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, 2024

Sharon Wendell
3620 Spring Blvd
Eugene, OR 97405

Re: WQ: Variance Approval: 248-23-000486-VAR: 16854 Brenda Dr; T.20S; R.10E; Sec. 25BB; Tax Lot 3400; Lot 14, Block 1 Oregon Water Wonderland Unit No. 1, 1.01 Acres; Deschutes County.

Dear Sharon Wendell,

This correspondence verifies that a variance hearing provided for under Oregon Administrative Rules 340-071-0430, was held on the site at 1:00 pm on May 29, 2024, for the subject property referenced above on Elsinore 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 12-inches 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 10- inches 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 27- 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 19, 2022, where a denial was issued for the use of an onsite wastewater system on October 26, 2022 . 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 16-inches and 18-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 3- inches of extra vertical separation and providing a total 27-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
Steffen F. and Sabine P. Schulze, 55713 Big River Dr., Bend, OR, 97707
Thomas and Karla Bunell, 55717 Big River Dr., Bend, Or 97707
DKMartin Asset Management LLC, PO box 6643, Bend, OR 97708
Bradley Gene and Lori Ann Rummel, 16846 Brenda Dr., Bend, OR 97707
Gregory J Becker Rev Trust, 16844 Brenda Dr, Bend OR 97707
Darren Joseph Staduhar, 1932 E Morrow Dr., Phoenix, AZ 85024
Haley Heather and David Stewart Kramer, 55710 Big River Dr., Bend, OR 97707

Schedule A – Sharon Wendell
Variance Report - Special Conditions
T 20S, R 10E, Sec: 25BB, TL 3400

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 16854 Brenda Lane; T.20S; R.10E; Sec. 25BB; Tax Lot 3400; Lot 14, Block 1 Oregon Water Wonderland No.1, 1.01 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.

TAX LOT 1900
STANDARD SYSTEM
(1975)

TAX LOT 3500
SAND FILTER +
DRAINFIELD (1984)

TAX LOT 1800
ATT + MODIFIED
BOTTOMLESS SAND FILTER
(2020 – REPAIR/UPGRADE)

TAX LOT 1700
BOTTOMLESS SAND FILTER
(OFFSITE – 1999)
UPGRADED WITH ATT (2022)

T20S, R10E, SECTION 25BB,
TAX LOT 3400

204.25'

PROPOSED ADVANTEX
AX20N (MODE 3B)
TREATMENT SYSTEM

PROPOSED 1,500
GAL. SEPTIC TANK

PROPOSED 10'x25'
REPLACEMENT AREA

TEST
PIT 1

PROPOSED
SHOP
(40'x40')

RidNOx™
UNIT

EXTERNAL
PUMP
BASIN

10'

5' MIN.

PROPOSED
GARAGE
(30'x25')

259.52'

TAX LOT 4100
BOTTOMLESS SAND
FILTER (1995)

TAX LOT 4200

CLEANOUT
(TYP.)

PROPOSED
HOUSE
(50'x50')

PROPOSED 10'x25'
MODIFIED BOTTOMLESS
SAND FILTER

TEST
PIT 2

20'
MIN.

260.52'

TBM – TOP OF
WOODEN STAKE ALONG
PROPERTY BOUNDARY

TAX LOT 4300
BOTTOMLESS SAND FILTER
ON TAX LOT 4200 TO
THE WEST (2007)

BRENDA DRIVE
(16854)

TAX LOT 3300
DENIED (1980)

TAX LOT 3200
DENIED (1999)

TAX LOT 3100
ATT + BOTTOMLESS SAND
FILTER (VARIANCE 2018,
INSTALLED 2019)

TAX LOT 3000
ATT + CARBON–ENHANCED
MODIFIED BOTTOMLESS SAND FILTER
(VARIANCE 2022, INSTALLED 2023)

APPROVED

By DEQ Variance Officer 07/31/24

David Hurley

0 40'
1"=40'
(SCALE AND LOCATIONS
ARE APPROXIMATE)

Figure 2. Site Plan

PROJECT NUMBER: 2023029	Formal Variance T20S, R10E, Section 25BB, Tax Lot 3400
DATE: 11/6/2023	
DWG NO: 2023029 F1–6.DWG	Sharon Wendell 16854 Brenda Drive Bend, OR 97707
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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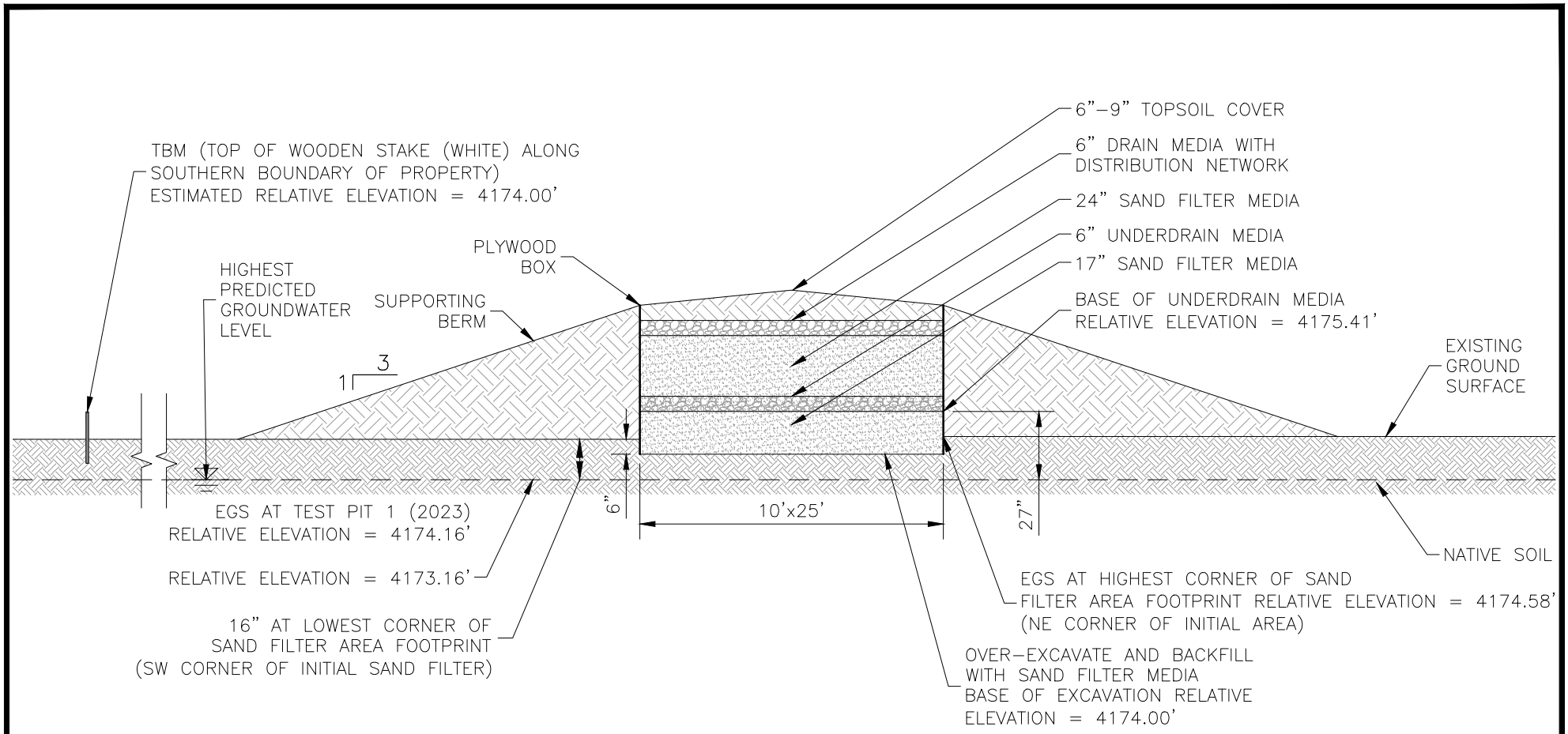

Figure 3A. Modified Bottomless Sand Filter Section – Initial

0 5'

1"=5'

PROJECT NUMBER: 2023029	Formal Variance
DATE: 11/6/2023	T20S, R10E, Section 25BB, Tax Lot 3400
DWG NO: 2023029 F1–6.DWG	Sharon Wendell
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	16854 Brenda Drive, Bend, OR 97707
REVISED:	ELKHORN CONSULTING LLC

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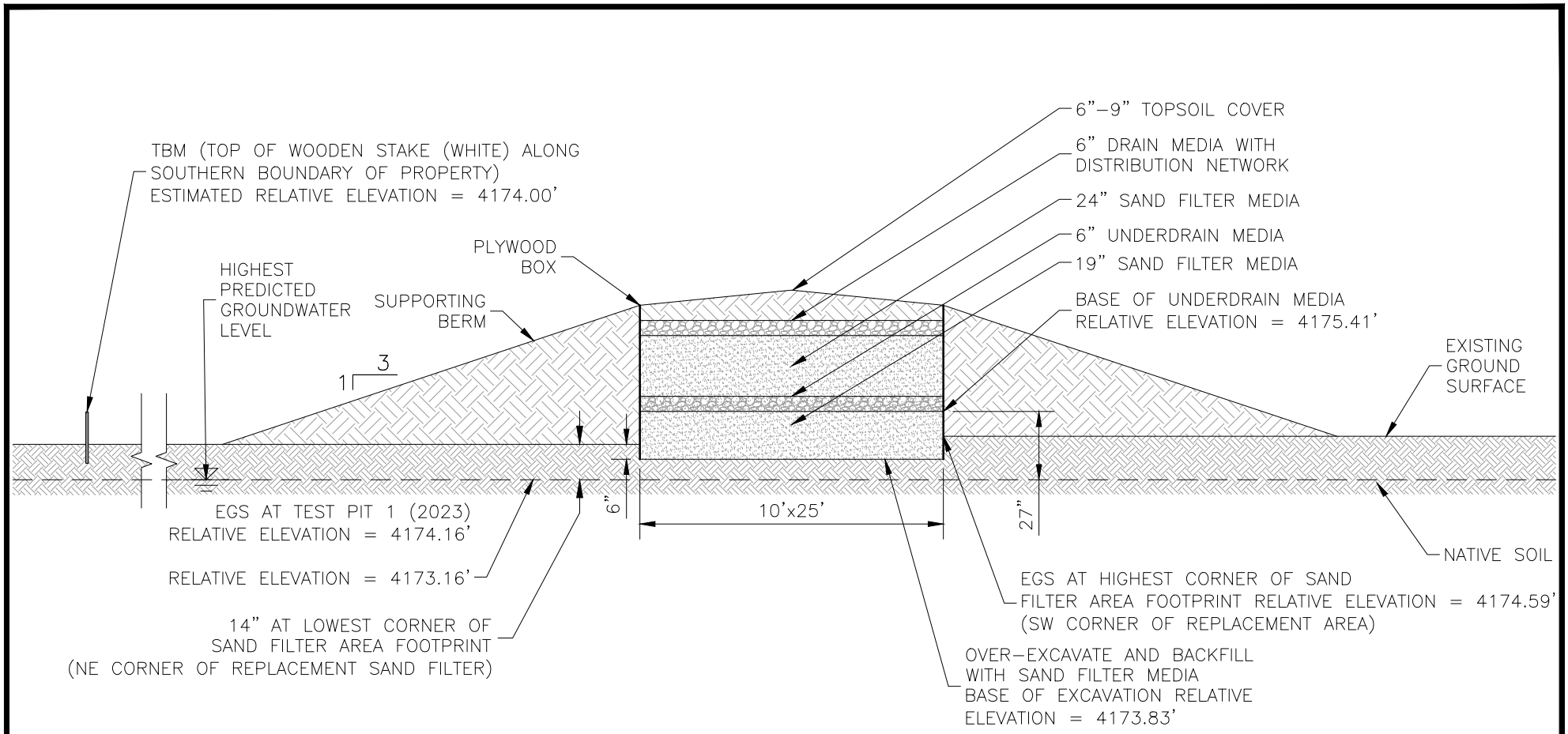

Figure 3B. Modified Bottomless Sand Filter Section – Replacement

0 5'

1"=5'

PROJECT NUMBER: 2023029	Formal Variance
DATE: 11/6/2023	T20S, R10E, Section 25BB, Tax Lot 3400
DWG NO: 2023029 F1–6.DWG	Sharon Wendell
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	16854 Brenda Drive
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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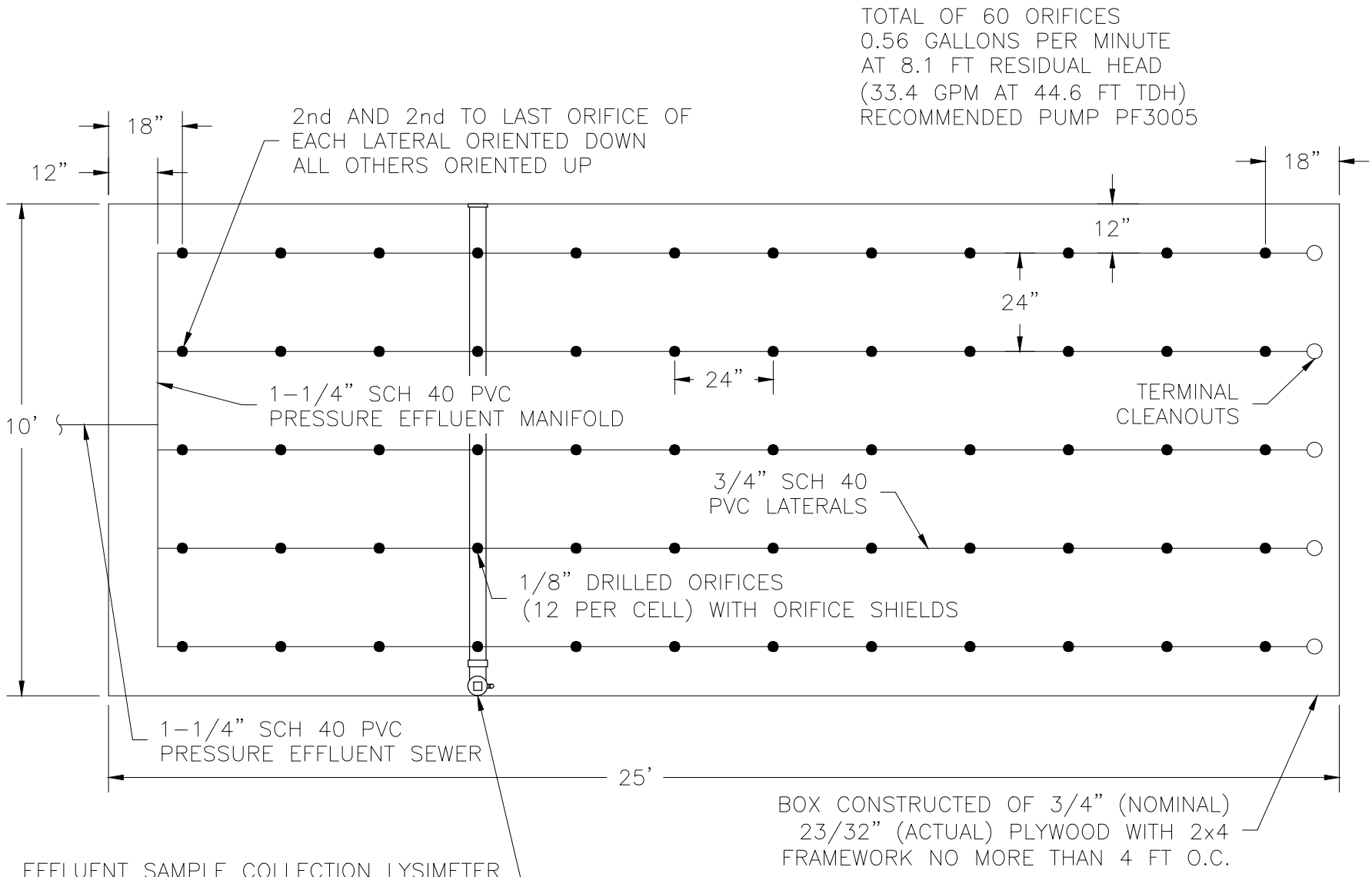

Figure 4. Sand Filter Plan Detail

PROJECT NUMBER: 2023029	Formal Variance T20S, R10E, Section 25BB, Tax Lot 3400
DATE: 11/6/2023	
DWG NO: 2023029 F1-6.DWG	Sharon Wendell 16854 Brenda Drive Bend, OR 97707
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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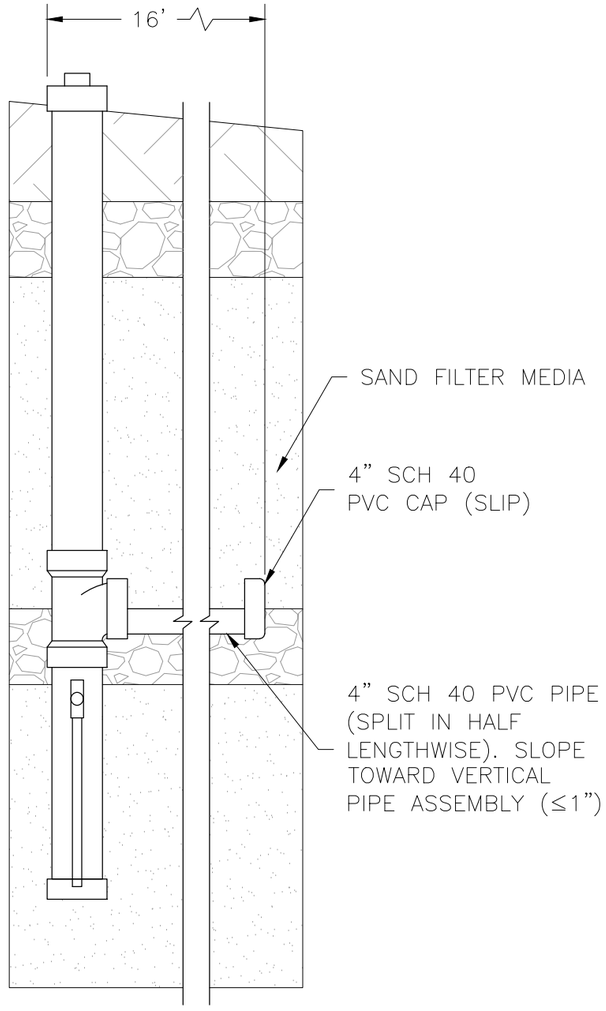
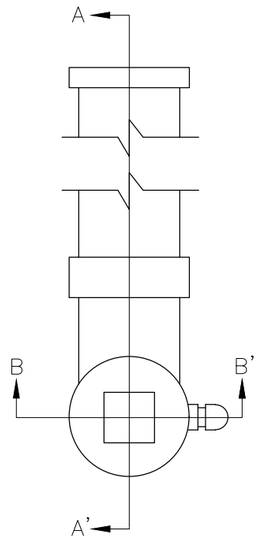


VIEW A–A'

0 1'

