# Groundwater Application Review Summary Form

**Application # G- _18843_**

**GW Reviewer _Karl Wozniak_ Date Review Completed: _04/03/2020_**

**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).*

**WATER RESOURCES DEPARTMENT**

**MEMO** **April 3**, 2020

**TO:** **Application** G-**18843**

**FROM:** **GW:** **Karl Wozniak**
(Reviewer's Name)

**SUBJECT: Scenic Waterway Interference Evaluation**

☐ **YES**
☒ **NO** The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

☐ **YES**
☒ **NO** Use the Scenic Waterway Condition (Condition 7J)

☐ 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 April 3, 2020

FROM: Groundwater Section Karl Wozniak and Ben Scandella
Reviewer's Name

SUBJECT: Application G- 18843 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: **Wag Holdings LLC** County: **Yamhill**

A1. Applicant(s) seek(s) 0.019 cfs from 1 well(s) in the Willamette Basin, Chehalem Creek subbasin

A2. Proposed use Irrigation & Nursery Seasonality: March 1 – October 31 (Irr). Yr-round for Nursery

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 | | Columbia River Basalt | 0.019 | 2S/2W-31 SE/SE | 1150' N, 640' W fr SE cor S31 |
| 2 | | | | | | |
| 3 | | | | | | |

* 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 | 1290 | | | | 400 | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Use data from application for proposed wells.

A4. **Comments:** The applicant proposes to use a maximum rate of 0.019 cfs (8.5 gpm) from 1 proposed well for irrigation and nursery uses with a maximum annual volume of 20 acre feet for primary irrigation of 20 acres, and 1.0 acre feet for nursery use. However, the well is located in the Chehalem Creek water-availability basin, which has a low season 80% exceedance flow of 0.39 cfs, so the maximum permitted rate, should a permit be issued, would be 1% of that rate, or 0.0039 cfs (1.75 gpm).

A5. ☒ **Provisions of the** Willamette Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water ☐ **are**, *or* ☒ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: The well will produce from a confined aquifer so the pertinent basin rules (OAR 690-502-0240) do not apply.

A6. ☒ **Well(s) #** 1 , _____ , _____ , _____ , _____ , tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **Chehalem Mountain Groundwater Limited Area (OAR 690-502-0200).**

Comments: New irrigation use is permitted in the limited area but permits may only be issued for a maximum of 5 years and must require drip or equally efficient irrigation and a limit of one acre-foot per acre per year. In addition, within two years of permit issuance, the applicant is required to submit a plan for obtaining an alternate long-term water supply.

## 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) **7i, large water-use 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~~ **a single basalt aquifer in the Columbia River Basalt Group aquifer system** ~~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:**

**Special Conditions** (The Water Rights section should substitute standard language, as appropriate for special conditions 1-3):

1. The use of water under this right shall be limited to drip, or equally efficient irrigation.
2. The amount of water used for irrigation shall be limited to one acre-foot per acre per year.
3. The maximum rate should be limited to 0.0039 cfs (1.75 gpm, which is 1% of the lowest natural stream flow of the Chehalem Creek water-availability basin in which the well is located).
4. Basalt well construction conditions:
   a. Each basalt well shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval in each well shall be no greater than 100 feet. However, an open interval of greater than 100 feet may be allowed if substantial evidence of a single aquifer completion can be demonstrated to the satisfaction of the Department hydrogeologists, using information from a video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval.
   b. If during well construction it becomes apparent that the well can be constructed to eliminate commingling between aquifers in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Groundwater 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 request is made after casing and seal are placed, the requested modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.

c. The applicant shall coordinate with the driller to ensure that drill cuttings are collected at 10-ft intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.

d. Copies of all geologic and hydrogeologic reports completed for the permittee during the development of the wells, including geophysical well logs and borehole video logs, shall be provided to the Department. Except for borehole video logs, two paper copies, or a single electronic copy, shall be provided of each report. Digital tables of any data shall be provided upon request.

e. Prior to using water on this permit, the permittee shall ensure that the well on this permit has an OWRD Well Identification Number (Well ID or Well tag number). If a well does not have a Well ID, the permittee shall apply for one from the Department. The Well ID shall be attached to the well and shall be used as a reference identification number for any correspondence regarding the well including any water use, water level, or pump test reports.

