Oregon
Tina Kotek, Governor

Department of Environmental Quality
Eastern Region Bend Office
475 NE Bellevue Dr., Suite 110
Bend, OR 97701
(541) 388-6146
FAX (541) 388-8283
TTY 711

July 31, 2025

Annes Butte, LLC
18160 Cottonwood Rd #274
Sunriver, OR 97707

Re: WQ: Variance Approval: 248-25-000015-VAR: 16924 Upland Rd; T.20S; R.10E; Sec. 13C; Tax Lot 7800; 0.51 Acres; Deschutes County.

Dear Annes Butte LLC,

This correspondence verifies that a variance hearing provided for under Oregon Administrative Rules 340-071-0430, was held on the site at 2:30 pm on June 2, 2025, for the subject property referenced above on Upland Road in Deschutes County. The purpose of the hearing was to provide a forum for the presentation of supportive facts to show that strict compliance with certain rules regulating onsite sewage disposal are inappropriate, or that special physical conditions at the site render strict compliance unreasonable, burdensome or impractical. The proposal and associated supporting information you provided with the application was presented during the recorded hearing.

Variance Decision:
Based on review and evaluation of the variance record and observations made during the variance hearing, I am pleased to inform you that the variance from the rules cited above is hereby granted. In my opinion, it would be unreasonable to prohibit this method of wastewater treatment by strictly following the administrative rules at this specific location at this time. It is my judgement that the proposed system is not likely to present a public health hazard risk or have any significant adverse impacts to groundwater or surface water quality if properly operated and maintained.

Justification for this decision:

- The proposed Orenco® AdvanTex AX20N-Mode 3B system is currently approved as a system meeting DEQ's Treatment Standard 2; OAR 340-071-0100(168) "Treatment Standard 2".
- On average, the AX20N-Mode 3B system is one of the best available technologies for Total Nitrogen treatment that has been approved for use in Oregon and is expected to treat residential wastewater to 20 mg/L Total Nitrogen, which is about two thirds of a reduction from that of a standard system and about half from a sand filter system in this climate.
- Treatment Standard 2, for the reduction of fecal coliform, will be met or exceeded with pre-treated effluent from the AX20N-Mode 3B unit (proposed w/o UV disinfection) and the RidNOx™ unit that will discharge into a 250 square foot bottomless sand filter with an additional 6-inches (8-inches for replacement) of sand filter media (embedded 6-inches below ground surface) placed below the filter to meet or exceed the minimum 24-inch separation requirement to groundwater below. Note: The bottomless sand filter is assumed to

meet Treatment Standard 2 criteria independently of the ATT, which is why UV disinfection is not included in the proposal.

- Overall Treatment: Treatment first occurs within the AX20N-Mode 3B system (w/o UV) for reductions in TSS, BOD_5 and Total Nitrogen (TN). The RidNOx™ unit is expected to further reduce TN (and Nitrate) as the effluent passes through and makes contact with the soluble carbon being released from the wood chip material. Final discharge will occur through the elevated bottomless sand filter, which may provide some additional reduction/treatment of BOD_5, TSS, Fecal Coliform and TN. It is expected that the final effluent being discharged shall meet or exceed that of the similar Nitrex unit, that was tested during the La Pine National Demonstration Project, which averaged a 96% reduction of TN. The final effluent Nitrate concentration is expected to be well under the EPA drinking water standard of 10 mg/L as well as local action levels set at 7 mg/L.
- The proposed system, with innovative technology, shall be required to be maintained by a certified maintenance provider for the life of the system. Additionally, the system shall be monitored and sampled at regular intervals to ensure that the system is performing as expected. The sampling, monitoring, and maintenance of the system shall be reported to Deschutes County on an annual basis.

Standards found in Oregon Administrative Rules Chapter 340, Division 071 & 073 have been developed to protect public health and the environment in Oregon. The variance officer's duty is to determine if in their professional judgement, the system proposed for this variance consideration is adequate to safeguard the public's health and the environment if variance from the standards noted above are granted. In my opinion, your proposal adequately addresses the limitations present at the site.

Other Considerations:
The effluent from the ATT and RidNOx™ system, discharging through a bottomless sand filter, will have a significant reduction in BOD, TSS, TN, and Fecal Coliform. In this proposal, treated ATT to RidNOx™ effluent will be discharged into a 250 square foot bottomless sand filter with an additional 7- inches (9 inches for replacement) of sand filter media embedded 6 - inches into the native soil that will be used to exceed the 24-inch separation from the shallowest water table depth standard by providing a total separation of 30 - inches. The additional media will mitigate the lack of vertical separation from the bottom of the sand filter to the highest level of groundwater on site. The RidNOx™ unit is expected to provide a significant reduction of Total Nitrogen (and Nitrate) before the treated effluent enters the bottomless sand filter with a basal area intersecting the native soil and ultimately the groundwater below.

This variance approval is being granted on the condition that requirements contained in the enclosed schedules are met. Schedules A and B (attached) include requirements and specifications for the design and location of the system approved through this variance. Failure to meet these conditions may cause the variance approval to become null & void.

Site History & Variance Proposal:
Deschutes County conducted a site evaluation with 3 test pits within the subject property on October 29, 2024, where a denial was issued for the use of an onsite wastewater system on November 5, 2024. The primary reason for denial was due to the predicted depth to the seasonally high permanent water table being less than 24- inches below the ground surface. Observed conditions associated with

saturation that are used to determine water table levels and site suitability were observed between 17-inches and 21-inches below ground surface (bgs), respectively.

The proposal to overcome the site limitations is by installing an Orenco® AdvanTex AX20N-Mode 3B Alternative Treatment Technology System followed by a RidNOx™ solid-phase carbon flow-through filter before discharging to a 250 sq. ft. elevated Bottomless Sand Filter system constructed on a 12-inch bed of sand filter media embedded 6 inches into the native soil. It is expected that the highest level of groundwater within the lowest point of the sand filter areas will come to 21- inches bgs. The proposal overcomes this limitation by providing additional sand filter media with 7- inches (9 – inches for replacement) of extra vertical separation and providing a total 30-inch separation to the shallowest predicted groundwater depth. The rest of the sand filter will be "conventional" from there up, consisting of 6 inches of underdrain media, 24- inches of sand filter media, 6- inches of drain media (with the distribution laterals), filter fabric, and 6-9 inches deep of final backfill on top. The sand filter will be contained within a supporting berm with a slope no steeper than 3:1.

You are seeking a variance from the following Oregon Administrative Rules (OAR):

340-071-0135(1) – which addresses DEQ approval of new or innovative technologies, materials, or designs for onsite systems. **This rule is being varied from due to deviating from the approved design for the AX20N in Mode 3B by not requiring UV disinfection. Treatment Standard 2 will still be met or exceeded without the UV disinfection by discharging the treated effluent through a bottomless sand filter.**

340-071-071-0150(4)(a)(B) - which requires all criteria for approving a specific type or types of systems, as described in this division are satisfied.

340-071-0290(4)(d) which states: Bottomless Sand Filter. Sites may use a conventional bottomless sand filter if the site meets the criteria in this section and section (3) of this rule. (d) The water table is at least 24- inches below the ground surface throughout the year, and a minimum 24-inch separation is maintained between a water table and the bottom of the sand filter.

Should future ATT technologies for treatment of Total Nitrogen be approved for use in Oregon before issuance of a construction-installation permit for this site, Deschutes County may allow installation of equal or better technology instead of the type noted in this approval.

Conclusion:

The decision to grant your variance request is a Final Order of DEQ. Any person who is adversely affected or aggrieved by this Order is entitled to a contested case hearing before the Environmental Quality Commission. A request for a hearing must be received by DEQ within twenty days from the date of certified mailing of this Order. The request must specifically describe how the Order fails to meet the requirements of Oregon Revised Statutes 454.657 and 454.660, and include the technical basis that supports the petition. The appeal must be directed to the Environmental Quality Commission, in care of Lindsay Trapp, EQC Assistant, Department of Environmental Quality, 700 NE Multnomah St., Suite 600, Portland, OR 97232-4100.

Deschutes County onsite staff is hereby authorized to issue a construction-installation permit, subject to all the conditions, upon their receipt of a complete permit application. The application must include a favorable land use compatibility statement issued by Deschutes County, a set of detailed plans and specifications for the onsite wastewater treatment system, a current maintenance service agreement and the appropriate application fee.

Please feel free to contact me if you have any questions concerning this decision. I can be reached by telephone at (541) 776-6130, or by email at david.hurley@deq.oregon.gov.

Sincerely,

David Hurley

David Hurley, REHS
Variance Officer – Onsite Wastewater Program

Encl: Schedule A- Special Conditions
Schedule B- Approved Plans
Approved Drawings / Schematics

cc: Todd Cleveland, REHS; Deschutes County Onsite Wastewater Division, 117 NW Lafayette Ave, Bend OR 97703
Brian T. Rabe, CPSS, WWS; Principal Soil Scientist, of Elkhorn Consulting LLC, 14833 Goodrich Creek Lane, Baker City, OR 97814
Randi L & Jess A Hill, 16923 Torrance Rd, Bend, OR 97707
Michael B & Melynda A Holliday, 16939 Torrance Rd, Bend, OR 97707
10 Peaks LLC, 3242 NE 3rd Avenue #1018, Camas, WA 98607
Bill & Jennifer Baskins, 2212 Demaray Dr, Grants Pass, OR 97527
David & Kara Perrault, 612 NE 164th St Ridgefield, WA 98642
Justin Wimmer, 20079 Mt Hope Ln, Bend, OR 97702
Ross Family Living Trust, 70 SW Centruy Dr # 1000, Bend, OR 97702
Deborah A. Martin, 300 Southfork Rd, Yakima, WA 98903

Schedule A – Annes Butte LLC
Variance Report - Special Conditions
T 20S, R 10E, Sec: 13C, TL 7800

Special Conditions and requirements for the Orenco® AX20N-Mode 3B Alternative Treatment Technology unit with a RidNOx™ system followed by an elevated 250 square foot Bottomless Sand Filter at 16924 Upland; T.20S; R.10E; Sec. 13C; Tax Lot 7800; 0.51 Acres; Deschutes County.

1. A person or business licensed by the Department of Environmental Quality in accordance with Oregon Revised Statutes, Chapter 454.695, must perform all work construction of this onsite wastewater treatment system.

2. Before starting with the actual construction of this system, the system installer shall submit, through a written statement to the Deschutes County Community Development Department, Onsite Wastewater Division (hereafter referred to as "County") that acknowledges that they have thoroughly reviewed the conditions of this variance approval with technical staff in that office, and they understand and will comply with all conditions associated with this variance approval.

3. This system incorporates the use of Sand Filter Media and Underdrain media, as defined in Oregon Administrative Rules (OAR) 340-071-0100(124) and OAR 340-071-0100(170). Prior to delivery to the site, a current sieve analysis, using testing requirements required in rule for the respective material, must be submitted for review and approval to the County. Special handling of the respective media is to occur, during transport, site storage, and construction of the sand filter.

4. This onsite wastewater treatment system shall serve a single-family residence with up to four bedrooms. The projected daily sewage flow must not exceed 450 gallons per day, and the average daily flow must not exceed 225 gallons per day. Where practical, low water-use plumbing fixtures and appliances should be used within the dwelling in conjunction with water conservation practices. **Use of a garbage disposal is not recommended.**

5. All construction of this system shall only occur under optimum soil moisture conditions. The soils must be nearly dry and not frozen. Typically, the ideal construction period begins at the end of spring run-off season and ends prior to the onset of winter weather.

6. The setback to all wells from the initial or replacement bottomless sand filters is to be at least 100 feet.

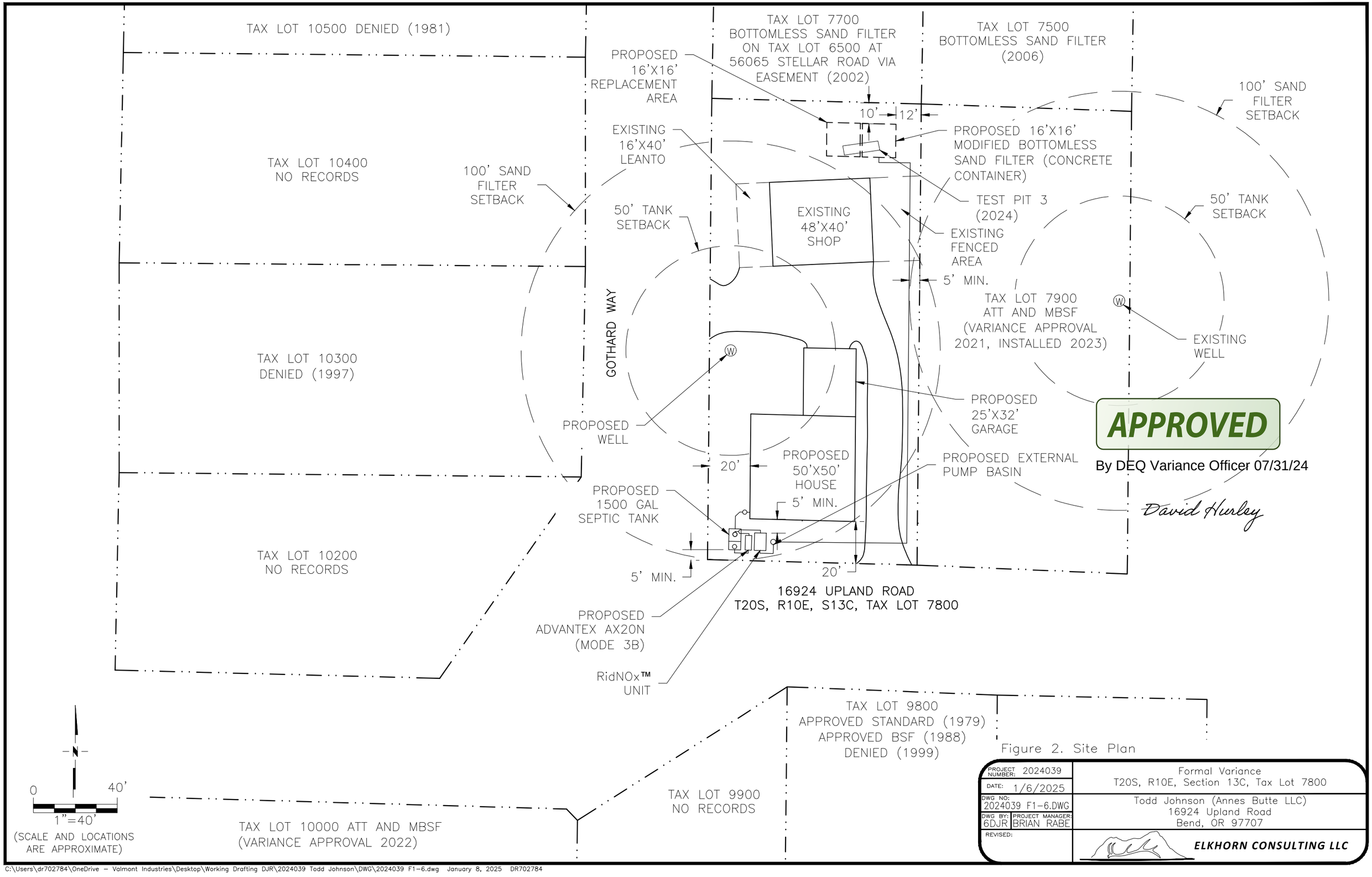
7. The County shall inspect the installation of this system at those stages of construction they identify as appropriate to ensure proper construction.

8. Except as specifically authorized, all requirements of the Oregon Administrative Rules (Chapter 340, Rules 071-0100 through 071-0650) must be met.

9. The permittee shall comply with all local planning, zoning and building ordinances.

10. A Certificate of Satisfactory Completion shall be issued for the completed installation only if all conditions of this variance approval are met.

11. Should the onsite wastewater treatment and disposal system, authorized through this variance fail, County staff may exercise professional discretion in effecting a repair, based upon an analysis of the possible causes of failure. An area next to the initial sand filter is to be designated for future repair or replacement and must be reserved for this use. The replacement system considered in this variance procedure is the installation of another sand filter.



APPROVED

By DEQ Variance Officer 07/31/24

David Hurley

Figure 2. Site Plan

PROJECT NUMBER: 2024039	Formal Variance T20S, R10E, Section 13C, Tax Lot 7800
DATE: 1/6/2025	
DWG NO: 2024039 F1-6.DWG	Todd Johnson (Annes Butte LLC) 16924 Upland Road Bend, OR 97707
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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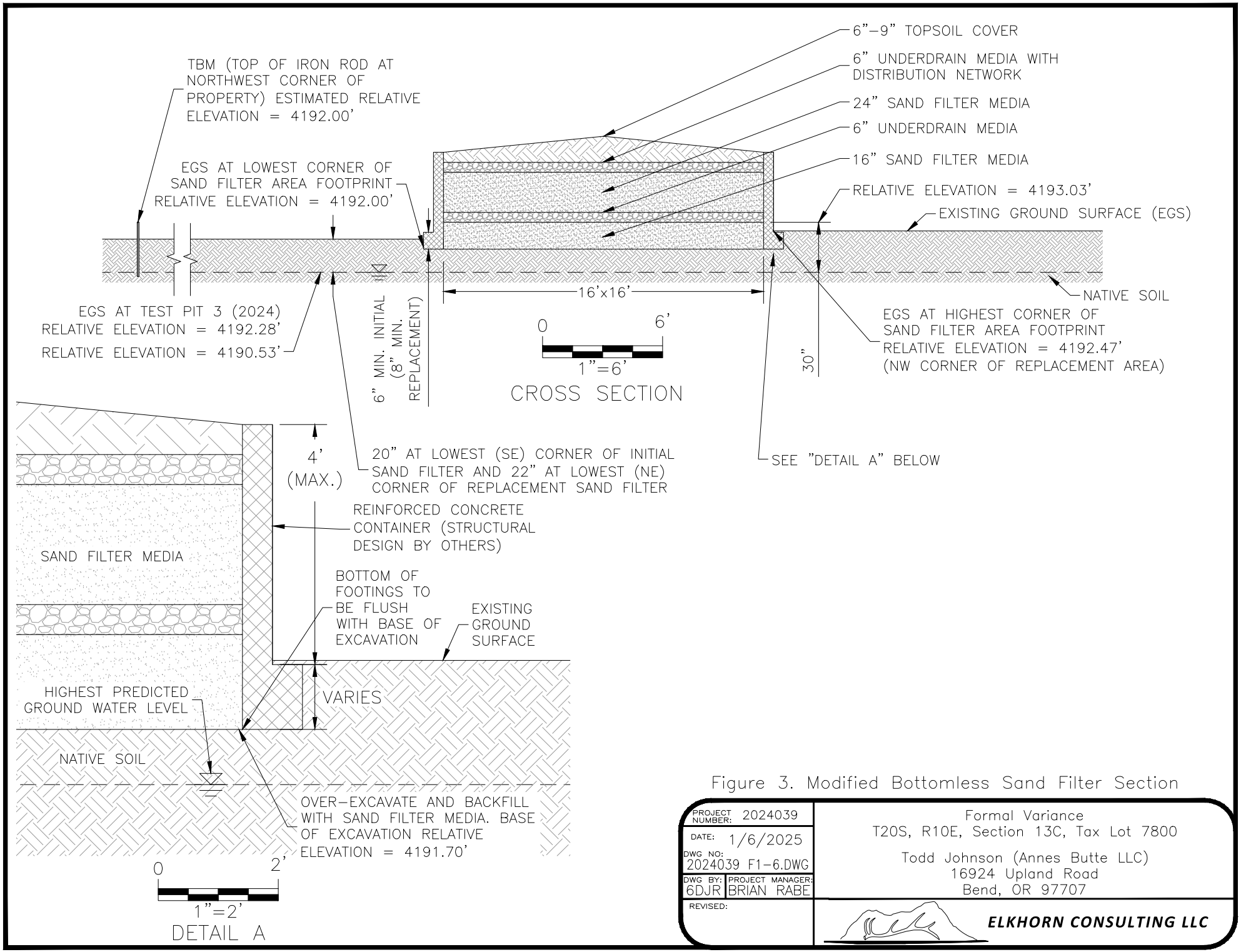

Figure 3. Modified Bottomless Sand Filter Section

PROJECT NUMBER: 2024039	Formal Variance T20S, R10E, Section 13C, Tax Lot 7800
DATE: 1/6/2025	
DWG NO: 2024039 F1–6.DWG	Todd Johnson (Annes Butte LLC) 16924 Upland Road Bend, OR 97707
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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TOTAL OF 64 ORIFICES
0.52 GALLONS PER MINUTE
AT 7.1 FT RESIDUAL HEAD
(33.1 GPM AT 45.5 FT TDH)
RECOMMENDED PUMP PF3005

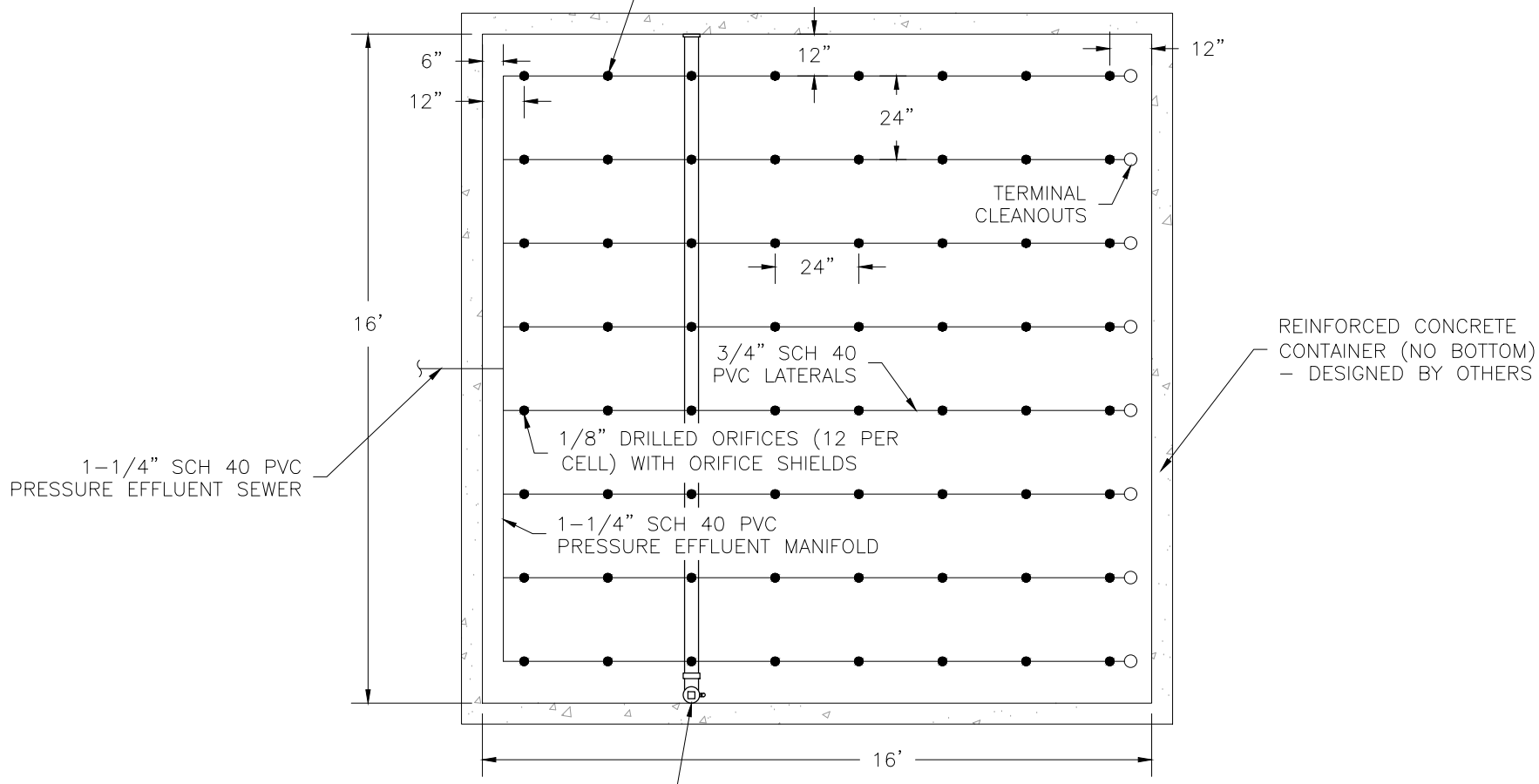

Figure 4. Sand Filter Plan Detail

PROJECT NUMBER: 2024039	Formal Variance T20S, R10E, Section 13C, Tax Lot 7800
DATE: 1/6/2025	
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REVISED:	ELKHORN CONSULTING LLC

