Approved: 

MEMO

To: Kristopher Byrd, Well Construction and Compliance Section Manager

From: Travis Kelly, Well Construction Program Coordinator

Subject: Review of Water Right Application LL-1826

Date: May 14, 2020

The attached application was forwarded to the Well Construction and Compliance Section by the Groundwater Section. Travis Brown reviewed the application. Please see Travis's Groundwater Review and the Well Report.

Applicant's Well #5 (MULT 128541): Based on a review of the Well Report, Applicant's Well #5 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). The problem is that the Well Report indicates that the well was sealed to a depth of 18 feet below land surface into Sand. In order to meet minimum well construction standards, the well must be resealed to a minimum depth of 25 feet below land surface, which is at least five feet into the Grey Silty Clay.

My recommendation is that the Department **not issue** a Limited License for Applicant's Well #5 (MULT 128541) unless it is brought into compliance with current minimum well construction standards or information is provided showing that it is constructed to meet current minimum well construction standards.

The repair of Applicant's Well #5 may not satisfy hydraulic connection issues.

MULT 128541

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)
Instructions for completing this report are on the last page of this form.

WELL I.D. # L 117846
START CARD # 1037809
MULT 128541

(1) LAND OWNER Well Number 1
Name University of Portland
Address 5828 N Van Houten Place
City Portland State Or Zip 97203

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

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

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☒ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☒ Other observation

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 138 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	Material	SEAL From	To	Sacks or pounds
12	0	18	3/4 Bentonite			
				0	20	15 sks
8"	0	138	Calculated	0	20	15 SKS

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other Pour & tamp
Backfill placed from 5 ft. to 138 ft. Material
Gravel placed from 105 ft. to 138 ft. Size of gravel 6x9

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8"	+ 2'	113	.250	☒	☐	☒	☐
	6" head	104'9	109'9		☒	☐	☒	☐
	6" tail	125'6	138		☒	☐	☒	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☐ Outside ☐ None
Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☒ Screens Type Stainless steel Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
109'9	125'6					☐	☐
		40		6"	pipe size	☒	☐
						☒	☐
						☐	☐

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

Yield gal/min	Drawdown	Drill stem at	Time
60	0		1 hr.
300		57	

Temperature of water 54° Depth Artesian Flow Found
Was a water analysis done? no ☐ Yes By whom
Did any strata contain water not suitable for intended use? no ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata: TDS: 5

(9) LOCATION OF WELL by legal description:
County Multnomah Latitude Longitude
Township 1N N or S Range 1E E or W. WM.
Section 18 NW 1/4 NE 1/4
Tax Lot 100 Lot Block Subdivision
Street Address of Well (or nearest address) 5828 N Van Houton

(10) STATIC WATER LEVEL:
21 ft. below land surface. Date 2-16-18
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 93'

From	To	Estimated Flow Rate	SWL
93'	138	300 gpm	21

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
Fill gravel	0	1	
Black sand	1	18	
Grey sand	18	20	
Grey silty clay	20	93	
sand gravel & water	93	125	21
Fine brown sand	125	138	21'

RECEIVED MAR 26 2018 OWRD
RECEIVED MAY 14 2018 OWRD

Date started 2-12-18 Completed 2-16-18

(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. Mark Blackburn WWC Number 1920
Signed Date 2-18-18

(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.
Ron Aspaas WWC Number 1445
Signed Ron Aspaas Date 2-28-18

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

Groundwater Application Review Summary Form

Application # LL- _1826_

GW Reviewer _Travis Brown_ Date Review Completed: _5/7/2020_

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 **May 7 ,2020**

TO: **Application** LL-**1826**

FROM: **GW: Travis Brown**
(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: 5/7/2020
FROM: Groundwater Section Travis Brown
Reviewer's Name
SUBJECT: Application LL- 1826 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: **University of Portland** County: **MULTNOMAH**

A1. Applicant(s) seek(s) 0.334[a] cfs from 1 well(s) in the Willamette Basin, Mainstem Willamette subbasin

A2. Proposed use: General Construction, Landscaping Establishment Seasonality: Year-round, August 2020-October 2024

A3. Well and aquifer data **(attach and number logs for existing wells; mark proposed wells as such under logid)**:

Well	Logid	Applicant's Well ID	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	MULT 128541	Well 5	Alluvium	**1.1134[a]**	1N/1E-18 NW-NE	1040' S, 2640' W fr NE cor S 18

* 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	~34[b]	93	21	2/16/2018	138	0-18	+2-113 (8") 104.75-109.75 (6") 125.5-138 (6")		109.75-125.5 (Scrn)	300		Air

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU is ~1,000 ft west of the University of Portland campus, on the north bank of the Willamette River. The proposed use is for construction and establishing landscaping and turf.