5. Other conditions as required by OAR 690-502-0200.

The proposed well is located just south of the crest of the Chehalem Mountains, a prominent northwest-trending ridge that forms the southern erosional edge of a sequence of Columbia River Basalt Group (CRBG) flows that are tilted at low-lying angles to the northeast toward the Tualatin River. The entire sequence of basalts is exposed by erosion on the southern slope of the mountain; the contact with underlying Tertiary marine sediments occurs at an elevation of about 600 feet, which indicates a local CRBG thickness of about 800 feet. Northeast of the proposed well, the basalt surface is deeply incised by local streams tributary to the Tualatin River. Although unconfined groundwater occurs near the surface of the basalts, most water occurs in confined aquifers within thin rubble zones (interflow zones) that occur at the contacts between lava flows. The thick interiors of the basalt flows generally have very low porosity and permeability and act as confining beds. This physical geometry generally produces a stack of thin, tabular aquifers (interflow zones) separated by thick confining beds (flow interiors). Because of the low permeability of the basalt flow interiors, the natural connection between the stacked aquifers is general very limited (very inefficient). As a result, hydraulic heads in the individual aquifers can be substantially different, especially in upland areas where the basalts crop out at land surface. Because the aquifers are confined (storativity is commonly on the order of 0.0001), hydraulic diffusivity is generally very high which causes the cone of depression to propagate outward at rapid rates to impact nearby wells and hydraulically connected springs and streams. In the absence of barriers to horizontal flow, impacts can occur at distances up to a mile within a matter of minutes.

Water well density is quite low in the surrounding area. Only one basalt irrigation well (at about 3600 feet to the west) occurs within a 1-mile radius of the proposed well. Tax lot maps and the OWRD well log database indicate that at least 50 domestic basalt wells lie within a 1-mile radius but these are not likely to all be completed in the same aquifer because of the layering in the basalt aquifer system, the great topographic relief, and highly variable well depths. Potential impacts to existing wells from the proposed well are difficult to assess because of a lack of knowledge about local hydraulic properties and the geometry of individual aquifers. Nevertheless, the low proposed (or allowed) production rate probably precludes substantial interference with most of the surrounding wells except those that are in close proximity and completed in the same water-bearing zones. The closest known well is YAMH 57902, about 300 feet to the northwest, but the well log indicates a water column of about 260 feet which should be sufficient to buffer any interference from the proposed well. Protections for potential impacts to existing wells should be adequately addressed by the recommended water-level and water-use conditions listed in section B1di above, which are required in the basalt aquifer system by basin rules in OAR 690-502-0250.

The OWRD well log database indicates a median basalt well yield of 15.5 gpm (ranging from 1-70 gpm) based on the well reports of about 72 wells in sections 31 and 32 of township 2S/2W. Most of these are domestic wells with 6-inch casing which is the proposed construction for the proposed well. Therefore, the proposed well is likely to produce yields that will satisfy the proposed rate of 8.5 gpm or the likely limited rate of 1.75 gpm.

Although representative observation wells are not available in the area, well deepenings are rare, and static water levels reported on well logs show no obvious trend over time (see enclosed well statistics plot). These facts indicate that groundwater levels are probably stable at the present time. The recommended water-level decline and shut-off conditions should protect the resource from any potential injury from the proposed use.

## 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** | **Columbia River Basalt** | ☒ | ☐ |

**Basis for aquifer confinement evaluation:** General knowledge indicates that groundwater is generally confined in the basalt aquifer system. Water levels in nearby basalt wells show static water levels that are substantially higher than the top of the reported water bearing zone.