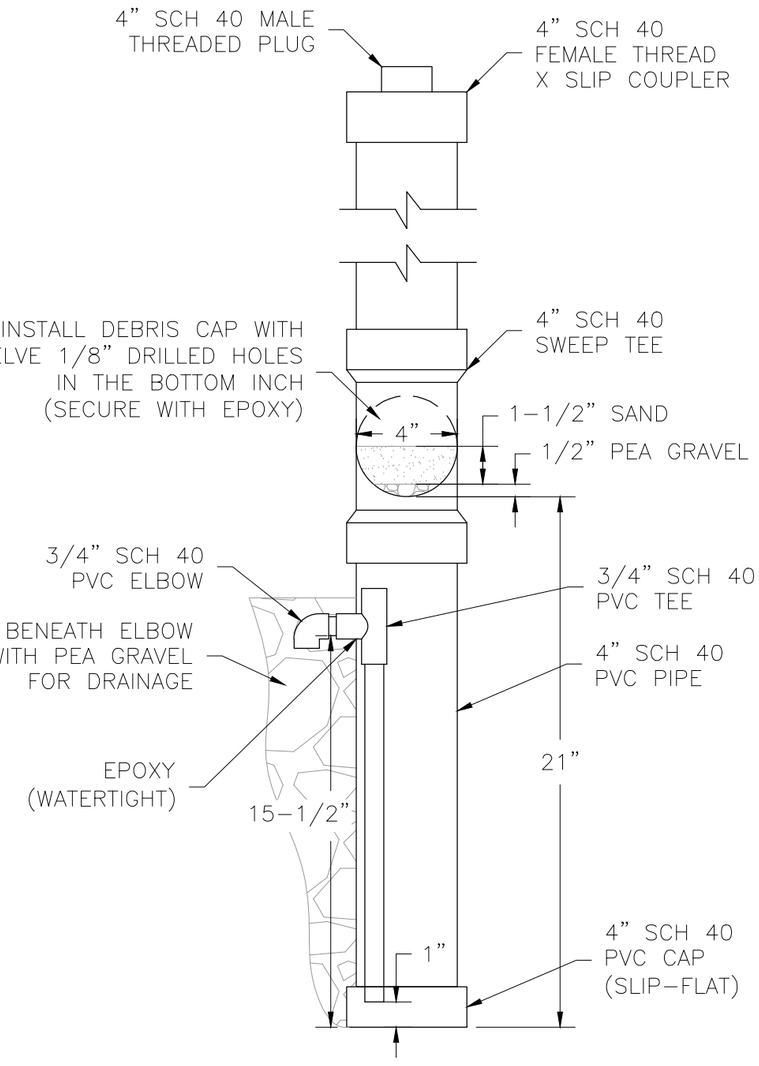
1"=1'



PLAN VIEW

0 0.5'

1"=0.5'



VIEW B–B'

0 0.5'

1"=0.5'

Figure 5. Lysimeter Details

PROJECT NUMBER: 2023029	Formal Variance T20S, R10E, Section 25BB, Tax Lot 3400
DATE: 11/6/2023	
DWG NO: 2023029 F1–6.DWG	Sharon Wendell 16854 Brenda Drive Bend, OR 97707
DWG BY: 6NSG PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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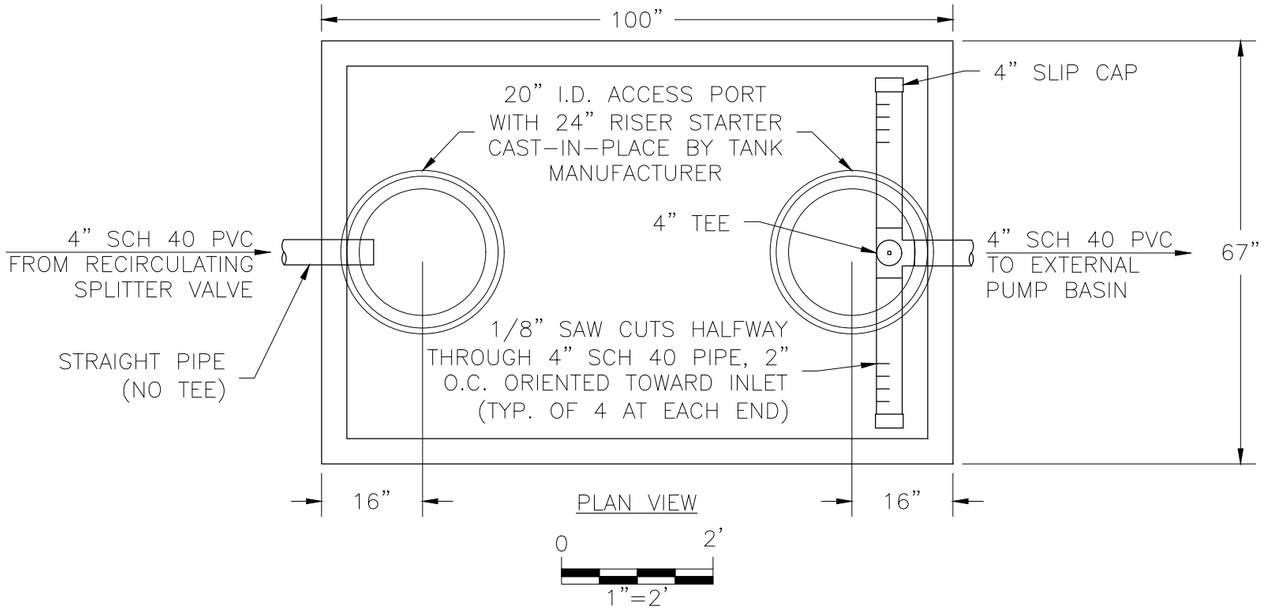

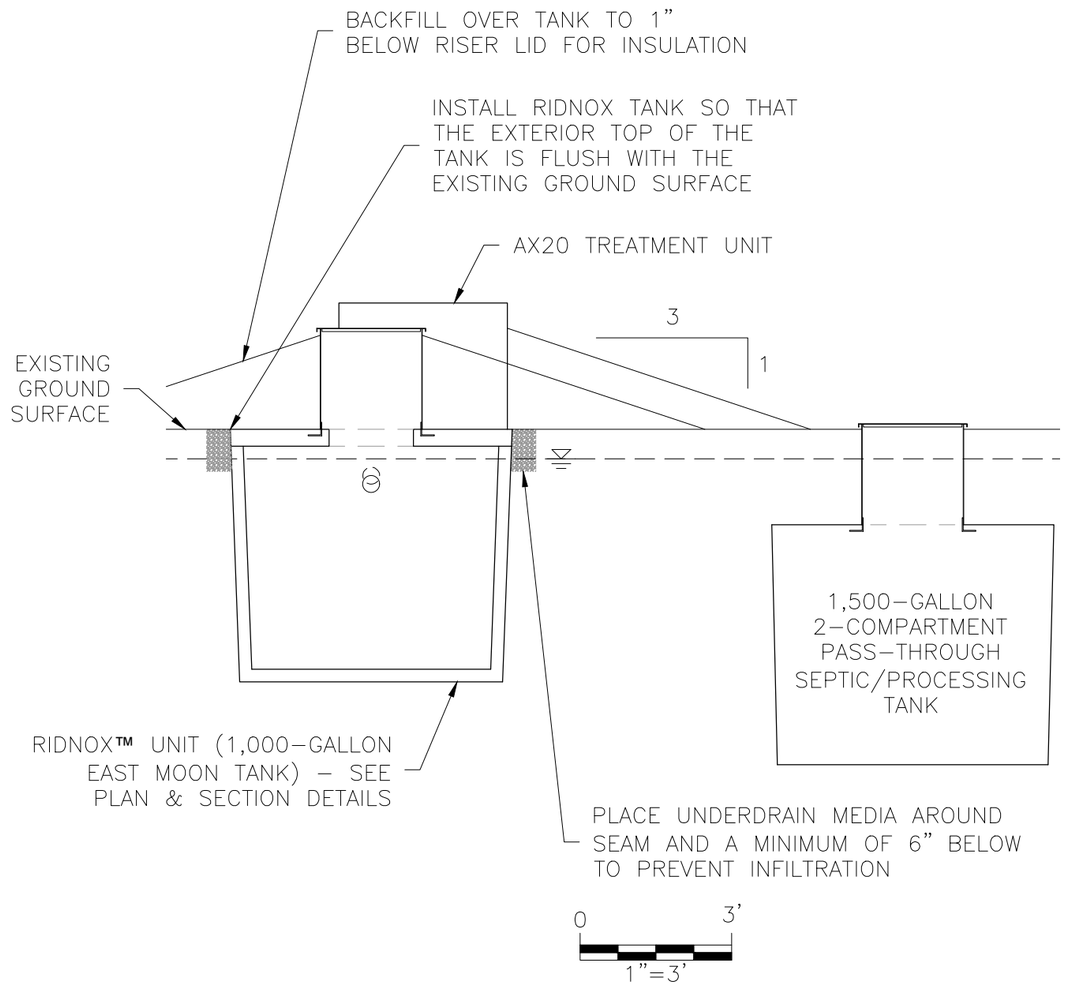

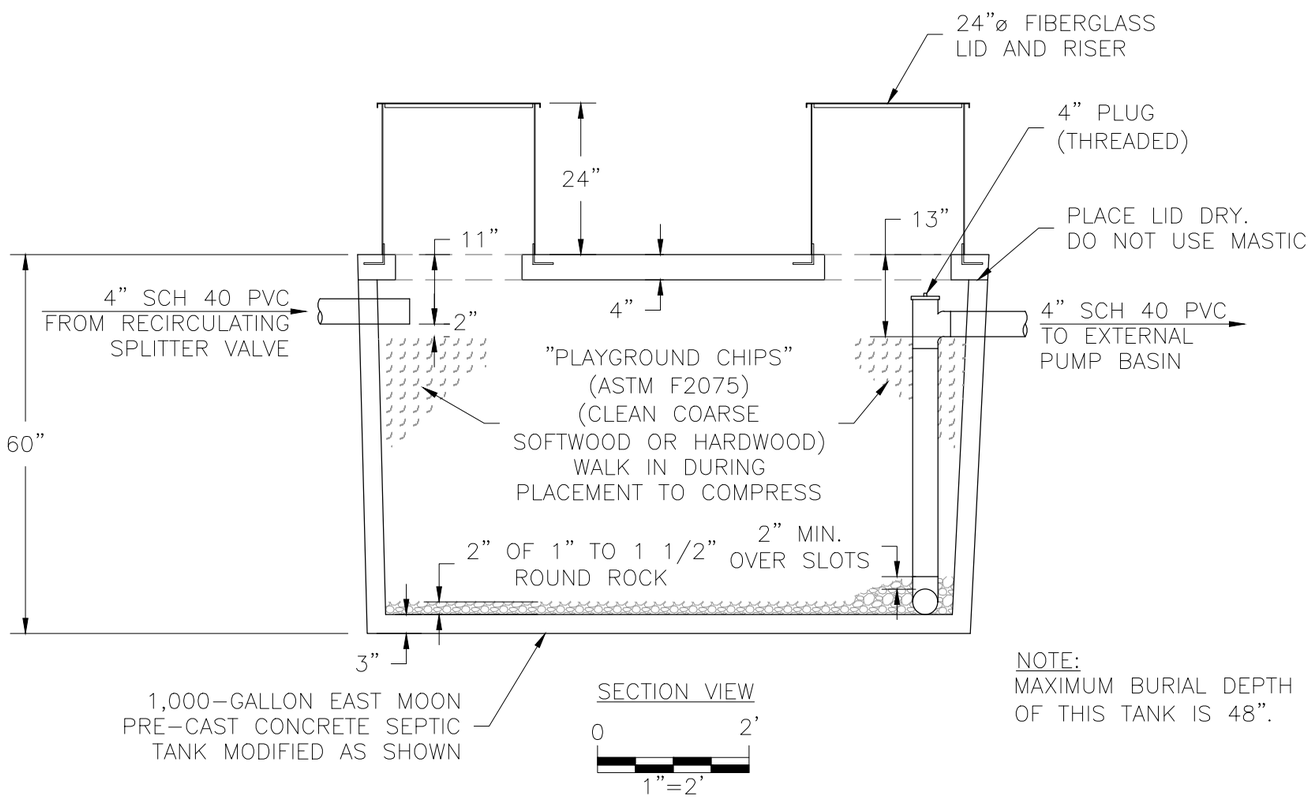

NOTE:
MAXIMUM BURIAL DEPTH OF THIS TANK IS 48".

Figure 6. RidNOx™ Details

PROJECT NUMBER: 2023029	Formal Variance
DATE: 11/6/2023	T20S, R10E, Section 25BB, Tax Lot 3400
DWG NO: 2023029 F1-6.DWG	Sharon Wendell
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	16854 Brenda Drive
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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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

May 21, 2024

Sharon M. Wendell
3620 Spring Blvd.
Eugene, OR 97405

Re: WQ: CAS: Variance Assignment: 248-23-000486-VAR: 16854 Brenda Drive; T.20S; R.10E; Sec. 25BB; Tax Lot 3400; Lot 14, Block 4 Oregon Water Wonderland Unit No. 1; 1.01 Acres; Deschutes County.

Dear Sharon M. Wendell,

The Department of Environmental Quality is in receipt of your onsite wastewater variance application and proposal. The application has been assigned to me for further action. I plan to hold an information gathering hearing (as provided under OAR 340-71-430) regarding your proposal on **Wednesday, May 29, 2024, at 1:00 pm** at the subject property. Your proposal and system plans have been prepared by Brian T. Rabe, CPSS, WWS; Principal Soil Scientist, of Elkhorn Consulting LLC. It is my understanding that Mr. Rabe will be present to answer any questions regarding the proposal.

Deschutes County conducted a site evaluation with three test pits at the subject property on August 8, 2023, where a denial was issued for the use of an onsite wastewater system on August 9, 2023. 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 less than 24 inches from the ground surface between 18 and 19 inches below ground surface (bgs).

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 proposal is to overcome the site limitations by installing an Orenco® AdvanTex AX20N-Mode 3B Alternative Treatment Technology (ATT) System followed by a reduced sized Bottomless Sand Filter (BSF) system constructed with a reinforced concrete berm. The nitrate-nitrogen is proposed to be further reduced with a post-anoxic RidNOx unit. You are seeking variance from the following Oregon Administrative Rules (OARs):

OAR 340-071-0135(1): which addresses Department of Environmental Quality approval of new or innovative technologies, materials, or designs for onsite systems.

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

OAR 340-071-0290(4)(d) which states: Bottomless sand filter. Sites may use a conventional sand filter without a bottom (BSF) 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.

Sometimes during a hearing, it can be determined that other rules or standards need to be considered in order to finalize a proposal. Should this occur, based on the proposal, site observations, and other considerations, I may or may not proceed with the hearing and my final decision process until further information is provided.

Notice of the hearing will be mailed to the neighboring property owners and to the Deschutes County Onsite Wastewater Division staff, see copy enclosed. However, all persons who wish to attend the hearing are welcome. The hearing will provide an opportunity for you and others to offer additional facts or reasons either in support of or in opposition to the proposal and requested variance to the rules.

Please remember, it is the burden of the applicant to show that strict compliance to the rules or standards are inappropriate, or that special physical conditions render strict compliance with the rules or standards to be unreasonable, burdensome or impractical. Additionally, the applicant needs to provide prudent reasonable justification in how their proposal will still protect both public health and the environment.

Deschutes County Onsite Wastewater Division staff will get a copy of your proposal and will have an opportunity to provide both written and verbal comments on your proposal. Others wishing to review your proposal can contact me.

The Department is committed to accommodating people with disabilities. Please notify DEQ of any special physical or language accommodations needed as far in advance of the hearing date as possible. To make any of these arrangements please contact, David Hurley, at (541) 776-6130 or toll free at (866)-863-6668, or by email at: david.hurley@deq.oregon.gov. People with hearing impairments can call DEQ's TTY at (800)-735-2900.

If you have questions concerning the variance process or hearing arrangements, please give me a call. You may also visit https://ordeq.org/septicvariance for more information about variances.

Sincerely,

David Hurley

David Hurley, REHS
Natural Resource Specialist 4
Variance Officer – Onsite Wastewater Program

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

In Addition, To The Following Adjacent Property Owners:

Steffen F. and Sabine P. Schulze, 55713 Big River Dr., Bend, OR, 97707
Thomas and Karla Bunell, 55717 Big River Dr., Bend, Or 97707
DKMartin Asset Management LLC, PO box 6643, Bend, OR 97708
Bradley Gene and Lori Ann Rummel, 16846 Brenda Dr., Bend, OR 97707
Gregory J Becker Rev Trust, 16844 Brenda Dr, Bend OR 97707
Darren Joseph Staduhar, 1932 E Morrow Dr., Phoenix, AZ 85024
Haley Heather and David Stewart Kramer, 55710 Big River Dr., Bend, OR 97707

Encl. Neighbor Notice

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

May 21, 2024

Hearing Date/Time is 1:00 PM on May 29, 2024

Re: WQ: CAS: Variance Assignment: 248-23-000486-VAR: 16854 Brenda Drive; T.20S; R.10E; Sec. 25BB; Tax Lot 3400; Lot 14, Block 4 Oregon Water Wonderland Unit No. 1, 1.01 Acres; Deschutes County.

Dear Resident:

Neighbors of yours, Sharon M. Wendell, own the property referenced above and herein to be referred to as the "Property", has submitted an application to the Oregon Department of Environmental Quality (DEQ) requesting a "For Cause Variance" from Oregon Administrative Rules regulating Onsite Wastewater Treatment Systems. The Property has been denied due to conditions associated with saturation being within 24 inches of the ground surface.

In the variance application, the applicant's proposal is to install an Orenco® AdvanTex AX20N-Mode 3B Alternative Treatment Technology (ATT) System followed by a reduced sized Bottomless Sand Filter (BSF) system with an additional RidNOx unit for nitrate-nitrogen reduction.

For more detail, please review the enclosed variance hearing notice.

A variance to the Oregon Administrative Rules regulating Onsite Wastewater Treatment Systems may be granted if a variance officer finds that:

1. Strict compliance with the rules or standards are inappropriate: or

2. Special physical conditions render strict compliance unreasonable, burdensome or impractical.

Part of the variance process involves an information gathering hearing. In this hearing, information is shared about the site conditions, rule requirements, public health or environmental protection concerns, and how the proposed system design overcomes these concerns. It is also an opportunity for all parties involved, including adjacent property owners, to voice any concerns they might have with the proposal. Department policy requires a variance officer to inform all adjacent property owners of the variance hearing date, time and place. You are not required to attend this hearing, but can, should you desire to do so.

The information gathering hearing for this variance proposal is to begin at **1:00 PM, Wednesday, May 29, 2024,** at the subject property.
The Department is committed to accommodating people with disabilities. Please notify DEQ of any special physical or language accommodations needed as far in advance of the hearing date as possible. To make any of these arrangements please contact, David Hurley, at (541) 776-6130 or toll free at (866)-863-6668,, or by email at: david.hurley@deq.oregon.gov. People with hearing impairments can call DEQ's TTY at (800)-735-2900.

If you have any questions concerning this variance process or hearing arrangements, please give me a call.