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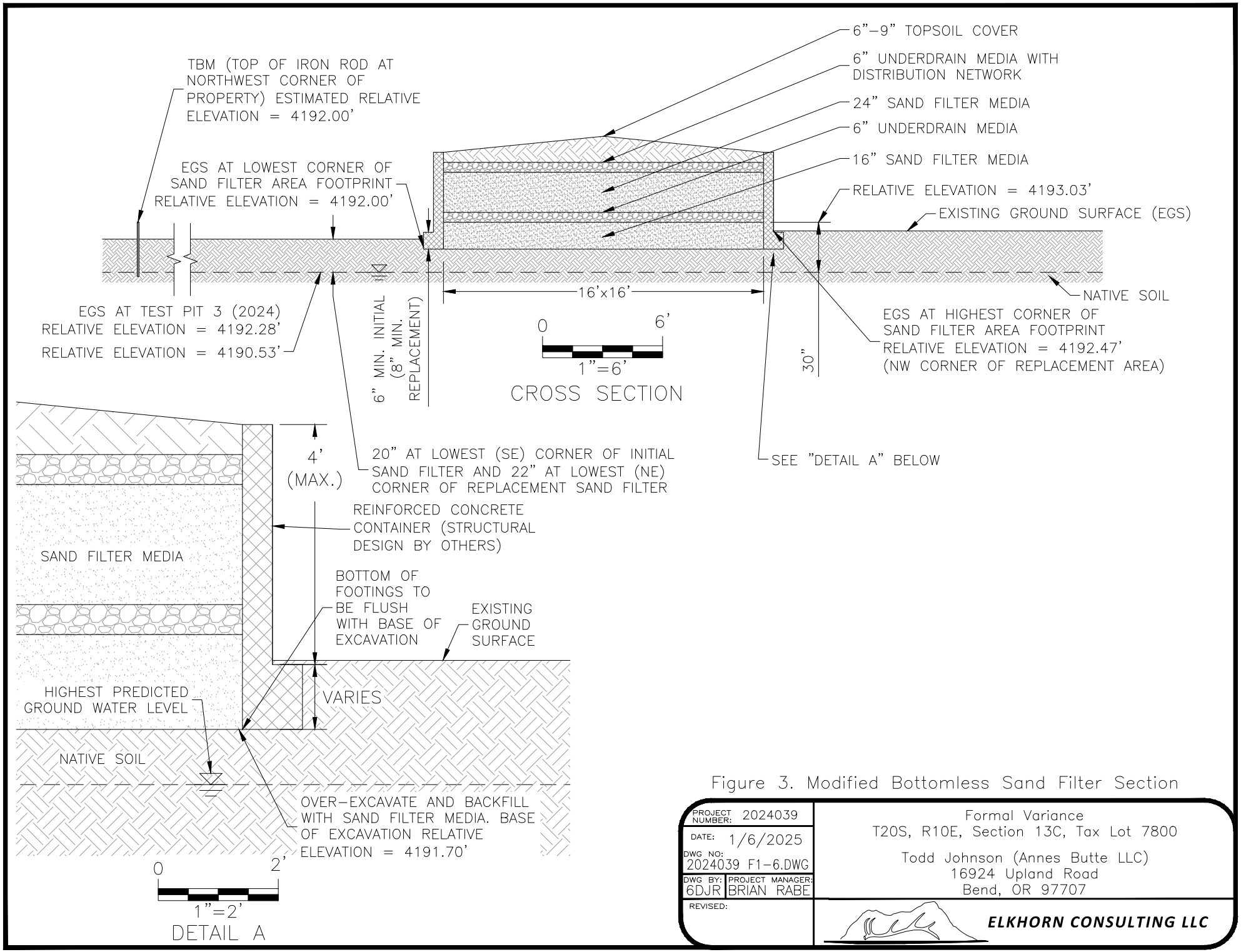

Figure 3. Modified Bottomless Sand Filter Section

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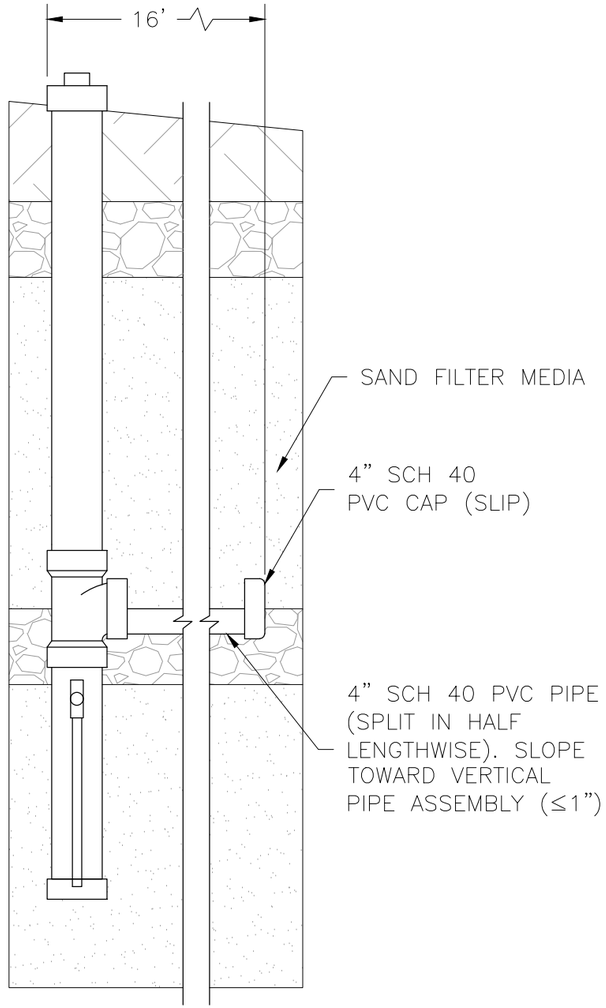
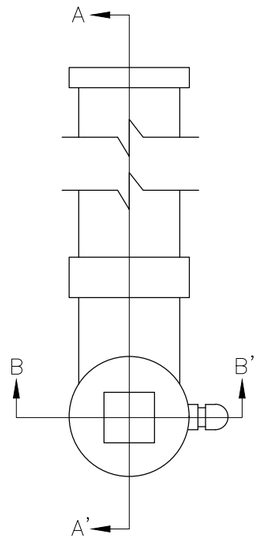


VIEW A–A'

0 1'

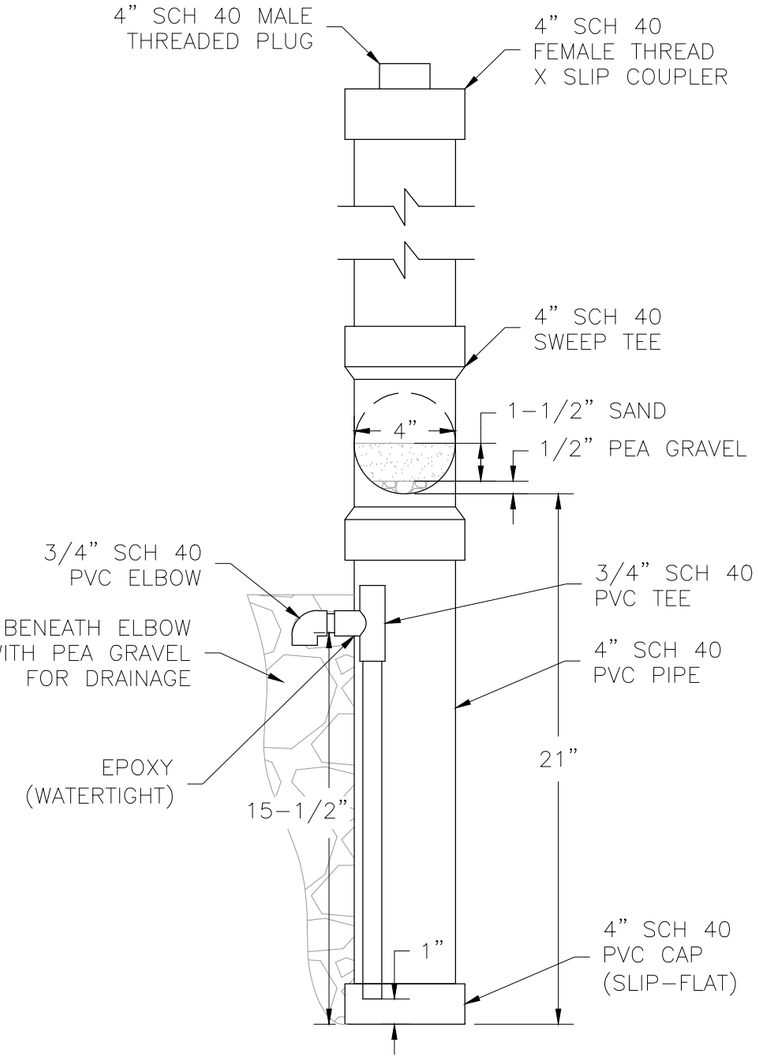
1"=1'



PLAN VIEW

0 0.5'

1"=0.5'



VIEW B–B'

0 0.5'

1"=0.5'

Figure 5. Lysimeter Details

PROJECT NUMBER: 2024039	Formal Variance T20S, R10E, Section 13C, Tax Lot 7800
DATE: 1/6/2025	
DWG NO: 2024039 F1–6.DWG	Todd Johnson (Annes Butte LLC) 16924 Upland Road Bend, OR 97707
DWG BY: 6DJR PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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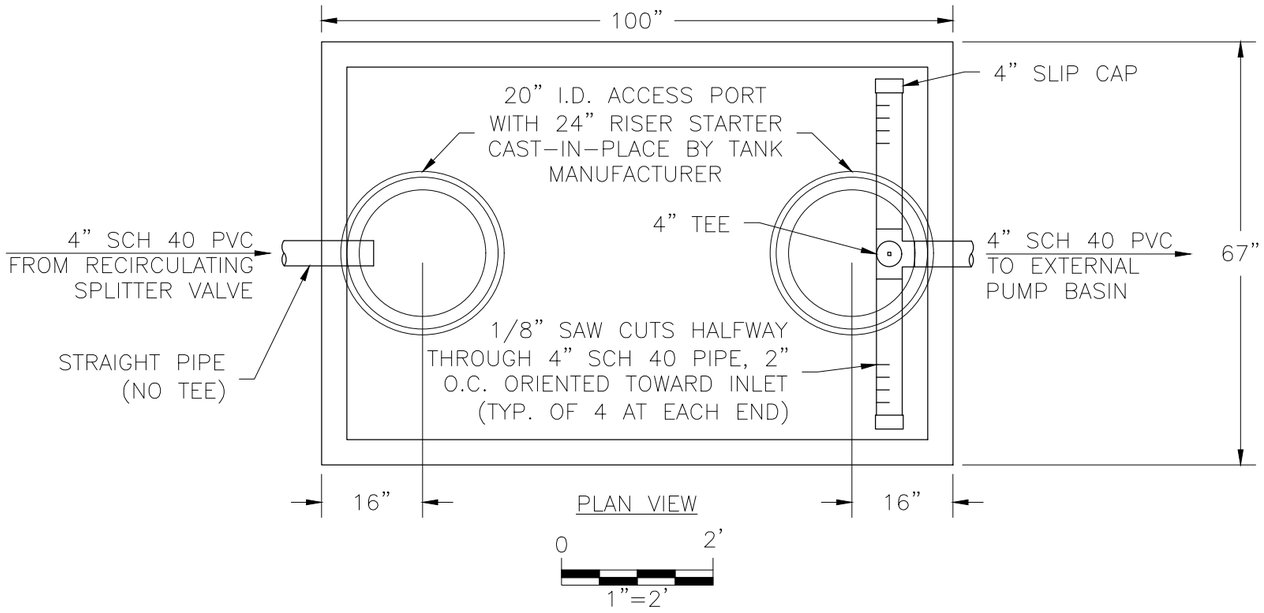

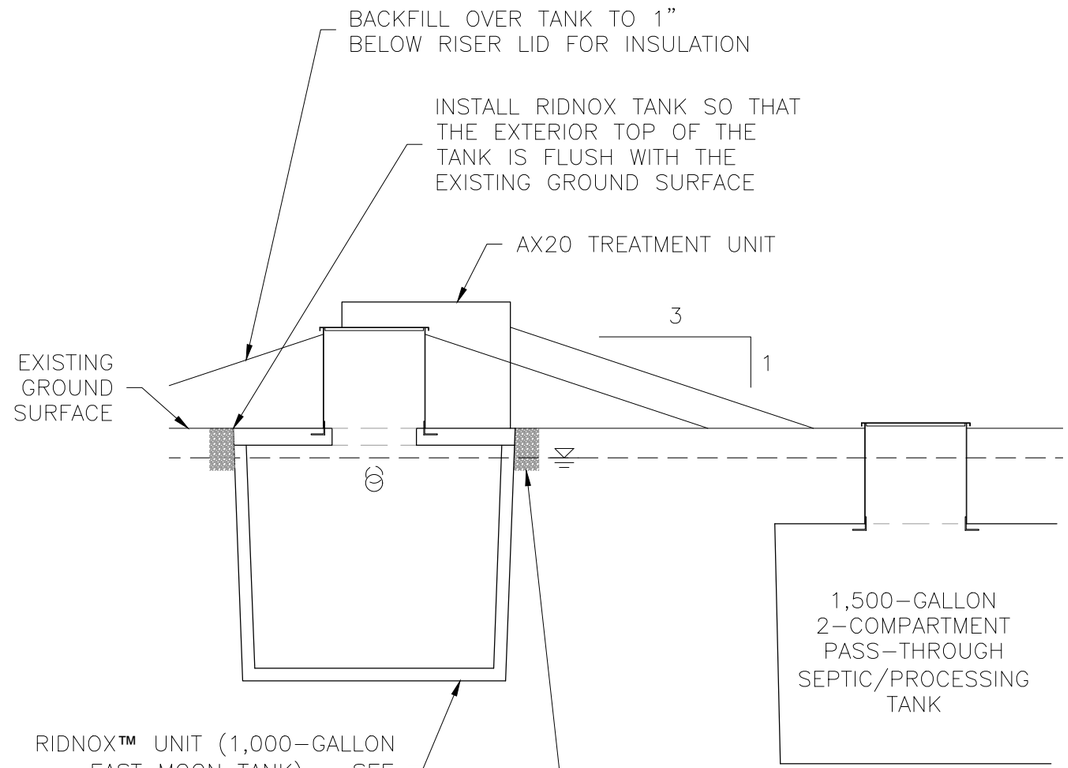

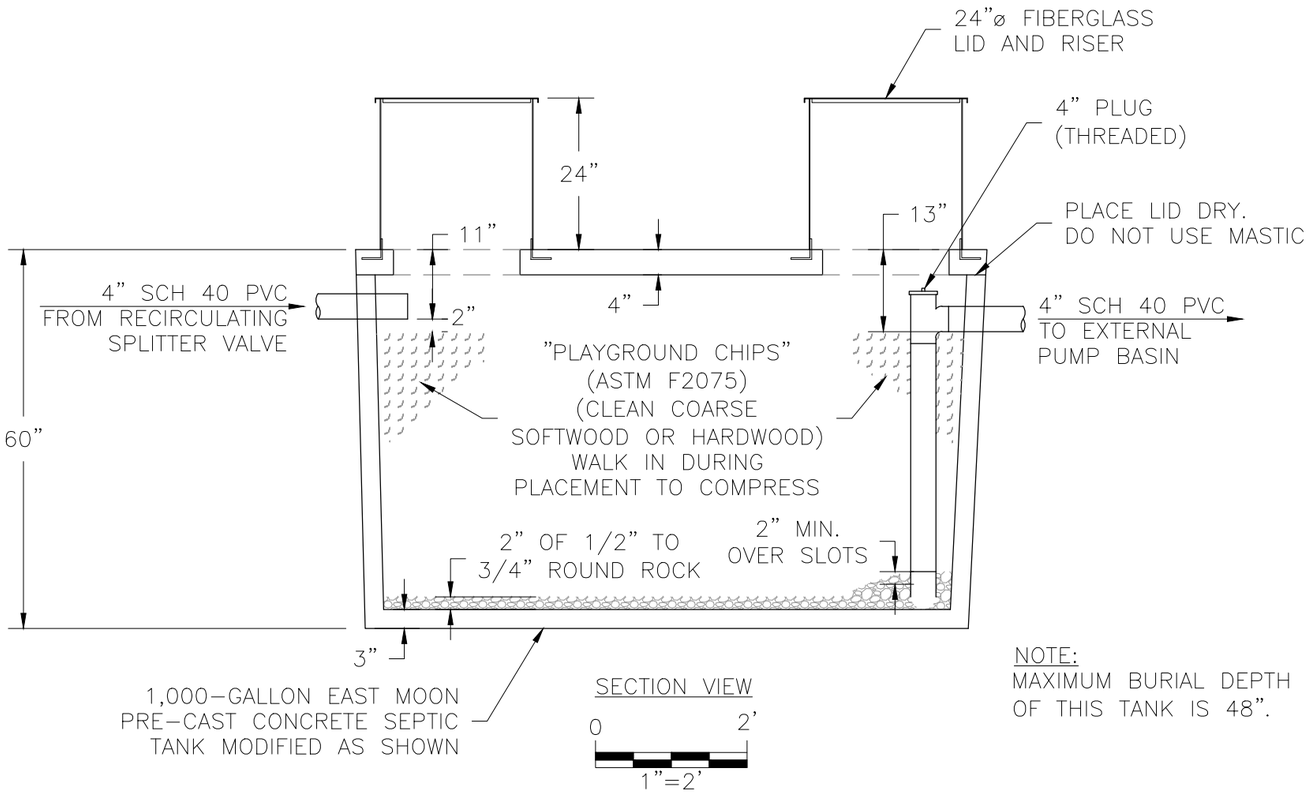

NOTE:
MAXIMUM BURIAL DEPTH OF THIS TANK IS 48".

Figure 6. RidNOx™ Details

PROJECT NUMBER: 2024039	Formal Variance
DATE: 1/6/2025	T20S, R10E, Section 13C, Tax Lot 7800
DWG NO: 2024039 F1-6.DWG	Todd Johnson (Annes Butte LLC)
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	16924 Upland Road
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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ELKHORN CONSULTING LLC

14833 Goodrich Creek Lane
Baker City, OR 97814 • 503-881-1604
elkhornconsultingllc@gmail.com

January 8, 2025

RECEIVED
JAN 13 2025
DEQ
Eastern Region Bend

Variance Officer
Onsite Variance Program
DEQ - Eastern Region Water Quality
475 NE Bellevue, Ste. 110
Bend, Oregon 97701

SUBJECT: Formal Variance Request –Annes Butte LLC – T20S, R10E, Section 13C Tax Lot 7800 (0.51 acres), Deschutes County, South of Bend, Oregon.

Dear Variance Officer:

A formal variance from selected onsite rules is hereby requested under the provisions of Oregon Administrative Rules, Chapter 340, Division 071, Section 0415 (OAR 340-071-0415).[1] The property is located at 16924 Upland Road, south of Bend in Deschutes County, Oregon (Site) (Figure 1) and consists of 0.505 acres. A Tax Lot map is attached in Appendix A and a copy of the Deed is attached in Appendix B.

Background

Deschutes County conducted a site evaluation on September 25, 2007, that was denied as inconclusive until spring water table measurements could be made in a normal year. Deschutes County conducted a new site evaluation on October 29, 2024, and issued a denial on November 5, 2024. The denial was based on conditions associated with saturation noted at 17 to 21 inches below the ground surface in 3 test pits. Test Pit 3 represented the best conditions and was near the northeast corner of the lot. The other test pits were along the eastern boundary of the lot. The primary reasons cited for the denial were the predicted depth to the highest level attained by a fluctuating permanent water table and the risk to groundwater quality that could result from increased nitrogen loading to the underlying aquifer. A copy of the site evaluation documentation from Deschutes County is attached in Appendix C.

Southern Deschutes County has a shallow water table that is typically unconfined in porous pumice soils and is susceptible to contamination from soluble and mobile constituents. The most common constituent of concern is nitrate-nitrogen from septic systems. The onsite rules require a minimum of 24 inches of separation from the upper limit of the water table to the bottom of a bottomless sand filter.

Soils

There is no published soil survey information for the Site or surrounding area. The nearest available survey information is about 500 feet east of the Site. Based on the similarity of elevation and landscape position, it is assumed that the test pits would have been delineated within Map Unit 144A, Sunriver sandy loam 0 to 3% slopes. Sunriver soils are described as very deep, somewhat poorly drained soils that formed on pumice mantled stream terraces. The typical profile generally consists of the following:

[1] Onsite wastewater treatment systems, 340 OAR § 340.71. (2020).

- Up to 2 inches of organic material underlain by,
- 5 inches of very dark gray ashy sandy loam underlain by,
- 15 inches of dark gray ashy loamy coarse sand underlain by,
- 9 inches of light brownish gray ashy coarse sand underlain by,
- 31 inches of very dark gray sandy loam.

The Sunriver series is described as having a water table that rises to about 2 to 4 feet below the surface from April to June.

The characteristics observed at the Site are reasonably similar to the Sunriver series. The primary differences between the conditions noted in the 2024 soil notes and the conditions typical for the Sunriver series are related primarily to coloration (browner colors) that are more indicative of the Shanahan series.

Preliminary Assessment

The Site was reviewed by Brian Rabe, CPSS, WWS, on November 22 and 29, 2024. The purpose was to review the Site conditions and assess the potential to design a modified bottomless sand filter that incorporates additional fill to create adequate separation from the underlying water table following advanced secondary treatment meeting the criteria for Treatment Standard 2 (TS2). The proposed bottomless sand filter area is located on this highest ground, represented by Test Pit 3 in the 2024 site evaluation (northeastern part of the lot - see Figure 2 and Appendix C).