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** | **Unnamed trib to Chehalem Cr (fed by Gordon Springs)** | **939** | **250-700** | **2280** | ☒ | ☐ | ☐ | ☐ | ☒ |
| **1** | **2** | **Unnamed trib to Chehalem Cr (east of Gordon Spring)** | **939** | **250-910** | **2450** | ☒ | ☐ | ☐ | ☐ | ☒ |
| **1** | **3** | **Unnamed trib to Chehalem Cr (fed by Skelton Spring)** | **939** | **450-890** | **4570** | ☒ | ☐ | ☐ | ☐ | ☒ |
| **1** | **4** | **Unnamed trib to Heaton Cr** | **939** | **720-910** | **2800** | ☒ | ☐ | ☐ | ☐ | ☒ |

**Basis for aquifer hydraulic connection evaluation:** The relatively flat lying basalt aquifers in the vicinity of the proposed well are truncated by local stream drainages which are eroded through the basalt column. Perennial streams, as shown on USGS 7.5-minute topographic maps, have their headwaters in the area of basalt outcrop. Mapped springs, or springs listed on water rights, occur within the stream drainages, commonly at the head of perennial reaches. Perennial reach elevations coincide with the elevations of water-bearing zones and water levels reported on nearby well logs. These facts indicate that ground water discharges from the basalt aquifers to support local stream flow; therefore, the streams and the aquifers are hydraulically connected. The distances between the well and perennial streams listed in table C2 are based on the nearest perennial reach as shown on USGS 7.5-minute topographic maps (see enclosed map); the groundwater elevation at the proposed well is assumed to be the same as the elevation of the static water level reported on the well log of nearby well YAMH 57902 (a land surface elevation estimated at 1317 feet and a reported static water level of 378 feet indicate a groundwater elevation of 939 feet).

**Water Availability Basin the well(s) are located within:** CHEHALEM CR > WILLAMETTE R - AT MOUTH (WAB ID 30200707) & MCFEE CR > TUALATIN R - AT MOUTH (WAB ID 30201001). The well is located within the Chehalem Creek drainage basin near the ridgeline that separates the Chehalem Creek and McFee drainage basins. Pumping is expected to impact streams in both drainage basins but Chehalem Creek is the limiting water-availability basin because it has the lowest 80%-exceedance natural stream flows (0.39 cfs in September). Therefore, only streams in the Chehalem Creek basin are evaluated in table C3a.

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** | ☐ | ☐ | | | ☐ | **0.39** | ☒ | | ☒ |
| **1** | **2** | ☐ | ☐ | | | ☐ | **0.39** | ☒ | | ☒ |
| **1** | **3** | ☐ | ☐ | | | ☐ | **0.39** | ☒ | | ☒ |
| | | ☐ | ☐ | | | ☐ | | ☐ | | ☐ |
| | | ☐ | ☐ | | | ☐ | | ☐ | | ☐ |
| | | ☐ | ☐ | | | ☐ | | ☐ | | ☐ |
| | | ☐ | ☐ | | | ☐ | | ☐ | | ☐ |
| | | ☐ | ☐ | | | ☐ | | ☐ | | ☐ |

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:** Interference at 30 days was not evaluated because of the lack of a readily available model for assessing stream impacts in a geometrically complex aquifer system.

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:** NA

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:** Springs in the CRBG commonly occur where porous interflow aquifers are breached by erosion. Gordon Springs, at a distance of about 2280 feet from the proposed well site, is the closest spring that clearly feeds a perennial stream reach that is tributary to Chehalem Creek. Water right certificate 1413 permits the use of 2.0 cfs from Gordon Spring for domestic and municipal uses. Nearby Atkinson Spring (the spring is not shown on the enclosed map but is apparently just downstream of Gordon Spring) is listed on certificate 5466 for the use of up to 2.0 cfs for municipal uses by the City of Newberg. The OWRD water-use database shows no use under certificate 5466 since 2006. These springs are located at, or near, an elevation of 700 feet which is within the elevation range of 675-799 feet for the producing water-bearing zone (wbz) in nearby well YAMH 57902 (wbz noted at depths from 518-642 feet which is equivalent to elevations of 675-799 feet based on a land surface elevation estimate of 1317 feet at the well). Assuming similar construction in the proposed well, interference with these springs, among others, is highly likely. Impacts to the springs are difficult to quantify given the complexity of the aquifer system but will not exceed the maximum production rate of the proposed well.