Sincerely,

David Hurley

David Hurley, REHS
Natural Resource Specialist 4
Variance Officer – Onsite Wastewater Program

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
Pineriver Homes, 23410 Highway 20, Bend, OR 97701

In Addition, To The Following Adjacent Property Owners:

Steffen F. and Sabine P. Schulze, 55713 Big River Dr., Bend, OR, 97707
Thomas and Karla Bunell, 55717 Big River Dr., Bend, Or 97707
DKMartin Asset Management LLC, PO box 6643, Bend, OR 97708
Bradley Gene and Lori Ann Rummel, 16846 Brenda Dr., Bend, OR 97707
Gregory J Becker Rev Trust, 16844 Brenda Dr, Bend OR 97707
Darren Joseph Staduhar, 1932 E Morrow Dr., Phoenix, AZ 85024
Haley Heather and David Stewart Kramer, 55710 Big River Dr., Bend, OR 97707

Encl. Variance Hearing Notice

ELKHORN CONSULTING LLC

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

November 13, 2023

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

SUBJECT: Formal Variance Request – Sharon M. Wendell – T20S, R10E, Section 25BB Tax Lot 3400 (1.01 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 16854 Brenda Drive, south of Bend in Deschutes County, Oregon (Site) (Figure 1) and consists of 1.01 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 and issued a denial in May 1980. An authorization notice was applied for in 1994 that describes a standard system typical of the late 1970's or early 1980's consisting of a septic tank and 150 linear feet of drainfield. A plot plan showing the location of the tank and drainfield references Jay Langley (Deschutes County Sanitarian) with a date of July 28, 1980. A single test pit is referenced that was evaluated on April 22, 1994 and the denial was issued on April 26, 1994. Faint mottling was described beginning at a depth of 18 inches below the existing ground surface (bgs) and water was described at a depth of 55 inches bgs. The most recent site evaluation was conducted on October 19, 2022, and a denial was issued on October 26, 2022. The denial was based on conditions associated with saturation noted at 12 to 16 inches below the ground surface in 2 test pits. Test Pit 1 is located west of the center of the parcel and Test Pit 2 is about 90 feet to the south. The primary reasons cited for the denial was 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.

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

Soils

The web soil survey shows the location of the Site and a copy of the output is provided in Appendix D. The north end of the parcel is within a delineation of Map Unit 29A, Cryaquolls, 0 to 3% slopes, that are also shown as wetlands on the Deschutes County property information website (Dial). The rest of the (represented by Test Pits 1 and 2) is within a delineation of Map Unit 144A, Sunriver sandy loam, 0 to 3% slopes (Appendix D and Figure 2). 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:

- 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 2023 soil notes and the conditions typical for the Sunriver series are related primarily to coloration (browner colors) in the surface horizons that are more indicative of the Shanahan series.

Preliminary Assessment

The Site was reviewed by Brian Rabe, CPSS, WWS, on October 24, 2023. 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 1 in the 2023 site evaluation (western part of the lot - see Figure 2 and Appendix C).

Other Considerations

This parcel and developed parcels in the surrounding area are primarily served by a public water system, operated by Oregon Water Wonderland Unit I Sanitary District.

A search of the database of the Oregon Department of Water Resources was conducted for the section that the subject property lies within (Section 25 of Township 20 South, Range 10 East of the Willamette Meridian). There are about 18 records on file for this section. A total of 7 water well records (well logs) were identified that could be tied to specific parcels within about one-eighth of a mile of the subject property (Appendix F). All 7 well logs are related to wells located on Tax Lot 4100 at least 615 feet east of the area proposed for the bottomless sand filters. Some of these well logs pertain to deepening of existing wells with no reference to the original log or enough data to correlate

to other found logs. The log for the primary well serving the public water utility (Oregon Water Wonderland) is summarized below.

The primary well was completed on August 20, 1999 to a depth of 650 feet. Water was described as being first found at a depth of 6 feet within a layer of "top soil + small gravel" and had a static water level of 6 feet bgs representing the shallow unconfined aquifer that extended down to a depth of 10 feet. The next water bearing zone was described as beginning at a depth of 517 feet in a layer of "black sand + pumice" with several clay layers described between the water bearing zones. A third water bearing zone was described as beginning at a depth of 585 feet within a layer of "fractured gray lava." The first and second water bearing zones were isolated with cement and the well was completed in the third water bearing zone with a static water level of 13 feet bgs on the date of completion with a reported yield of 600 gallons per minute (gpm) with 50 feet of drawdown after 1 hour with air. A review of the public drinking water system test results indicate that the nitrate-nitrogen concentrations are very low with the highest recent result being 0.14 milligrams per liter (mg/L) in 2019.

The regional groundwater gradient, as indicated in a study published by the U.S. Geological Survey[2], is to the north or northeast toward or parallel to the Deschutes River. The subject property is located within Management Area 11, which recommends a 79% to 100% reduction from the base scenario loading (standard systems) for existing and future homes. The results of the Nitrate Loading Management Model within the study (Figures 25 and 26) suggest that this area represents a moderate to high risk of adverse impacts to groundwater quality unless a high level of treatment is achieved. 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 1.71 milligrams per liter (mg/L) with 18.83% exceeding 3 mg/L and 1.17% exceeding 10 mg/L (based on 1,200 test results, viewed on November 6, 2023).[3]

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

[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 November 6, 2023, from ARC GIS Online: https://www.arcgis.com/apps/MapSeries/index.html?appid=c0d7daea497049c1a686d07dab7106e5

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^{TM}) 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 an effluent with an average total nitrogen (TN) concentration of 17 mg/L. A post-anoxic process, similar to the RidNOx unit that 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 in the La Pine project 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 NO_3-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 NO_3-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 NO_3-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 NO_3-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 TN concentration of 60 mg/L, an average TN concentration in the AX20 effluent of 17 mg/L, the TN concentration leaving the RidNOx unit and going to the modified bottomless sand filter the typical reduction from the base scenario presented in the groundwater study cited previously is expected to be approximately 98 percent.

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

Test Pit 1 (2022) was described as:

- Very dark grayish brown (10YR 3/2) sandy loam from 0 to 9 inches with moderate coarse subangular blocky structure; common very fine, few fine and medium roots; underlain by
- Very dark grayish brown (10YR 3/2) sandy loam from 9 to 29 inches with weak fine to medium subangular blocky structure; few very fine, fine, and medium roots; with redoximorphic features described beginning at 12 inches; underlain by
- Light yellowish brown (2.5Y 6/3) silt loam from 29 to 35 inches, structureless (massive); with few fine and medium roots; with redoximorphic features throughout; underlain by
- Light gray (10YR 7/1) silt loam from 35 to 39 inches, structureless (massive); with few fine and medium roots; with redoximorphic features throughout; underlain by
- Very dark gray (10YR 3/1) and white (10YR 8/1) coarse sand from 39 to 54 inches, single grain (structureless); few roots; with redoximorphic features throughout.

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 profiles for both test pits. The highest level of the water table is expected to be 16 inches below the existing ground surface at the lowest point within the area proposed for the initial sand filter and 14 inches at the lowest point within the area proposed for the replacement sand filter based on the depth to the redoximorphic features described in Test Pit 1 (2022).

The proposed system seeks to overcome this limitation by elevating the modified bottomless sand filter in a manner that provides an additional 3 inches of separation (Figures 3A and 3B). The sod and underlying sandy soil to a depth of 6 inches within the footprint of the sand filter will be excavated and replaced with sand filter media. An additional 11 inches (initial sand filter) or 13 inches (replacement sand filter) of sand filter media (total of 17 and 19 inches, respectively) will be used to exceed the 24-inch separation from shallowest water table depth standard by providing a total separation of 27 inches. 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.

Deschutes County has noted that the results of the Nitrate Management Loading Model indicated that there was no surplus capacity within Management Area 11 to accommodate additional lots that were denied or otherwise not expected to be approved. In a recent variance hearing for another parcel within Management Area 11, Deschutes County stated that about 18 parcels have been approved through the formal variance process in this area and expressed concern about the cumulative effects of the additional nutrient load on groundwater and surface water quality.

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.

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: Sharon Wendell
Todd Cleveland, REHS – Deschutes County

CPSS
Certified Professional
Soil Scientist
BRIAN T. RABE
15239 Exp. 31DEC23
Registered Wastewater Specialist
No. EH-W-448430 Exp. 30SEP24

FIGURES

Figure 1. Vicinity Map

0 2,000'

1" = 2,000'

(LOCATIONS AND SCALE ARE APPROXIMATE)

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

PROJECT NUMBER: 2023029	Formal Variance T20S, R10E, Section 25BB, Tax Lot 3400
DATE: 11/6/2023	
DWG NO: 2023029 F1-6.DWG	Sharon Wendell 16854 Brenda Drive Bend, OR 97707
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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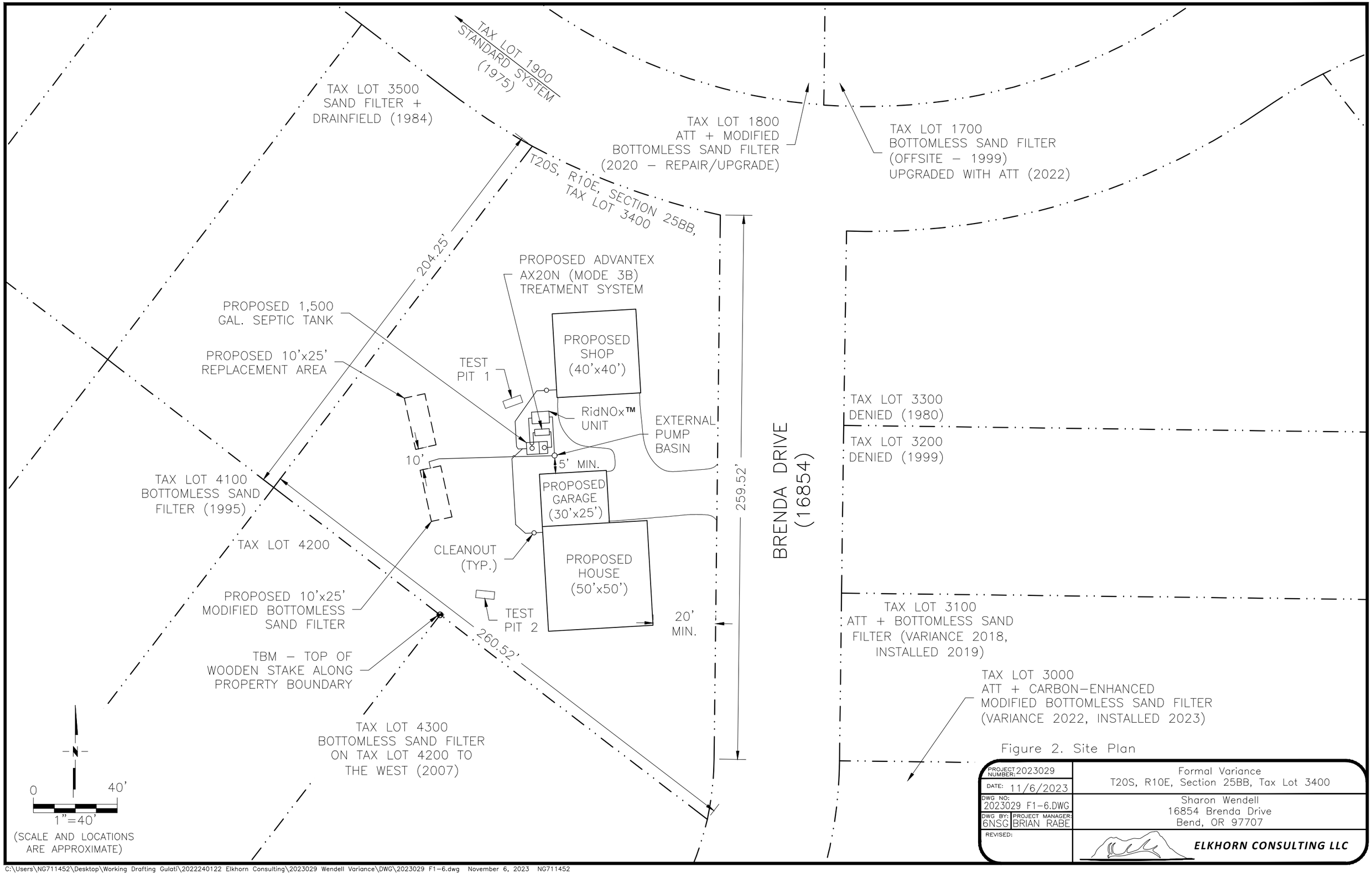

Figure 2. Site Plan

PROJECT NUMBER: 2023029	Formal Variance T20S, R10E, Section 25BB, Tax Lot 3400
DATE: 11/6/2023	
DWG NO: 2023029 F1–6.DWG	Sharon Wendell 16854 Brenda Drive Bend, OR 97707
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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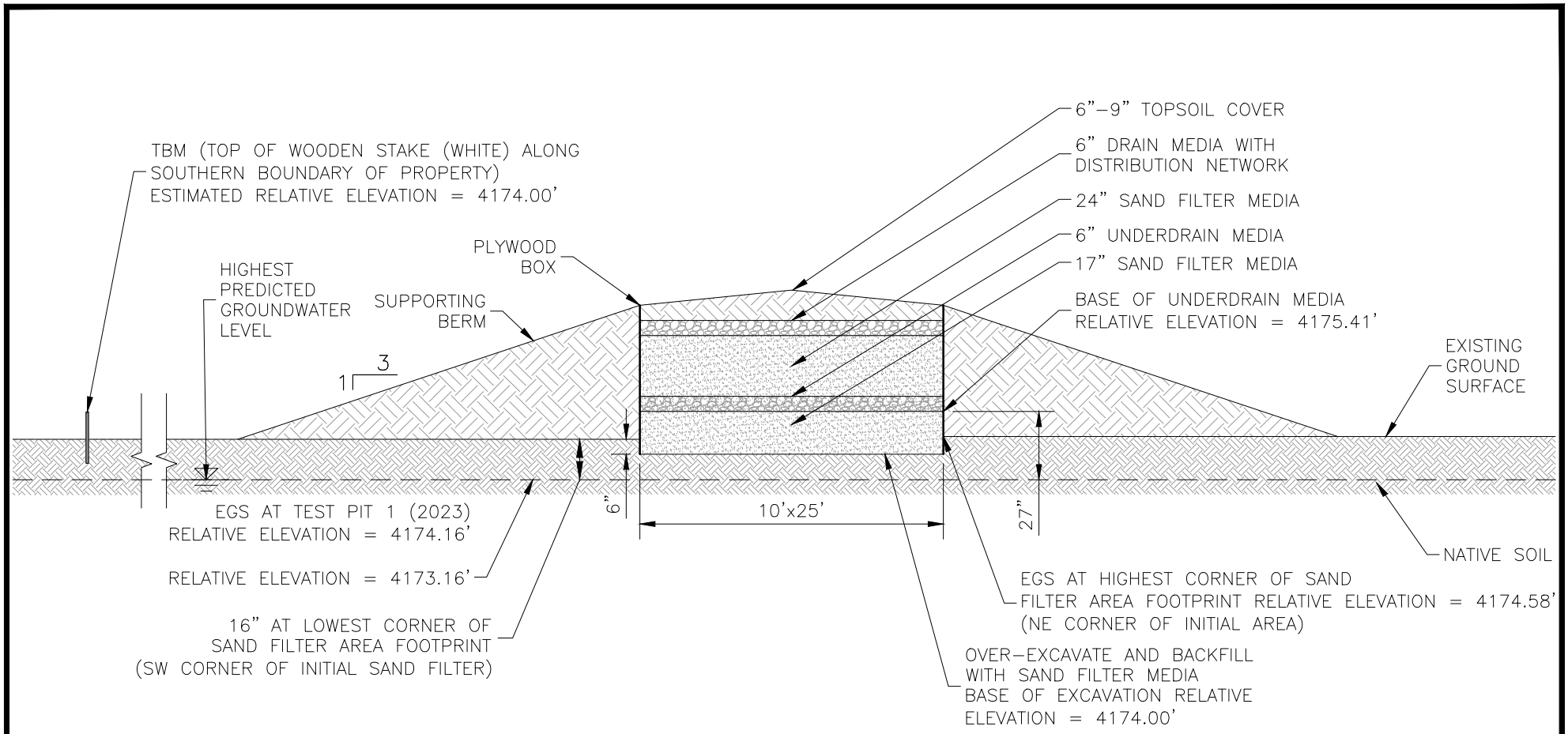

Figure 3A. Modified Bottomless Sand Filter Section – Initial

0 5'

1"=5'

PROJECT NUMBER: 2023029	Formal Variance
DATE: 11/6/2023	T20S, R10E, Section 25BB, Tax Lot 3400
DWG NO: 2023029 F1–6.DWG	Sharon Wendell
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	16854 Brenda Drive, Bend, OR 97707
REVISED:	ELKHORN CONSULTING LLC

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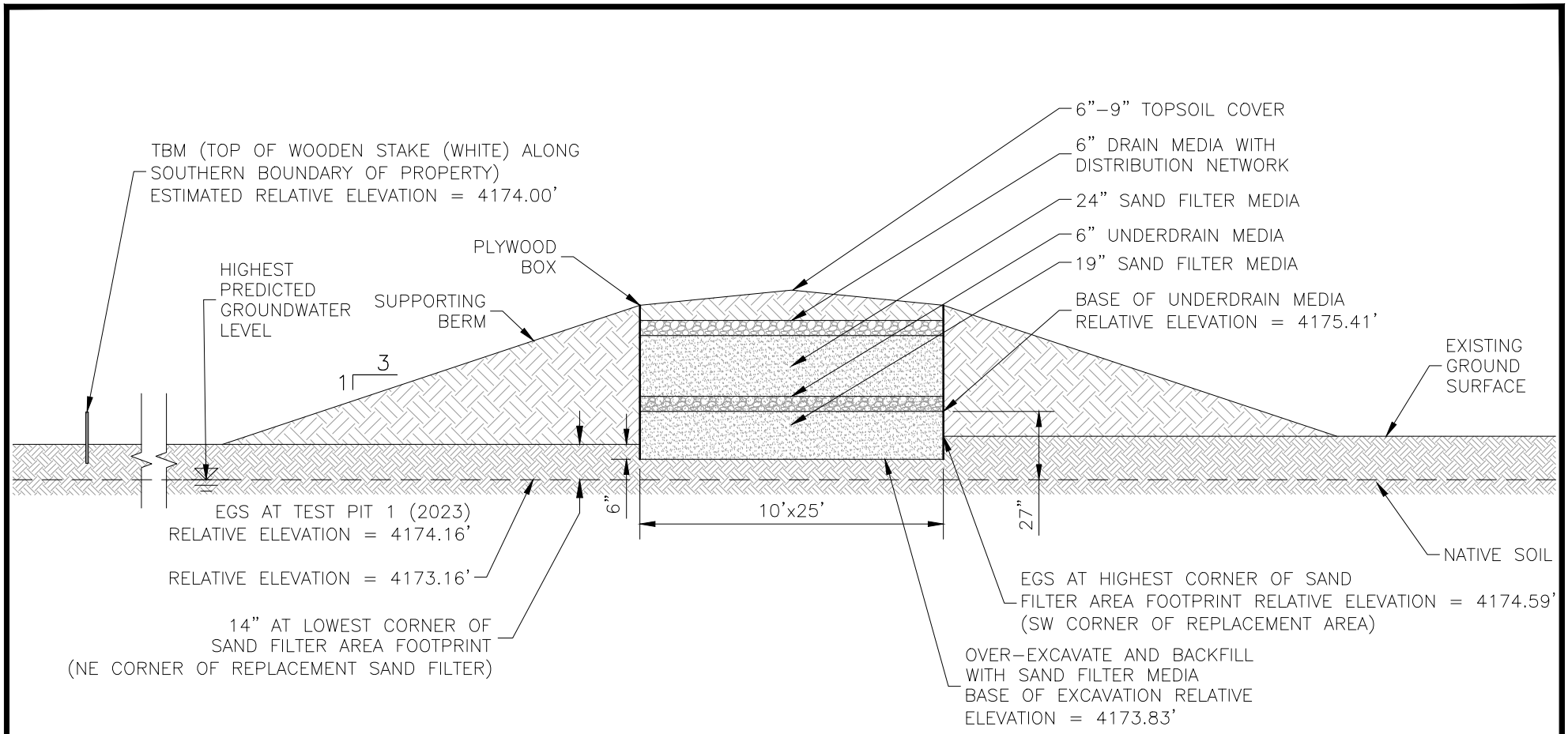