[a] The proposed POA is also an authorized POA under LL-1640 for 50 gpm (0.1114 cfs) for Riparian Habitat Restoration, year-round through May 16, 2021 and under LL-1807 for 300 gpm (0.6684 cfs) for Construction Activities year-round through December 31, 2024. These rates have been included in the total combined rate of appropriation assessed under this application (1.1134 cfs). Additionally, the proposed POA is also a proposed POA under Application G-18551 for 2.0051 cfs of year-round Quasi-Municipal Use; however, Application G-18551 is currently on administrative hold and, therefore, its rate has not been included in the anticipated total combined rate of appropriation under this application.

[b] Ground surface elevation estimated from LIDAR (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 completed in a confined aquifer; therefore, per OAR 690-502-0240, the relevant 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), 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 **Troutdale Gravel Aquifer (TGA)** groundwater reservoir between approximately **90** ft. and **235** 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): The proposed POA has previously been evaluated for **Application G-18551**, which was subject to review by the Oregon Department of Environmental Quality (DEQ) per **OAR 690-33**. In its review, the DEQ noted that the area of the proposed POA "was used for industrial purposes by multiple parties. Site investigations detected petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and metals in soil and shallow groundwater in the fill. Although previous characterization investigations were extensive and the University has completed all work required by the EPA, including the DEQ the (sic) final remedy, there is the potential for residual impacts and/or previously unknown contamination in the fill to be inadvertently encountered in areas not previously investigated." To minimize the potential for drilling, construction, and operation of the proposed POA to inadvertently encounter and/or cause downward migration of contamination from the upper water-bearing material in the fill/Unconsolidated Sedimentary Aquifer (USA) to the deeper Troutdale Gravel Aquifer (TGA), the DEQ recommended that the proposed use be subject to certain conditions. Accordingly, and in keeping with the requirements of **OAR 690-210-0140**, the currently inadequate seal for **MULT 128541** must be extended to a depth of at least 25 ft below land surface (bls). See Section D for more details.

B3. **Groundwater availability remarks:** The proposed POA (**MULT 128541**) produces groundwater from confined sand and gravel deposits of the Troutdale Gravel Aquifer (TGA), as delineated by Swanson et al. (1993). The total thickness of the TGA in this area is estimated to be ~100-200 ft (Swanson et al., 1993). The TGA in this area is underlain by the Undifferentiated Fine-grained Sediments and overlain by the Unconsolidated Sedimentary Aquifer (USA) as delineated by Swanson et al. (1993). The proposed POA location is only ~250 ft from the Willamette River, and the general coincidence of local groundwater and river levels indicates hydraulic connection between the TGA and the river in this area. Additionally, bathymetric data for this area indicates that the Willamette River bottom is at an elevation of ~ -54 ft mean sea level (msl), while the top of the water-bearing zone noted in the well log for **MULT 128541** is at an elevation of ~ -59 ft msl, indicating that likely only a thin clay layer may separate the water-bearing zone from the river bottom (David Evans and Associates, 2018). Reported yields for wells in the TGA range from a minimum of 50 gpm to more than 1,000 gpm, although the reported yield for **MULT 128541** is only 300 gpm (Swanson et al., 1993).

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	**Troutdale Gravel Aquifer (TGA)**	☒	☐

Basis for aquifer confinement evaluation: The reported static water level (SWL) measurement for **MULT 128541** is ~72 ft above the reported top of the water-bearing sand and gravel tapped by the proposed POA (**MULT 128541**). A substantial clay interval extends from ~20-93 ft bls, overlying the water-bearing sand and gravel tapped by the proposed POA (**MULT 128541**). Therefore, the aquifer appears to be confined.

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	Willamette River	~13	~5-15	~250	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: The reported SWL for the proposed POA (MULT 128541) is coincident with or above the estimated surface water elevation for SW 1 (Willamette River) (WSI, 2015; USGS, 2019). Additionally, the reported top of the water-bearing sand and gravel (~93 ft bls, or ~ -59 ft msl) tapped by the proposed POA is within 5 feet of the stream bottom elevation of the nearby Willamette River (~ -54 ft msl) (David Evans and Associates, 2018). Therefore, based on the available evidence, the proposed POA is hydraulically connected to SW 1 (Willamette River).