**References Used:**

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.

Frank, F.J., and Collins, C.A., 1978, Groundwater in the Newberg area, northern Willamette Valley, Oregon: Oregon Department of Water Resources Ground Water Report No. 27, 77p.

Gannett, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A, 32 p.

O'Connor, J.E., Sarna-Wojcicki, A., Wozniak, K.C., Polette, D.J., and Fleck, R.J., 2001: U.S. Geological Survey Professional Paper 1620.

Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82p.

## D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #**: _____ **Logid:** _____

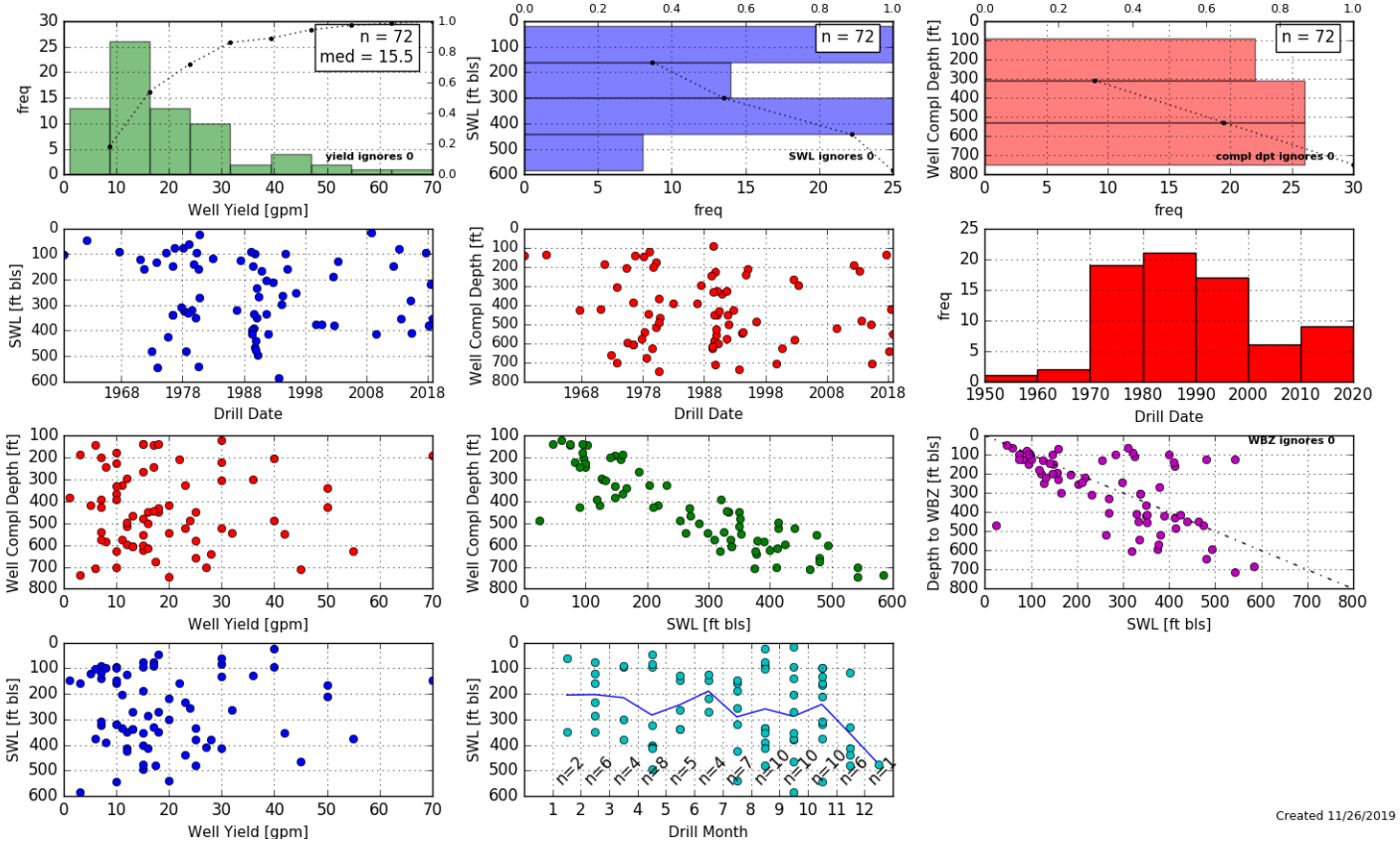
D2. **THE WELL does not appear to meet current well construction standards based upon:**