Figure 3B. Modified Bottomless Sand Filter Section – Replacement

0 5'

1"=5'

PROJECT NUMBER: 2023029	Formal Variance
DATE: 11/6/2023	T20S, R10E, Section 25BB, Tax Lot 3400
DWG NO: 2023029 F1–6.DWG	Sharon Wendell
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	16854 Brenda Drive
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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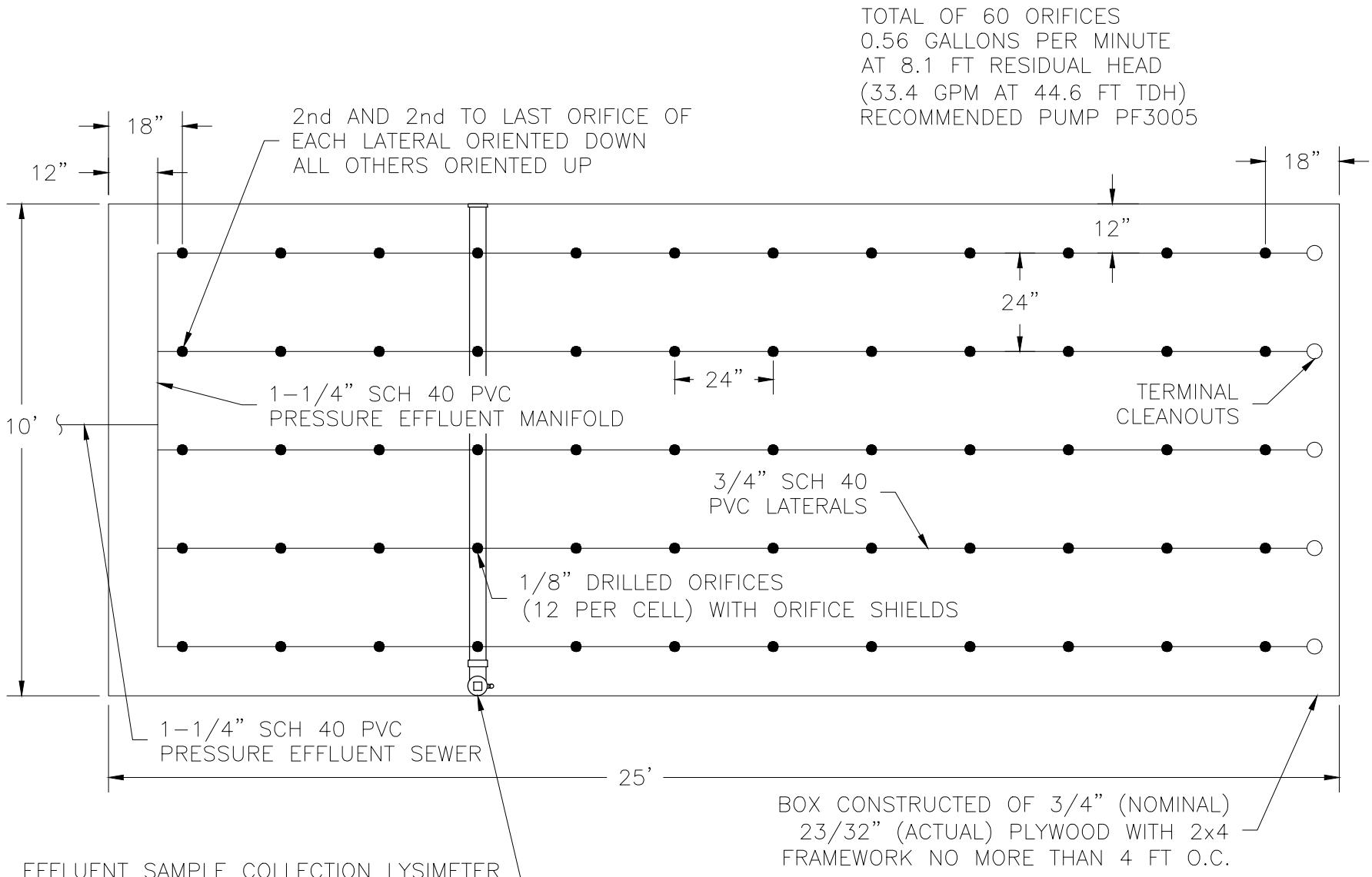

Figure 4. Sand Filter Plan Detail

PROJECT NUMBER: 2023029	Formal Variance T20S, R10E, Section 25BB, Tax Lot 3400
DATE: 11/6/2023	
DWG NO: 2023029 F1-6.DWG	Sharon Wendell 16854 Brenda Drive Bend, OR 97707
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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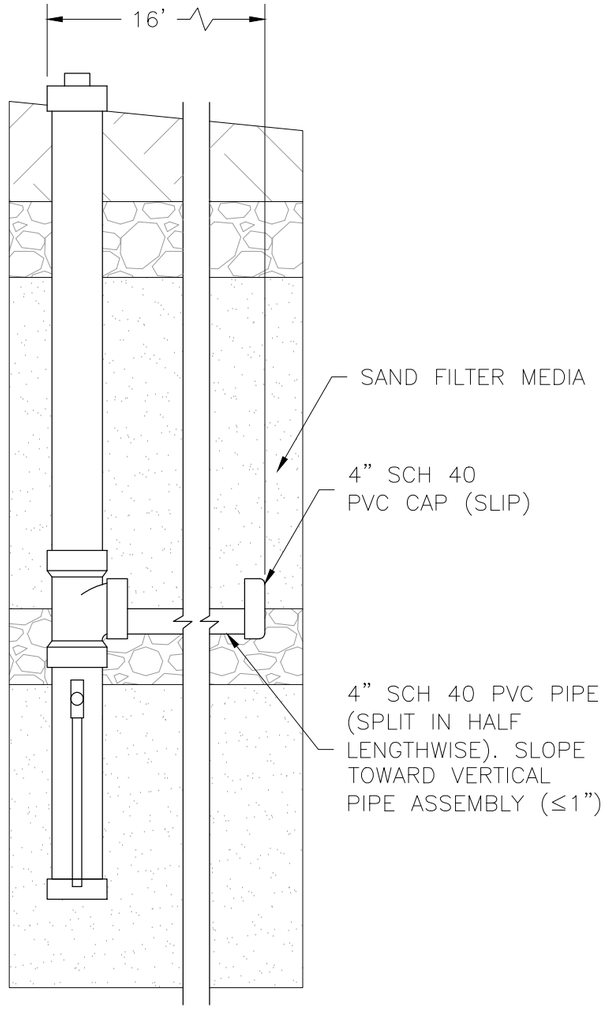
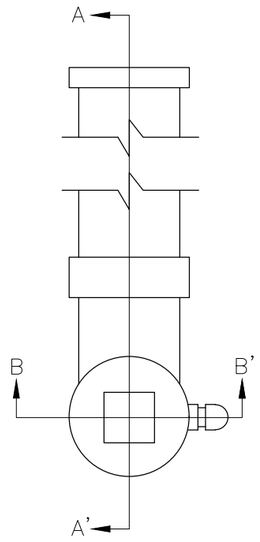


VIEW A–A'

0 1'

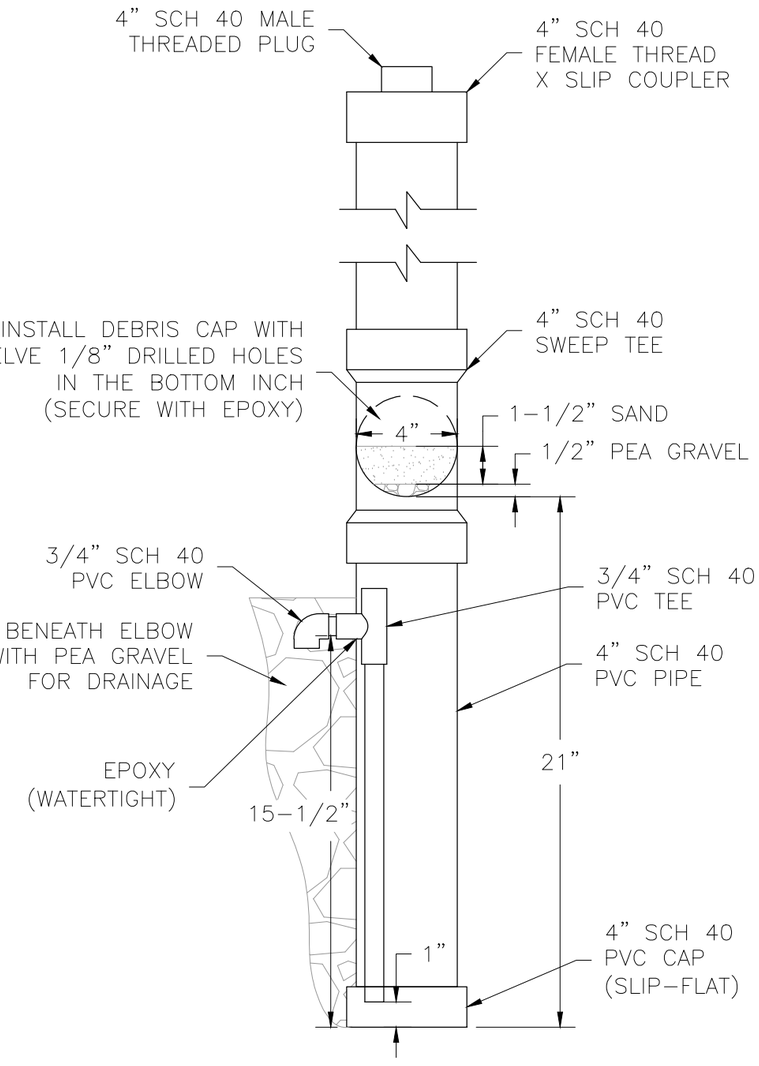
1"=1'



PLAN VIEW

0 0.5'

1"=0.5'



VIEW B–B'

0 0.5'

1"=0.5'

Figure 5. Lysimeter Details

PROJECT NUMBER: 2023029	Formal Variance T20S, R10E, Section 25BB, Tax Lot 3400
DATE: 11/6/2023	
DWG NO: 2023029 F1–6.DWG	Sharon Wendell 16854 Brenda Drive Bend, OR 97707
DWG BY: 6NSG PROJECT MANAGER: BRIAN RABE	
REVISED:	ELKHORN CONSULTING LLC

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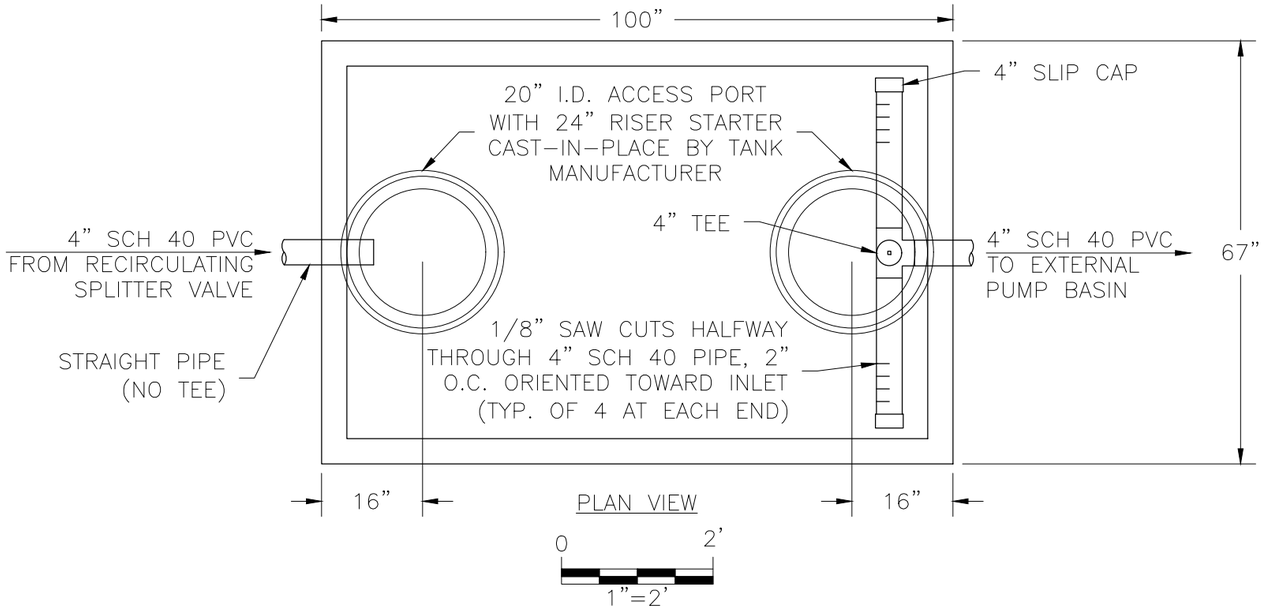

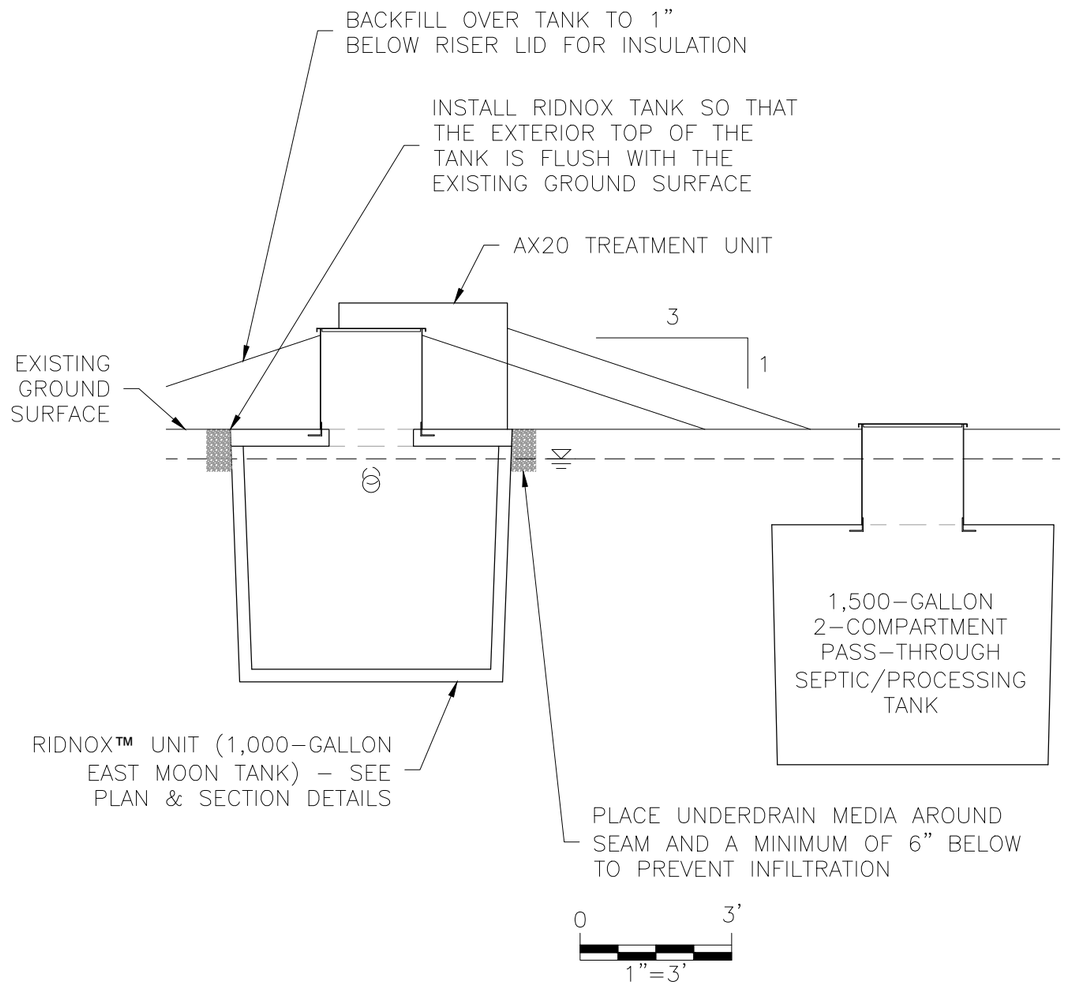

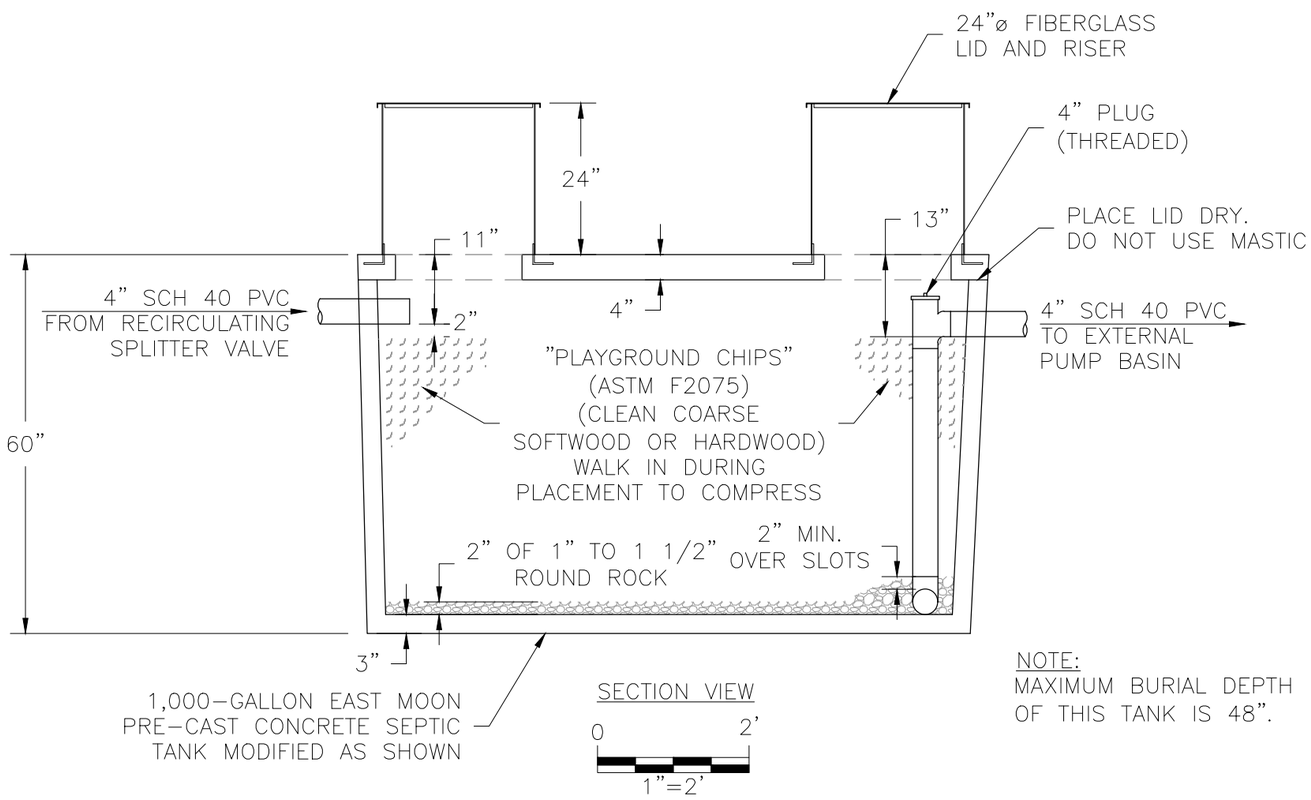

NOTE:
MAXIMUM BURIAL DEPTH OF THIS TANK IS 48".