Other Considerations

This parcel and developed parcels in the surrounding area are served by individual private wells. A search of the database of the Oregon Department of Water Resources was conducted for the section that the subject property lies within (Section 13 of Township 20 South, Range 10 East of the Willamette Meridian). There are about 393 records on file for this section. A total of 14 water well records (well logs) were identified in Section 13 that could be tied to specific parcels within about one-eighth of a mile of the subject property (Appendix E).

The closest existing well is on Tax Lot 7900 and is 130 feet southeast of the proposed bottomless sand filter area. This well was completed on May 2, 2022, to a depth of 100 feet. Water was described as being first found at a depth of 94 feet in a layer of "coarse black sand" and had a static water level of 21 feet bgs on the date of completion with a reported yield of 15 gpm with 24 feet of drawdown after 1 hour with a pump.

The next closest existing well is on Tax Lot 10600 and is about 200 feet northwest of the proposed bottomless sand filter area. This well was completed on April 20, 2007, to a depth of 99 feet. Water was described as being first found at a depth of 9 feet in a layer of "Brown Sand Fine." This layer was sealed off and water was next found at a depth of 88 feet in a layer of "Brown Sand Med Fine" and had a static water level of 16 feet bgs on the date of completion with a reported yield of 21 gpm with 3 feet of drawdown after 2 hours with a pump.

The next closest existing well is on Tax Lot 7500, about 230 feet north-northeast of the proposed bottomless sand filter area. This well was completed on June 29, 1998, to a depth of 88 feet. Water was described as being first found at a depth of 84 feet in a layer of "sand and gravel" and had a static water level of 18 feet bgs on the date of completion with a reported yield of 15 gpm with 18 feet of drawdown after 1 hour with a pump.

The next closest existing well is on Tax Lot 7501, about 260 feet northeast of the proposed bottomless sand filter area. This well was completed on May 16, 2007, to a depth of 98 feet. Water was described as being first found at a depth of 89.5 feet in a layer of "sand" and had a static water level of 16 feet bgs on the date of completion with a reported yield of 30 gpm with 44 feet of drawdown after 1.5 hours with a pump.

The well on Tax Lot 9900 is between 260 feet and 480 feet south-southwest of the proposed bottomless sand filter area. This well was completed on May 30, 1969 to a depth of 95 or 96 feet. There is no indication regarding the depth at which water was first found nor any indications of perforations in the casing. The casing was installed to a depth of 80 feet bgs terminating in a layer of "green clay with fine gravel." The well had a static water level of 20 feet bgs on the date of completion with a reported yield of 10 gallons per minute (gpm) with 5 feet of drawdown after 1 hour with a bailer.

The well for Tax Lot 10700 is about 270 feet north-northwest of the proposed bottomless sand filter area. This well was completed on August 21, 2006, to a depth of 100 feet. Water was described as being first found at a depth of 87 feet in a layer of "blk sand" and had a static water level of 17 feet bgs on the date of completion with a reported yield of 15 gpm with 10 feet of drawdown after 3.5 hours with a pump.

The well for Tax Lot 7400 is about 290 feet northeast of the proposed bottomless sand filter area. This well was completed on May 31, 2022, to a depth of 106 feet. Water was described as being first found at a depth of 88 feet in a layer of "coarse black sand" and had a static water level of 21 feet bgs on the date of completion with a reported yield of 8 gpm with 64 feet of drawdown after 1.5 hours with a pump.

The well for Tax Lot 8200 (described in the water well report as Tax Lot 8100 – later merged with Tax Lot 8200) is about 320 feet east of the proposed bottomless sand filter area. This well was completed on October 19, 1994, to a depth of 97 feet. Water was described as being first found at a depth of 8 feet in a layer of "gravel." The well was cased and perforated in layers of "sand & clay" and "sand & gravel" between 86 and 96 feet bgs. The well had a static water level of 18 feet bgs on the date of completion with a reported yield of 25 gpm with 10 feet of drawdown after 4 hours.

The well for Tax Lot 6100 is about 350 feet northeast of the proposed bottomless sand filter area. This well was completed on June 30, 2024, to a depth of 94 feet. Water was described as being first found at a depth of 22 feet in a layer of "diatomite" but was screened between 89 and 94 feet in a layer of "coarse black sand" and had a static water level of 22 feet bgs on the date of completion with a reported yield of 20 gpm with 50 feet of drawdown after 1 hour with a pump.

The well for Tax Lot 14600 is about 570 feet northwest of the proposed bottomless sand filter area. This well was completed on April 28, 2004, to a depth of 90 feet. Water was described as being first found at a depth of 22 feet in a layer of "Black sand mixed with Grey ash" and had a static water level of 22 feet bgs on the date of completion with a reported yield of 15 gpm with 19 feet of drawdown after 4 hours with a pump.

The well for Tax Lot 14700 is also about 570 feet northwest of the proposed bottomless sand filter area. This well was completed on August 28, 2001, to a depth of 89 feet. Water was described as being first found at a depth of 9 feet in a layer of "gravel & sand mix" but was sealed off. Water was next found at a depth of 87 feet in a layer of "red & brown sand coarse" and had a static water level of 13.5 feet bgs on the date of completion with a reported yield of 20 gpm with 11.5 feet of drawdown after 3 hours with a pump.

The well for Tax Lot 15000 is about 590 feet southwest of the proposed bottomless sand filter area. This well was completed on October 5, 2019, to a depth of 110 feet. Water was described as being first found at a depth of 108 feet in a layer of "white pumice" and had a static water level of 17 feet bgs on the date of completion with a reported yield of 22 gpm with 15 feet of drawdown after 1 hour with a pump.

The well for Tax Lot 6200 is about 600 feet northeast of the proposed bottomless sand filter area. This well was completed on December 4, 2020, to a depth of 102 feet. Water was described as being first found at a depth of 75 feet in a layer of "fine black sand" and had a static water level of 20 feet bgs on the date of completion with a reported yield of 22 gpm with an unspecified drawdown after 1.5 hours with a pump.

The well for Tax Lot 9300 is about 650 feet southeast of the proposed bottomless sand filter area. This well was completed on November 30, 2023, to a depth of 150 feet. Water was described as being first found at a depth of 43 feet in a layer of "Green/ gray clay" but was screened between 124 and 144 feet in a layer of "Black snad w/ clay seems" and had a static water level of 43 feet bgs on the date of completion with a reported yield of 20 gpm with an unspecified drawdown after 1 hour with air.

The regional groundwater gradient, as indicated in a study published by the U.S. Geological Survey, is to the east-northeast toward the Deschutes River (Morgan & Hinkle, 2007)[2]. The subject property is located within Management Area 9, which recommends a 0 to 10 percent reduction from the base scenario loading (standard systems) for both existing homes and future homes. The results of the Nitrate Loading Management Model within the study (Figures 25 and 26) suggest that this area represents a low risk to adversely impact groundwater quality. According to the interactive map for Oregon Domestic Well Testing, this part of Deschutes County has an average nitrate-nitrogen concentration in domestic wells of 0.51 milligrams per liter (mg/L) with 7.58% exceeding 3 mg/L and none exceeding 10 mg/L (based on 211 test results, viewed on January 4, 2025).[3]

[2] Morgan, D. S., & Hinkle, R. S. (2007). *Evaluation of approaches for managing nitrate loading from on-site wastewater systems near La Pine, Oregon,* (Scientific Investigations Report 2007-5237). Reston, VA: U.S. Geologic Survey.

[3] ARC GIS Online. (n.d.). Oregon domestic well testing, [Data file]. Retrieved January 4, 2025, from ARC GIS Online: https://www.arcgis.com/apps/MapSeries/index.html?appid=c0d7daea497049c1a686d07dab7106e5

Formal Variance Request

Variance is requested from the following rules:

1. OAR 340-071-0135(1) – which addresses Department of Environmental Quality (DEQ) approval of new or innovative technologies, materials, or designs for onsite systems.[1]
2. OAR 340-071-0150(4)(a)(B) – which requires all criteria for approval shall be met.[1]
3. OAR 340-071-0290(4)(d) – which states that the water table is at least 24 inches bgs throughout the year.[1]

This request seeks to overcome the limitations of this Site by treating the sewage using a recirculating textile filter system (AdvanTex® AX20N-Mode 3B) prior to discharge into an elevated bottomless sand filter. AdvanTex units do an effective job of reducing five-day biochemical oxygen demand and total suspended solids to below 10 mg/L. Nitrogen is often fully converted from ammonia-nitrogen to nitrate-nitrogen (greater than 90%). Operating in Mode 3, the AdvanTex unit reduces total nitrogen sufficiently to meet TS2 (less than 30 mg/L). The DEQ approval of the AX20N in Mode 3B includes an ultraviolet light to satisfy the pathogen reduction requirements of TS2. However, this request includes the use of a modified bottomless sand filter to achieve the pathogen reduction requirements of TS2 instead of an ultraviolet light and, therefore, this configuration does not have (or need) an ultraviolet disinfection unit. The "B" designation indicates the AdvanTex unit is configured with the second pump for the final discharge to the modified bottomless sand filter. A post-anoxic treatment process (RidNOx™) is proposed to reduce the total nitrogen concentration in the final effluent pumped to the modified bottomless sand filter to less than 2 mg/L.

The AX20 systems in the La Pine project produced effluent with an average total nitrogen (TN) concentration of 17 mg/L. A post-anoxic process similar to what is proposed, referred to at the time as Nitrex, was tested following treatment through a lined intermittent sand filter. The Nitrex unit consisted of a 2-compartment concrete tank filled with what was described as a proprietary carbon media (wood chips).

The sand filters produced an average TN of about 50 mg/L and the final effluent from the Nitrex units had an average TN of 2.4 mg/L, representing a 96% reduction from the 60 mg/L average TN concentration in the septic tank effluent. So long as there is sufficient soluble carbon being released from the wood chips, and the hydraulic loading rate is low enough to allow the dissolved oxygen in the effluent to approach zero, the NO3-N concentration will typically be below the method detection limit. What nitrogen remains in the effluent will often be organic, as measured by the Total Kjeldahl Nitrogen (TKN) method. The organic nitrogen may be subsequently oxidized in the bottomless sand filter but is just as likely to be retained or recycled in the biomass that develops in the sand filter media. Therefore, the concentration of nitrogen leaving the bottomless sand filter after treatment through both the AX20 and the RidNOx unit is expected to be even lower than the results from the La Pine project.

The RidNOx unit described in this proposal is configured similar to larger units used on several systems permitted under Water Pollution Control Facilities (WPCF) permits and monitored on a regular basis. Some of these units have been in tanks and some have been in lined basins. Typical results from the post-anoxic process (prior to discharge, typically to a soil absorption system) include

NO3-N concentrations near or below the method detection limit and TKN concentrations between 1 and 3 mg/L.

A recent test result (August 2022) from a similarly configured system (predominantly residential sources using AdvanTex treatment with Mode 3-style pre-anoxic denitrification, followed by post-anoxic treatment in tanks filled with wood chips) produced a TKN concentration of 0.68 mg/L and a NO3-N concentration of 0.13 mg/L for a TN of 0.81 mg/L.

A recent test result (July 2022) from a high-nitrogen source (150 mg/L TKN treated by AdvenTex with alkalinity augmentation to support full nitrification, configured in a Mode 3-style pre-anoxic process, followed by post-anoxic treatment in lined wood-chip beds) produced a TKN concentration of 0.99 mg/L and a NO3-N concentration of 0.05 mg/L for a TN of 1.04 mg/L.

Assuming a maximum 65 to 75% reduction from the starting concentration, the NO3-N concentration entering the post-anoxic process is expected range between 40 and 45 mg/L, similar to the sand filter effluent from the La Pine Project and higher than what is expected from the AX20 in a residential scenario. Based on the performance of the commercial systems described above, and a typical residential total nitrogen concentration of 60 mg/L, the typical reduction from the base scenario presented in the groundwater study cited previously would be approximately 98 percent.

The initial and replacement bottomless sand filter areas are proposed on the highest ground near the southern corner of the parcel. This represents an area with the appropriate spatial footprint and meets all required horizontal setback requirements.

Test Pit 3 (2024) was described as:

- Dark brown (10YR 3/3) loamy sand from 0 to 9 inches with weak medium subangular blocky structure to structureless (single grain); common very fine, fine, medium, and coarse roots; underlain by
- Very dark grayish brown (10YR 3/2) loamy coarse sand from 9 to 26 inches, structureless (single grain); with few fine roots; with redoximorphic features (stripping) described beginning at 21 inches; underlain by
- Very dark grayish brown (10YR 3/2) sandy loam from 26 to 39 inches with moderate medium subangular blocky structure; few fine roots; with redoximorphic features (iron concentrations) throughout; underlain by
- Very dark gray (10YR 3/1) fine sandy loam from 39 to 50 inches with weak medium subangular blocky structure, no roots, black sand with iron concentrations.

Relative elevation measurements were made at all 4 corners of both the proposed initial and replacement bottomless sand filters as well as at the existing ground surface adjacent to the described profile for both Test Pit 3 (2024). The highest level of the water table is expected to be 20 inches below the existing ground surface at the lowest point within the area proposed for the initial and replacement sand filters based on a depth of 21 inches to the redoximorphic features described in Test Pit 3 (2024).

The proposed system seeks to overcome this limitation by elevating the modified bottomless sand filter in a manner that provides an additional 6 inches of separation (Figure 3). The sod and underlying sandy soil to a depth of 6 inches within the footprint of the initial sand filter (8 inches for the replacement sand filter) and replaced with sand filter media. An additional 10 inches of sand filter media (total of 16 inches) will be used to exceed the 24-inch separation from shallowest water table depth standard by providing a total separation of 30 inches. In order to optimize the use of the highest available ground and maximize separation from the underlying water table, the sand filters are proposed in a reinforced concrete container with inside dimensions of 16 feet by 16 feet with the west wall of the initial sand filter intended to serve as the east wall of the replacement sand filter at such time as it needs to be installed. The rest of the sand filter will be "conventional" from there up, consisting of 6 inches of underdrain media, 24 inches of sand filter media, 6 inches of drain media (with the distribution laterals), filter fabric, and 6 to 9 inches of backfill. The additional 6 inches of separation is intended to account for any potential mounding that may occur within the concrete container during an extreme weather event in conjunction with the highest predicted rise of the water table.

Brian Rabe will need to be involved during the construction of this system to install the lysimeter in the sand filter and oversee the installation of the RidNOx unit. Additional information regarding the installation of the RidNOx unit and the lysimeter, as well as sampling instructions, are described in Appendix F and shown in Figures 4, 5, and 6. The owner agrees to facilitate sampling of the RidNOx effluent in conjunction with routine service visits (twice per year for the first 2 years and annually thereafter) to monitor the performance. Samples will be collected from the pump basin between the RidNOx unit and the sand filter. When the media begins to show signs of depletion (as indicated by average nitrogen concentrations climbing to above 7 mg/L nitrate-nitrogen or 10 mg/L total nitrogen), the owner will schedule media replacement for the following summer when the water table is at least 30 inches below the top of the tank (to prevent displacement of the empty tank by buoyant forces). If this request is approved, a condition of approval will require access be allowed to the treatment system and sand filter by current and future property owners for periodic sampling.

In addition to the high level of treatment achieved by the AdvanTex treatment system and post-anoxic denitrification process, further treatment of the effluent will occur with predominantly unsaturated flow within the imported sand and native sandy soil beneath the bottomless sand filter (minimum of 24 inches above the highest predicted level of the underlying fluctuating water table). Small doses, coupled with substantial resting periods achieved with pressure distribution (see recommended sand filter plan detail in Figure 4), will ensure unsaturated, thin-film flow through the soils above the water table. This will further reduce pathogens and other residual contaminants. The subsoil found beneath the sandy surface soils include evidence of both oxidation and reduction of iron. Conditions that support the reduction of iron will reduce nitrate-nitrogen to nitrogen gas since nitrate ions are used as electron acceptors preferentially over iron compounds. This will facilitate additional reduction of nitrate-nitrogen as the highly treated effluent is assimilated into the environment.

Additional Considerations for No Net Impact to Groundwater Nitrate Contribution

A letter from the Deputy Director of the Oregon Department of Environmental Quality dated December 19, 2023, to the Deschutes County Commissioners formally focused additional attention on the potential impacts to water quality in southern Deschutes County from onsite sewage

treatment systems. It is important to consider a number of very conservative assumptions that were made in the USGS groundwater modeling effort that likely overestimated the potential impacts. The following addresses a few specific examples.

Plant Uptake of Nitrogen

The model specifically assumes no nitrogen removal from plant uptake. This may be appropriate for shallow rooted grasses, forbes, and other understory vegetation (e.g., bitterbrush). However, this is not appropriate for the overstory vegetation which is primarily lodgepole and ponderosa pine. These tree species have deeper root systems that can withstand periodic saturation. The model accounted for the impact of transpiration in the water balance but did not account for the impact of nutrient removal and storage in the nitrogen balance. The study concluded that there would be a concentration effect as a result. However, this is not realistic. Plants do not take up water without taking up nutrients that they need, if they are present.

Although studies of nutrient removal by lodgepole pine are limited, there are data available from peer-reviewed journal articles. One such article (T.J. Fahey, 1985)[4] documented total nitrogen uptake of 1.25 grams per square meter (g/m^2) with root turnover of 0.37 g/m^2 for a net uptake of 0.88 g/m^2. This corresponds to 7.85 pounds of nitrogen uptake per acre per year.

Another data source is a chapter from a publication by the United States Forest Service (USFS) which states that the pumice soils in the area are "very severely deficient" in nitrogen (Shainsky, 1992)[5]. Table 4 of that publication lists the average nitrogen concentrations for several components of the tree. Since yield estimates in the published soil survey are focused on the volume of merchantable wood produced over the typical rotation of a stand of timber, only the concentrations of the bolewood (0.06% N) and bark (0.25% N) are accounted for (the parts removed during harvest). The crowns, stumps, and roots are not removed during harvest and would contribute to nutrient cycling on site. The estimated yield of lodgepole pine for Shanahan soils in the published soil survey is 65 cubic feet per acre per year ($ft^3/ac/yr$). The dry density of lodgepole pine ranges from 22 to 53 pounds per cubic foot (lb/ft^3). For the purpose of calculation, an average of 37.5 lb/ft^3 will be used.

The smallest lots eligible for development in southern Deschutes County are about 0.5 acres in size. Assuming two thirds of the lot is developed (home, outbuildings, driveway, yard, etc.) the other third is typically maintained with native trees (lodgepole and/or ponderosa pine). Assuming one third the average annual growth (21.5 $ft^3/ac/yr$), an average density of 37.5 lb/ft^3, and the nitrogen content described previously, the annual amount of N taken up and stored in standing wood biomass on 0.17 acres (on third of a half-acre lot) is 0.8 pounds.

As described in the variance proposal, the proposed system represents the best currently available technology (AdvanTex + RidNOx + MBSF), which is expected to be comparable or better than the best system studied in the La Pine Demonstration Project (Sand Filter + Nitrex + Drainfield). Using expected average total nitrogen concentrations in the effluent leaving the bottomless sand filter after secondary treatment through AdvanTex unit in Mode 3B, followed by tertiary treatment through the RidNOx unit, and the data presented in the USGS groundwater loading and modeling study, the

[4] T.J. Fahey, e. a. (1985). The Nitrogen Cycle in Lodgepole Pine Forests, Southeast Wyoming. *Biogeochemistry*

[5] Shainsky, S. N. (1992). *Distribution of Biomass and Nutrients in Lodgepole Pine/Bitterbrush Ecosystems in Central Oregon.* USFS Deschutes National Forest.

annual mass load to groundwater would be 0.7 lb N/yr (2 mg/L x 2.55 people per home x 45 gallons per person per day x 365 days per year). Even the conservative nitrogen uptake and retention from residual trees on this lot is greater than the contribution from the proposed system. Therefore, approval of this lot utilizing this treatment approach is not likely to make an additive contribution of nitrogen to groundwater.

Hydraulic Loading

The annual hydraulic contribution to groundwater (precipitation minus evapotranspiration) is based on the natural condition. As development occurs, the transpiration component is reduced by the amount of area covered in roofs, driveways, and other impervious or non-vegetated areas. Runoff is limited in these soils so a higher proportion of precipitation contributes to recharge on developed lots than was assumed in the model. This would have a slight positive impact on resulting concentrations.

The letter from the Deputy Director states that the credibility of the state and county could be called into question regarding protection of water quality if more variances are approved. I respectfully disagree, based on the data provided in the previous paragraphs. Use of systems that further reduce the contribution to groundwater, with some systems under certain conditions representing a net zero contribution in most situations, and a net negative contribution in areas with slightly elevated (or higher) nitrate concentrations, are protective of groundwater quality and public health. These systems are only currently available through the variance process.

Conclusions

As described, the proposed combination of treatment components are expected to produce a final effluent with very high quality and a low potential to impact water quality, human health, or the environment. Given the unique circumstances at this Site, strict compliance with the rules is considered to be unreasonable.

It is acknowledged that detailed plans and specifications will need to be submitted and approved before any construction can take place. It is also understood that if this request is approved, there will be language included that allows the county to allow or require a prescriptive system that is demonstrated to perform equal to or better than what is described in this proposal.

Directions to the Site as well as a map showing the ownership of adjacent parcels along with a list of names and addresses are attached in Appendix G. If you have any questions or comments, please do not hesitate to contact me directly at (503) 881-1604.