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 Statistics: Sections 31 & 32, 2S/2W**




Created 11/26/2019

**Water Availability Tables**

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION
Water Availability as of 3/11/2005 for
CHEHALEM CR > WILLAMETTE R - AT MOUTH

Watershed ID #: 30200707 Basin: WILLAMETTE Exceedance Level: 80
Time: 08:35 Date: 03/11/2005

| Month | Natural Stream Flow | CU + Stor Prior to 1/1/93 | CU + Stor After 1/1/93 | Expected Stream Flow | Reserved Stream Flow | Instream Water Rights | Net Water Available |
|---|---|---|---|---|---|---|---|
| 1 | 101.00 | 3.11 | 0.00 | 97.90 | 0.00 | 0.00 | 97.90 |
| 2 | 115.00 | 2.97 | 0.00 | 112.00 | 0.00 | 0.00 | 112.00 |
| 3 | 80.60 | 2.20 | 0.00 | 78.40 | 0.00 | 0.00 | 78.40 |
| 4 | 33.00 | 1.31 | 0.00 | 31.70 | 0.00 | 0.00 | 31.70 |
| 5 | 14.90 | 1.87 | 0.00 | 13.00 | 0.00 | 0.00 | 13.00 |
| 6 | 8.48 | 3.14 | 0.00 | 5.34 | 0.00 | 0.00 | 5.34 |
| 7 | 2.13 | 4.69 | 0.00 | -2.56 | 0.00 | 0.00 | -2.56 |
| 8 | 0.59 | 3.87 | 0.00 | -3.28 | 0.00 | 0.00 | -3.28 |
| 9 | 0.39 | 2.26 | 0.00 | -1.87 | 0.00 | 0.00 | -1.87 |
| 10 | 3.05 | 0.61 | 0.00 | 2.44 | 0.00 | 0.00 | 2.44 |
| 11 | 11.50 | 0.90 | 0.00 | 10.60 | 0.00 | 0.00 | 10.60 |
| 12 | 66.20 | 2.44 | 0.00 | 63.80 | 0.00 | 0.00 | 63.80 |
| Stor | 48900 | 1770 | 0 | 47300 | 0 | 0 | 47300 |