Figure 6. RidNOx™ Details

PROJECT NUMBER: 2023029	Formal Variance
DATE: 11/6/2023	T20S, R10E, Section 25BB, Tax Lot 3400
DWG NO: 2023029 F1-6.DWG	Sharon Wendell
DWG BY: 6NSG / PROJECT MANAGER: BRIAN RABE	16854 Brenda Drive
REVISED:	Bend, OR 97707
	ELKHORN CONSULTING LLC

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APPENDICES

Appendix A.

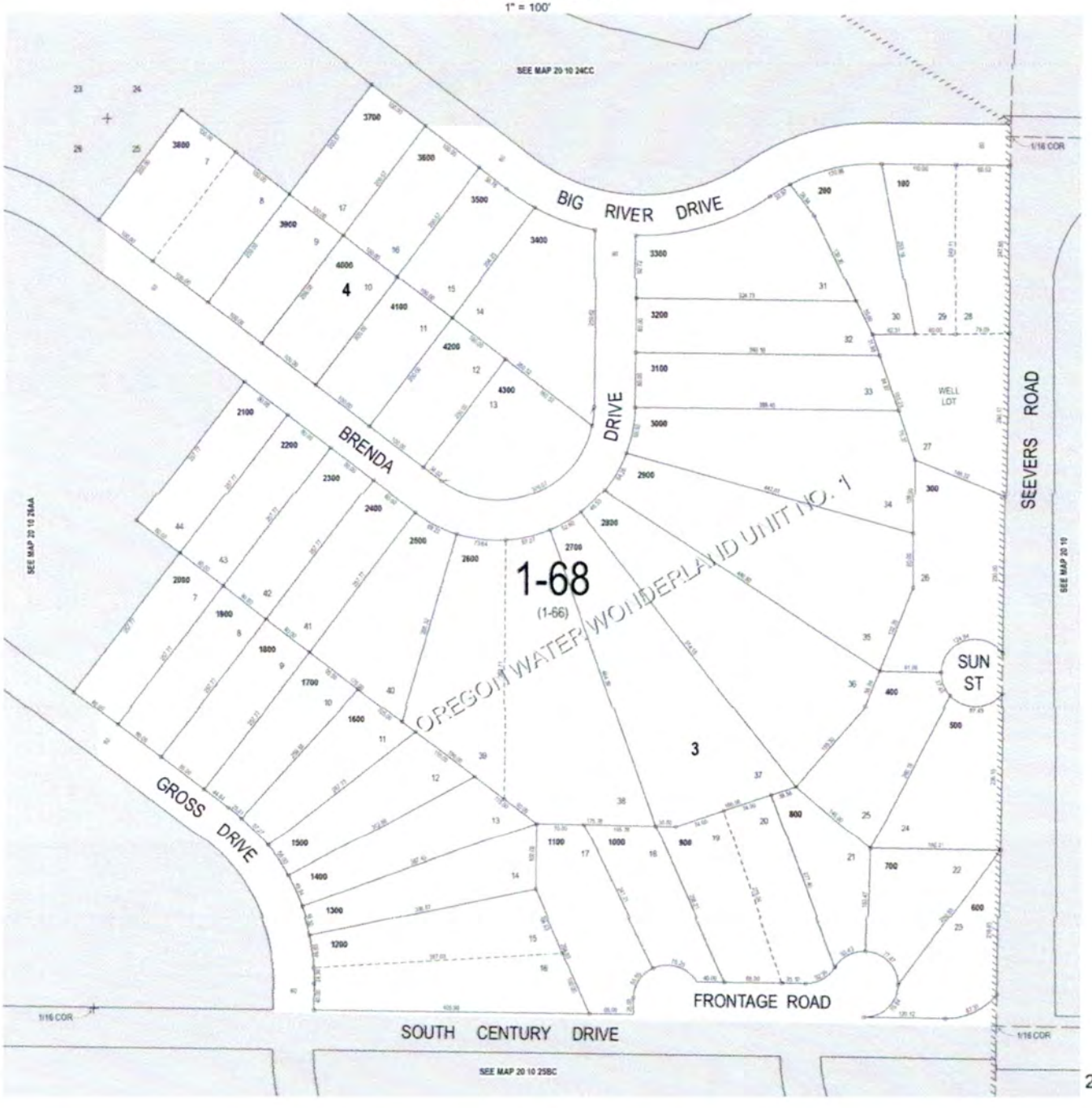
Tax Lot Map

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

8/23/2022

N.W.1/4 N.W.1/4 SEC.25 T.20S. R.10E. W.M.
DESCHUTES COUNTY
1" = 100'

20 10 25BB



20 10 25BB

Appendix B.

Deed

DESCHUTES COUNTY OFFICIAL RECORDS
NANCY BLANKENSHIP, COUNTY CLERK

2003-64021

$31.00

00203204200300640210010010

09/16/2003 11:33:19 AM

D-D Cnt=1 Stn=2 TRACY
$5.00 $11.00 $10.00 $5.00

After recording return to:
STEPHEN A. WENDELL AND SHARON M. WENDELL
3620 SPRING BLVD.
EUGENE, OR 97405

Until a change is requested all tax statements
shall be sent to the following address:
STEPHEN A. WENDELL AND SHARON M. WENDELL
3620 SPRING BLVD.
EUGENE, OR 97405

WARRANTY DEED -- STATUTORY FORM

SHIRLEY M. ZAUSS ROBERTSON WHO AQUIRED TITLE AS SHIRLEY M. ZAUSS, Grantor,

conveys and warrants to

3

STEPHEN A. WENDELL and SHARON M. WENDELL, husband and wife, Grantee,

the following described real property, free of encumbrances except as specifically set forth herein, to wit:

Lot 14, Block 4, UNIT NO. 1, OREGON WATER WONDERLAND, Deschutes County, Oregon.

Tax Account No(s): 137512
Map/Tax Lot No(s): 20-10-25-B-1700

This property is free from encumbrances, EXCEPT: All those items of record, if any, as of the date of this deed, including any real property taxes due, but not yet payable.

The true consideration for this conveyance is $12,000.00 .

THIS INSTRUMENT WILL 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 APPROVED USES AND TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

Dated this 12 day of August, 2003.

x Shirley M. Zauss Robertson
SHIRLEY M. ZAUSS ROBERTSON

STATE OF MISSOURI, COUNTY OF Butler) SS.

This instrument was acknowledged before me on ~~August~~ September 12, 2003 by SHIRLEY M. ZAUSS ROBERTSON.

Erin Moody
(Notary Public)
My commission expires 7-17-2005

Erin Moody
Notary Public - Notary Seal
State of Missouri - County of Butler
My Commission expires 7-17-05

TITLE NO. 13-0017703
ESCROW NO. 13-0017703

Recorded By:
Western Title & Escrow Co.

Appendix C.

Site Evaluation Reports

October 26, 2022

WENDELL, SHARON M
3620 SPRING BLVD
EUGENE, OR 97405

RE: 247-22-001384-EVAL
16854 BRENDA DR, BEND

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 10/19/2022. 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 12 inches of the ground surface. Previous site evaluations conducted on this property indicated the water table may rise within 10-20 inches of the ground surface. Past observations and site evaluations in the surrounding area also verify the presence of a high water table. 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:

- The minimum separation requirements from the permanent water table cannot be met for any system type (OAR 340-071-0220(a)(b)(A), 340-071-0265(1)(c), and 0290(2)(b)(A)(i)); and
- Installation of an onsite wastewater system in the area evaluated will likely lead to nitrate pollution of public waters. The Nitrate Loading Management Model indicates this area, Management Area 11, cannot sustain added loading from high groundwater lots if nitrate levels are to remain below the action level (Morgan, Hinkle, Weick. USGS. 2007). Groundwater shall be protected from pollution that could impair existing and future beneficial uses, including domestic drinking water from wells (OAR 340-040-0020) and as an agent of the Department of Environment Quality (DEQ), Deschutes County, may not authorize installation or use of a system that is likely to pollute public waters or create a public health hazard (OAR 340-071-0130(1)).

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.

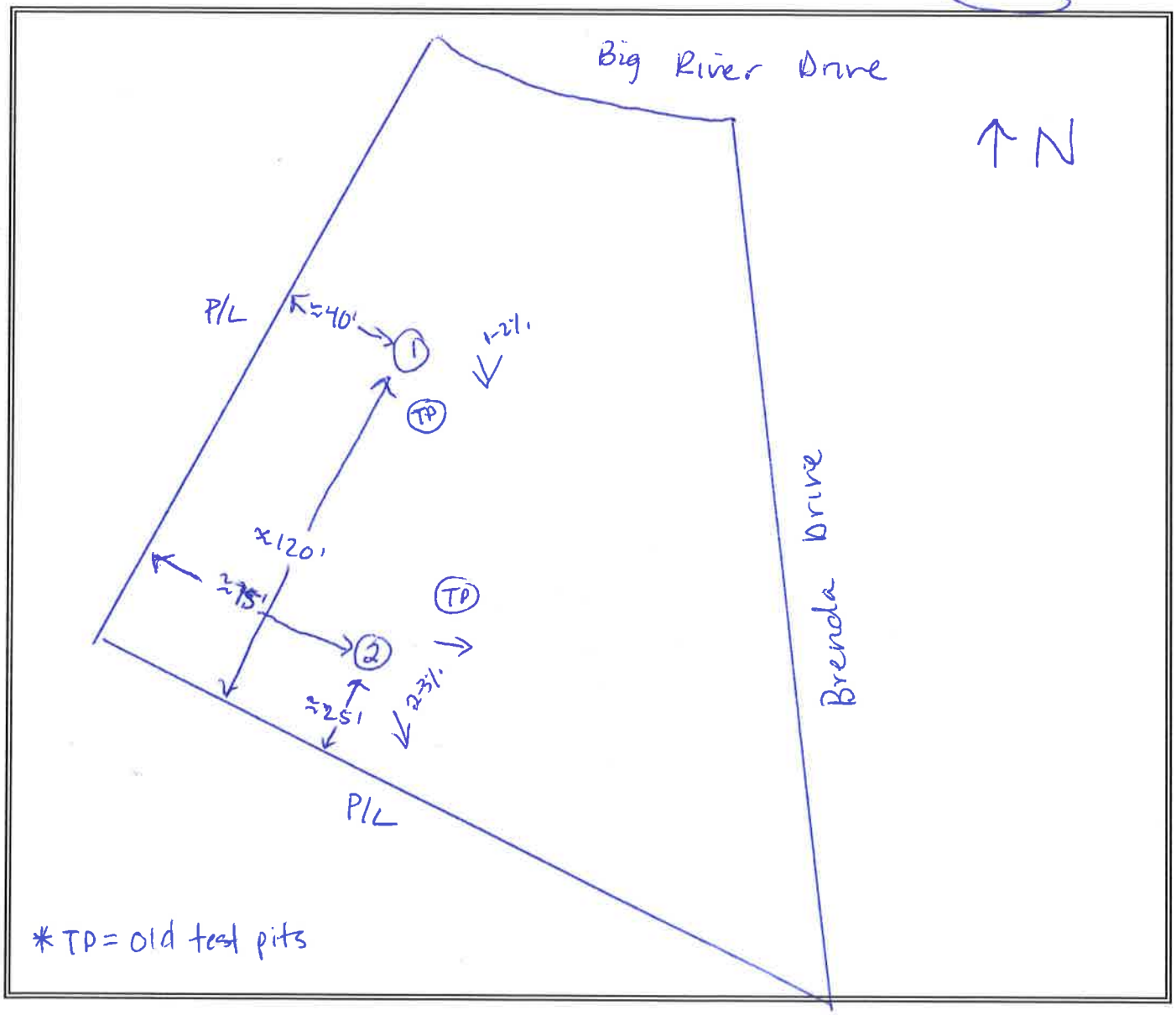
Sincerely,
Onsite Wastewater Division

KILEY RUCKER CLAMONS, REHS
Onsite Wastewater Specialist II

SITE EVALUATION FIELD INSPECTION FORM

Applicant: Sharon Wendell Site Evaluation # 247-22-001384-EVAL
Evaluator: K. Rucker Clemens Date: 10/19/2022 Parcel Size: 1.01 Acres
Subdivision: Oregon Winter Wonderland T 20 R 10 S 25B TL 3400 L 14 B 4

Suitable **Sketch/Not to Scale** **Unsuitable**



*systems approved are the **minimum** to meet current DEQ rules and are not design specifications*

System type approved: _____
Initial _____
Replacement _____
Tank Size _____
Special Conditions: Denied

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

SITE EVALUATION FIELD INSPECTION FORM

Applicant: Sharon Wendell Site Evaluation # 247-22-001384-EVAL
Evaluator: K Rucker Clamans Date: 10/19/2022 Parcel Size: 1.01 Acres
Subdivision: Oregon Winter Wonderland T 20 R 10 S 25B TL 3400 L 14 B 4

	DEPTH	TEXTURE	COLOR	Notes on roots, structure, rock frag, redox, limiting layer type & depth
1	0-9"	SL	10YR 3/2	2vf1f1m, 2csbk; FR
	9-29"	SL	10YR 3/2	1vf1f1m; 1f, msbk; FR → VFI; f2d Fe conc. @ 12"
	29-35"	SiL	2.5Y 6/3	1f1m; massive; FR; m2p Fe conc. throughout
	35-39"	SiL	10YR 7/1	1f1m; massive, FR →; f2f Fe conc.
	39-54"	COS	10YR 3/1 + 6/1	few roots; sg; loose; pumiceous; c2p Fe conc. throughout
2	0-12"			} similar to Pit #1
	12-16"			c2d Fe conc. @ 16"
	16-23"			
	23-27"			
	27-55"			
5				
6				
7				

Stripping/staining c2p Fe conc. @ 18" throughout

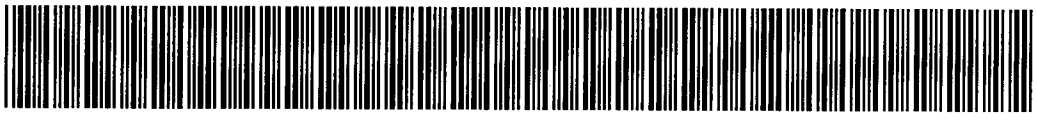
Landscape Note: Lodgepole; Horsetail; Idaho fescue; broad petal strawberry
Slope: 1-3% Aspect: SE Groundwater: Permanent
Other site notes:

Comments:

Reason for Unsuitability: (Include Rule Reference)
Does not meet minimum separation from permanent water table [OAR 340-071-0290]. Installation of a system in the area evaluated will likely lead to nitrate pollution of public waters [NLMM, USGS, 2007]. Groundwater shall be protected from pollution that could impair existing and future beneficial uses [OAR 340-040-0020] and Deschutes County may not authorize installation or use of a system that is likely to pollute public waters or create a public health hazard [OAR-340-071-0130(1)]

CDD ARCHIVE COVER SHEET FOR JMM
08/23/2000 15:32:45 1 of 2

EH 001 ARCHIVE



FILE ID	201025B001700EH20000823999001
TAXMAP	201025B001700
SERIAL	137512
DIVISION	EH
SITUS	16854 BRENDA DR
HOUSE#	16854
STREET	BRENDA
CONTENT	ARCHIVE

DESCHUTES COUNTY

Community Development Department

Administration Bldg., 1130 N.W. Harriman, Bend, Oregon 97701
(503) 388-6575
Planning Division
Building Safety Division
Environmental Health Division

April 26, 1994

Shirley Zauss
16064 Elkhorn Ln
LaPine OR 97739

RE #S35348: 20-10-25B-1700
16854 Brenda Dr, Bend

Dear Mrs Zauss

On 04/22/94 an evaluation of the existing system was done on the above property.

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).

In the test pits on this property the indicators suggest the water table may rise to within 10 - 20 inches of the ground surface. Past observations and evaluations in this area verify the presence of a high water table.

Oregon Department of Environmental Quality Rules pertaining to on-site sewage disposal require a minimum four foot separation between the bottom of a sewage disposal trench and the highest level a permanent water table may reach in the ground. Drainfields are installed a minimum of 12" into the ground. Drainfield can only be installed, therefore, where the water table does not rise closer that 5' from the ground surface. This allows for the 4' separation from the bottom of the trench to the water. [OAR Chapter 340-71-220(1d) and (2bA), copy enclosed.]

These rules also allow for a 24 inch separation between the high level of the water table and the bottom of a surface mounted sand filter system. A sand filter is an alternative sewage disposal system that treats the sewage to a better extent than a drainfield, and is considerably more expensive to install. However, conditions on this parcel indicate the

water table may rise to within of the ground surface.

DEQ rules would not allow installation of a standard drainfield, capping fill drainfield, pressurized distribution system or sand filter in these circumstances. [OAR 340-71-290(b)].

This property would therefore be denied for on-site sewage disposal.