Sincerely,
ELKHORN CONSULTING LLC

Brian T. Rabe, CPSS, WWS
Principal Soil Scientist

BTR/ddr
Enc: Figures 1-6, Appendices A-G
c: Todd Johnson (Annes Butte LLC)
Todd Cleveland, REHS – Deschutes County

CPSS
Certified Professional
Soil Scientist
BRIAN T. RABE
15239 Exp. 31DEC25
Registered Wastewater Specialist
No. EH-W-448430 Exp.30SEP25

FIGURES

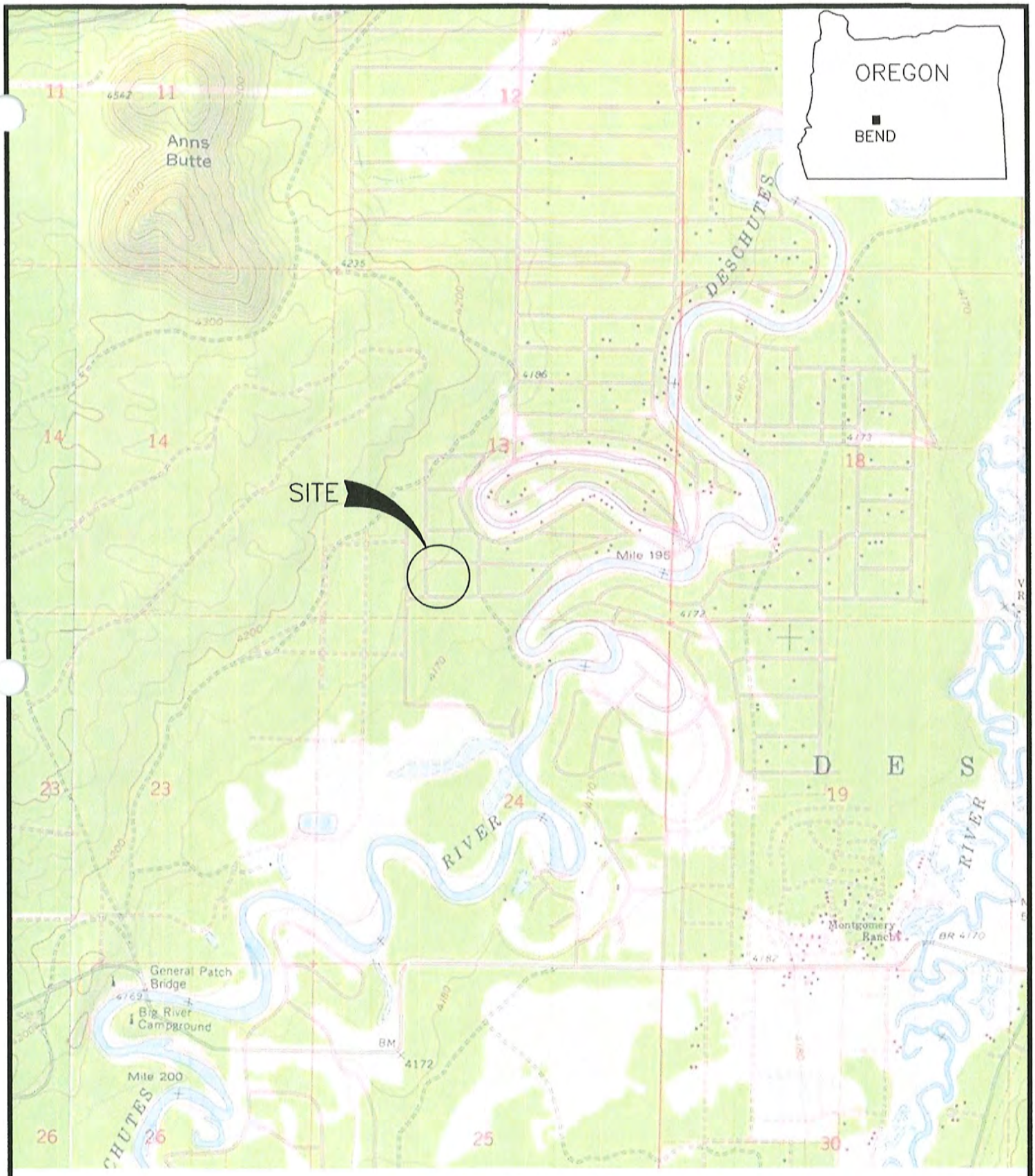

Figure 1. Vicinity Map

0 2,000'

1" = 2,000'

(LOCATIONS AND SCALE ARE APPROXIMATE)

N

(SOURCE: ©2013 National Geographic Society, i-cubed)

PROJECT NUMBER: 2024039	Formal Variance T20S, R10E, Section 13C, Tax Lot 7800
DATE: 1/6/2025	
DWG NO: 2024039 F1-6.DWG	Todd Johnson (Annes Butte LLC) 16924 Upland Road Bend, OR 97707
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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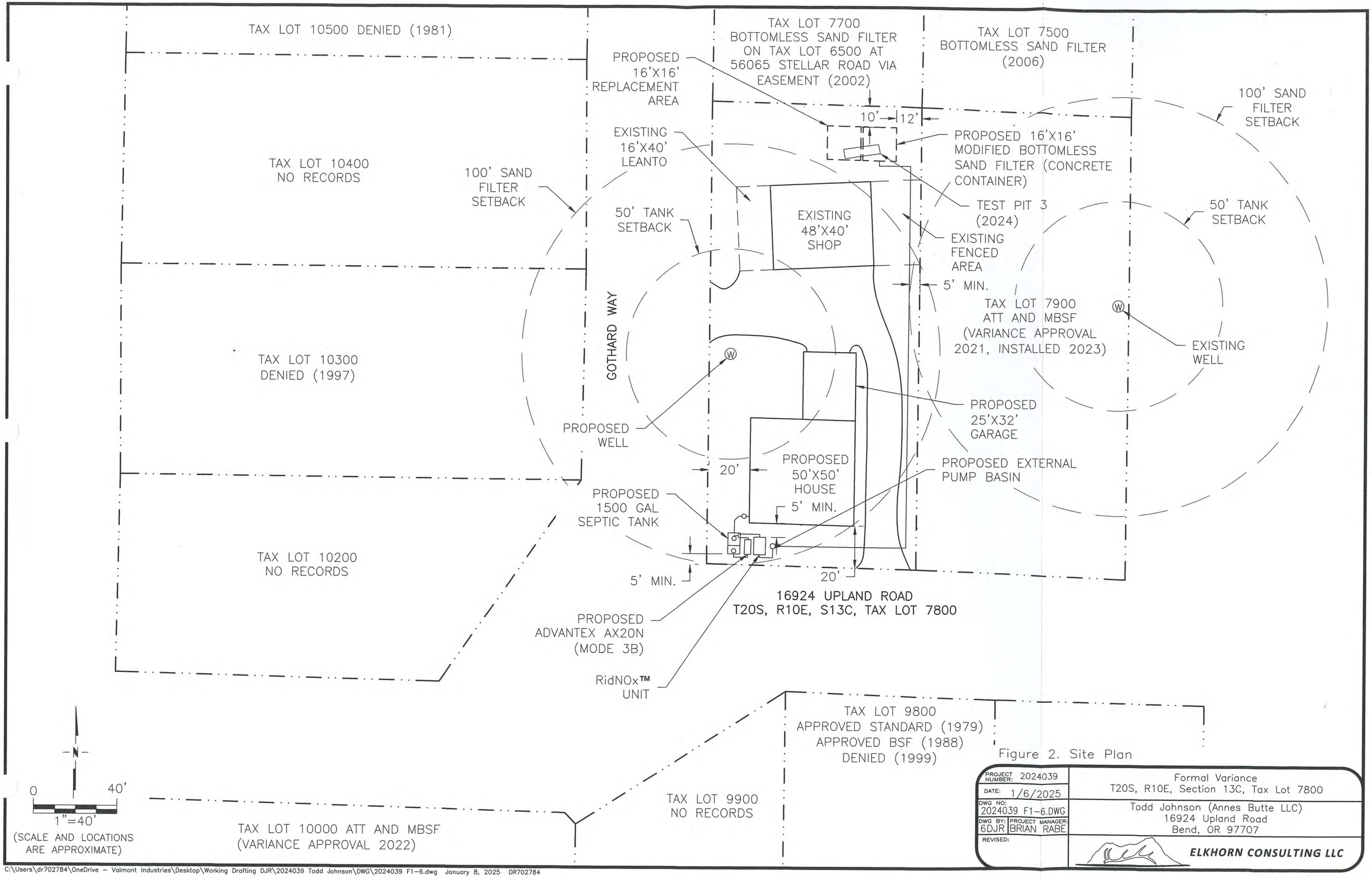

Figure 2. Site Plan

PROJECT NUMBER: 2024039	Formal Variance
DATE: 1/6/2025	T20S, R10E, Section 13C, Tax Lot 7800
DWG NO: 2024039 F1-6.DWG	Todd Johnson (Annes Butte LLC)
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	16924 Upland Road
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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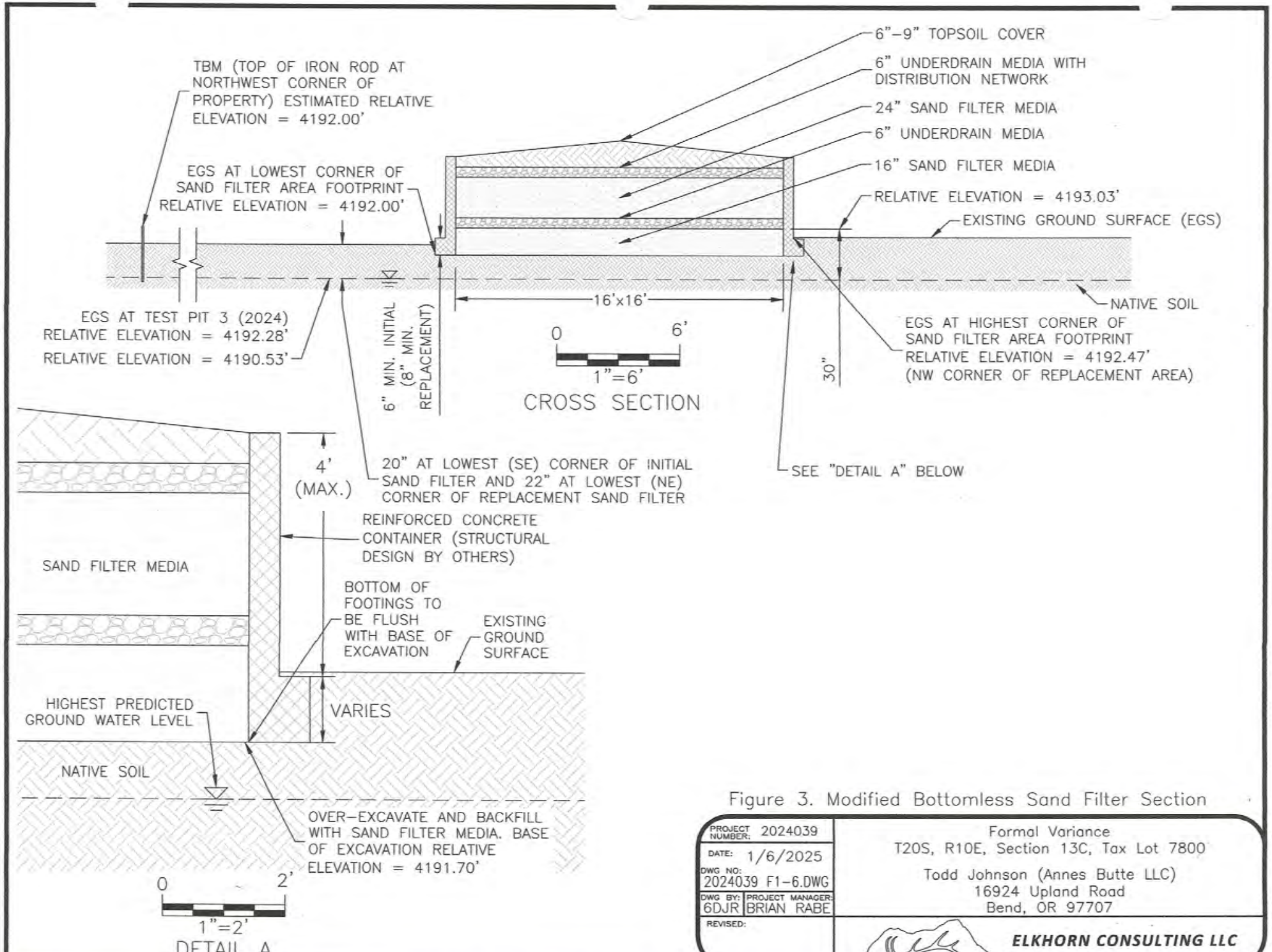

Figure 3. Modified Bottomless Sand Filter Section

PROJECT NUMBER: 2024039	Formal Variance T20S, R10E, Section 13C, Tax Lot 7800
DATE: 1/6/2025	
DWG NO: 2024039 F1-6.DWG	Todd Johnson (Annes Butte LLC) 16924 Upland Road Bend, OR 97707
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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TOTAL OF 64 ORIFICES
0.52 GALLONS PER MINUTE
AT 7.1 FT RESIDUAL HEAD
(33.1 GPM AT 45.5 FT TDH)
RECOMMENDED PUMP PF3005

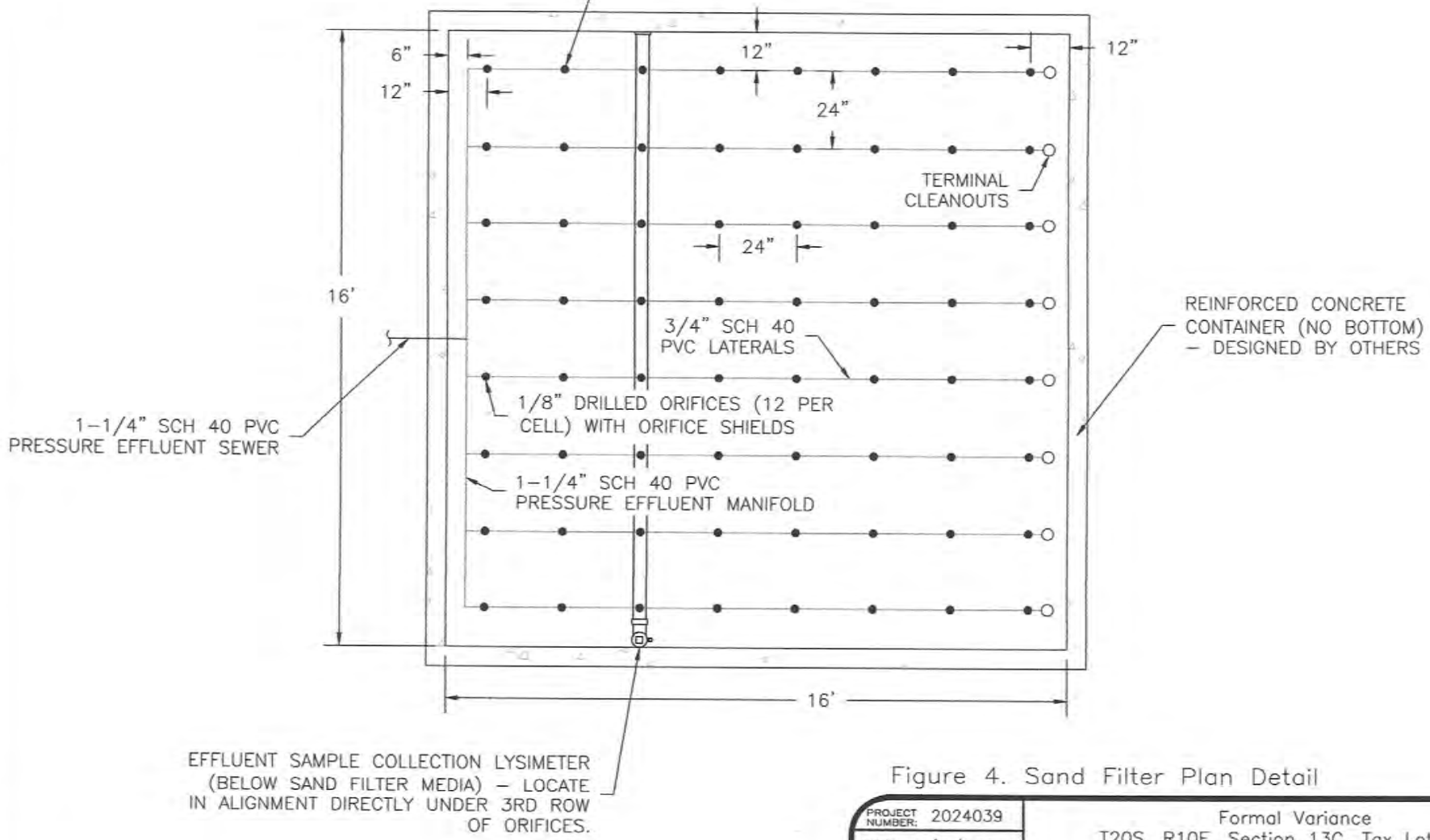

Figure 4. Sand Filter Plan Detail

PROJECT NUMBER: 2024039	Formal Variance T20S, R10E, Section 13C, Tax Lot 7800
DATE: 1/6/2025	
DWG NO: 2024039 F1–6.DWG	Todd Johnson (Annes Butte LLC) 16924 Upland Road Bend, OR 97707
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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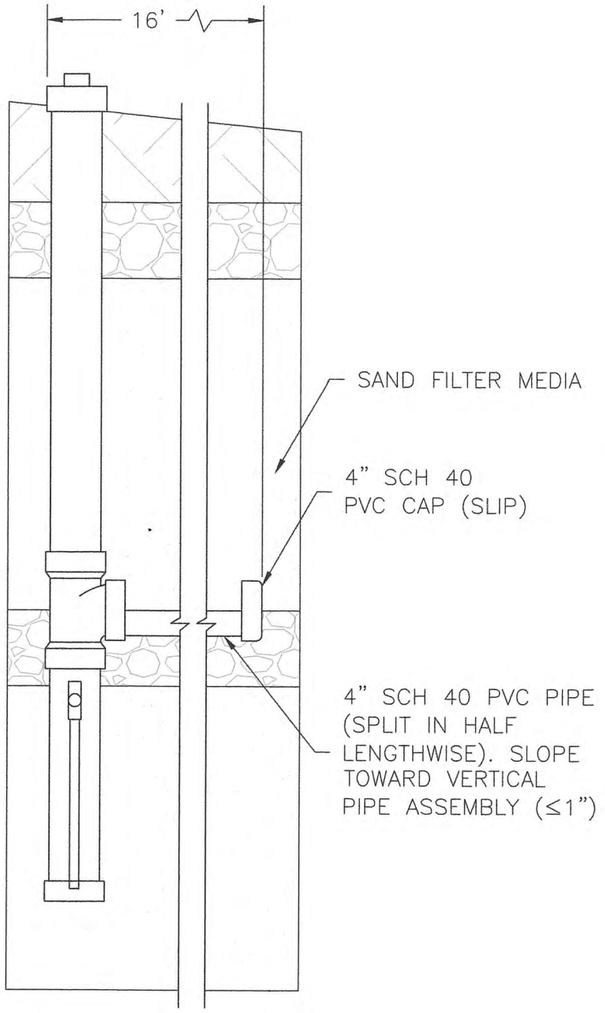
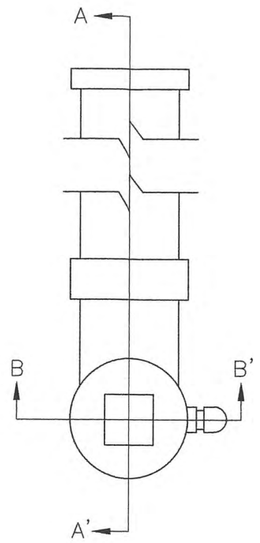


VIEW A–A'

0 1'

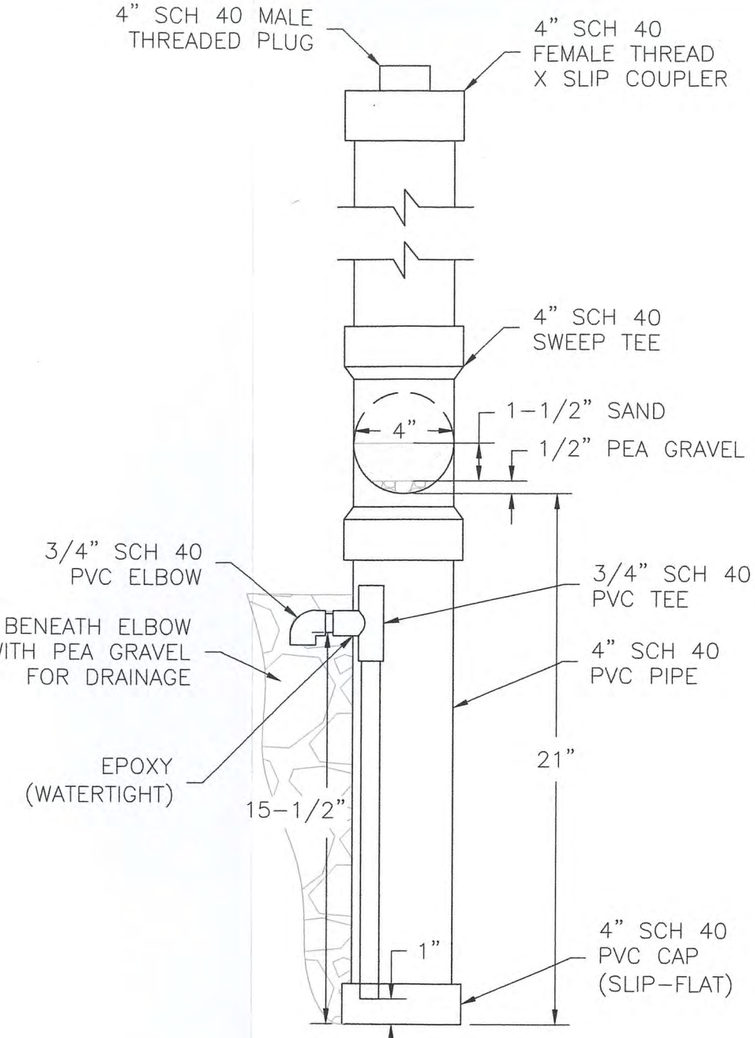
1"=1'



PLAN VIEW

0 0.5'

1"=0.5'



VIEW B–B'

0 0.5'

1"=0.5'

Figure 5. Lysimeter Details

PROJECT NUMBER: 2024039	Formal Variance T20S, R10E, Section 13C, Tax Lot 7800
DATE: 1/6/2025	
DWG NO: 2024039 F1–6.DWG	Todd Johnson (Annes Butte LLC) 16924 Upland Road Bend, OR 97707
DWG BY: 6DJR PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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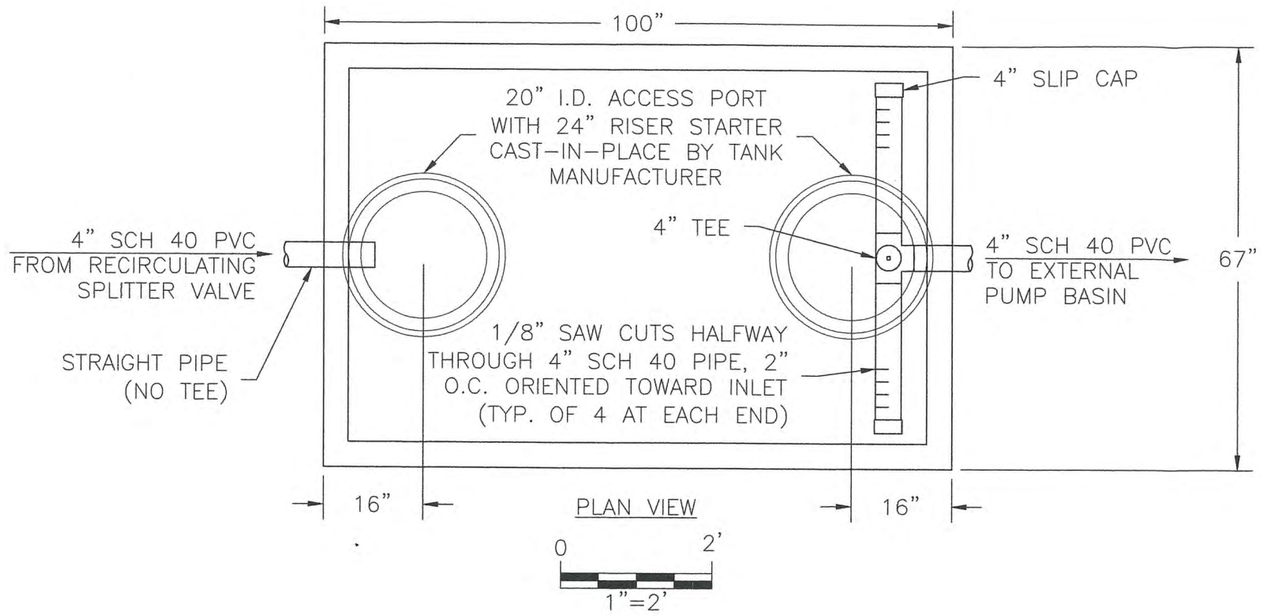