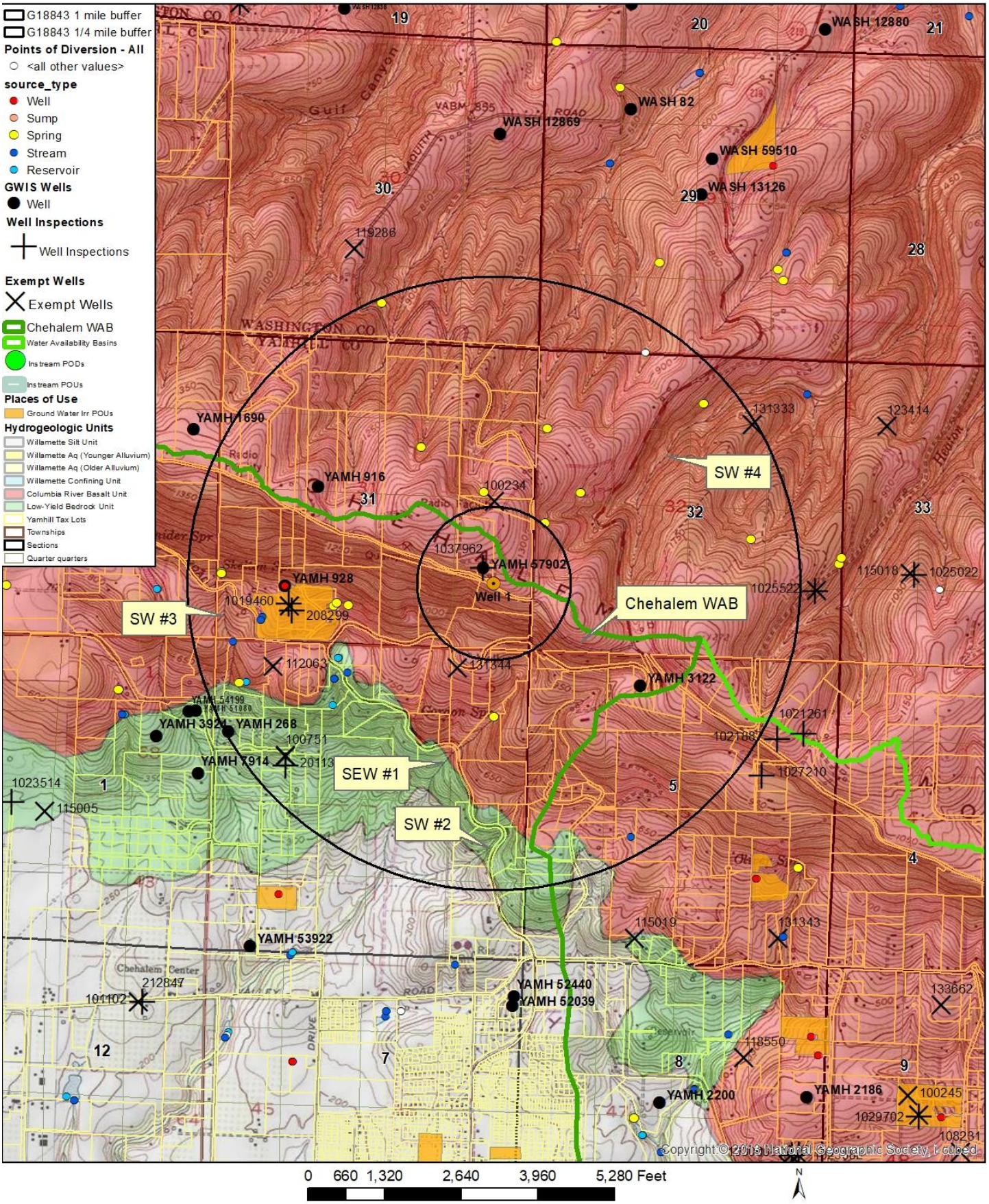
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

MCFEE CR > TUALATIN R - AT MOUTH

Watershed ID #: 30201001 Basin: WILLAMETTE Exceedance Level: 80
Time: 9:02 AM Date: 11/27/2019