Sincerely

ENVIRONMENTAL HEALTH DIVISION
Roger W. Everett, Director

Dan Haldeman

Dan Haldeman
Sanitarian

RWE:DWH:bgd

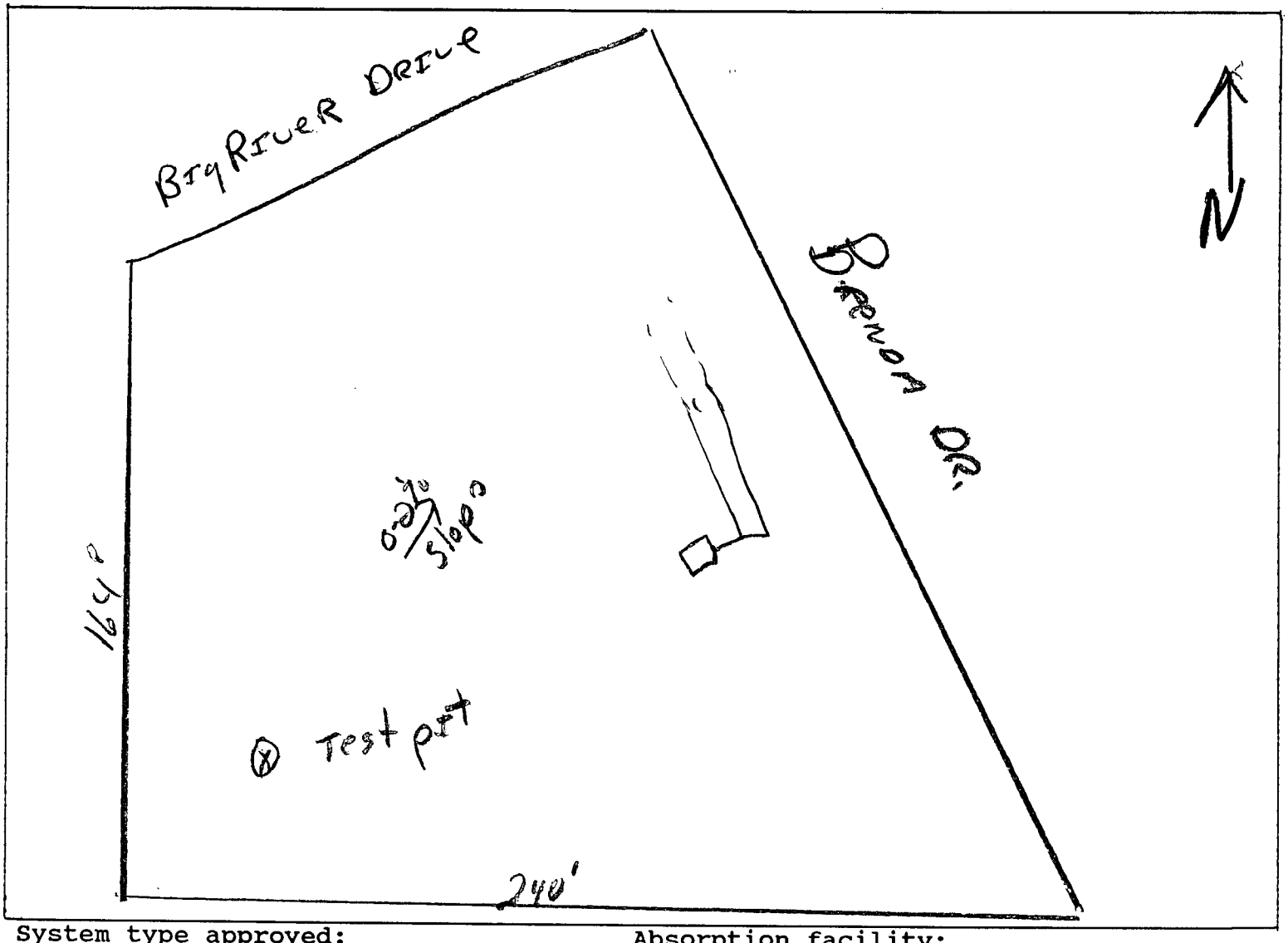
SITE EVALUATION FIELD INSPECTION FORM

APPLICANT ZAUSS, Shirley SITE EVALUATION # S 35348
DATE 4-22-94

SUBDIVISION OWW L 14 B 4 PARCEL SIZE 1

EVALUATOR: DAN HALDEMAN T 20 R 10 S 25B TL 1700

SUITABLE ☐ SKETCH/NOT TO SCALE UNSUITABLE ☑



System type approved:
Initial
Replacement
Tank Size

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

Special Conditions: Denied due to conditions of saturation
see attached letter

SITE EVALUATION FIELD INSPECTION FORM

APPLICANT ZAUSS, SHIRLEY SITE EVALUATION # 535348
DATE 4-20-94

SUBDIVISION O.W.W. I L B

EVALUATOR: OLSEN T 20 R 10 S 25B TL 1700

	Depth	Texture	Color	Notes on mottling, roots, structure, layer limiting effective soil depth, % loose rock, etc.
1	0-24	COL.S.	10YR 4/2-3/2	few fewwt red mottles start 18"
	24-32	loAM	2.5Y 5/2	f.d. mottles
	32-44	SILT	2.5Y 7/2	m.d. mottles
	44-55	SAND	SALT & pepper color - rounded edges, washed	
			ground water at 55 inches	
2				
3				
4				

Landscape notes T2A
Slope Aspect Groundwater permanent
Other site notes

Test pit is on highest part of lot

Comments: water grasses, willows, lush vegetation

Reason For Unsuitability: (Include Rule Reference)

Dear Mr Haldeman 4/12/94

Re: Evaluation of existing septic system

I am applying for a loan authorization to evaluate septic system possibilities on a piece of property across the street from mine, with the purpose of buying that property if it is not denied. I am on Parcel 500, Lot 95 OWW-I.

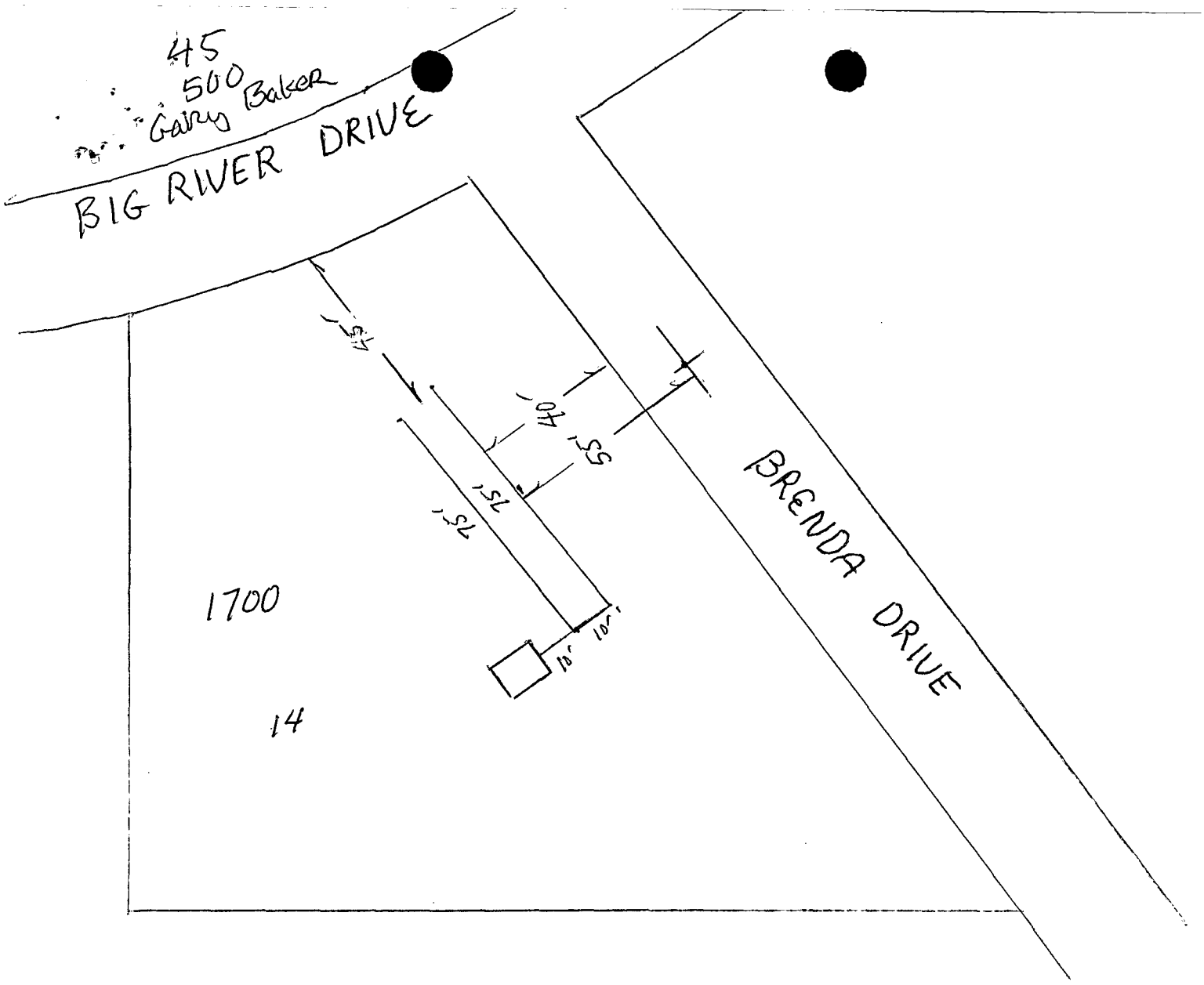
The parcel to be tested is Parcel 1700, Lot 14, Block 4 OWW-I, 20 10 25B. It is just shy of one full acre. I has an approved (1980) septic system in place, Permit # 09-554-76. Please send me a copy of your report - I am paying for this evaluation - Send a copy to Shirley Zauss, Route 2-Box 270 Poplar Bluff MO 63901

My address for mail: Gary & Lynn Baker
1966 Loop Rd
FORTUNA CA 95540
707 725 4263

Local address - No mail
Gary & Lynn Baker
55713 Big River Drive
Bend (OR LaPine?) OR 97707

I will have dug the 5' deep hole, so hunt for it on high ground. If you think there is any hope of using existing septic, even with modifications, please contact Ray Krulic 503-593-6552 to perform the excavations required.

Gary M Baker



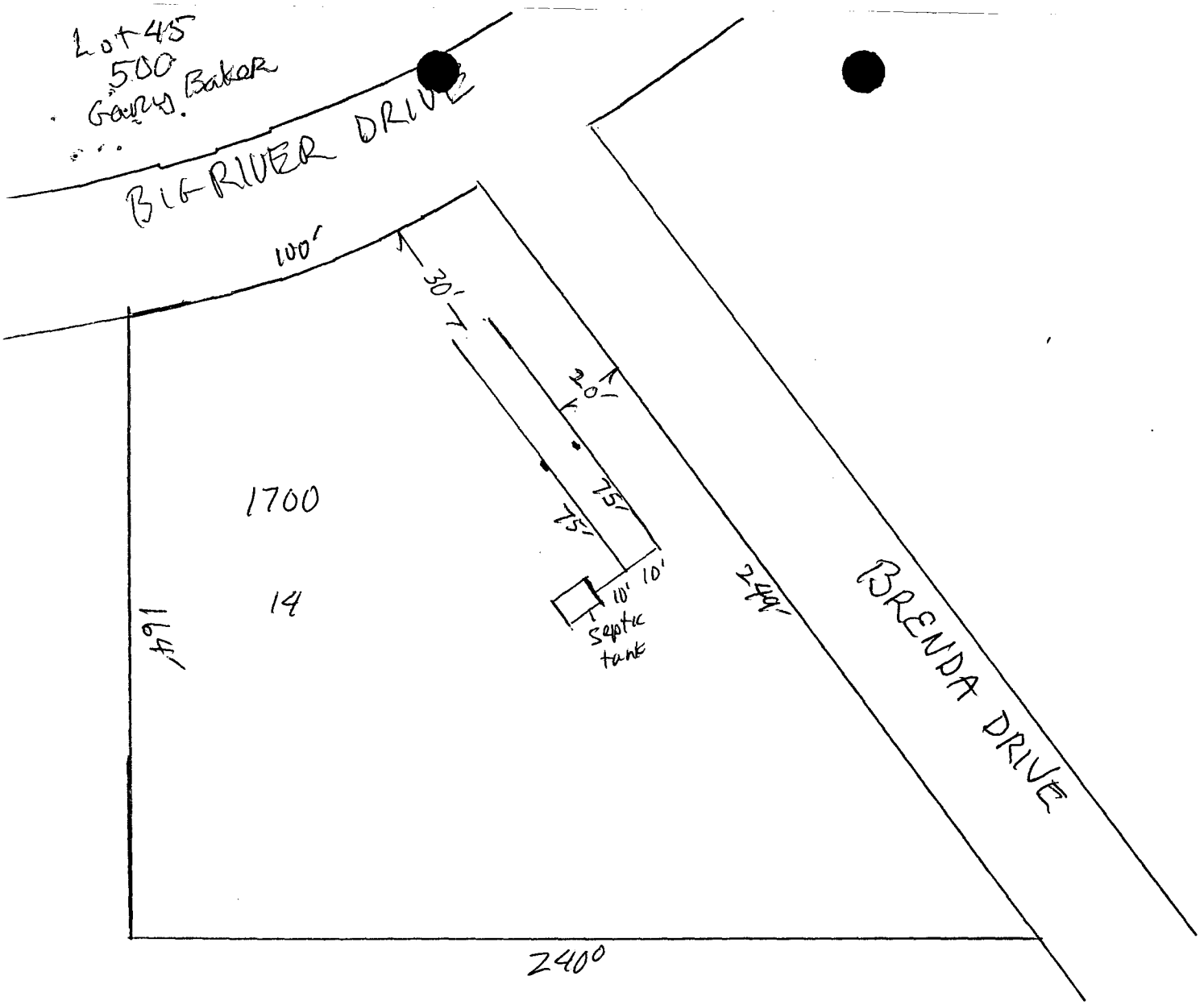
Distribution box - No
Length each line - 75', 75' = 150' total
Width Trench 2 ft Total Sq ft - 300
Distance between lines 10'
Filler Type - River Stone - 1" - 2½"
Waterline - none Well - none
Spring - none Cistern - none
Nearest River to drain line - 2650' - 300'
Big Deschutes River

Gary BAKER - COPY OF REPORT
1966 Loop Rd
FORTUNA CA 95540
707 725 4263
(No mail delivery - 55713 Big River Dr, Parcel 500, Lot 45 - 593-7140)

Shirley Zauss
20 10 25B
~~Lot~~ 1700 Parcel
Lot 14 Block 4
Oregon WaterWorld - I
Septic Permit #09554 76
Suspect: Cap & fill
Plot Plan based on existing ground disturbance (approximate)
Gary Baker

¼" = 10'

Prepared by Gary Baker
707-725-4263



Distribution box - No
Length per leach line 75', 75', Total 150'
Trench width - 2'; Total sq ft - 300
Distance between lines - 10'
Filler Type - River Stone - 1" - 2½"
No - Waterline, Spring, Well, Cisterns
Nearest River - 265' - 300'
Big Deschutes River

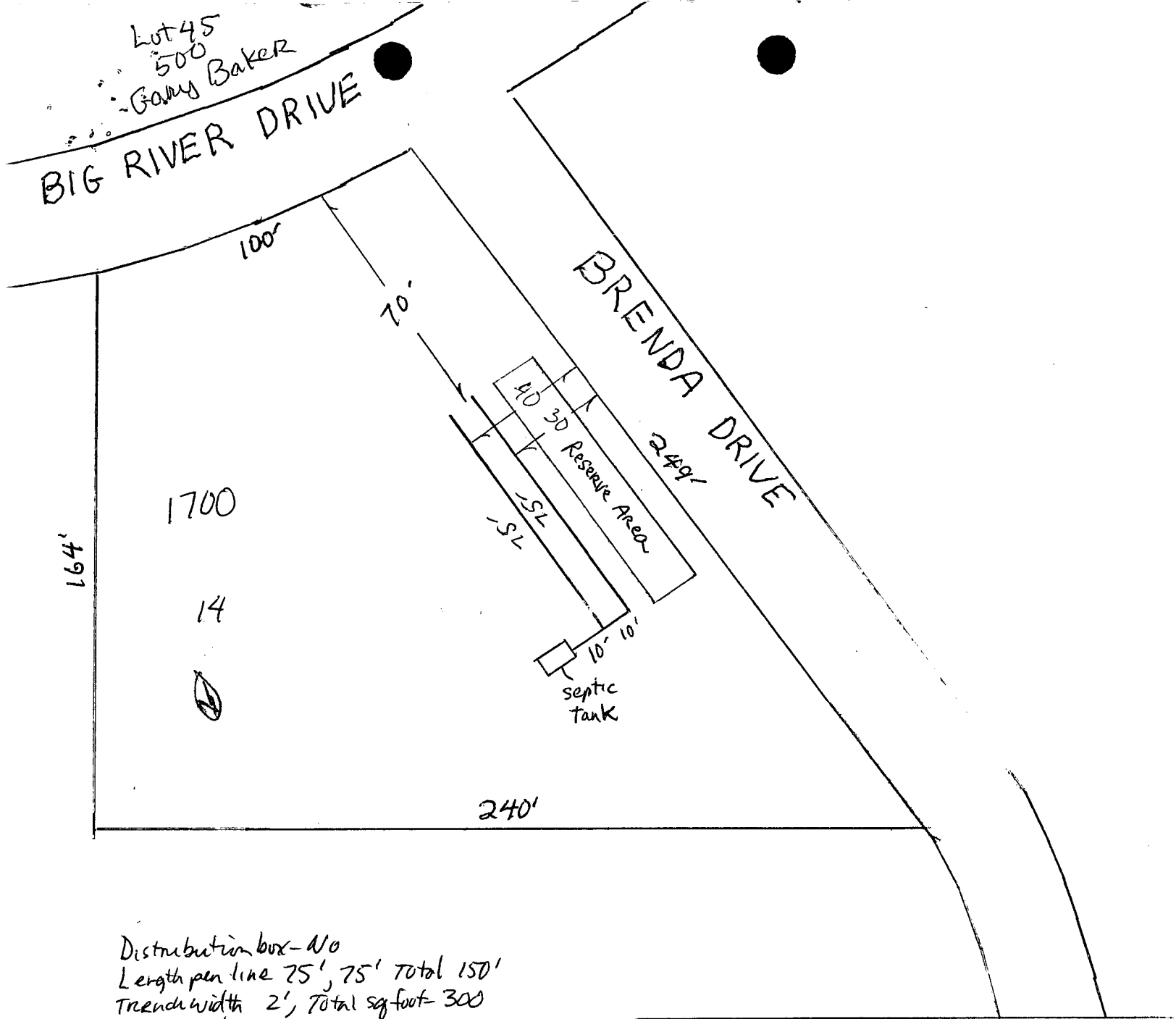
Shirley Zauss
20 10 25 B
Parcel 1700
Lot 14 Block 4
Oregon Water Wonderland - I
Septic permit #0955476

N

¼" = 10'

Plot plan according to:
Jay E. Langley
Sanitarian
7-28-80

Prepared by: Gary Baker
707 725 4263



Distribution box - No
Length pen line 75', 75' Total 150'
Trench width 2', Total sq foot - 300
Distance between Lines - 10'
Fill type River Stone - 1" - 2½"
No waterline, well, Spring, Cisterns
Nearest River - 265' - 300'
Big Deschutes River

COPY OF LOAN AUTHORIZATION TO:
Gary Baker
1966 Loop Rd
FORTUNA, CA 95540
707 725 4263
LOCAL Address: No mail delivery
503 593 7140 - 55713 Big River DRIVE
Parcel 500, Lot 45, OWW-I

Shirley Zauss
20 10 25B
Parcel 1700
Lot 14 Block 4
OWW-I
Septic permit # 09554 76

1/4" = 10'

Plot Plan
according to
Eugene Zauss

Prepared by: Gary Baker
707 725 4263

16854 Brenda Dr [illegible] Bend

20-[illegible]0-25B 1700
(See also 20-~~10~~-25B 500)

April 12, 1994

Attention: Sandy Smith
for: Dan Halterman, Sanitarian

As, the property owner, of 16854 Brenda Dr. Lapine, Oregon I, am giving authorization to Mr. Gary Baker, to proceed with authorized notice for Septic study.