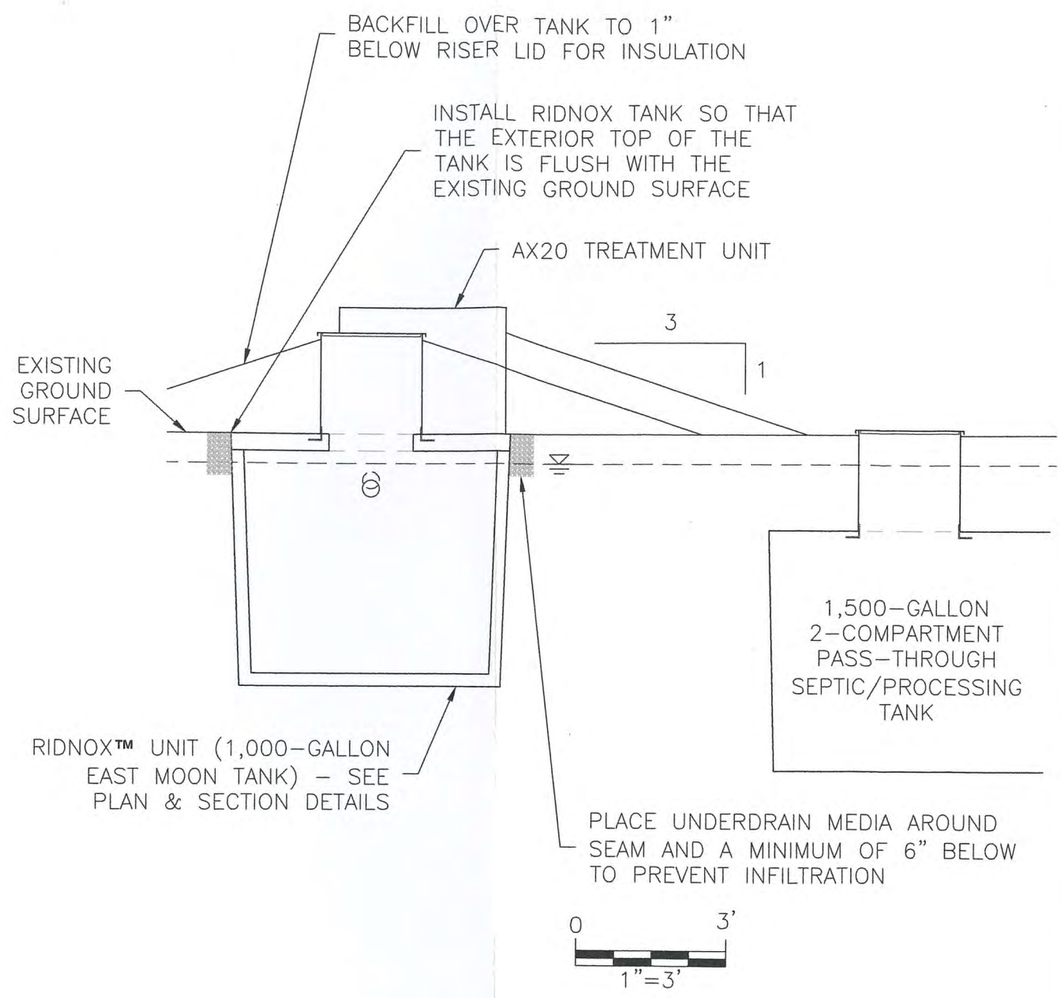

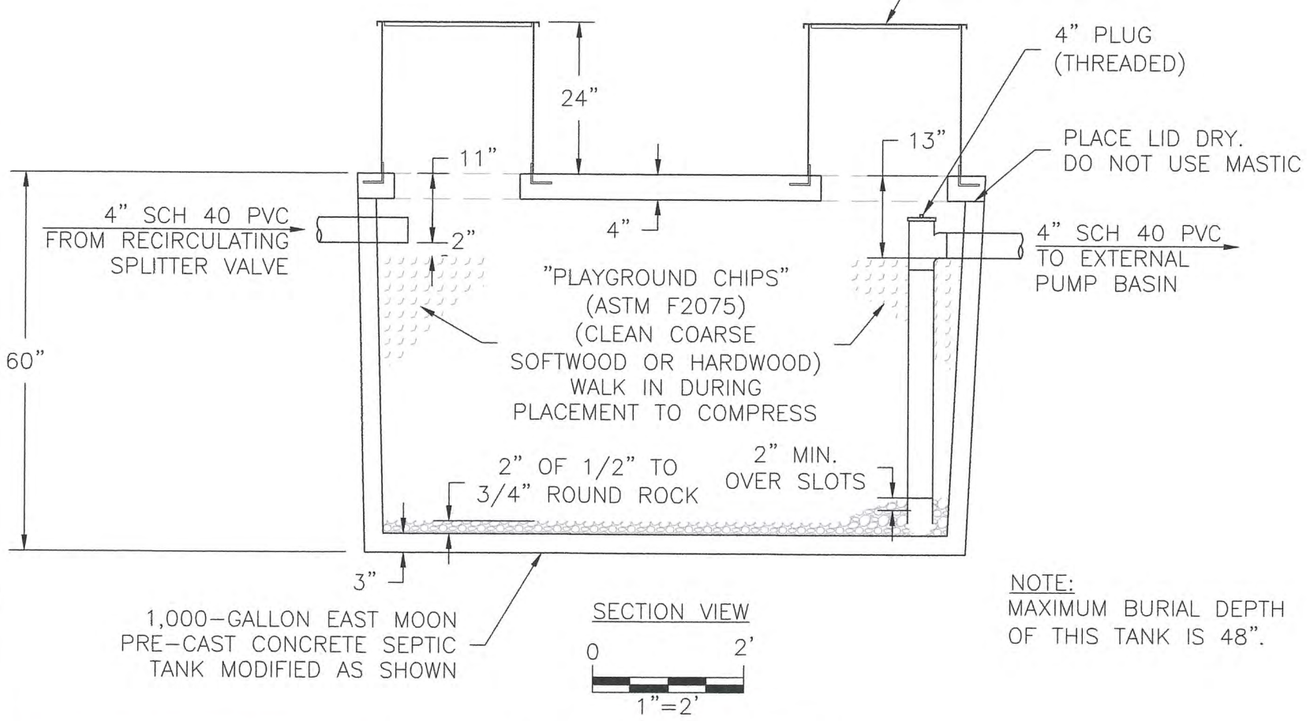

NOTE:
MAXIMUM BURIAL DEPTH OF THIS TANK IS 48".

Figure 6. RidNOx™ Details

PROJECT NUMBER: 2024039	Formal Variance
DATE: 1/6/2025	T20S, R10E, Section 13C, Tax Lot 7800
DWG NO: 2024039 F1-6.DWG	Todd Johnson (Annes Butte LLC)
DWG BY: 6DJR / PROJECT MANAGER: BRIAN RABE	16924 Upland Road
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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APPENDICES

Appendix A.	**Tax Lot Map**
Appendix B.	**Deed**
Appendix C.	**Site Evaluation Reports**
Appendix D.	**NRCS Soil Report**
Appendix E.	**Water Well Reports**
Appendix F.	**RidNOx™ and Lysimeter Installation and Sampling Instructions**
Appendix G.	**Directions to Site, List of Names and Addresses for Neighboring Property Owners**

Appendix A.

Tax Lot Map

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

8/7/2021

S.W.1/4 SEC.13 T.20S. R.10E. W.M.
DESCHUTES COUNTY
1" = 200'

20 10 13C0

20 10 13C0

Appendix B.

Deed

After recording return to:
Anne's Butte, LLC
150 NW Phils Loop
Bend, OR 97701

Until a change is requested all tax statements shall be sent to the following address:
Anne's Butte, LLC
150 NW Phils Loop
Bend, OR 97701

File No.: 7064-2528702 (BC)
Date: September 21, 2015

THIS SPACE RESERVED FOR RECORDER'S USE

Deschutes County Official Records **2015-042360**
D-D
Stn=4 BN **10/14/2015 11:42:59 AM**
$10.00 $11.00 $10.00 $6.00 $21.00 **$58.00**

I, Nancy Blankenship, County Clerk for Deschutes County, Oregon, certify that the instrument identified herein was recorded in the Clerk records.

Nancy Blankenship - County Clerk

STATUTORY WARRANTY DEED

Jeremie Lucas and Katie Lucas, as tenants by the entirety, Grantor, conveys and warrants to **Anne's Butte, LLC** , Grantee, the following described real property free of liens and encumbrances, except as specifically set forth herein:

LEGAL DESCRIPTION: Real property in the County of Deschutes, State of Oregon, described as follows:

LOT NINE (9), BLOCK FIFTY-TWO (52), DESCHUTES RIVER RECREATION HOMESITES UNIT 9 PART 2, RECORDED MARCH 5, 1965, IN CABINET A, PAGE 121, DESCHUTES COUNTY, OREGON.

Subject to:

1. Taxes for the fiscal year 2015-2016 a lien due, but not yet payable.
2. Covenants, conditions, restrictions and/or easements, if any, affecting title, which may appear in the public record, including those shown on any recorded plat or survey.

The true consideration for this conveyance is **$79,900.00.** (Here comply with requirements of ORS 93.030)

BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010.

Dated this 29th day of September, 2015.

Jeremie Lucas

Katie Lucas

STATE OF Oregon)
)ss.
County of Deschutes)

This instrument was acknowledged before me on this 29 day of September, 2015 by **Jeremie Lucas and Katie Lucas.**

BCoombe

Notary Public for Oregon
My commission expires: 4-1-17

OFFICIAL SEAL
BREANNA F M COOMBE
NOTARY PUBLIC-OREGON
COMMISSION NO. 477117
MY COMMISSION EXPIRES APRIL 01, 2017

Appendix C.

Site Evaluation Reports

November 5, 2024

ANNES BUTTE LLC
18160 COTTONWOOD RD ## 274
SUNRIVER, OR 97707

RE: 247-24-000756-EVAL
16924 Upland Rd, Bend OR 97707

A site evaluation for an onsite wastewater treatment system for a single-family dwelling was recently completed at the property noted above. Test pits were evaluated on **October 29, 2024**. Part of the evaluation is to determine the level to which the groundwater rises during the wet season of a normal weather year. Permanent water tables are present throughout the year although they may fluctuate in elevation seasonally. The soil indicators used to determine the level to which the water table rises are gray soils and mottling (discoloration of the soil).

In the test pits on the property the indicators suggest the water table may rise within **17- 21** inches of the ground surface. Past observations and site evaluations in the surrounding area also verify the presence of a high-water table. Past observations on nearby properties verify the water table rises within 12 inches of the ground surface. Extensive study and modeling of the groundwater in south Deschutes County has demonstrated that this area is sensitive to added loading from areas that do not meet separation to groundwater. **This site is denied due to high permanent groundwater observed and conditions associated with saturation.**

The site is denied based on the following:

- Does not meet minimum separation from the permanent water table (OAR 340-071-0220, 0260, 0265, 0275, 0280, 0285, 0290, 0302).
- Deschutes County may not authorize installation or use a system that is likely to pollute public waters or create a public health hazard (OAR 340-071-130(1)). Nitrogen loading from an onsite wastewater system on this property will likely contribute to the development of a public health hazard and groundwater contamination.

You have 90 days from the initial site visit to provide additional test pits for evaluation at no additional fee. However, it appears that other areas on the property would not be suitable due to the lack of topographical changes.

REVIEW AVAILABLE

Pursuant to Oregon Administrative rules (OAR 340-071). You may request a site evaluation report review if you believe this report to be in violation of the rules. The Oregon DEQ conducts report reviews upon submission of the appropriate application materials including: a written request that includes all information you have received from Deschutes County, the reason the report is in error including the specific Oregon Administrative Rules that conflict with the report, and the application fee. The DEQ will review the county's report and visit the site to determine the report's compliance with the appropriate rules.

Also pursuant to this rule, you may request a variance from these rules. The Oregon DEQ reviews variance requests upon application. This is not an automatic variance. You must provide technical justification that demonstrates your proposed system will operate over an extended period of time, will not degrade the environment, and will provide public health protection.

An application, application fee, justification and exhibits, including this report, a land use compatibility statement and detailed plans of your proposed system are required for the application. Technical advice from a knowledgeable consultant is recommended. A Variance Office from DEQ will review your application and the property and issue a written determination following an informational hearing.

Deschutes County recognizes your right to a variance request. This property, however, has severe limitations for onsite wastewater treatment as noted above. Unless public health and environmental protection can be assured, a variance request cannot be supported by the Deschutes County Onsite Wastewater Division and will not likely be approved by DEQ.

For further information regarding a report review for a variance request, please contact the Oregon Department of Environmental Quality at 471 NE Bellevue Dr., #110, Bend, OR 97701, phone 541-388-6146.

If you have any questions, please do not hesitate to call this office at 541-388-6519.

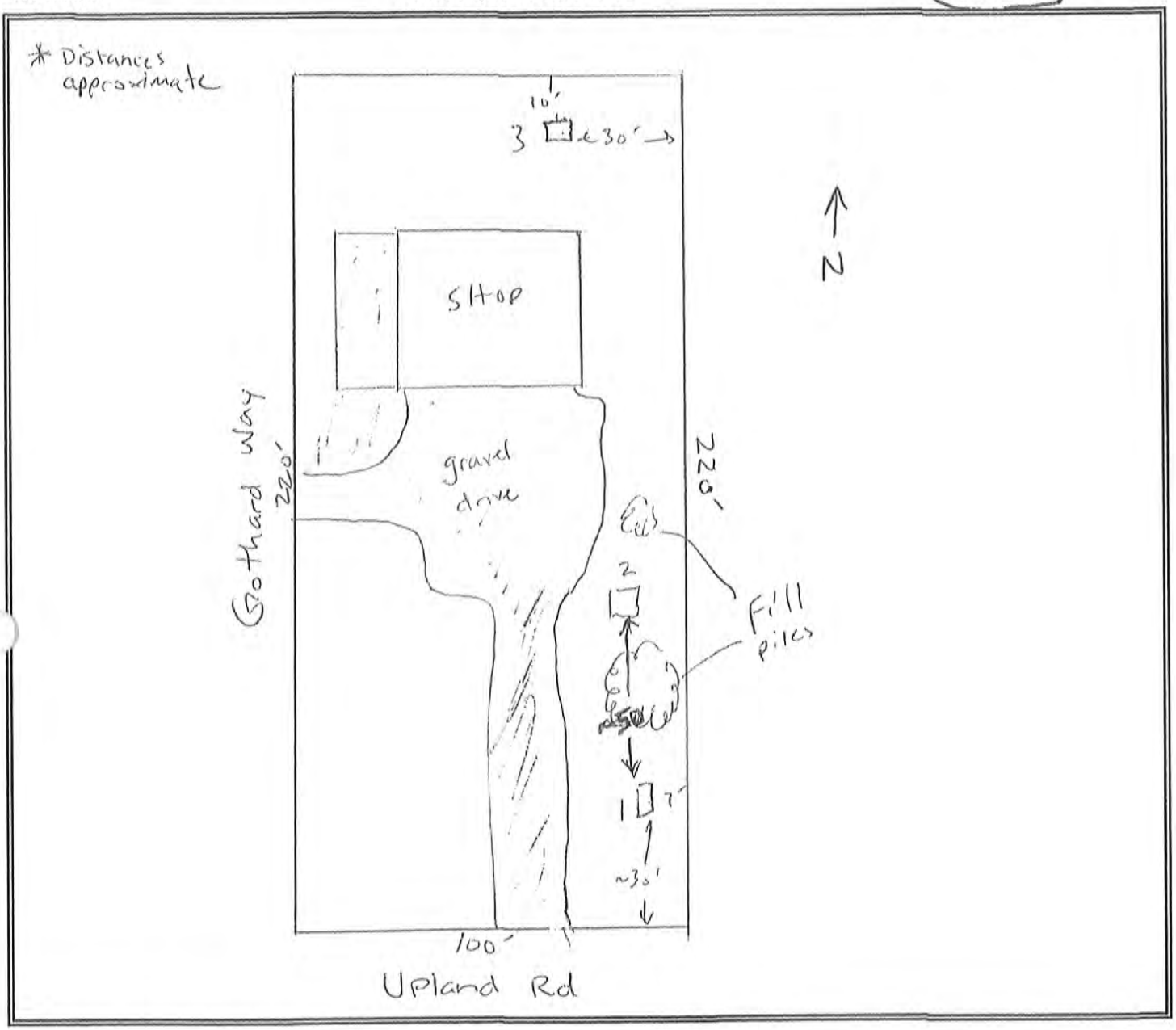
Sincerely,
Onsite Wastewater Division

Todd Cleveland

Todd Cleveland, REHS
Onsite Wastewater Manager

SITE EVALUATION FIELD INSPECTION FORM

Applicant: ANNES BUTTE LLC Site Evaluation # 247-24-000756-EVAL
Date: 10/29/24 Subdivision: DRRH L 9 B 52 Parcel Size: 0.50
Evaluator: Todd Cleveland T 20 R 10 S 13C0 TL 7800
Suitable **Sketch/Not to Scale** **Unsuitable**



systems and parameters approved are the **minimum to meet current DEQ rules*

System type approved: Denied Absorption facility: Denied
Initial _____ Min. Size _____ Max. Depth _____ Min. Depth _____
Replacement _____ Min. Size _____ Max. Depth _____ Min. Depth _____
Tank Size _____ Sewage Flow _____
Special Conditions: This site is denied due to conditions associated with saturation within 24 inches of the ground surface. Soil characteristics indicate the water table rises to within 17-21 inches of the ground surface.

SITE EVALUATION FIELD INSPECTION FORM

Applicant: ANNES BUTTE LLC Site Evaluation # 247-24-000756-EVAL

Evaluator: Todd Cleveland Date: 10/29/24 Parcel Size: 0.5

Subdivision: DRRH T 20 R 10 S 13C0 TL 7800 L 9 B 52

	DEPTH	TEXTURE	COLOR	Notes on roots, structure, % loose rock, mottling, layer limiting effective soil depth, etc.
1	0 – 13	LcoS	10 YR 3/3	2vffmc; 1msbk>sg; loose pumiceous sand
	13 – 24	LcoS	10 YR 3/2	V1m; sg; @17"+ faint stripping 10 YR 7/3; staining 10yr4/6
	24 – 44	SL	10 YR 3/2	0 roots; 2msbk; c2d Fe conc.
	44 – 52	grS	10 YR 2/1	0 roots; 1msbk; black sand & gravel; ~20% gravel
2	6 – 0	Fibrous OM		Compacted organic fill; abrupt;
	0 – 19	LcoS	10 YR 3/3	0 roots; 1msbk>sg; slightly compacted;
	19 – 25	LcoS	10 YR 3/3	0 roots; sg; @19"+ stripping and Fe conc f1d Fe 10yr3/6; 10YR 6/2
	25 – 43	SL	10 YR 3/2	0 roots; 2msbk; c2d Fe conc.
3	0 – 9	LS	10 YR 3/3	2vffmc; 1msbk>sg; loose
	9 – 26	LcoS	10 YR 3/2	1f; sg; stripping @21"+
	26 – 39	SL	10 YR 3/2	1f; 2msbk; f2d Fe conc.
	39 - 50	fSL	10 YR 3/1	0 roots; 1msbk; black sand w/ Fe conc.
4				
5				
6				

Landscape Note: Terrace; lodgepole, bunchgrass, rushes, bitterbrush

Slope: 0 – 1% Aspect: E Groundwater: Perm. 17 – 21"

Other site notes:

Comments: This site is denied due to conditions associated with saturation within 24 inches of the ground surface.

Reason for Unsuitability: (Include Rule Reference)

OAR 340-071-130(1), 0220, 0260, 0265, 0275, 0280, 0285, 0290, 0302

CDD COVER SHEET FOR JJR
09/28/2007 12:15:38

EH
4 PAGES

FILE ID	201013C007800EH20070928121538
TAXMAP	201013C007800
SERIAL	116582
DIVISION	EH
SITUS	
HOUSE#	
STREET	
CONTENT	SE - DENIAL LTR DTD 9-27-07
RECORD ID	F23482

Cover Sheet Identifier

AHJKMTWX

DESCHUTES COUNTY

Community Development Department

Planning Division Building Safety Division Environmental Health Division

117 NW Lafayette Avenue Bend Oregon 97701-1925
(541)388-6575 FAX (541)385-1764
http://www.co.deschutes.or.us/cdd/

September 27, 2007

Getsfrid, Jay A.
10713 N.E. 42nd St.
Vancouver, WA 98682

RE: F-23482
20 10 13CO 7800

Dear Jay Getfrid:

You recently completed a Site Evaluation application for the property at the above referenced address.

Part of the evaluation is to determine the level to which the ground water rises during the wet season of a normal weather year. Permanent water tables are present throughout the year although they may fluctuate in elevation seasonally. The soil indicators used to determine the level to which the water table rises are gray soils and mottling (discoloration of the soil).

Department of Environmental Quality rule 340-71-220- (2) (b) states: water table levels shall be predicted using conditions associated with saturation. If conditions associated with saturation do not occur in soil with rapid or very rapid permeability, predictions of the highest level of the water shall be determined by past recorded observations of the agent. **If such observations have not been made, or are *inconclusive*, the application shall be denied until observations shall be made. Groundwater level determinations shall be made during the period of the year in which high ground water normally occurs in that area.**

In this area we have documented observations where the water table exceeds 24 inches (the minimum for a sand filter) and have documented that the water table rises above the "conditions of saturation".

Therefore, this lot is **denied** until further observations can be made.

Groundwater observations are only valid in a spring following a greater than normal precipitation total for the preceding winter. The exact date when groundwater reaches maximum level varies between January and May.

It is best to apply for Springtime observations in January. It is required that you or an authorized representative submit the required application fee.

If the winter precipitation total is below normal, then your application will be kept and observations will be made the next spring that qualifies as an above normal year.

If you choose not to wait until more conclusive evidence is available, the following options are still available.

Pursuant to Oregon Administrative Rules (OAR Chap. 340), if you conclude this report to be in error of these Rules, you may request a review. The report review is through the Department of Environmental Quality. The application is a written request that includes all information you have received from Deschutes County, the reason the report is in error, citing the specific OAR's that conflict with the report, and an application fee. DEQ will review the county report and visit the site to determine compliance with the appropriate rules.

Pursuant to Oregon Administrative Rules (OAR Chap. 340), you can request a variance from these Rules. The variance request is through the Department of Environmental Quality. This is not an automatic variance. You must provide technical justification that demonstrates your proposed system will operate over an extended period of time, that it will not degrade the environment, and that it will provide public health protection. An application will be necessary including, justification and exhibits, this Deschutes County report, a land use compatibility statement, and detailed plans of your proposed system. Technical advice from a knowledgeable consultant is recommended. A variance application fee is required. A Variance Officer from DEQ will review your application and the property. A determination will be made, in writing, following an informational hearing. Deschutes County recognizes your right to a variance request. This property however, has severe limitations for on-site sewage disposal; as noted in the above report. Unless public health and environmental protection is assured, a variance request cannot be supported by the Deschutes County Environmental Health Division, and will not likely be approved by DEQ.