| 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 | 36.60 | 0.89 | 35.70 | 0.00 | 0.00 | 35.70 |
| FEB | 42.00 | 0.89 | 41.10 | 0.00 | 0.00 | 41.10 |
| MAR | 34.20 | 0.75 | 33.50 | 0.00 | 0.00 | 33.50 |
| APR | 21.60 | 0.66 | 20.90 | 0.00 | 0.00 | 20.90 |
| MAY | 11.70 | 2.99 | 8.71 | 0.00 | 0.00 | 8.71 |
| JUN | 5.40 | 3.64 | 1.76 | 0.00 | 0.00 | 1.76 |
| JUL | 3.02 | 5.02 | -2.00 | 0.00 | 0.00 | -2.00 |
| AUG | 2.22 | 4.32 | -2.10 | 0.00 | 0.00 | -2.10 |
| SEP | 1.97 | 2.35 | -0.38 | 0.00 | 0.00 | -0.38 |
| OCT | 1.90 | 0.41 | 1.49 | 0.00 | 0.00 | 1.49 |
| NOV | 5.34 | 0.48 | 4.86 | 0.00 | 0.00 | 4.86 |
| DEC | 25.20 | 0.85 | 24.30 | 0.00 | 0.00 | 24.30 |
| ANN | 22,300 | 1,410 | 21,100 | 0 | 0 | 21,100 |

**Well Location Map**



**Selected Well Logs**

YAMH 57902

**STATE OF OREGON** **Arrow 18-05**
**WATER SUPPLY WELL REPORT**
(as required by ORS 537.765 & OAR 690-205-0210)

**WELL I.D. LABEL#** L 128509 **Page 1 of 1**
**START CARD #** 1037962
**ORIGINAL LOG #** YAMH 57902

**(1) LAND OWNER:**
Owner Well I.D. _____
First Name: Jeremy Last Name Quinby
Company Quinby Construction
Address: 1002A N Springbrook Rd #259
City: Newberg State: OR Zip: 97132

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

**(2a) PRE-ALTERATION**

| | Dia | + | From | To | Gauge | Stl | Plstc | Wld | Thrd |
|---|---|---|---|---|---|---|---|---|---|
| Casing: | | | | | | ☐ | ☐ | ☐ | ☐ |

| | Material | From | To | Amt | sacks/lbs |
|---|---|---|---|---|---|
| Seal: | | | | | |

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

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

**(5) BORE HOLE CONSTRUCTION:** Special Standard ☐(attach copy)
Depth of Completed Well 642 ft.

| BOREHOLE Dia | From | To | SEAL Material | From | To | Amt | sacks/ lbs |
|---|---|---|---|---|---|---|---|
| 10" | 0 | 400' | bentchips | 0 | 184 | 98 | sks |
| 6 1/4" | 400' | 642' | | | Calculated | 66 | sks |
| | | | cement w/ | 184 | 400 | 70 | sks |
| | | | 3% bent | | Calculated | 43 | sks |

How was seal placed: Method ☐A ☐B ☒C ☐D ☐E
☒ Other bent poured-probed-hydrated
Backfill placed from ____ ft. to ____ ft. Material ____
Filter pack placed from ____ ft. to ____ ft. Material ____ Size ____
Explosives Used ☐Yes Type ____ Amount ____

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

**(6) CASING/LINER:**

| Casing | Liner | Dia | + | From | To | Gauge | Stl | Plstc | Wld | Thrd |
|---|---|---|---|---|---|---|---|---|---|---|
| ☒ | ☐ | 6" | ☒ | 15" | 400' | .250 | ☒ | ☐ | ☒ | ☐ |
| ☐ | ☐ | | ☐ | | | | ☐ | ☐ | ☐ | ☐ |
| ☐ | ☒ | 4 1/2" | ☐ | 382' | 642' | sch 40 | ☐ | ☒ | Screwed | |
| ☐ | ☐ | | ☐ | | | | ☐ | ☐ | ☐ | ☐ |
| ☐ | ☐ | | ☐ | | | | | | ☐ | ☐ |

Shoe ☐ Inside ☒ Outside ☐ Other Location of Shoe(s): ____
Temp casing ☒ Yes Dia : 10" From : 0 To : 6'
41/2" x 5" pvc reducer top of liner