Water Availability Basin the well(s) are located within: WID #181, WILLAMETTE R > COLUMBIA 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 (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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	☒	☐	MF181A	1,500	☐	4,890	☐	**>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: **The proposed POA (MULT 128541) is less than ¼ mile from SW 1 (Willamette River). Per OAR 690-009-0040(4)(a), the proposed POA is assumed to have the Potential for Substantial Interference (PSI).**

To estimate the amount of interference with SW 1 due to the proposed use, the Hunt (2003) analytical model was used. Hydraulic parameters used for the analysis were derived from regional data and studies (OWRD Well Log Query; David Evans and Associates, 2018; McFarland and Morgan, 1996) or are within a typical range of values for the given parameter within the hydrogeologic regime (Freeze and Cherry, 1979; Domenico and Mifflin, 1965). **Results of the analysis indicate the proposed use is likely to result in stream depletion (interference) greater than 25 percent of the rate of pumping within the first 30 days of continuous pumping (see attached Stream Depletion Analysis); therefore, per OAR 690-009-0040(d), the proposed POA is assumed to have PSI.** However, because the proposed POA is less than 1 stream width (estimated as ~1,730 ft) from the Willamette River at this location, the zero-width stream approximation is no longer valid and the Hunt (2003) model results are anticipated to slightly overestimate the actual amount of stream depletion (interference) (Hunt, 2008); therefore, an explicit

value has not been listed. Given a sufficiently long period of continuous pumping, the rate of stream depletion will be approximately equal to the rate of withdrawal from the proposed POA.

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: N/A

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:** _____

References Used:

Application Files: LL-1826, LL-1807, LL-1640, G-18551

David Evans and Associates, Inc., 2018, Willamette River, Oregon, river mile 1.9 to 11.8 hydrographic survey report, July 2018, Vancouver, WA. Accessed via http://ph-public-data.com/document/DEA_2018/ December 12, 2018.

Domenico, P.A. and Mifflin, 1965, Water from low-permeability sediments and land subsidence: Water Resource Research, v. 1, no. 4, p. 563-576.

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

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, Vol. 8, p. 12-19.

Hunt, B., 2008, Stream depletion for streams and aquifers with finite widths: Journal of Hydrologic Engineering, February, Vol. 12, No. 2, p. 80-89.

McFarland, W.D., and Morgan, D.S., 1996, Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington, Water Supply Paper 2470-A, 58 p: U. S. Geological Survey, Reston, VA.

Swanson, R. D., McFarland, W. D., Gonthier, J. B., and Wilkinson, J. M., 1993, A description of hydrogeologic units in the Portland Basin, Oregon and Washington, Water-Resources Investigations Report 90-4196, 56 p.: U. S. Geological Survey, Reston, VA.

United States Geological Survey, 2019, Gage height data for Willamette River at Portland, OR (USGS 14211720), https://waterdata.usgs.gov/usa/nwis/uv?site_no=14211720, accessed 12/13/2019.

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

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #**: **1** **Logid:** **MULT 128541**

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:** A well construction deficiency regarding the seal for MULT 128541, originally identified in the review for LL-1807, appears to be unresolved as the Department has not yet received an alteration log confirming that the well has been appropriately repaired.