Sincerely,

ENVIRONMENTAL HEALTH DIVISION

Jerry Kathan

Jerry S. Kathan, R.S.
Sanitarian
JSK/jjr

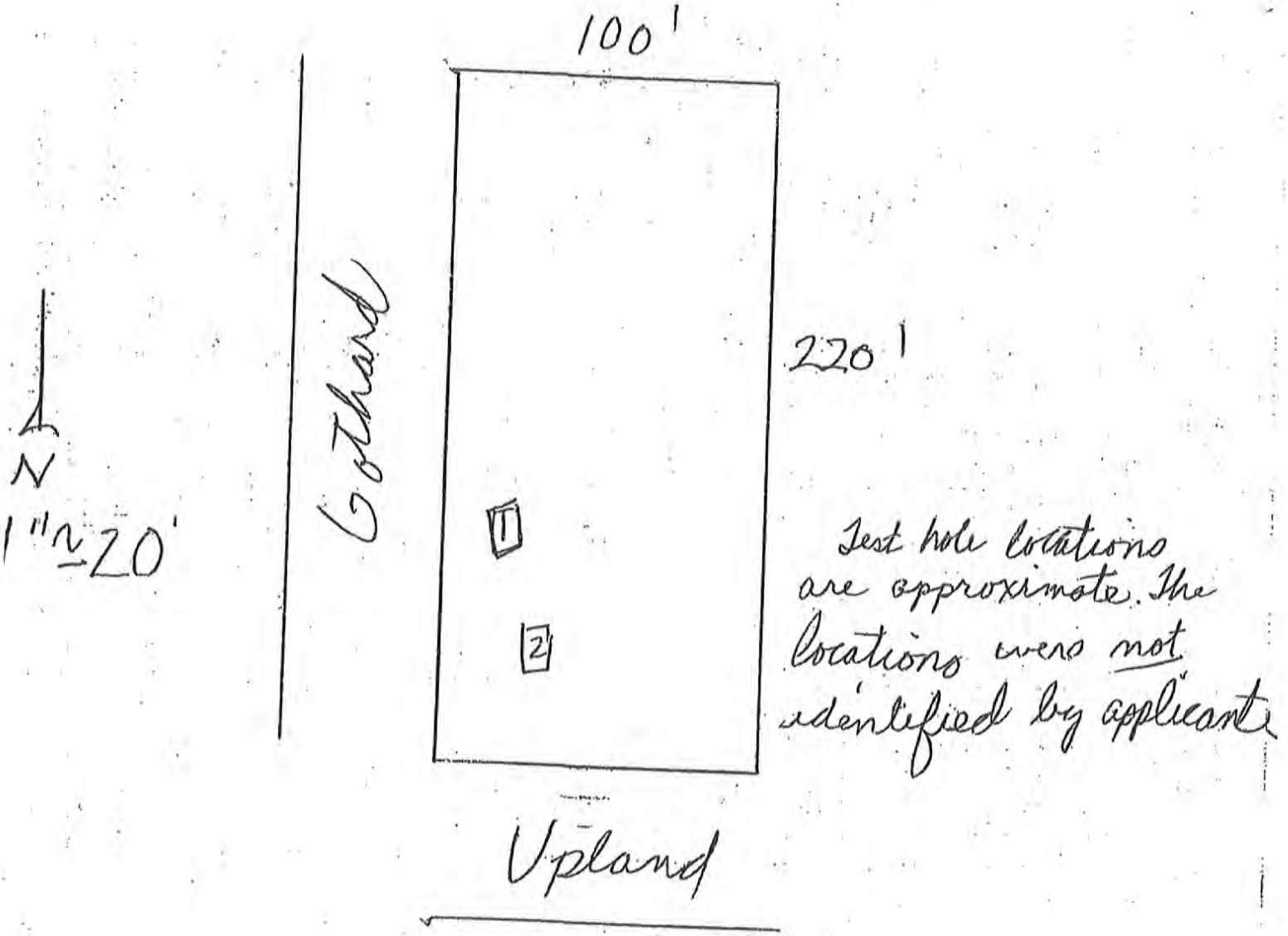
CC: Dick Eaynn

PC Bob Baggett (Department of Environmental Quality)

SITE EVALUATION FIELD INSPECTION FORM

Applicant: Owner Site Evaluation # F 23482
Date: 9/25/01 Subdivision: DRRH L 9 B 2 Parcel Size: 0.5
Evaluator: Jerry Kathan T 20 R 10 S 13CO TL 7800

Suitable ☐ **Unsuitable** ☒



Test hole locations are approximate. The locations were not identified by applicant

System type approved: Initial Denied
Replacement
Tank Size gals.
Special Conditions: The soil morphology is inconclusive. Water table monitoring in the area has shown the water table is less than 24" from the permanent water table

Absorption facility:
Min. Size Max. Depth Min. Depth
Min. Size Max. Depth Min. Depth
Sewage Flow gpd

SITE EVALUATION FIELD INSPECTION FORM

WEATHER: Clear Site Evaluation # F 23482

Evaluator: JSK Date/Time: 9/25/07 pm Parcel Size: 0.51 ac

	DEPTH	TEXTURE	COLOR 10YR	Notes on mottling, roots, structure, layer limiting effective soil depth, % loose rock, etc.
①	0-27	Pumice	3/4 mixed	sg↓ abk 0-12-3vf,f,m+c 12"+2vf, fm
T	27-36	sl or ls	2/2	abk lvf,f+m
	36-55+	gs	2/2 (m2d)	abk Ø
①	0-32	pum	3/4	gr↓abk 0-12"-3vf,m+c,f, 12"+3vf,f,2m
+	32-40	sl	3/3 f1d [fg]	abk lvf,f+m
	40-50+	fs	2/2	c2d abk Ø

Landscape Note:

Slope: % Aspect: Groundwater:

Other site notes:

Comments:

Reason for Unsuitability: (Include Rule Reference)

Denied DEQ rule - DEQ Rule 340-071-0130 (23)

Appendix D.

NRCS Soil Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties

16924 Upland Road

November 26, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

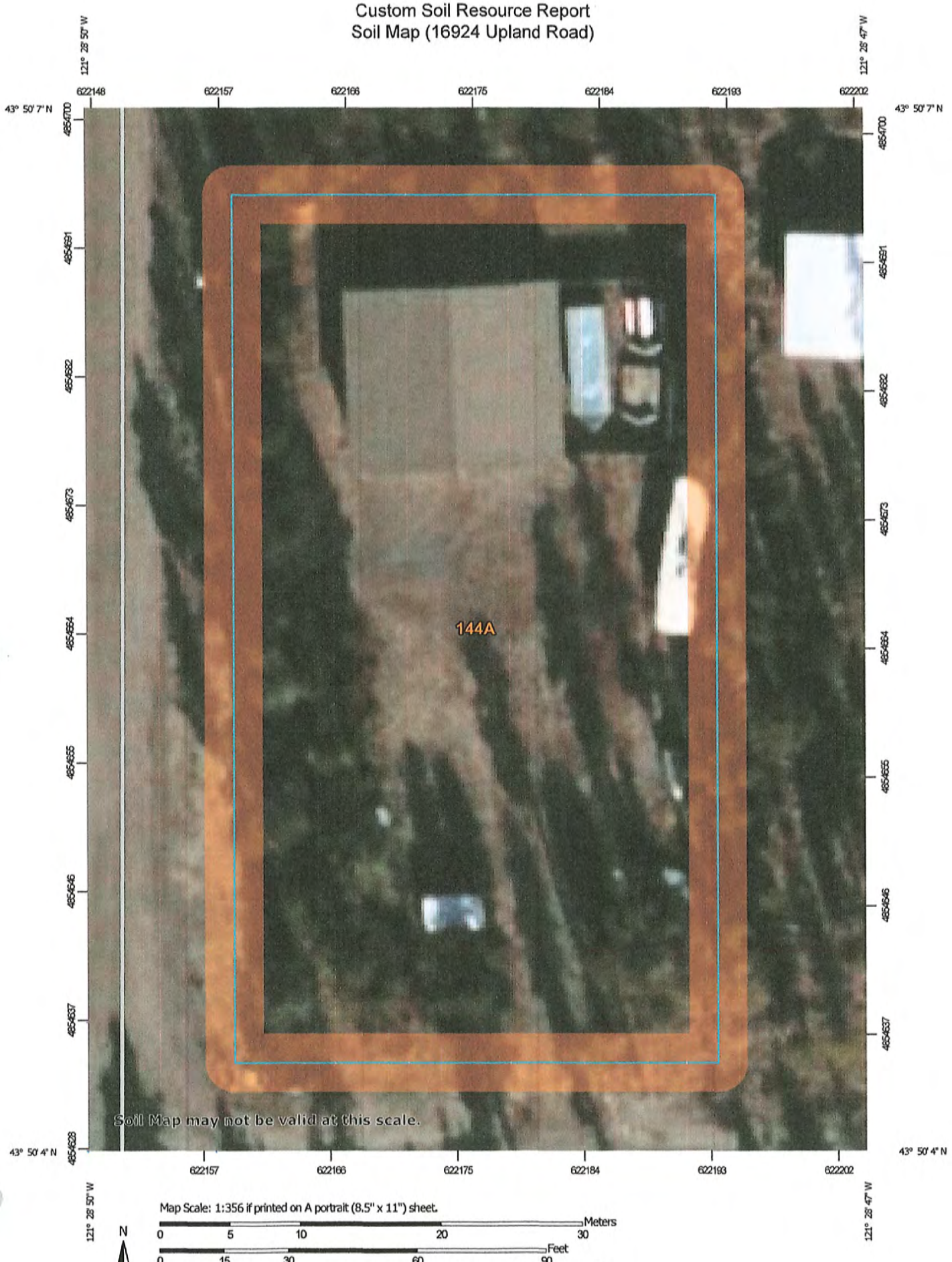
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map (16924 Upland Road)



Map Scale: 1:356 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 15 30 60 90

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties
Survey Area Data: Version 22, Aug 30, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 1, 2019—Nov 4, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (16924 Upland Road)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
144A	Sunriver sandy loam, 0 to 3 percent slopes	0.5	100.0%
Totals for Area of Interest		**0.5**	**100.0%**

Map Unit Descriptions (16924 Upland Road)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Upper Deschutes River Area, Oregon, Parts of Deschutes, Jefferson, and Klamath Counties

144A—Sunriver sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 241l
Elevation: 4,000 to 4,300 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 10 to 50 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sunriver and similar soils: 85 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sunriver

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash over old alluvium

Typical profile

H1 - 0 to 5 inches: sandy loam
H2 - 5 to 20 inches: loamy coarse sand
H3 - 20 to 29 inches: coarse sand
H4 - 29 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6c
Hydrologic Soil Group: B
Ecological site: F006XE807OR - Cryic Aquic Pumice Basins (PICO/SPDO-VAUL)
Other vegetative classification: Pinus contorta/Vaccinium uliginosum/forb (CLM311)
Hydric soil rating: No

Minor Components

Cryaquolls

Percent of map unit: 8 percent
Landform: Mountains
Ecological site: R006XB102OR - Cold Wet Meadow
Hydric soil rating: Yes

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Appendix E.

Water Well Reports

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.545 & 537.765 and OAR 690-205-0210)

DESC 63344
5/3/2022

WELL I.D. LABEL# L 144538
START CARD # 1056449
ORIGINAL LOG #

(1) LAND OWNER
Owner Well I.D.
First Name Last Name
Company 10 PEAKS LLC
Address PO BOX 1535
City WHITE SALMON State WA Zip 98672

(2) TYPE OF WORK
[X] 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 [X] Cable [X] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other

(4) PROPOSED USE
[X] Domestic [ ] Irrigation [ ] Community
[ ] Industrial/ Commericial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION
Special Standard [ ] (Attach copy)
Depth of Completed Well 100.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	100

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	15	S
		Calculated	15	
		Calculated		

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other POURED
Backfill placed from ft. to ft. Material
Filter pack 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	X	1	95	.250	●	○	X	
○	●	4		10	90	.010	○	●	X	
○	○						○	○		
○	○						○	○		
○	○						○	○		

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s)
Temp casing [ ] Yes Dia From + [ ] To

(7) PERFORATIONS/SCREENS
Perforations Method
Screens Type slotted Material pvc

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	4	90	100	.01		3500	

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

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
15	24	45	1

Tempemture 47 °F Lab analysis [ ] Yes By
Water quality concerns? [ ] Yes (describe below) TDS amount 54 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 13 SE 1/4 of the SW 1/4 Tax Lot 7900
Tax Map Number Lot
Lat ° ' " or 43.83506798 DMS or DD
Long ° ' " or -121.47983774 DMS or DD
● Street address of well ○ Nearest address
16932 UPLAND THREE RIVERS

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration				
Completed Well	5/2/2022			21

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 94.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
5/2/2022	94	100	15			21

(11) WELL LOG
Ground Elevation

Material	From	To
pumice and brown clay	0	5
black sand and gravel	5	7
gray clay	7	48
green diatamite	48	67
pink ash with gravel	67	68
yellow diatamite	68	94
coarse black sand	94	100

Date Started 4/29/2022 Completed 5/2/2022

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, 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 2078 Date 5/3/2022
Signed RICK KING (E-filed)

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, 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 1528 Date 5/3/2022
Signed STEVE MATHERS (E-filed)
Contact Info (optional) 5413890743

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:
New exempt use wells must be submitted with a map and recording fee.

WATER SUPPLY WELL REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

DESC 63344

5/3/2022

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

OREGON WATER RESOURCES DEPARTMENT

LOCATION OF WELL

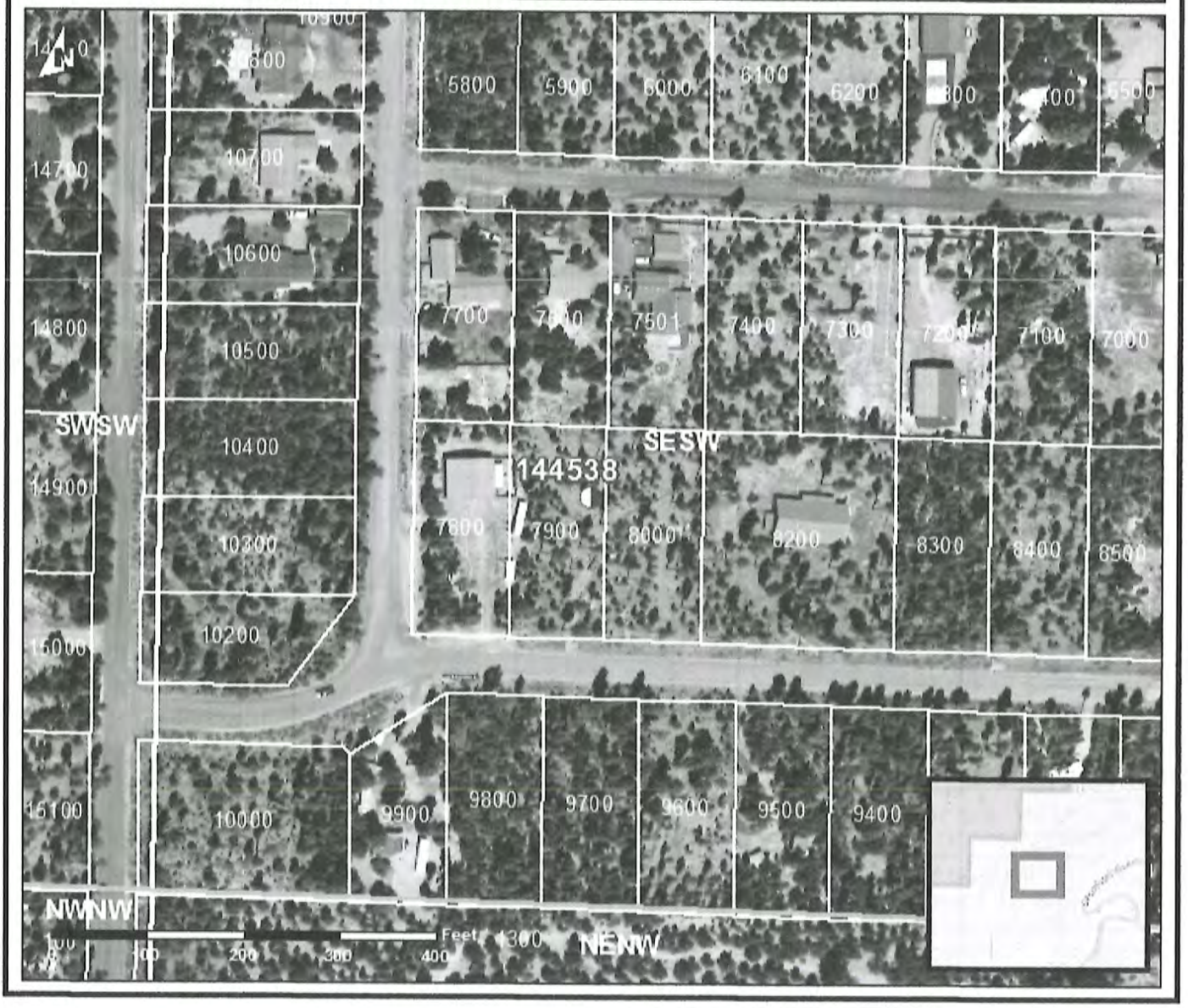
Latitude: 43.83506798 Datum: WGS84
Longitude: -121.47983774
Township/Range/Section/Quarter-Quarter Section:
WM20.00S10.00E13SESW
Address of Well:
16932 UPLAND THREE RIVERS

Well Label: 144538

Printed: May 3, 2022

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor



DESC 57969

DESC 57969
04-30-2007

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

WELL LABEL # L 88844

START CARD # 1000925

(1) LAND OWNER

Owner Well I.D.

First Name Last Name

Company Winchester Homes, Inc.

Address P.O. Box 4532

City Sunriver State OR Zip 97707

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion
☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☒ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ Attach copy

Depth of Completed Well 99.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
10	0	18	Bentonite Chips	0	18	13	S
6	18	99					

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E

☒ Other 3 Minute Pour/Bag

Backfill placed from ft. to ft. Material

Filter pack from ft. to ft. Material Size

Explosives used: ☐ Yes Type Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●	○	6	☒	1.16	91.5	.250	●	○	☒	☐
○	●	4.5	☐	19	99	PVC	○	●	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)

Temp casing ☐ Yes Dia From To

(7) PERFORATIONS/SCREENS

Perforations Method

Screens Type Sawcut Material PVC

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	4.5	94	99	.01		1,950	2

(8) WELL TESTS: *Minimum testing time is 1 hour*

● Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
21	3	20	2

Temperature 46 °F Lab analysis ☐ Yes By

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County Deschutes Twp 20.00 S N/S Range 10.00 E E/W WM

Sec 13 SE 1/4 of the SW 1/4 Tax Lot 10600

Tax Map Number 20101310600 Lot

Lat ° 0 ' " or DMS or DD

Long ° 0 ' " or DMS or DD

● Street address of well ○ Nearest address

56050 Savage

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well	4-20-07			16

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 9

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
04-19-2007	9	11	5	8		
04-20-2007	88	99	21	16		

(11) WELL LOG

Ground Elevation

Material	From	To
Pummie	0	4
Brown Sand Coarse	4	9
Brown Sand Fine	9	11
Brown Clay	11	88
Brown Sand Med Fine	88	99

RECEIVED
JUL 07 2008
WATER RESOURCES DEPT
SALEM OREGON

Date Started 04-19-2007 Completed 04-20-2007

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, 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

Electronically Filed

Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, 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 1614 Date 04-30-2007

Electronically Filed

Signed SAM J OLSON (E-filed)

Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.88

DESC 51757

RECEIVED
JUL - 6 1998
WATER RESOURCES DEPT.
SALEM, OREGON

20664

STATE OF OREGON WATER WELL REPORT

(as required by ORS 537.765)

(START CARD) # 91271

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number

Name Ernest Hamner

Address 56532 Solar Dr

City Bend State Ore. Zip 97709

(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

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☑ No Depth of Completed Well 88 ft.

Explosives used ☐ Yes ☑ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0'	20'	Bentonite	0	18	10 SACKS
6	20'	88'				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E

☑ Other Poured

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	0	88	.250	☑	☐	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☑ Perforations Method Torch

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
85	88	1/8	12	3"		☑	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☑ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
15 GPM	18'		1 hr.

Temperature of water 48° Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Desch Latitude Longitude

Township 20 N or S Range 10 E or W. WM.

Section 13C NE 1/4 NW 1/4

Tax Lot 7300 Lot Block Subdivision

Street Address of Well (or nearest address) 16939 Tollenice

(10) STATIC WATER LEVEL:

18 ft. below land surface. Date 6-28-98

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found

From	To	Estimated Flow Rate	SWL
84	88	40 GPM	

(12) WELL LOG:

Ground Elevation

Material	From	To	SWL
Soil + Pumice	0	10	
Pink Ash	10	25	
Green Diatomite	25	84	
Sand + Gravel	84	88	18

Date started 6-25-98 Completed 6-29-98

(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.

WWC Number

Signed Date

(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.

WWC Number 1528

Signed Steve Gulley Date 6-26-98

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

DESC 58013

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # L L85157

START CARD # 188697

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number
Name LAURA + PAT M MULDREN
Address 16939 TORRANCE RD.
City BEND State ORE Zip 97707

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

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

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

(5) BORE HOLE CONSTRUCTION Special Construction: ☐ Yes ☐ No
Depth of Completed Well 98 ft.
Explosives used: ☐ Yes ☒ No Type Amount

BORE HOLE Diameter	From	To	SEAL Material	From	To	Sacks or Pounds
16"	0	19	Backfill	0	19	9
6"	19	98				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other POURED
Backfill placed from — ft. to — ft. Material —
Gravel placed from — ft. to — ft. Size of gravel —

(6) CASING/LINER

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+16	91-8½	.250	☒	☐	☒	☐
Liner:	4½"	-16½	98	SDR 26	☐	☒	GLUED	

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

(7) PERFORATIONS/SCREENS
☒ Perforations Method SLOTTED
☐ Screens Type Material

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
92	96	.010	2800	4½"	SDR26	☐	☒

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

Yield gal/min	Drawdown	Drill stem at	Time
30 GPM	44 ft		1½ HRS

Temperature of water 43 °F Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom NONE
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata: 82 ft

(9) LOCATION OF WELL (legal description)
County DESCHUTES
Tax Lot 07501 Lot
Township 20 N or S Range 10 E or W WM
Section 13 SE 1/4 SW 1/4
Lat ° ' " or (degrees or decimal)
Long ° ' " or (degrees or decimal)
Street Address of Well (or nearest address) SAME AS OWNERS

(10) STATIC WATER LEVEL
16 ft ft. below land surface. Date 5-16-07
ft. below land surface. Date
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES
Depth at which water was first found 89½ ft

From	To	Estimated Flow Rate	SWL
89½	98	30 GPM	16

(12) WELL LOG Ground Elevation

Material	From	To	SWL
Pumice	0	5	
Clay	5	89½	
Sand	89½	98	16

RECEIVED
MAY 21 2007
WATER RESOURCES DEPT
SALEM, OREGON

Date Started 5-14-07 Completed 5-16-07

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, 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.