**(7) PERFORATIONS/SCREENS:**
☐Perforations Method: ____
☒Screen Type: slotted Material: pvc

| Perf/ Screen | Casing/ Liner | Screen Dia | From | To | Scrn/slot width | Slot length | #of slots | Tele/ pipe size |
|---|---|---|---|---|---|---|---|---|
| S | L | 4.5" | 602 | 642 | .032 | | | P |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

**(8) WELL TESTS: Minimum testing time is 1 hour**
☐Pump ☐Bailer ☒Air ☐Flowing Artesian

| Yield gpm | Drawdown | Drill Stem/pump depth | Duration (hr) |
|---|---|---|---|
| 28 | n/a | 640 | 1 hr |
| | | | |
| | | | |

Temperature of water 54 °F Lab analysis ☐ Yes By ____
Water quality concerns? ☐ Yes (describe below) TDS amount 66

| From | To | Description | Amount | Units |
|---|---|---|---|---|
| | | | | |

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**(9) LOCATION OF WELL by legal description:**
County: Yamh Twp: 2S Range: 2W
Sec: 31 NE ¼ of the SE ¼ Tax Lot: 3500
Tax Map Number ____ Lot ____
Block: ____ Subdivision: ____
Lat ____ ° ____ ' ____ " or ____ DMS or DD
Long ____ ° ____ ' ____ " or ____ DMS or DD

☒ Street Address of Well ☐Nearest Address
25707 NE Mountain Top Rd Newberg OR 97132

**(10) STATIC WATER LEVEL:**

| Description | Date | SWL(psi) | + | SWL (ft) |
|---|---|---|---|---|
| sat overnight | 3-8-18 | | ☐ | 378' |
| | | | ☐ | |

Flowing Artesian? ☐ Dry Hole? ☐
WATER BEARING ZONES: Depth at which water was first found 269'

| SWL Date | From | To | Est. Flow | SWL(psi) | + | SWL(ft) |
|---|---|---|---|---|---|---|
| | 269 | 281 | <2 gpm | | | dmn |
| | | | | | | |
| | 518 | 642 | 28 gpm | | | 378' |
| | | | | | | |
| | | | | | | |

**(12) WELL LOG:** Ground Elevation: ____

| Material | From | To | SWL |
|---|---|---|---|
| Gravel fill | 0 | 2 | |
| Soil and bkn rock | 2 | 4 | |
| Rock wthd w/ some clay | 4 | 7 | |
| Basalt very wthd brwn bkn | 7 | 54 | |
| Basalt brwn/gray fract | 54 | 96 | |
| Basalt brwn decomp vesic | 96 | 107 | |
| Basalt gray hrd fract | 107 | 144 | |
| Basalt gray/brwn well fract | 144 | 246 | |
| Basalt brwn/gray fract (loose) | 246 | 269 | |
| Basalt brwn decomp bkn vesic (loose) | 269 | 281 | |
| Basalt brwn well fract decomp | 281 | 309 | |
| Basalt gray hrd fract occ brwn | 309 | 347 | |
| Basalt gray/blk hrd fract | 347 | 371 | |
| Basalt gray hrd occ fract | 371 | 518 | |
| Basalt gray/blk slightly vesic | 518 | 529 | |
| Basalt gray/brwn decomp vesic | 529 | 544 | |
| Basalt gray hrd fract | 544 | 550 | |
| Basalt gray hrd well fract | 550 | 599 | |
| Basalt gray/blk vesic occ green claystone | 599 | 612 | |
| Basalt gray hrd some fract | 612 | 619 | |
| Basalt gray/blk hrd fract | 619 | 642 | |
| | | | |
| | | | |

Date Started: 3-01-18 Completed: 3-08-18

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

License Number ____ Date ____

Signed ____

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

License Number 1483 Date 3-23-18

Signed _____

Contact Info (optional) ARROW DRILLING 503-538-4422

ORIGINAL - Water Resources Department
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHING 30 DAYS OF COMPLETION OF WORK