Mrs Shirley Zauss
Rt 2 Box 270
Poplar Bluff, Mo
63901

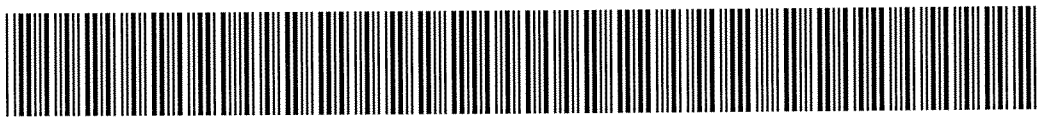
314-857-2592

by fax 4/12/94
S—

APR.12 '94 12:39PM STLOUIS TRANSPORTATION CO 1 314 686 9060 P.1

CDD COVER SHEET FOR DRK
12/30/2003 09:31:24

EH
9 PAGES



FILE ID	201025B001700EH20031230093124
TAXMAP	201025B001700
SERIAL	137512
DIVISION	EH
SITUS	16854 BRENDA DR
HOUSE#	16854
STREET	BRENDA
CONTENT	F1885
RECORD ID	F1885

denial

F1885

306-80

APPLICATION TO DEPARTMENT OF ENVIRONMENTAL QUALITY FOR EVALUATION REPORT OF SUITABILITY OF PROPOSED SEWAGE DISPOSAL

PROCESSED NOV 08 1982

16854 Brenda D

SN 137512

DESCRIPTION OF PARCEL *(Attach a Plat or Map Showing All Sites as Exhibit A)*

Section 35B; *Township* 20; *Range* 10; *County of* Deschutes, *Oregon; Tax lot* 1700

Narrative Description: Oregon Water Wonderland Unit 1
Lot-14, B-4

PROPOSED USE OF PARCEL (RESIDENTIAL) *OTHER (SPECIFY)*

PRESENTLY DESIGNATED LAND USE, ZONING, AND NAME OF DESIGNATING AGENCY

PROPOSED METHOD OF SEWAGE DISPOSAL *(Check one and Provide Requested Information)*

[ ] EXISTING SEWERAGE SYSTEM (Fee: $5 for one lot; $10 for two or more lots)

(1) Parcel is located within the boundaries of and can be provided sewerage service by the following entity which owns and operates a sewerage system:

Name of Entity _____

System Identification _____

Address of Entity _____

City, Zip Code _____

(2) Present status of sewers or sewer extensions to serve parcel:

(a) Plans for sewers ( ) have ( ) have not been prepared.
(b) Plans for sewers ( ) have ( ) have not been approved by DEQ.
(c) Sewers ( ) have ( ) have not been installed.

(3) STATEMENT OF CERTIFICATION BY SEWERAGE SYSTEM OWNER (Separate statement may be attached if available).

As representative of the owner of the sewerage system named in (1) above, I hereby certify that sewerage service will be provided for the above described parcel, that said sewerage system has capacity to serve the parcel, and that the above information relative to the status of such sewerage service is correct to the best of my knowledge.

Signature of Representative _____

Title _____

Date _____

[ ] PROPOSED NEW SEWERAGE SYSTEM (Fee: $5 for one lot; $10 for two or more lots)

Has DEQ approved the proposed system previously in writing? ( ) No ( ) Yes, on _____ *(date)*
Has DEQ issued a Waste Discharge Permit for the proposed system? ( ) No ( ) Yes, Permit No. _____

[X] SUBSURFACE SEWAGE DISPOSAL SYSTEM (Fee: ~~$5~~ $65.00 per lot)

Show location of proposed subsurface system or systems on the plat plan for each site which is attached as Exhibit A. For a subdivision of four or more sites, attach as Exhibit B:

1. A topographical map 2. Rates of slope data 3. Soils data 4. Water table data 5. Drainage data (surface and subsurface) 6. Water supply source and distribution systems data 7. Existing subsurface sewage disposal systems location

Special Instruction:

DEQ and/or its contract agent must complete a site investigation before a report can be given. To facilitate such investigation, prepare two (2) backhoe test-holes at least 5 ft. deep and approximately 75 ft. apart (at the same approximate ground surface elevation) at the site of each proposed system.

Test holes ( ) have been prepared ( ) will be prepared by _____.

I HAVE ATTACHED THE REQUIRED EXHIBITS AND FEE SPECIFIED IN THE INSTRUCTIONS AND ON THIS APPLICATION AND HEREBY REQUEST FROM THE DEPARTMENT OF ENVIRONMENTAL QUALITY A REPORT OF SUITABILITY OF THE ABOVE DESCRIBED METHOD OF SEWAGE DISPOSAL FOR THE ABOVE DESCRIBED PARCEL.

Name of Applicant Eugene ZAUSS *Signature of Applicant* Gene Zauss

Address of Applicant 3107 Candleweed Pl. *Title* _____

City, State, Zip Code Riverbank, CA 95367 *Phone:* _____ *Date* 5-6-80

(FOR DEQ OR AGENT USE ONLY)

Comments and recommendations based on Subsurface Site Investigation by DEQ or Contract Agent:

This lot has been evaluated by a member of this department. Studies including but not limited to soil conditions, water table circumstances and topographical variations were conducted. It is the opinion of this department that it is NOT feasible to install a septic tank and subsurface drainfield on this lot. Mottling of the soil indicates that the seasonal high water table will be less than two feet. Actual water table at time of the evaluation was observed at 28 inches from the natural ground surface.

DESCHUTES COUNTY DEPT. OF HEALTH
Deschutes County Courthouse Annex
Agent/DEQ BEND, OREGON 97701 Signature John K. Glover Date May 27, 1980

John K. Glover, R.S.

Statement of DEQ or Agent Relative to Above Application

[ ] The above described method of sewage disposal is approved subject to the following conditions:

[X] The above described method of sewage disposal is not approved for the following reasons:

Chapter 340 Section 71-030, Oregon Administrative Rules, prohibits installation of disposal trenches in an area where the highest level attained by a permanently perched water table will be within two (2) feet of the bottom point of the effective sidewall of the disposal trench.

DESCHUTES COUNTY DEPT. OF HEALTH
Deschutes County Courthouse Annex
Agent/DEQ BEND, OREGON 97701 Signature John K. Glover Date May 27, 1980
For the Department of Environmental Quality

John K. Glover, R.S.
DEQ Agent Representative

DEQ Form 4/15/74

denied

306-80

APPLICATION TO
DEPARTMENT OF ENVIRONMENTAL QUALITY
FOR

EVALUATION REPORT OF SUITABILITY OF PROPOSED SEWAGE DISPOSAL

DESCRIPTION OF PARCEL *(Attach a Plat or Map Showing All Sites as Exhibit A)*

Section 25B; *Township* 20; *Range* 10; *County of* Deschutes, *Oregon; Tax lot* 1700

Narrative Description: Oregon Water Wonderland Unit 1
Lot-14, B-4

PROPOSED USE OF PARCEL (RESIDENTIAL) *OTHER (SPECIFY)*

PRESENTLY DESIGNATED LAND USE, ZONING, AND NAME OF DESIGNATING AGENCY

PROPOSED METHOD OF SEWAGE DISPOSAL *(Check one and Provide Requested Information)*

[ ] EXISTING SEWERAGE SYSTEM (Fee: $5 for one lot; $10 for two or more lots)

(1) Parcel is located within the boundaries of and can be provided sewerage service by the following entity which owns and operates a sewerage system:

Name of Entity _____

System Identification _____

Address of Entity _____

City, Zip Code _____

KEY PUNCHED
MAY 29 1980

(2) Present status of sewers or sewer extensions to serve parcel:

(a) Plans for sewers ( ) have ( ) have not been prepared.
(b) Plans for sewers ( ) have ( ) have not been approved by DEQ.
(c) Sewers ( ) have ( ) have not been installed.

(3) STATEMENT OF CERTIFICATION BY SEWERAGE SYSTEM OWNER (Separate statement may be attached if available).

As representative of the owner of the sewerage system named in (1) above, I hereby certify that sewerage service will be provided for the above described parcel, that said sewerage system has capacity to serve the parcel, and that the above information relative to the status of such sewerage service is correct to the best of my knowledge.

Signature of Representative _____

Title _____

Date _____

[ ] PROPOSED NEW SEWERAGE SYSTEM (Fee: $5 for one lot; $10 for two or more lots)

Has DEQ approved the proposed system previously in writing? ( ) No ( ) Yes, on _____ *(date)*
Has DEQ issued a Waste Discharge Permit for the proposed system? ( ) No ( ) Yes, Permit No. _____

[X] SUBSURFACE SEWAGE DISPOSAL SYSTEM (Fee: ~~$10~~ $65.00 per lot)

Show location of proposed subsurface system or systems on the plat plan for each site which is attached as Exhibit A. For a subdivision of four or more sites, attach as Exhibit B:

1. A topographical map 2. Rates of slope data 3. Soils data 4. Water table data 5. Drainage data (surface and subsurface) 6. Water supply source and distribution systems data 7. Existing subsurface sewage disposal systems location

Special Instruction:

DEQ and/or its contract agent must complete a site investigation before a report can be given. To facilitate such investigation, prepare two (2) backhoe test holes at least 5 ft. deep and approximately 75 ft. apart (at the same approximate ground surface elevation) at the site of each proposed system.

Test holes ( ) have been prepared ( ) will be prepared by _____

I HAVE ATTACHED THE REQUIRED EXHIBITS AND FEE SPECIFIED IN THE INSTRUCTIONS AND ON THIS APPLICATION AND HEREBY REQUEST FROM THE DEPARTMENT OF ENVIRONMENTAL QUALITY A REPORT OF SUITABILITY OF THE ABOVE DESCRIBED METHOD OF SEWAGE DISPOSAL FOR THE ABOVE DESCRIBED PARCEL.

Name of Applicant Eugene ZAUSS *Signature of Applicant* Gene Zauss

Address of Applicant 3107 Candleweed Pl. *Title* _____

City, State, Zip Code Riverbank, CA 95367 *Phone:* _____ *Date* 5-6-80

(FOR DEQ OR AGENT USE ONLY)

Comments and recommendations based on Subsurface Site Investigation by DEQ or Contract Agent:

This lot has been evaluated by a member of this department. Studies including but not limited to soil conditions, water table circumstances and topographical variations were conducted. It is the opinion of this department that it is NOT feasible to install a septic tank and subsurface drainfield on this lot. Mottling of the soil indicates that the seasonal high water table will be less than two feet. Actual water table at time of the evaluation was observed at 28 inches from the natural ground surface.

DESCHUTES COUNTY DEPT. OF HEALTH
Deschutes County Courthouse Annex
Agent/DEQ BEND, OREGON 97701 Signature John K. Glover, R.S. Date May 27, 1980

Statement of DEQ or Agent Relative to Above Application

[ ] The above described method of sewage disposal is approved subject to the following conditions:

[X] The above described method of sewage disposal is not approved for the following reasons:

Chapter 340 Section 71-030, Oregon Administrative Rules, prohibits installation of disposal trenches in an area where the highest level attained by a permanently perched water table will be within two (2) feet of the bottom point of the effective sidewall of the disposal trench.

DESCHUTES COUNTY DEPT. OF HEALTH
Deschutes County Courthouse Annex
Agent/DEQ BEND, OREGON 97701 Signature John K. Glover, R.S. Date May 27, 1980
For the Department of Environmental Quality DEQ Agent Representative

DEQ Form 4/15/74

Deschutes County Health Department

SANITATION SECTION

COURTHOUSE ANNEX BEND, OREGON 97701

May 27, 1980

Eugene Zauss
2107 Candlewood Pl.
Riverbank, CA 95367

RE: Oregon Water Wonderland Unit I, Lot 14, Block 4

Dear Mr. Zauss:

Enclosed is your Feasibility Statement for the above lot. It is located in a high water table area. Current Oregon Administrative Rules require a four foot separation between the effective sidewall of the trench and the seasonal high water table that occurs each spring. This means that it must be at least five feet from the original ground surface to the seasonal high water table to qualify. The seasonal high water table was observed at 28 inches from ground surface.

Enclosed for your information is a Department of Environmental Quality memorandum regarding sites which are denied under present rules.

Please feel free to contact this office if you have further questions in regard to this matter.

Sincerely,

John K. Glover

John K. Glover, R.S.
County Sanitarian

JKG:dlg

State of Oregon

DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE MEMO

To: All DEQ Contract County, Branch and Regional Offices

Date: 5/31/78

From: Mark P. Ronayne

Subject: Public Awareness - Future Impact on Land Use Which May Result From Experimental Systems Studies

Persons refused on-site sewage treatment and disposal permits should be aware potential options for systems in the future may come about as a result of the experimental program.

It is too easy for "insiders" to ascertain which properties have been refused permit and as a result, cheaply buy property from an owner who does not realize they may one day be developable.

We suggest you post the attached information on your office bulletin board and enclose a copy of the following statement with all future permit denial letters.

MPR:em
Attachment

CAN'T GET A SEPTIC TANK PERMIT?

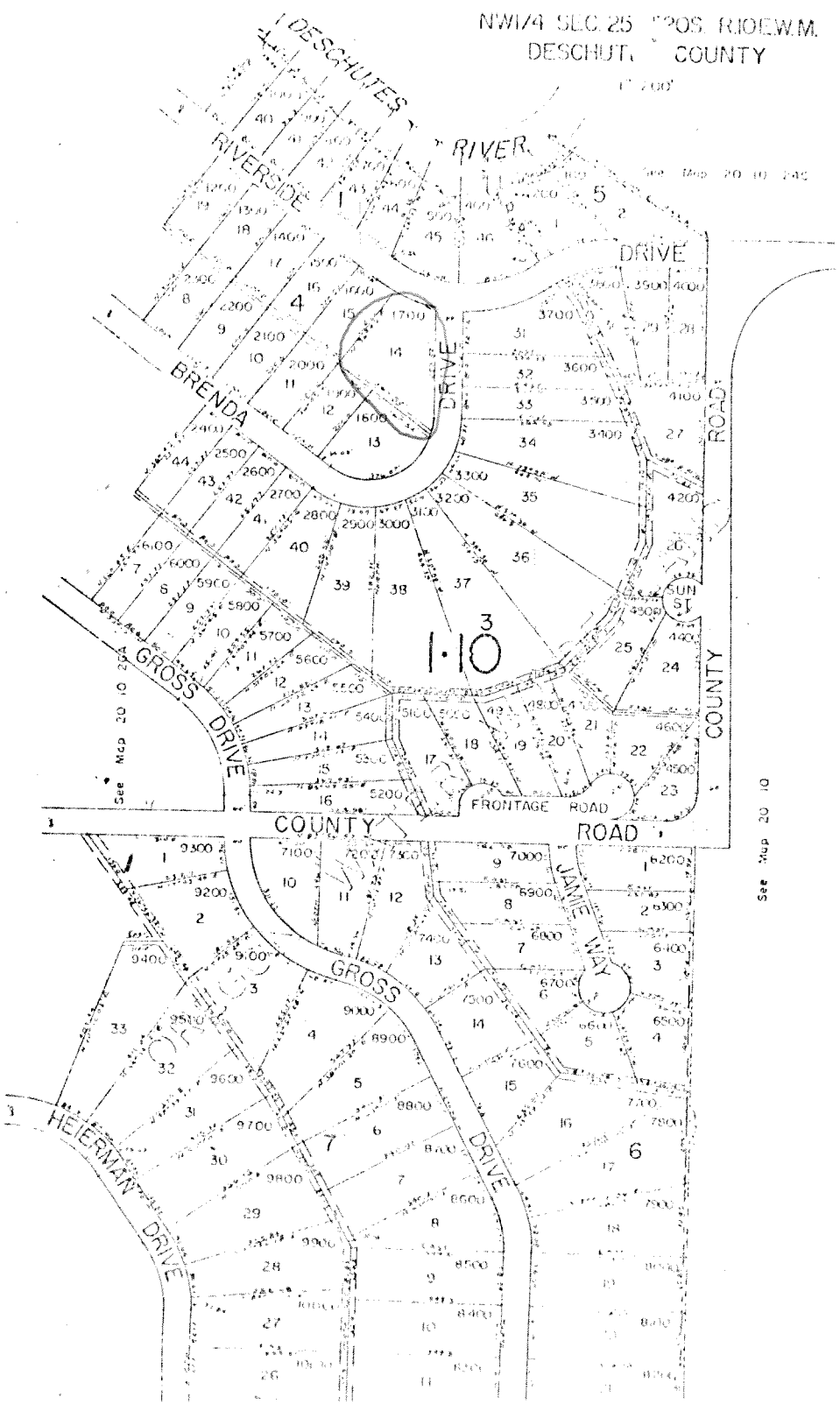
IMPORTANT

Even though you were denied a septic tank permit today, your property may be developable in the future.

If you own property which has been refused a standard septic tank/drainfield installation permit, or even a variance permit for a different type of system, you should know this. Experimental systems of different types are being tested now in several areas of the State. The DEQ is testing with the hope that systems will be found that will work in areas where the present systems cannot be trusted to operate properly. While the testing has to go on for up to five years to be sure the systems will hold up in all seasons, some systems have been working well for several months.

You cannot install an experimental system now unless that system and your property go together well for experimentation. These systems are not yet authorized simply to solve individual disposal problems. However, within the next five years it may be possible to install systems in many areas where soils are unacceptable for today's type of system. Please keep this in mind when you make choices involving the sale or use of your property. It may save you money.

NW1/4 SEC. 25 T20S R10E W.M.
DESCHUTES COUNTY



DEQ LAND USE COMPATABILITY REQUIREMENTS & STATEMENT

ORS 197.180 and DEQ's Coordination Program, as approved by LCDC, require that DEQ issued permits for new or expanded facilities not become effective until a Statement of Compatability with applicable local land use plans and Statewide Planning Goals is provided to the DEQ from the responsible local planning authorities.

Applicant Completes

Applicant's Description of the Nature & Location of Proposed New or Expanded Facility. (Include appropriate legal description, planning reference information. ☐ Check if the site is inside an Urban Growth Boundary but outside City Limits. Attach evidence of City concurrence with the county statement if concurrence not given below.

Oregon Water Wonderland - Unit I
Lot 14, Block 4

COMPLETE ONE ONLY OF THE FOLLOWING:

Planning Authority State.

Statement of Compatability.

The Deschutes County Planning Department has reviewed the referenced proposal for compatability with (cross out one) (its LCDC Acknowledged Comprehensive Plan) (Statewide Planning Goals) and finds the proposal to be compatible.

Signed George Cress Title Planner Date 5-6-80

☐ City concurrence inside Urban Growth Boundary:

Signed _____ Title _____ Date _____

Applicant's Alternative

Request to Proceed with Permit Processing pending Receipt of Compatability Statement.

I hereby certify that I have applied to _____ on _____ for the necessary Statement of Compatability. The local review action is expected to be complete by _____. I hereby request DEQ to proceed with processing my application during this time period in order to minimize delays. I understand that the requested permit when issued cannot become effective until the Compatability Statement is filed with the Department.

Signed _____

Date _____

INSPECTION REC ST FORM

306-80

Owners name Eugene Zamzow

Sanitation Permit No. 306-80

Installers Name Feasibility - Test Holes are ready

Time Job will be Completed: DATE 5-7-80

HOUR now

Directions for finding Oregon water wonderland I
Lot 14 Blk 4

Call taken by Glover Date 5-7-80

Time 1:00 PM

FIELD INSPECTION FORM

LOCATION: T._____ R._____ Sec. _____ Tax Lot #_____

Subdivision OWW I

Block 4 Lot 14

OWNERS NAME Eugene Zauss

TEST HOLES EXAMINED

#1 0-22 v.dk. gr.br. l.s. 10YR 3/2
22-27 grey ash
27-38 v. cos. gr.-br. l.s.

#2 0-12 v.dk. gr-br s.l 10YR 3/2
12-21 pale yel. s.c.l. 2.5Y 7/4
21-28 gr-br. cos. l.s.