WWC Number Date

Signed

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, 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.

WWC Number 639 Date 5-16-07

Signed Gerald R. Olson

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER 06/16/2004

DESC 60H

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON within 30 days from the date of well completion.

RECEIVED JUN 6 1969 STATE ENGINEER SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print. Do not write above this line.)

RECEIVED FEB 24 1970 STATE ENGINEER SALEM, OREGON

State Well No. 20/10-13

State Permit No.

(1) OWNER:
Name Frank Aimonetti
Address 1137 Mc Pinness Ave San Jose Calif.

(2) TYPE OF WORK (check):
New Well [X] Deepening [ ] Reconditioning [ ] Abandon [ ]
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary [ ] Driven [ ]
Cable [X] Jetted [ ]
Dug [ ] Bored [ ]

(4) PROPOSED USE (check):
Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(5) CASING INSTALLED:
Threaded [ ] Welded [X]
6" Diam. from 0 ft. to 80 ft. Gage .25
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:
Perforated? [ ] Yes [X] No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? [ ] Yes [X] No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WATER LEVEL: Completed well.
Static level 20' ft. below land surface Date 5/30/69
Artesian pressure lbs. per square inch Date

(9) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? [ ] Yes [X] No If yes, by whom?
gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test 10 gal./min. with 5 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water 54 Was a chemical analysis made? [ ] Yes [X] No

(10) CONSTRUCTION:
Well seal—Material used Bentonite
Depth of seal 20 ft.
Diameter of well bore to bottom of seal 8 in.
Were any loose strata cemented off? [ ] Yes [X] No Depth
Was a drive shoe used? [ ] Yes [X] No
Did any strata contain unusable water? [ ] Yes [X] No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? [ ] Yes [X] No Size of gravel:
Gravel placed from ft. to ft.

(11) LOCATION OF WELL:
County Deschutes Driller's well number 57
¼ S.W. ¼ Section 13 T. 20S R. 10E W.M.
Bearing and distance from section or subdivision corner
Lot 65 Area 53 Deschutes Recreation Home Sites.

(12) WELL LOG:
Diameter of well below casing 6"
Depth drilled 95' ft. Depth of completed well 93 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level as drilling proceeds. Note drilling rates.

MATERIAL	From	To	SWL
Pumice	0	6	
Blue Mud	6	30	
Black sand	30	46	
(Green clay with fine Gravel)	46	96	

Work started May 26 1969 Completed May 30 1969
Date well drilling machine moved off of well May 30 1969

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Lloyd L. Mathers (Drilling Machine Operator) Date June 4, 1969
Drilling Machine Operator's License No. 134

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
NAME Mathers Drilling Co. (Person, firm or corporation) (Type or print)
Address 905 S. 4th Bend, Oregon
[Signed] Lloyd L. Mathers (Water Well Contractor)
Contractor's License No. 251 Date June 4, 1969

(USE ADDITIONAL SHEETS IF NECESSARY)

DESC 57594

DESC 57594

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 85366
START CARD # 186990

(1) LAND OWNER
Name RAY & GAIL CAREY Well Number
Address 56071 GOTHARD
City BEND State OR Zip 97707

(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

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 100 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0	20'	BENTONITE	0	18	11
6"	20'	100'				

How was seal placed: Method ☐A ☐B ☐C ☐D ☐E
☒ Other POURED DRY
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1'	100'	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

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

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

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
95'	100'	6"	16	.060	6"	☒	☐
						☐	☐
						☐	☐
						☐	☐

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

Yield gal/min	Drawdown	Drill stem at	Time
15	10'		3½ HR

Temperature of water 43° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

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AUG 23 2006
WATER RESOURCES DEPT
SALEM, OREGON

(9) LOCATION OF WELL by legal description:
County DESCHUTES Latitude Longitude
Township 20 N or S Range 10 E or W WM
Section 13C 1/4 SE 1/4 SW
Tax Lot 0700 Lot Block Subdivision
Street Address of Well (or nearest address) 56071 GOTHARD

(10) STATIC WATER LEVEL:
17 ft. below land surface. Date 8/21/06
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 87'

From	To	Estimated Flow Rate	SWL
87'	100'	15 GPM	17

(12) WELL LOG:
Ground Elevation 4,000

Material	From	To	SWL
PUMI TOP SOIL	0'	4'	
BRN SAND	4'	10'	
CEMENTED SAND	10'	25'	17'
ASH / SAND	25'	45'	17'
GREY ASH	45'	87'	17'
BLK SAND	87'	100'	17'

Date started 8/17/06 Completed 8/21/06

(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.
WWC Number 1853
Signed Date 8/22/06

(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.
WWC Number 1761
Signed Robert Bangler Date 8-22-06

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.545 & 537.765 and OAR 690-205-0210)

DESC 63407
6/4/2022

WELL I.D. LABEL# L 146706
START CARD # 1056690
ORIGINAL LOG #

(1) LAND OWNER
Owner Well I.D.
First Name KEITH Last Name PETERSEN
Company
Address 16995 MILKY WAY
City THREE RIVERS State OR Zip 97707

(2) TYPE OF WORK
[X] 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 [X] Cable [X] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other

(4) PROPOSED USE
[X] Domestic [ ] Irrigation [ ] Community
[ ] Industrial/ Commericial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION
Special Standard [ ] (Attach copy)
Depth of Completed Well 106.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	106

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	15	S
		Calculated	15	
		Calculated		

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other POURED
Backfill placed from ft. to ft. Material
Filter pack 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	X	1.5	98.5	.250	●		X	

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s)
Temp casing [ ] Yes Dia From + [ ] To

(7) PERFORATIONS/SCREENS
Perforations Method
Screens Type slotted Material pvc

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	4	86	106	.02		3500	

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

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
8	64	85	1.5

Temperature 51 °F Lab analysis [ ] Yes By
Water quality concerns? [ ] Yes (describe below) TDS amount 46 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 13 SE 1/4 of the SW 1/4 Tax Lot 7400
Tax Map Number Lot
Lat ° ' " or 43.83570092 DMS or DD
Long ° ' " or -121.47933938 DMS or DD
(●) Street address of well ( ) Nearest address
16947 TORRENCE

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			[ ]	
Completed Well	5/31/2022		[ ]	21

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 88.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
5/31/2022	88	106	8			21

(11) WELL LOG
Ground Elevation

Material	From	To
soil and pumice	0	3
black sand	3	9
pink ash	9	13
gray clay	13	40
yellow diatamite	40	88
coarse black sand	88	103
pumice and black sand	103	106

Date Started 5/19/2022 Completed 5/31/2022

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, 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 2078 Date 6/3/2022
Signed RICK KING (E-filed)

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, 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 1528 Date 6/3/2022
Signed STEVE MATHERS (E-filed)
Contact Info (optional) 5413890743

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:
New exempt use wells must be submitted with a map and recording fee.

WATER SUPPLY WELL REPORT - continuation page

DESC 63407

6/4/2022

WELL I.D. LABEL# L	146706
START CARD #	1056690
ORIGINAL LOG #	

(2a) PRE-ALTERATION

Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

Material	From	To	Amt	sacks/lbs

(5) BORE HOLE CONSTRUCTION

BORE HOLE Dia	From	To

SEAL Material	From	To	Amt	sacks/lbs
		Calculated		
		Calculated		
		Calculated		
		Calculated		

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To

Comments/Remarks

helper james king

WATER SUPPLY WELL REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

DESC 63407

6/4/2022

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

OREGON WATER RESOURCES DEPARTMENT

LOCATION OF WELL

Latitude: 43.83570092 Datum: WGS84
Longitude: -121.47933938
Township/Range/Section/Quarter-Quarter Section:
WM20.00S10.00E13SESW
Address of Well:
16947 TORRENCE

Well Label: 146706

Printed: June 3, 2022

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

DESC 9715

20S/10E/13ab

(START CARD) # 58298

(1) OWNER: Well Number

Name BUD & SALLY SHELLY

Address 16686 STAGE STOP DR.

City BEND State OR Zip 97707

(2) TYPE OF WORK:

☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☐ Rotary Air ☐ Rotary Mud ☒ Cable

☐ Other

(4) PROPOSED USE:

☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☒ No Depth of Completed Well 97 ft.

Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
10"	0	18'	PORTLAND	0	18'	8 SACKS
6"	18'	97'				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E

☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+1'	97'	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☒ Perforations Method TORCH CUT

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
86'	96'	12"	20	6"		☒	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
25GPM	10'		4 hr.

Temperature of Water 50° Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☒ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata: 8' - 92'

(9) LOCATION OF WELL by legal description:

County DESCHUTES Latitude Longitude

Township 20S N or S. Range 10E E or W. WM.

Section 013C NW ¼ NE ¼

Tax Lot 08100 Lot Block Subdivision

Street Address of Well (or nearest address) 16956 UPLAND BEND, OR. 97707

(10) STATIC WATER LEVEL:

18 ft. below land surface. Date 10/19/94

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 8'

From	To	Estimated Flow Rate	SWL
8'	65'	3 GPM	8'
65'	92'	5 GPM	8'
92'	97'	25 GPM	18'

(12) WELL LOG:

Ground elevation

Material	From	To	SWL
PUMICE	0	7'	-
GRAVEL	7'	13'	8'
CLAY	13'	65'	8'
SAND & CLAY	65'	92'	8'
SAND & GRAVEL	92'	97'	18'

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JAN 30 1995

WATER RESOURCES DEPT.

SALEM, OREGON

Date started 10/15/94 Completed 10/19/94

(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 well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number

Signed Date

(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 well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1584

Signed Kale L. Wynne Date 10/24/94

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 10/91

DESC 9715

WELL IDENTIFICATION FORM

Owner's Well Number: _____

CURRENT WELL OWNER: Phone 541/593-9188

Name: Dale C & Barbara I Largent

Mailing Address: 16956 Upland Rd.

City: Bend State: OR. Zip: 97707

WELL LOCATION: Desc 9715

County: Deschutes Latitude: _____ Longitude: _____

Township: _____ N or (S) Range: _____ (E) or W Section: _____ SE 1/4 SW 1/4

Tax Lot Number: 201013 CO 08200 Unit 9 Part 2 Lot: 12,13 BLK 52 DRRH

Street Address of Well (if different from above): _____

_____

If a well report is available for this well, please attach a copy of it to this form and return. It is not necessary for you to complete the remainder of the form if the well report is attached. If a well report is not available, please complete the remainder of the form to the best of your ability.

WELL INFORMATION:

Start Card Number: _____ Approx. Construction Date: _____

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AUG 14 2006
WATER RESOURCES DEPT.
SALEM, OREGON

Well Constructor: _____

Name of Owner at Time of Construction: _____

Well Depth (in feet): _____ Static Water Level (in feet): _____

Diameter of Exposed Well Casing (in inches): _____

Does this well have a formal water right associated with it? Yes: _____ No: _____ If yes:

Application #: _____ Permit #: _____ Certificate #: _____

Please Return Completed Form to: **Oregon Water Resources Department**
158 12th Street NE
Salem, OR 97301-4172

(Office use only)

Well Identification Number: 44662

Amended 7/9/2024

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.545 & 537.765 and OAR 690-205-0210)

DESC 64850
6/30/2024

WELL I.D. LABEL# L 154534
START CARD # 1074113
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name KEITH Last Name PETERSEN
Company
Address 16995 MILKEY WAY
City THREE RIVERS State OR Zip 97707

(2) TYPE OF WORK

[X] 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 [X] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other

(4) PROPOSED USE

[X] Domestic [ ] Irrigation [ ] Community
[ ] Industrial/ Commericial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION

Special Standard [ ] (Attach copy)
Depth of Completed Well 94.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/lbs
10	0	94	Bentonite Chips	0	44	29	S
					Calculated	10	
					Calculated		

Seal placement method [ ] A [ ] B [ ] C [ ] D [ ] E [X] Other: POURED
Backfill placed from 44 ft. to 89 ft. Material SAND
Filter pack from 89 ft. to 94 ft. Material FILTER SAN Size 10/20
Explosives used: [ ] Type Amount
Seal Placement Begin Date 6/19/2024 Begin Time 13 00

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

C/L	Dia	+	From	To	Gauge	Mat. Type	Wld	Thrd	Shoe	Shoe Location
C	6	X	1	5	.160	PL	X			
C	4		5	89	.160	PL	X			

Temp casing [ ] Yes Dia From + [ ] To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type slotted Material pvc

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ Pipe size
Screen	Casing	4	89	94	.1		1750	

(8) WELL TESTS: Minimum testing time is 1 hour

Type of Test	Yield (gal/min)	Drawdown	Drill Stem/ Pump Depth	Duration (hr)
Pump	20	50	80	1

Temperature 49 °F Lab analysis [ ] Yes By
Water quality concerns? [ ] Yes (describe below) TDS amount 52 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 13 SE 1/4 of the SW 1/4 Tax Lot 6100
Tax Map Number Lot
Lat ° ' " or 43.83604479 DMS or DD
Long ° ' " or -121.47925758 DMS or DD
(•) Street address of well ( ) Nearest address
16950 TORRENCE

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration				
Completed Well	6/19/2024			22

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 22.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
6/19/2024	22	94	20			22

(11) WELL LOG

Ground Elevation

Material	From	To
topsoil	0	1
coarse dark brown sand	1	3
brown sand and gravel	3	7
coarse dark brown sand	7	11
clay	11	18
fine black sand	18	21
diatomite	21	43
fine black silt	43	64
fine black silt and gravel	64	82
coarse black sand	82	94

Construction
Begin Date 6/14/2024 Begin Time 00 00 End Date 6/19/2024

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, 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 2020 Date 6/30/2024

Signed TYLER MATHERS (E-filed)

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, 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 1528 Date 6/30/2024

Signed STEVE MATHERS (E-filed)

Drilling Company: mathers drilling

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:
New exempt use wells must be submitted with a map and recording fee.

WATER SUPPLY WELL REPORT - continuation page

DESC 64850

6/30/2024

WELL I.D. LABEL# L	154535
START CARD #	1074113
ORIGINAL LOG #	

(2a) PRE-ALTERATION

Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

Material	From	To	Amt	sacks/lbs

(5) BORE HOLE CONSTRUCTION

BORE HOLE Dia	From	To

SEAL Material	From	To	Amt	sacks/lbs
		Calculated		
		Calculated		
		Calculated		
		Calculated		

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

C/L	Dia	+	From	To	Gauge	Mat. Type	Wld	Thrd	Shoe	Shoe Location

(7) PERFORATIONS/SCREENS

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ Pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Type of Test	Yield (gal/min)	Drawdown	Drill Stem/ Pump Depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Material	From	To

Name of person(s) who assisted with construction and Trainee License # / Helper #

Assistant Name	Type	#
JESSE MACK	HELPER WATER	8888872

Comments/Remarks

4in glued to 6in with a bell reducer

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

OREGON WATER RESOURCES DEPARTMENT

LOCATION OF WELL

Latitude: 43.83604479 Datum: WGS84
Longitude: -121.47925758
Township/Range/Section/Quarter-Quarter Section:
WM 20S 10E 13 SESW
Address of Well:
16950 TORRENCE

Well Label: L154534

Well Log: DESC 64850

Printed: July 9, 2024

DISCLAIMER: This map is intended to represent the approximate location of the exempt use well provided by the land owner. It is not intended to be construed as survey accurate in any manner.

Generated by OWRD

DESC 56004

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 70951
START CARD # W146711

(1) LAND OWNER Well Number
Name Jim Atwood
Address P.O. Box 8213
City Bend State OR Zip 97708

(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

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☐ No Depth of Completed Well 88 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0'	20'	Bentonite	0'	20'	11 Sacks
6"	20'	90'				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other poured dry
Backfill placed from ft. to ft. Material
Gravel placed from 86 ft. to 90 ft. Size of gravel 8x12

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+16"	88	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

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

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

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
84'	88'	6"	10	.010	6"	☒	☐
						☐	☐
						☐	☐
						☐	☐

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

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.
15	19ft.		4 HRS

Temperature of water 43° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Deschutes Latitude Longitude
Township 20 N or S Range 10 E or W. WM.
Section 13c 1/4 SW 1/4 SW
Tax Lot 4600 Lot Block Subdivision
Street Address of Well (or nearest address) 56069 SAVAGE

(10) STATIC WATER LEVEL:
20 ft. below land surface. Date 4-28-04
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 22ft.

From	To	Estimated Flow Rate	SWL
22ft	90ft	15 GPM	22ft.

(12) WELL LOG:
Ground Elevation APROX. 4,000 FT

Material	From	To	SWL
pumice top soil	0'	3'	
then Sand & Gravel &	3'		
Clay (mixed)		22'	
Black sand mixed	22'		
with Grey Ash		83'	
Black sand mixed	83'		
with Fine cinders		90'	22ft.

RECEIVED
MAY 11 2004
WATER RESOURCES DEPT
SALEM, OREGON

Date started 4-26-04 Completed 4-28-04

(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.
WWC Number
Signed Date

(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.
WWC Number 1761
Signed Richard Brogdon Date 4-29-04

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

DESC 54084

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 50752
START CARD # 143382

(1) LAND OWNER Well Number
Name CLAYTON & TRINITY MARSHALL
Address 56055 SAVAGE
City BEND State OR Zip 97701

(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

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 89 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
10"	0	18'	3/4" HOLE PLUG	8	18'	
6"	18'	89'				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other 3 MIN. POUR/BAG
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+/-4'	89'	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	NONE				☐	☐	☐	☐
					☐	☐	☐	☐

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

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

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

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

Yield gal/min	Drawdown	Drill stem at	Time
20	11'-6"		3 ½ hr.

Temperature of water 46° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☒ Other NONE
Depth of strata:

(9) LOCATION OF WELL by legal description:
County DESCHUTES Latitude Longitude
Township 20 N or (S) Range 10 (E) or W. WM.
Section 13C SW 1/4 SW 1/4
Tax Lot 1700 Lot Block Subdivision
Street Address of Well (or nearest address) 56055 SAVAGE BEND, OR

(10) STATIC WATER LEVEL:
13'-6" ft. below land surface. Date 8-28-01
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found 9'

From	To	Estimated Flow Rate	SWL
9'	12'	5+GPM	7'
87'	89'	20GPM	13'-6"

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
PUMMY	0	4'	
BROWN SAND CLAY MIX	4'	9'	
GRAVEL & SAND MIX	9'	12'	7'
GRAY CLAY	12'	87'	
RED & BROWN SAND COARSE	87'	89'	13'-6"

RECEIVED
SEP 04 2001
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 8-28-01 Completed 8-28-01

(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.
WWC Number
Signed Date

(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.
WWC Number 1814
Signed Date 8-31-01

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

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

DESC 61766
10/6/2019

WELL I.D. LABEL# L 135779
START CARD # 1045017
ORIGINAL LOG #

(1) LAND OWNER
Owner Well I.D.
First Name KEVIN Last Name KOZAD
Company
Address PO BOX4104
City SUNRIVER State OR Zip 97707

(2) TYPE OF WORK
[X] 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 [X] Auger [X] Cable Mud
[ ] Reverse Rotary [ ] Other

(4) PROPOSED USE
[X] Domestic [ ] Irrigation [ ] Community
[ ] Industrial/ Commericial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION
Special Standard [ ] (Attach copy)
Depth of Completed Well 110.00 ft.

BORE HOLE

Dia	From	To
10	0	18
6	18	110

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	18	11	S
		Calculated	10	
		Calculated		

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other POURED
Backfill placed from ft. to ft. Material
Filter pack 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	X	1	108	250	◉	○	X	
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s)
Temp casing [ ] Yes Dia From + To

(7) PERFORATIONS/SCREENS
Perforations Method
Screens Type Material

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

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

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
22	15	40	1

Tempemature 48 °F Lab analysis [ ] Yes By
Water quality concerns? [ ] Yes (describe below) TDS amount 54 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 13 SW 1/4 of the SW 1/4 Tax Lot 15000
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of well ○ Nearest address
56019 SAVAGE

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration				
Completed Well	10/5/2019			17

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 108.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
10/5/2019	108	110	40			17

(11) WELL LOG
Ground Elevation

Material	From	To
soil and pumice	0	4
clay and gravel	4	13
pink ash	13	21
gray clay and green diatamite	21	90
soft black clay and sand	90	108
white pumice	108	110

Date Started 9/30/2019 Completed 10/5/2019

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, 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, deepening, 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 1528 Date 10/6/2019
Signed STEVE MATHERS (E-filed)
Contact Info (optional) 541 389 0743

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

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

DESC 62378
12/5/2020

WELL I.D. LABEL# L 140805
START CARD # 1050109
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name KEITH Last Name PETERSON
Company
Address 16995 MILKY WAY
City BEND State OR Zip 97707

(2) TYPE OF WORK

[X] 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 [X] Cable [X] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other

(4) PROPOSED USE

[X] Domestic [ ] Irrigation [ ] Community
[ ] Industrial/ Commericial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION

Special Standard [ ] (Attach copy)
Depth of Completed Well 87.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	87

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	22	S
		Calculated	12	
		Calculated		

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[X] Other POURED
Backfill placed from ft. to ft. Material
Filter pack 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	X	1	79	250	●		X	
	●	4		20	82	160		●	X	

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s)
Temp casing [ ] Yes Dia From + To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type slotted Material pvc

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	4	82	87	.1		1750	

(8) WELL TESTS: Minimum testing time is 1 hour

(●) Pump ( ) Bailer ( ) Air ( ) Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
22		60	1.5

Temperature 44 °F Lab analysis [ ] Yes By
Water quality concerns? [ ] Yes (describe below) TDS amount 71 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W WM
Sec 13 SE 1/4 of the SW 1/4 Tax Lot 6200
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
(●) Street address of well ( ) Nearest address
16958 TORRENCE

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration				
Completed Well	12/4/2020			20

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 75.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
12/4/2020	75	87	40			20

(11) WELL LOG

Ground Elevation

Material	From	To
soil and pumice	0	3
white pumice	3	6
clay and gravel hard	6	17
gray clay and green diatamite with silt	17	60
black silt	60	75
fine black sand	75	81
medium fine black sand	81	87

Date Started 11/28/2020 Completed 12/4/2020

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, 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, deepening, 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 1528 Date 12/5/2020

Signed STEVE MATHERS (E-filed)
Contact Info (optional) 541 389 0743

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.545 & 537.765 and OAR 690-205-0210)

DESC 64588
12/5/2023

WELL I.D. LABEL# L 152972
START CARD # 1072206
ORIGINAL LOG #

(1) LAND OWNER
Owner Well I.D.
First Name LEWIS Last Name LANCE & SHANNON
Company
Address 16967 UPLAND
City BEND State OR Zip 97707

(2) TYPE OF WORK
[X] 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
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other

(4) PROPOSED USE
[X] Domestic [ ] Irrigation [ ] Community
[ ] Industrial/ Commericial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION
Special Standard [ ] (Attach copy)
Depth of Completed Well 144.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/lbs
12	0	50	Bentonite	0	50	42	S
8	50	150			Calculated	28.35	
					Calculated		

Seal placement method [ ] A [ ] B [ ] C [ ] D [ ] E [X] Other: BENTONITE DRY
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: [ ] Type Amount
Seal Placement Begin Date 11/29/2023 Begin Time 15 40

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

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉	○	8	[X]	2	135	.250	◉	○	[X]	[ ]
○	◉	6	[ ]	117	144	.188	◉	○	[X]	[ ]
○	○		[ ]				○	○	[ ]	[ ]
○	○		[ ]				○	○	[ ]	[ ]
○	○		[ ]				○	○	[ ]	[ ]

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s)
Temp casing [ ] Yes Dia From + [ ] To

(7) PERFORATIONS/SCREENS
Perforations Method
Screens Type STAINLESS STEEL Material STAINLESS STEEL

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	6	124	144	.01	18	3360	

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

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
20		145	1

Temperature 42 °F Lab analysis [ ] Yes By
Water quality concerns? [ ] Yes (describe below) TDS amount 52 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
County DESCHUTES Twp 20.00 S N/S Range 10.00 E E/W
Sec 13 SE 1/4 of the SW 1/4 Tax Lot 9300
Tax Map Number Lot
Lat ° ' " or 43.83399700 DMS or DD
Long ° ' " or -121.47843700 DMS or DD
◉ Street address of well ○ Nearest address
16967 UPLAND, BEND, OR 97707

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			[ ]	
Completed Well	11/30/2023		[ ]	43

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
11/30/2023	43	144	20		[ ]	43
					[ ]	
					[ ]	
					[ ]	
					[ ]	

(11) WELL LOG
Ground Elevation

Material	From	To
Brown sand & pumice	0	7
Gray clay w/ fine sand	7	41
Green/ gray clay	41	70
Gray clay w/ fine sand	70	110
Black sand w/ clay seems	110	150
natural backfill 144-150	110	150

Construction
Begin Date 11/29/2023 Begin Time 11 29 End Date 11/30/2023

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, 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 2025 Date 12/4/2023
Signed SHAUN ALEXANDER (E-filed)

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, 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 construction standards. This report is true to the best of my knowledge and belief.
License Number 1970 Date 12/5/2023
Signed NEIL FAGEN (E-filed)
Contact Info (optional) 541-548-1245

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

WATER SUPPLY WELL REPORT - continuation page

DESC 64588

12/5/2023

WELL I.D. LABEL# L	152972
START CARD #	1072206
ORIGINAL LOG #	

(2a) PRE-ALTERATION

Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

Material	From	To	Amt	sacks/lbs

(5) BORE HOLE CONSTRUCTION

BORE HOLE Dia	From	To

SEAL Material	From	To	Amt	sacks/lbs
		Calculated		
		Calculated		
		Calculated		
		Calculated		

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(7) PERFORATIONS/SCREENS

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

(10) STATIC WATER LEVEL

SWL Date	From	To	Est Flow	SWL(psi)	+ SWL(ft)

(11) WELL LOG

Material	From	To

Name of person(s) who assisted with construction and Trainee License # / Helper #

Assistant Name	Type	#

Comments/Remarks

Depth drilled was 150 feet, material caved and back filled to completed depth of 144 feet. 7 feet of 6" .188 steel liner plus Stainless steel sand screens and 1 clamshell trap placed at 117 were placed from -117-144 feet.

