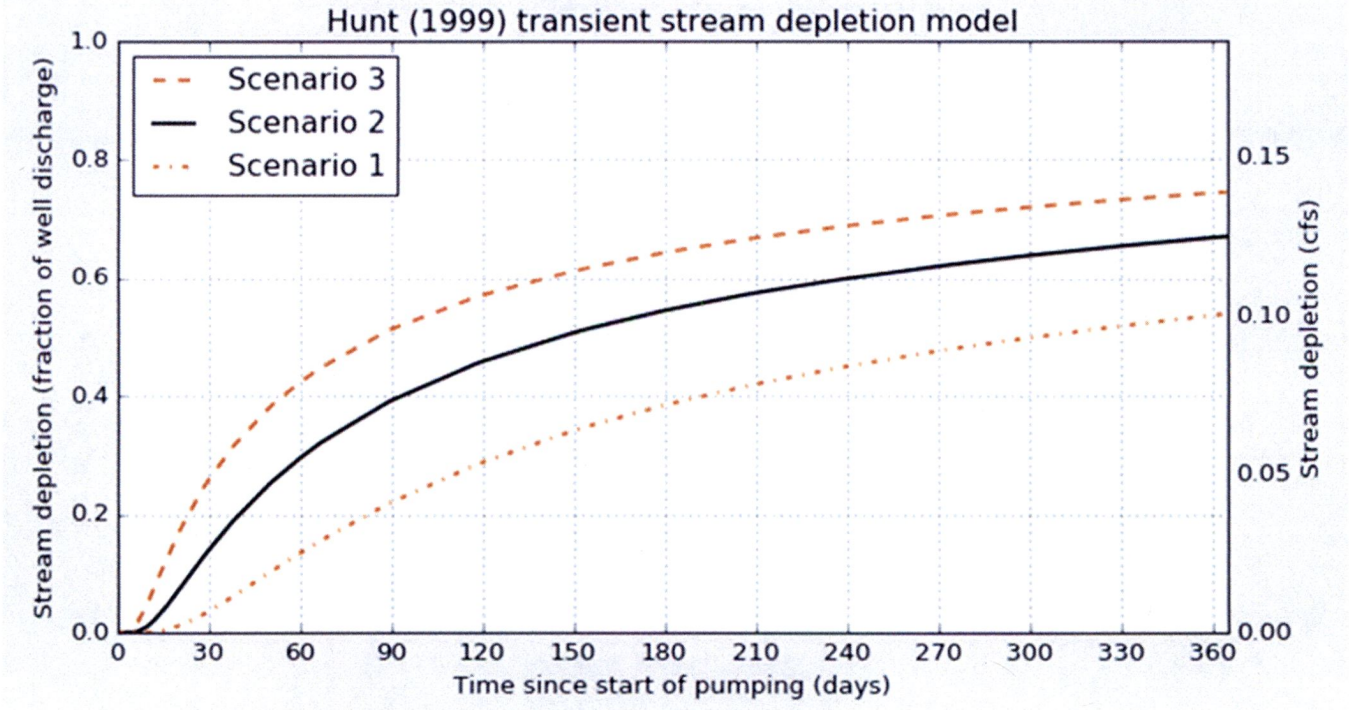
**Stream Depletion Analysis – SW 1 (Molalla River)**

| | |
|---|---|
| Application type: | G |
| Application number: | 18737 |
| Well number: | 1 |
| Stream Number: | 1 |
| Pumping rate (cfs): | 0.187 |
| Pumping duration (days): | 365 |

| Parameter | Symbol | Scenario 1 | Scenario 2 | Scenario 3 | Units |
|---|---|---|---|---|---|
| Distance from well to stream | a | 1515.0 | 1515.0 | 1515.0 | ft |
| Aquifer transmissivity | T | 3000.0 | 4500 | 6000.0 | ft2/day |
| Aquifer storativity | S | 0.3 | 0.25 | 0.2 | - |
| Aquitard vertical hydraulic conductivity | Kva | 1.0 | 10.0 | 100.0 | ft/day |
| Not used | | 0.0 | 0.0 | 0.0 | |
| Aquitard thickness below stream | babs | 3.0 | 3.0 | 3.0 | ft |
| Not used | | 0.0 | 0.0 | 0.0 | |
| Stream width | ws | 135.0 | 135.0 | 135.0 | ft |

Stream depletion for Scenario 2:

| Days | 10 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depletion (%) | 1 | 14 | 29 | 39 | 46 | 51 | 54 | 58 | 60 | 62 | 64 | 65 | 67 |
| Depletion (cfs) | 0.00 | 0.03 | 0.06 | 0.07 | 0.09 | 0.09 | 0.10 | 0.11 | 0.11 | 0.12 | 0.12 | 0.12 | 0.13 |



**Stream Depletion Analysis – SW 2 (Pudding River)**

| | |
|---|---|
| Application type: | G |
| Application number: | 18737 |
| Well number: | 1 |
| Stream Number: | 2 |
| Pumping rate (cfs): | 0.187 |
| Pumping duration (days): | 365 |

| Parameter | Symbol | Scenario 1 | Scenario 2 | Scenario 3 | Units |
|---|---|---|---|---|---|
| Distance from well to stream | a | 3660.0 | 3660.0 | 3660.0 | ft |
| Aquifer transmissivity | T | 3000.0 | 4500.0 | 6000.0 | ft2/day |
| Aquifer storativity | S | 0.3 | 0.25 | 0.2 | - |
| Aquitard vertical hydraulic conductivity | Kva | 0.25 | 0.25 | 0.25 | ft/day |
| Not used | | 0.0 | 0.0 | 0.0 | |
| Aquitard thickness below stream | babs | 3.0 | 3.0 | 3.0 | ft |
| Not used | | 0.0 | 0.0 | 0.0 | |
| Stream width | ws | 100.0 | 100.0 | 100.0 | ft |

Stream depletion for Scenario 2:

| Days | 10 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depletion (%) | 0 | 0 | 0 | 2 | 4 | 6 | 8 | 10 | 13 | 15 | 17 | 19 | 20 |
| Depletion (cfs) | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.04 |