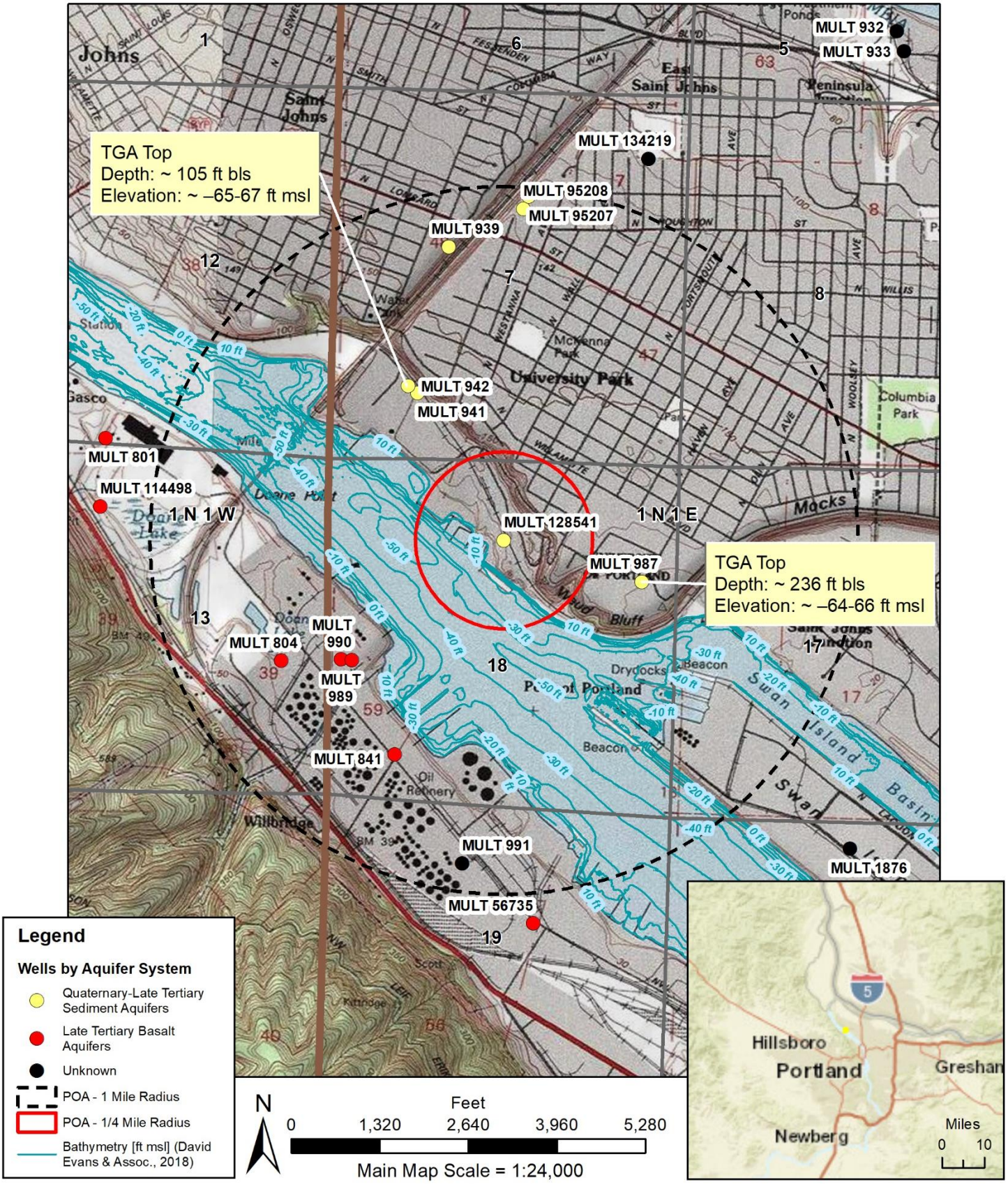
Based upon the well log for MULT 128541, the upper oversized (12-inch diameter) borehole extends only from land surface to 18 ft below land surface (bls) – into "black sand" as noted on the well log (see attached Well Construction Diagram). Below this, the borehole is noted as being 8 inches in diameter with an 8 inch diameter casing – meaning there is no annular space into which the bentonite sealing material could have been placed to create an effective seal. From 18 to 20 ft bls, the log describes the material as "grey sand". From 20 to 93 ft bls, the log describes the material as "grey silty clay". The well is screened from 109.75 to 125.5 ft bls, through what is described as "sand gravel & water". Based on the requirements of OAR 690-210-0140, "Sealing of Water Supply Wells in Unconsolidated Formations with Significant Clay Beds", the upper oversized borehole should extend "at least five feet into the clay interval overlying the water-bearing zone" or to a depth of at least 25 ft bls based on the well log.

The insufficient seal in MULT 128541 is of particular concern because the well, as currently constructed, may provide a potential pathway for cross-contamination between the shallow fill and sediments of the Unconsolidated Sedimentary Aquifer (USA) and the deeper Troutdale Gravel Aquifer (TGA) at this site – see Section B3, above, for more details.

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

Well Location Map

LL-1826 University of Portland



Water Availability Tables

Water Availability Analysis
Detailed Reports

WILLAMETTE R > COLUMBIA R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 5/6/2020