WATER SUPPLY WELL REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

DESC 64588

12/5/2023

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

OREGON WATER RESOURCES DEPARTMENT

LOCATION OF WELL

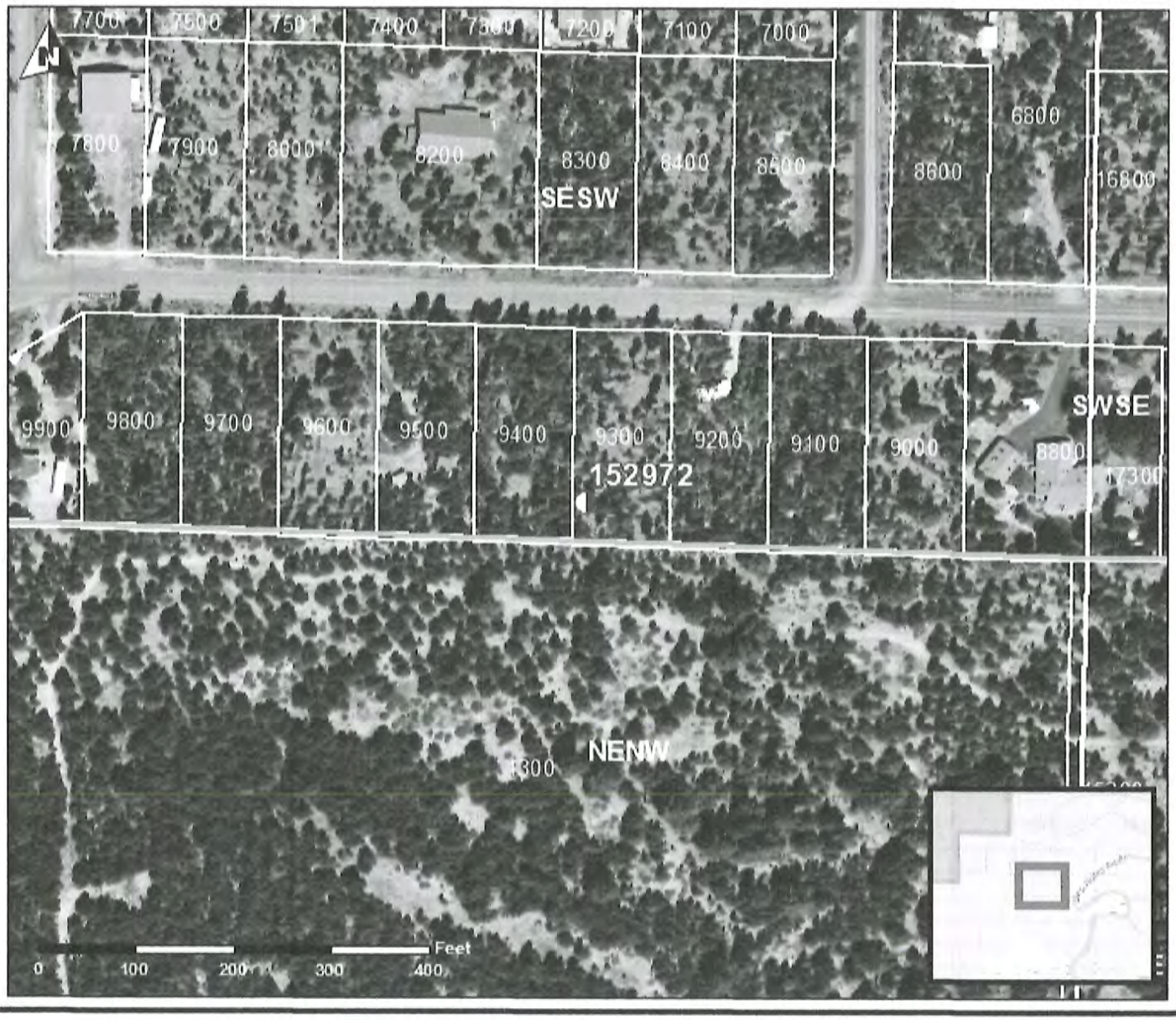
Latitude: 43.83399700 Datum: WGS84
Longitude: -121.47843700
Township/Range/Section/Quarter-Quarter Section:
WM20.00S10.00E13SESW
Address of Well:
16967 UPLAND, BEND, OR 97707

Well Label: 152972

Printed: December 4, 2023

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor



Appendix F.

RidNOx™ and Lysimeter Installation, and Sampling Instructions

ELKHORN CONSULTING LLC

14833 Goodrich Creek Lane
Baker City, OR 97814 • 503-881-1604
elkhornconsultingllc@gmail.com

RidNOx Installation Instructions

RidNOx Installation

1. Excavate to a depth that will result in the top of the RidNOx tank being at the same elevation as the existing ground surface.
2. Prepare a level, stable base.
3. Set the body of the tank in the hole.
4. Prepare and install inlet and outlet fittings as shown on the approved plans.
5. Place a 2-inch layer of ½ to ¾-inch round rock on the floor of the tank.
6. Cover the slotted outlet pipe with the same rock to a minimum depth of 2 inches.
7. Install the clean wood media (playground chips meeting ASTM F2075) in 6 inch lifts, walking in each lift to compress the media, to the bottom of the outlet fitting.
8. Set the lid on the tank. **Do not use mastic.**
9. Backfill the tank to 6 inches below the seam between the body and the lid.
10. Place underdrain media to the top of the tank.
11. Backfill over the tank with native soil after the risers are attached.

Media Replacement

- Pothole near tank to make sure the water table is at least 30" below the top of the tank to prevent buoyancy during replacement operations.
- Carefully remove the soil cover from over and around the tank to a level below the seam.
- Carefully remove the lid from the tank.
- Use a sump pump to transfer free water from the media to the pump basin.
- Scoop the media from the tank being careful not to damage the inlet and outlet piping or the underdrain media.
- After the excess moisture drains from the spent media, it can be loaded into a dump truck and hauled to a sanitary landfill.
- Install fresh media and re-install the lid as described in steps 7 through 11 above.

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Lysimeter Installation Instructions

Lysimeter Installation in a Bottomless Sand Filter

- Remove duff and surface soil layer (typically 6 inches) to provide an infiltrative surface free of roots.
- When installing sampling devices (trough lysimeters), carefully mark the location of the orifice positions on each side of the sand filter container.
- Also mark the target elevations for each layer on the walls.
- Install the lower layer of medium sand and the underdrain media.
- Remove enough underdrain media from a 4-inch wide strip (trough) across the bottom aligned with a row of orifices (typically the 4th row from either end).
- With an auger or a tile spade, dig a hole at one end of the trough large enough and deep enough to set the vertical part of the lysimeter against the wall.
- Fine-grade the placement of the body of the lysimeter with the horizontal fitting of the sanitary tee aligned with the trough.
- Bed the half pipe with a slight slope (no more than 1 inch in 10 feet) toward the body of the lysimeter.
- Glue one end of the half pipe into the coupler extending from the sanitary tee with a cap glued at the opposite end.
- Place about one-half inch of underdrain media (pea gravel) in the bottom of the trough with enough ramped up inside the sanitary tee to cover the drilled holes in the debris cap.
- Backfill around the lysimeter with pea gravel to provide drainage from the self-emptying port.
- Secure the body of the lysimeter to the wall with a metal strap or other device to stabilize it during the placement of the various layers of media.
- The rest of the sand filter will be constructed in a customary fashion.

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RidNOx and Bottomless Sand Filter Sampling Instructions

General

- Contact the laboratory to coordinate scheduling and acquire sample containers,
- Target parameters are total Kjeldahl nitrogen (TKN) and nitrate-nitrogen (NO_3-N).
- Make sure you have the proper sampling equipment, chain-of-custody forms, and a cooler with ice.
- Label all sample bottles in advance.

RidNOx Sampling Procedures

- Remove the lid from the pump basin.
- Use a bailer, peristaltic pump, or other appropriate sampler, to carefully collect a sample from the pump basin without disturbing and attached growth on the surfaces of pipes, floats, etc.
- Transfer sample into sample bottles.
- Repeat as necessary until all bottles are filled.
- Secure the caps on each bottle and place them immediately in a cooler with ice.
- Deliver samples to the laboratory (nitrate-nitrogen samples need to be analyzed within **48 hours** of sample collection).

Lysimeter Sampling Procedures (if/when desired)

- Loosen the square nut plug on the lysimeter.
- Shine a flashlight down the pipe to confirm the presence of filtrate.
- Use a bailer (disposable or cleaned) on a string to collect sample from the body of the lysimeter.
- Transfer sample into sample bottles.
- Repeat as necessary until all bottles are filled.
- Secure the caps on each bottle and place them immediately in a cooler with ice.
- Replace the square nut plug.
- If funding allows, collect sample of the AdvanTex-treated effluent as it flows into the RidNOx unit at the inlet of the tank.
- Deliver samples to the laboratory (nitrate-nitrogen samples need to be analyzed within **48 hours** of sample collection).

Appendix G.

Directions to Site, List of Names and Addresses for Neighboring Property Owners

Google Maps

475 NE Bellevue Dr, Bend, OR 97701 to 16924 Upland Rd, Bend, OR 97707

You can enter notes here.

475 NE Bellevue Dr
Bend, OR 97701

Take NE Dalton St to US-20

37 sec (463 ft)

1. Head north toward NE Dalton St

79 ft

2. Turn right toward NE Dalton St

148 ft

3. Turn right onto NE Dalton St

226 ft

Take US-97 S to S Century Dr/Lava Cast Forest Rd/NF-9720. Take exit 153 from US-97 S

22 min (17.3 mi)

4. Turn right onto US-20
   Pass by Wells Fargo Bank (on the left in 0.4 mi)

2.3 mi

5. Continue straight onto NE Greenwood Ave

0.3 mi

6. Turn left onto NW Hill St

0.1 mi

7. Turn left onto NW Hawthorne Ave

413 ft

8. Turn right onto US-97 S

14.3 mi

9. Take exit 153 for S Century Dr toward Sunriver

0.2 mi

Follow S Century Dr, Spring River Rd and Stellar Dr to Upland Rd in Three Rivers

11 min (6.1 mi)

10. Turn right onto S Century Dr/Lava Cast Forest Rd/NF-9720 (signs for Sunriver/Mt Bachelor)
    Continue to follow S Century Dr

1.5 mi

11. At the traffic circle, take the 2nd exit and stay on S Century Dr

0.6 mi

12. Continue onto Spring River Rd

1.7 mi

13. Turn left onto Stellar Dr

1.9 mi

14. Turn right to stay on Stellar Dr

0.2 mi

15. Turn right onto Upland Rd
    Destination will be on the right

0.1 mi

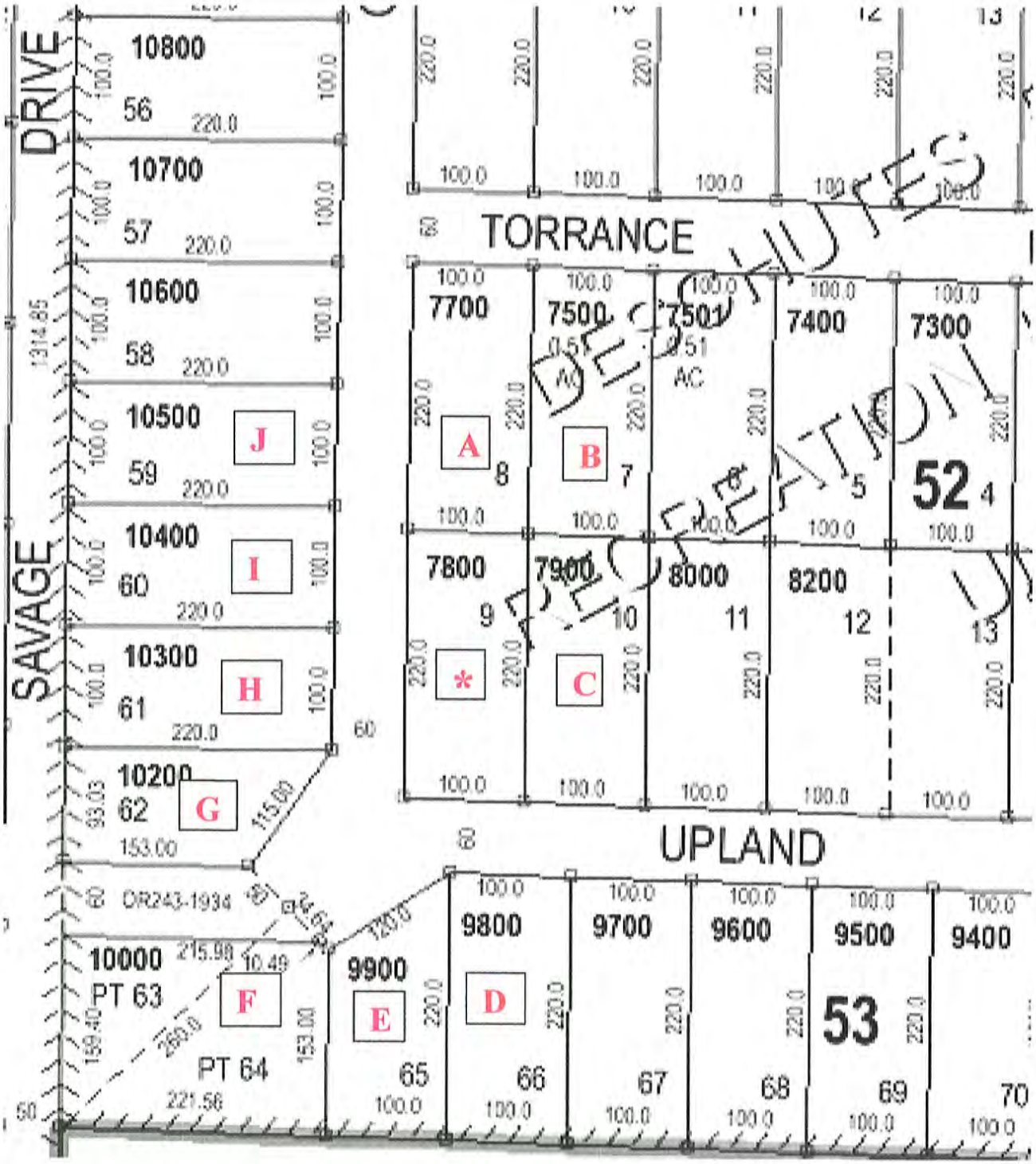
16924 Upland Rd
Bend, OR 97707

Adjacent Parcels Property Owners

16924 Upland Road, Bend, Oregon
(T20S, R10E, Section 13C, Tax Lot 7800, 0.51 acres

*	Tax Lot	7800	Annes Butte LLC 18160 Cottonwood Road Sunriver, OR 97707
A.	Tax Lot	7700	Hill, Randi L & Jess A 16923 Torrance Road Bend, OR 97707
B.	Tax Lot	7500	Holliday, Michael B & Melynda A 16939 Torrance Road Bend, OR 97707
C.	Tax Lot	7900	10 Peaks LLC 3242 NE 3rd Avenue ## 1018 Camas, WA 98607
D.	Tax Lot	9800	Baskins, Bill Jr & Jennifer E 2212 Demaray Drive Grants Pass, OR 97527
E.	Tax Lot	9900	Perrault, David & Kara 612 NE 164th Street Ridgefield, WA 98642
F.	Tax Lot	10000	Wimmer, Justin 20079 Mt Hope Lane Bend, OR 97702
G.	Tax Lot	10200	Ross Family Living Trust 70 SW Century Drive #1000 Bend, OR 97702
H.	Tax Lot	10300	Keller, John C. & Stacey PO Box 4660 Bend, OR 97707
I.	Tax Lot	10400	Martin, Deborah A. 300 Southfork Road Yakima, WA 98903

J. Tax Lot 10500 Martin, Deborah A.
300 Southfork Road
Yakima, WA 98903



Variance Application from Oregon Administrative Rules Regulating Onsite Wastewater Treatment Systems

State of Oregon Department of Environmental Quality

Western and Northwest Regions:

Oregon Department of Environmental Quality
Onsite Program
165 East Seventh Ave, Ste 100
Eugene, Oregon 97401

Eastern Region:

Oregon Department of Environmental Quality
Onsite Program
475 NE Bellevue Dr, Ste 110
Bend, OR 97701

Please complete this application form and submit it with the fee and required attachments to one of the addresses above. The fees can be found in the current rule tables on DEQ's website here: https://ordeq.org/variancefees

Please note: Variance approval is not guaranteed, and fees are non-refundable. Learn more about the variance process at https://ordeq.org/septicvariance

Owner Information - Please Print:

Owner Name(s) (Last, First) Annes Butte LLC

Mailing Address 18160 Cottonwood Road, ## 274

City, State, Zip Sunriver, OR 97707

Phone (503) 706-6628 Email toddj@changemtg.com

Property Information:

County Deschutes

Township, Range, Section, Tax Lot T20S R10E S13C Tax Lot 7800

Lot and Block Number Lot 9, Block 52 Subdivision Name Deschutes River Recreation Homesites Unit 9 Part 2

Provide the Following Attachments:

1. A locator map showing accurate directions to the property. List the property's street address if the street address is known.

2. **Two copies** of the parcel's legal description (metes and bounds, warranty deed, sales contract or approved subdivision plat). Include copies of the protective covenants, deed restrictions and easements applicable to the property.

3. **Two copies** of the assessor's tax lot map showing the property or a surveyor's plat map.

4. **Two copies** of a land use compatibility statement from the appropriate land use authority that your proposed land use is compatible with the Land Conservation and Development Commission's acknowledged comprehensive plan or statewide planning goals.

5. **One copy** of the DEQ (or county agent) site evaluation report, field notes, and other correspondence relating to past evaluations for septic system development.

RECEIVED
JAN 13 2025
DEQ
Eastern Region Bend

6. **Two copies** of a narrative description for your variance proposal, including system construction specifications and the step-by-step procedures you propose to follow when installing the system. You must clearly describe how your proposal will overcome the limitations cited by DEQ or the county in the original denial.

7. **Two copies** of a plot plan drawn with the location and dimensions of all components of the proposed system. Use a defined scale that is not smaller than one-inch equals 30 feet. Also, be sure to include the replacement absorption facility in the plot plan drawing. Indicate separation distances between disposal trenches, springs, water courses, agricultural drainage tile, ditches, drainage ways, water lines, buildings, roads, embankments, and other identifying features, which help demonstrate parcel-to-drainfield relationships. Locate all wells within 200 feet of the proposed system and the replacement system.

8. The names and mailing addresses of all adjacent property owners and other known interested persons, for hearing notice.

9. The variance officer will request additional items be provided, if found necessary for the variance. The application will be deemed incomplete until the requested items are provided.

A minimum of two test pits must be provided within the specific area where the variance system is proposed, and should be approximately two feet wide, four feet long, and excavated to either bedrock or to a depth of five feet. Similar pits must be provided in the area of the repair system. The variance officer may require the proposed drainfield and the future replacement drainfield to be staked out.

Hardship Variances:

Hardship variances may be considered in cases of extreme and unusual hardship. The following factors may be considered: advanced age or bad health of applicant, need of applicant to care for aged, incapacitated or disabled relative, and the hardship variance will have relative, insignificant environmental impact. Documentation of hardship must be provided.

☐ MARK THIS BOX FOR HARDSHIP CONSIDERATION

By my (our) signature(s), I (we) request DEQ act on this application and hereby grant permission to enter onto the above-described property. I (we) also acknowledge that I (we) have read the Variance Process Fact Sheet found here: https://ordeq.org/septicvariance

12-20-2024 — Managing Member Annies Butte, LLC

Date — Owner Signature

Date — Owner Signature

NOTE: All owners must sign this application form. If there are more than two owners, have them sign additional duplicate applications and include them with submittal.

* Pursuant to ORS 454.662, the applicant is not required to submit the application fee if, at the time of filing the application, the applicant is 65 years of age or older, is a resident of the State of Oregon, and has an annual household income, as defined in ORS 310.630, of $15,000 or less. Appropriate documentation must be submitted with the application.