Watershed ID #: 181 (Map)
Date: 5/6/2020

Exceedance Level: 80%
Time: 6:28 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	27,500.00	2,700.00	24,800.00	0.00	1,500.00	23,300.00
FEB	30,000.00	7,970.00	22,000.00	0.00	1,500.00	20,500.00
MAR	28,500.00	7,550.00	21,000.00	0.00	1,500.00	19,500.00
APR	25,400.00	7,190.00	18,200.00	0.00	1,500.00	16,700.00
MAY	20,700.00	4,430.00	16,300.00	0.00	1,500.00	14,800.00
JUN	11,000.00	2,360.00	8,640.00	0.00	1,500.00	7,140.00
JUL	6,280.00	2,310.00	3,970.00	0.00	1,500.00	2,470.00
AUG	4,890.00	2,070.00	2,820.00	0.00	1,500.00	1,320.00
SEP	4,930.00	1,690.00	3,240.00	0.00	1,500.00	1,740.00
OCT	5,990.00	733.00	5,260.00	0.00	1,500.00	3,760.00
NOV	12,700.00	1,040.00	11,700.00	0.00	1,500.00	10,200.00
DEC	24,800.00	1,360.00	23,400.00	0.00	1,500.00	21,900.00
ANN	19,700,000.00	2,480,000.00	17,300,000.00	0.00	1,090,000.00	16,200,000.00

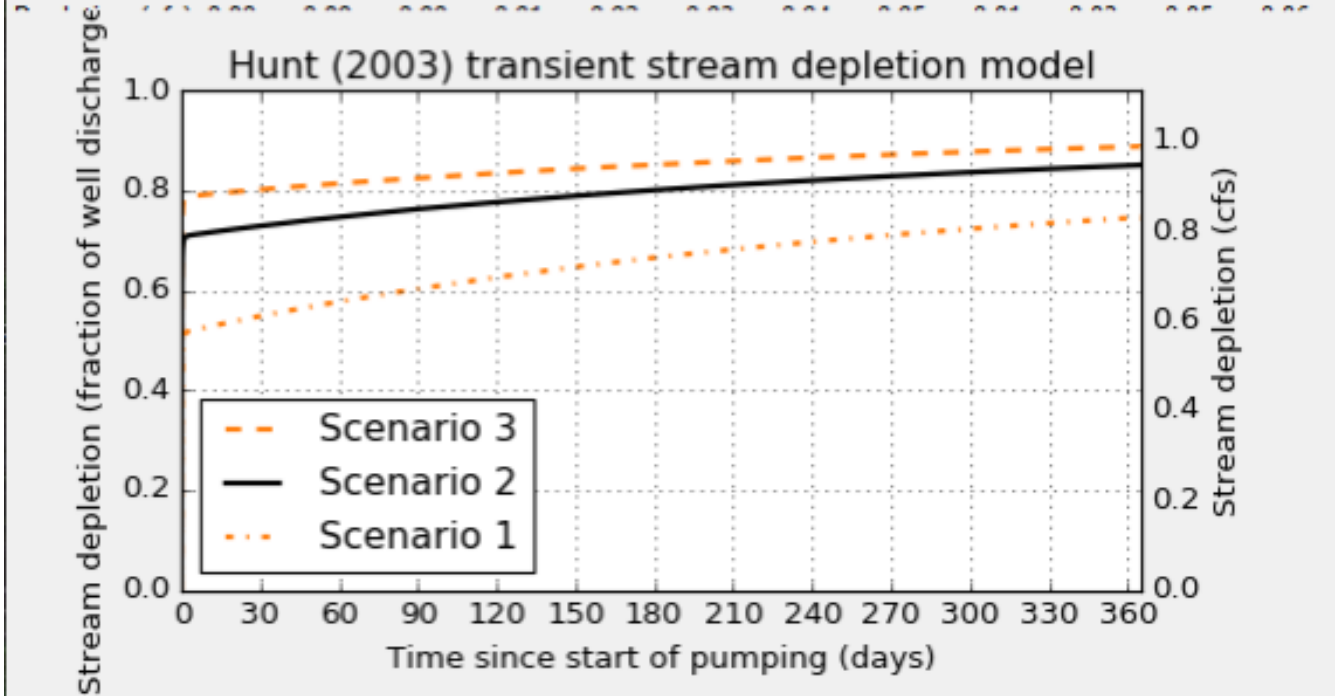
Stream Depletion Analysis

Application type:	LL
Application number:	1826
Well number:	1
Stream Number:	1
Pumping rate (cfs):	1.1134
Pumping duration (days):	365.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	250.0	250.0	250.0	ft
Aquifer transmissivity	T	250.0	1000.0	2000.0	ft2/day
Aquifer storativity	S	0.0008	0.0008	0.0008	-
Aquitard vertical hydraulic conductivity	Kva	0.08	0.08	0.08	ft/day
Aquitard saturated thickness	ba	60.0	70.0	80.0	ft
Aquitard thickness below stream	babs	10.0	5.0	3.0	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-

Stream depletion for Scenario 2:

Days	10	180	210	240	270	300	330	360	30	60	90	120
Depletion (%)	71	80	81	82	83	84	84	85	73	75	76	78



Well Construction Diagram