#3

#4

WATER TABLE #1 38" #2 - 28"

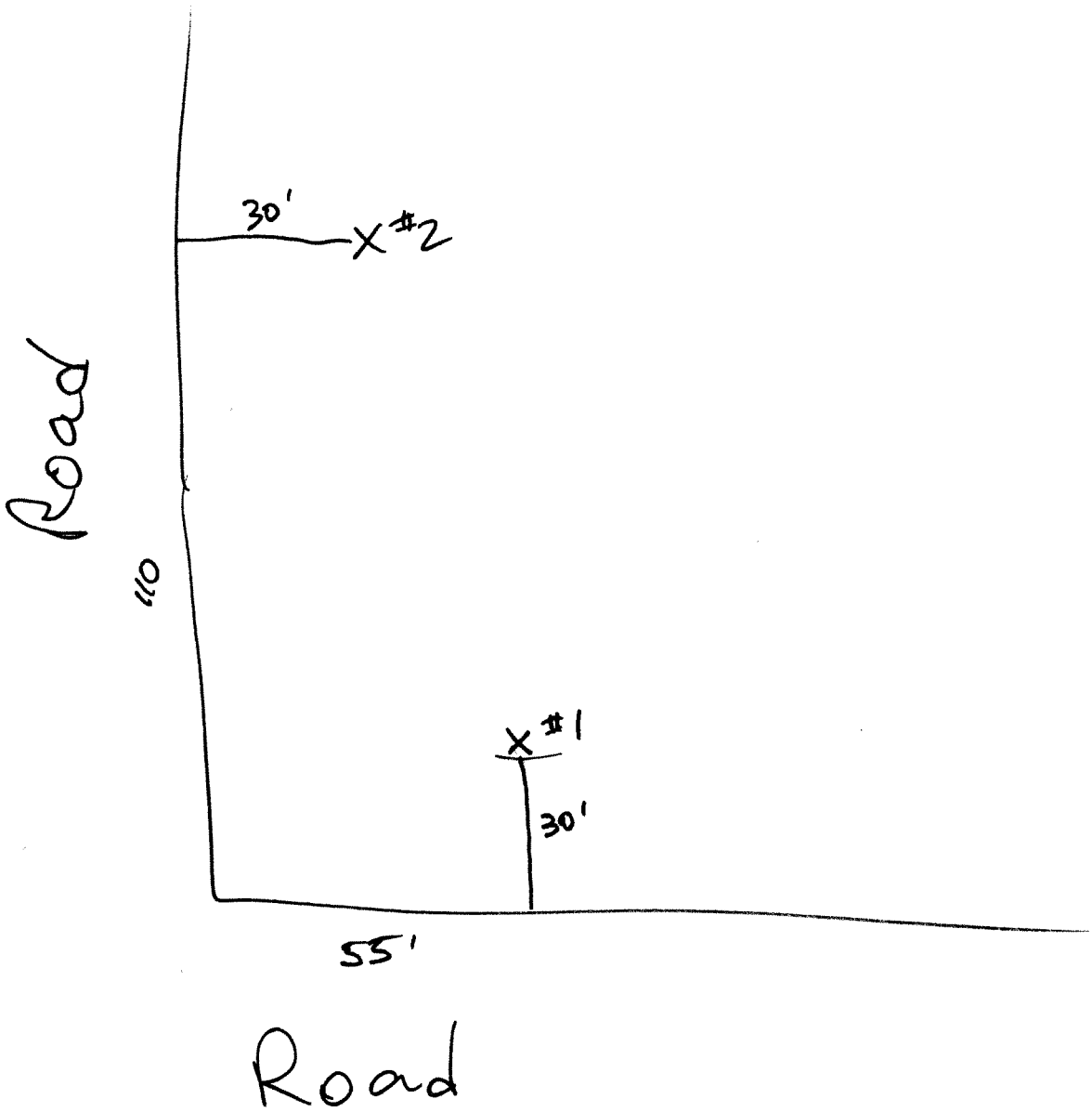
MOTTLING #2 12"

Sufficient area on lot for installation of septic tank and drainfield. YES _____ NO X

RECOMMEND APPROVAL _____ DENIAL X

INSPECTION BY Jay Langley DATE 5-20-80

REMARKS water in test pits will rise at least 12" when river rises.


30'
X #2
Road
110
X #1
30'
55'
Road

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

16854 Brenda Drive

November 6, 2023

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.

Map Scale: 1:625 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 30 60 120 180

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 21, Sep 8, 2023

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 (16854 Brenda Drive)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
29A	Cryaquolls, 0 to 3 percent slopes	0.1	12.7%
144A	Sunriver sandy loam, 0 to 3 percent slopes	0.9	87.3%
Totals for Area of Interest		**1.0**	**100.0%**

Map Unit Descriptions (16854 Brenda Drive)

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

29A—Cryaquolls, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 245b
Elevation: 3,000 to 4,500 feet
Mean annual precipitation: 15 to 35 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 10 to 50 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cryaquolls and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cryaquolls

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pumice over mixed alluvium

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 3 inches: silt loam
H2 - 3 to 15 inches: loam
H3 - 15 to 19 inches: sandy loam
H4 - 19 to 23 inches: loamy sand
H5 - 23 to 61 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: R006XB102OR - COLD WET MEADOW
Hydric soil rating: Yes

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
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

PAGE 1 of 2

DESC 52615

RECEIVED
SEP 13 1999
WATER RESOURCES DEPT
SALEM, OREGON

RECEIVED
NOV 24 1999
WATER RESOURCES DEPT
SALEM, OREGON

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

WELL I.D. # L 36273
START CARD # 02300

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

(1) OWNER: Well Number
Name Oregon Water Wonderland
Address P.O Box 3584
City Sun River 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 650 ft.
Explosives used ☐ Yes ☒ No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
20"	0	6	Cement	0	38	56 sacks
18"	6	38				
14"	38	352				
			SEE 2nd PAGE			

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:	14"	+2	38	.250	☒	☐	☒	☐
	12"	+2	352	.250	☒	☐	☒	☐
	10"	+2	565	.250	☒	☐	☒	☐
					☐	☐	☐	☐
Liner:	8"	-450	650	.250	☒	☐	☒	☐
					☐	☐	☐	☐

Final location of shoe(s) ____

(7) PERFORATIONS/SCREENS:
☒ Perforations Method Factory cut
☐ Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
550	650	18, 3"	3040	8"		☐	☒
						☐	☐
						☐	☐
						☐	☐
						☐	☐

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

Yield gal/min	Drawdown	Drill stem at	Time
600	50'	630	1 hr.

Temperature of water 490 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 Desc Latitude ____ Longitude ____
Township 20 S N or S Range 10 E E or W. WM.
Section 25 NW 1/4 NW 1/4
Tax Lot 4100 Lot ____ Block 3 Subdivision OWW
Street Address of Well (or nearest address) ____
Big River Or

(10) STATIC WATER LEVEL:
13 ft. below land surface. Date 8-18-99
Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:
Depth at which water was first found 6

From	To	Estimated Flow Rate	SWL
6	10	10 gpm	6
517	530	200 gpm	28
Cement slurry pumped down to			
Seal off above zone			
585	650	600 gpm	13

(12) WELL LOG:
Ground Elevation ____

Material	From	To	SWL
Sandy loam top soil	0	6	
Top soil + small gravel	6	10	
Hard brown clay	10	60	
Caving brown clay	60	75	
Hard brown clay	75	90	
Yellow clay	90	135	
Green clay	135	165	
Hard brown clay	165	195	
Yellow clay	195	235	
Green clay	235	245	
Hard pink clay	245	327	
Boulders + cobbles	327	345	
Hard Pink clay	345	385	
Heaving black sand + Pumice	385	438	
Hard Pink clay	438	475	
Boulders + broken lava	475	495	
Brown clay	495	517	
Black sand + Pumice	517	530	
See 2nd Page			

Date started ____ Completed ____

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonme 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 knowledg and belief.
WWC Number Trainee
Signed Mark Kuhn Date 8-28-

(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 1568
Signed ____ Date 9-8-

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

PAGE 2 RECEIVED

DESC 52615

SEP 1 3 1999

WATER RESOURCES DEPT. SALEM, OREGON

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 _____

START CARD # _____

(1) OWNER: Well Number _____

Name _____

Address _____

City _____ State _____ Zip _____

(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 _____ ft.

~~Explosives used ☐ Yes ☐ No Type _____ Amount _____~~

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12"	352	566				
10"	566	650				

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:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

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
			1 hr.

Temperature of water _____ 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 _____ Latitude _____ Longitude _____

Township _____ N or S Range _____ E or W. WM.

Section _____ _____ 1/4 _____ 1/4

Tax Lot _____ Lot _____ Block _____ Subdivision _____

Street Address of Well (or nearest address) _____

(10) STATIC WATER LEVEL:

_____ ft. below land surface. Date _____

Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:

Depth at which water was first found _____

From	To	Estimated Flow Rate	SWL

RECEIVED NOV 2 4 1999 WATER RESOURCES DEPT. SALEM, OREGON

(12) WELL LOG: Ground Elevation _____

Material	From	To	SWL
Hard grey clay + Pumice	530	557	
Grey Basalt	557	566	
Fractured gray lava	566	650	
22 sack slurry mix was used to seal 10" liner pipe at 565-			
K-Packers were placed between the 12" and 14" pipes at 26- and 29-			
K-Packers between the 10" and 12" pipes are at 75- and 85-			
K-Packers between the 8" and 10" pipes are at 455-, 460-, 465- and 470-			

Date started May 17, 99 Completed August 20, 99

(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 Trainee

Signed Mark Kuhn Date 8-28-99

(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 1568

Signed David J Kuhn Date 9-8-99

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

WATER WELL REPORT
STATE OF OREGON

DES6 6090

RECEIVED
JUN 6 1984
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 20s/10E-25bb

State Permit No.

(1) OWNER:
Name Oregon Water Wonderland Imp. Dist.
Address 55579 S. Century Drive
City Bend, Ore. State Oregon

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

(3) TYPE OF WELL:
Rotary Air ☐ Driven ☐
Rotary Mud ☐ Dug ☐
☒ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☒ Plastic ☐
Threaded ☐ Welded ☐
10 " Diam. from +1 ft. to -40 ft. Gauge .250
" Diam. from ft. to ft. Gauge

LINER INSTALLED:
8 " Diam. from +1 ft. to -126 ft. Gauge .188

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ 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.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
Air test gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☒
Well seal—Material used Portland Cement
Well sealed from land surface to -35 ft.
Diameter of well bore to bottom of seal 14 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 26 sacks
How was cement grout placed? Pressure pumped
Was pump installed? no Type HP Depth ft.
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☒ Yes ☐ No Silty
Type of Water? Silty depth of strata 105 to 118
Method of sealing strata off Cased
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Deschutes Driller's well number 354-84-4
NW ¼ NW ¼ Section 25 T. 20S R. 10E W.M.
Tax Lot # Lot 27 Blk 3 Subdivision OWW
Address at well location: Oregon Water Wonderland

(11) WATER LEVEL: Completed well.
Depth at which water was first found 105 ft.
Static level 13 ft. below land surface. Date 5-24-84
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing
Depth drilled 126 ft. Depth of completed well 126 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 and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Sandy Loam Top Soil	0	6	
Hard Dark Gray Clay	6	12	
Dark Gray Clay/Sand	12	25	
Hard Dark Gray Clay	25	40	
Pinkish/Gray Clay	40	90	
Greenish Gray Clay	90	105	
Black Silt with Sand	105	118	13
Hard Gray Clay	118	126	
(On Standby 5 days)			

Work started 5-17 19 84 Completed 6-1 1984
Date well drilling machine moved off of well 6-1 1984

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] (Drilling Machine Operator) Date 6-1, 19 84
Drilling Machine Operator's License No. 759

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 Big Three Drilling & Pump Service (Person, firm or corporation) (Type or print)
Address 1990 NW 35th, Redmond, Or. 97756
[Signed] (Water Well Contractor)
Contractor's License No. 685 Date 6-1, 19 84

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

'SP*12658-690

WATER WELL REPORT
STATE OF OREGON

DESC 6091

RECEIVED
MAR 11 1985
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 20S/10E-25G6
State Permit No. Dep.

(1) OWNER:
Name Oregon Water Wonderland Imp. Dist.
Address 55579 S. Century Drive
City Bend State Oregon

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

(3) TYPE OF WELL:
Rotary Air ☐ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☒ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☒ Plastic ☐
Threaded ☐ Welded ☒
8 " Diam. from +1.5 ft. to 383.5 ft. Gauge .250
" Diam. from ft. to ft. Gauge

LINER INSTALLED:
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ 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.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Big 3 Drill.
Yield: 19 gal./min. with 335 ft. drawdown after 24 hrs.
" " " "
Air test gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water 47° Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☒
Well seal—Material used Undistrubed
Well sealed from land surface to ft.
Diameter of well bore to bottom of seal in.
Diameter of well bore below seal in.
Number of sacks of cement used in well seal sacks
How was cement grout placed?
Was pump installed? NO Type HP Depth ft.
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☒ Yes ☐ No
Type of Water? Silt depth of strata 126-370
Method of sealing strata off Cased Off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL: See # 354-84-4
County Deschutes Driller's well number 366-85-3
NW ¼ NW ¼ Section 25 T. 20S R. 10E W.M.
Tax Lot # Lot 27 Blk 3 Subdivision OWW
Address at well location: Oregon Water Wonderland

(11) WATER LEVEL: Completed well.
Depth at which water was first found 14 ft.
Static level 3 ft. below land surface. Date 2-18-85
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing
Depth drilled 390 ft. Depth of completed well 385 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 and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Gray Clay	126	160	
Black Silt	160	175	
Gray Clay	175	210	
Black Silt	210	225	
Green Clay & Silt	225	240	
Pink Clay & Silt	240	337	
Tan Pumice/Ash/Cinder	337	341	
Thin layer Clay/Pumice & Silt	341	370	
Fine Black Sand	370	375	
Coarse Pumice	375	380	
Black Sand	380	390	3

Work started 2-11 19 85 Completed 2-22 19 85
Date well drilling machine moved off of well 2-22 19 85

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] (Drilling Machine Operator) Date , 19
Drilling Machine Operator's License No. 759

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 Big Three Drilling & Pump Service (Person, firm or corporation) (Type or print)
Address 1990 NW 35th, Redmond, Or. 97756
[Signed] (Water Well Contractor)
Contractor's License No. 685 Date 2-22, 19 85

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*12658-690

RECEIVED
JUL 18 1986
WATER RESOURCES DEPT
SALEM, OREGON

DESC 60922

20s/10E-25bb
Deep.

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

(1) OWNER: Owner's Well Number: 398-86-10
Name Ore. Water Wonderland Water Imp. Dist.
Address 55579 S. Century Drive
City Bend State Oregon 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:
Depth of Completed Well 642 ft.
Special Standards date of approval --

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
8	385	647	UNDISTRUBED			

How was seal placed? Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other
Backfill placed from NO ft. to ft. Material
Gravel placed from NO ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8"	385	575	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS: NONE
☐ 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	Pumping level	Drill stem at	Time
160	148		¼ hr 24hrs
			1 hr

Temperature of water 56° Depth Artesian Flow Found
Was a water analysis done? ☒ Yes By whom Sun Country Eng.
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 20S XXX N or S, Range 10E E or W, WM.
Section 25 NW ¼ NW ¼
Tax Lot Lot Block Subdivision
Street Address of Well (or nearest address)
Oregon Water Wonderland

(10) STATIC WATER LEVEL:
5.5 ft. below land surface. Date 6-20-86
Artesian pressure lb. per square inch. Date

(11) WELL LOG: Ground elevation

Material	From	To	WB?	SWL
Fine Blk Sand/Pumice	385	395		
GreenishGray clay/sand	395	425		
Heaving blk sand	425	435		
Hard pink/gray clay	435	515		
Hard Gray clay	515	555		
Gray clay/pumice	555	570		
Gray Lava	570	597		
Pumice/broken rock	597	602		20
Broken gray Lava	602	610		10
Coarse blk sand/Sgrav.	610	618		5.5
Brkn blk rock/tan clay	618	647		

Date started 5-27-86n Completed 7-10-86

(unbonded) Water Well Constructor Certification:
I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.
Signed Date 7/13/86
Company Big Three Drilling Co. Job No. 398-86-10

9809C 10/85

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED DEC 5 1969 STATE ENGINEER SALEM, OREGON

NC

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

DESC 6096

State Well No. 20/10-25 ~~20/10-26~~

State Permit No.

(1) OWNER:
Name Oregon Water Wonderland
Address 538 W. Highland Redmond, Ore.

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

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☒ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☐
..... " Diam. from ..... ft. to ..... ft. Gage .....
..... " Diam. from None ft. to ..... ft. Gage .....
..... " Diam. from ..... ft. to ..... ft. Gage .....

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ 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 ☒ 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 3 ft. below land surface Date 11/3/69
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 ☒ No If yes, by whom?
..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "
Bailer test 20 gal./min. with 120 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water 51° Was a chemical analysis made? ☐ Yes ☒ No

(10) CONSTRUCTION:
Well seal—Material used See # 12
Depth of seal ..... ft.
Diameter of well bore to bottom of seal ..... in.
Were any loose strata cemented off? ☐ Yes ☒ No Depth .....
Was a drive shoe used? ☐ Yes ☒ No
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☒ Yes ☐ No Size of gravel: 3/4 -
Gravel placed from 370 ft. to 686 ft.

(11) LOCATION OF WELL:
County Deschutes Driller's well number
¼ ¼ Section 26 T. 20-S R. 10-E W.M.
Bearing and distance from section or subdivision corner

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 271 ft. Depth of completed well 686 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
Gravel (small) Black Sand (fine)	320	415	3
Brown Clay	415	427	
Black Sand (fine)	427	430	
Brown Clay	430	490	
Black Sand (med)	490	496	
Green Clay	496	563	
Brown Clay	563	620	
Bkk. Hard Rock	620	641	
Brn. Clay Strips of Sand	641	686	3
This Well was already Cased To 374 - Seal Undisturbed.			

Work started 10/14 1969 Completed 11/3 1969
Date well drilling machine moved off of well 11/3 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] Thom. Cunningham (Drilling Machine Operator) Date 11/3, 1969
Drilling Machine Operator's License No. 320-527

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 Cunningham Well Drilling (Person, firm or corporation) (Type or print)
Address P.O. Box 104 Bend, Ore.
[Signed] Wm. M. Cunningham (Water Well Contractor)
Contractor's License No. 474 Date 11/3, 1969

(USE ADDITIONAL SHEETS IF NECESSARY)

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

AUG 17 1992

WATER RESOURCES
SALEM, OR

DESC 1441

20s/10E/25bb

(START CARD) # 33160

(1) OWNER: Well Number 577-20-92

Name Oregon Water Wonderland Water Imp. Dist.

Address P.O. Box 3584

City Sun River State Oregon 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 753 ft.

Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
8"	410	745	undistrubed			
6"	745	753				

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:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	6"	+2	-745	.188	☒	☐	☒	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☒ Perforations Method Machine

☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
-720	-740	1/8x3	239	6		☐	☒
						☐	☐
						☐	☐
						☐	☐
						☐	☐

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

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
200	60	630	1 hr.
100	30	745	1hr
30	0	615 & 738	1 hr. each

Pump

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

Depth of strata: 575 to 600

(9) LOCATION OF WELL by legal description:

County Deschutes Latitude Longitude

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

Section 25 NW ¼ NW ¼

Tax Lot 4100 Lot 27 Block 3 Subdivision OWW#1

Street Address of Well (or nearest address) Big River Drive Unit 1 Well #2

(10) STATIC WATER LEVEL:

11 ft. below land surface. Date 7-16-92

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 11

From	To	Estimated Flow Rate	SWL
685	753	200+	11

(12) WELL LOG:

Ground elevation

Material	From	To	SWL
Cement	410	685	
Red Cinder, Boulders & Sand	685	753	11
1K&H formation packers	640		
"	645		
"	590		
"	595		

Date started 7-16-92 Completed 8-12-92

(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 1568

Signed David J. Kuhn Date 8-12-92

(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 685

Signed Date 8-12-92

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

RECEIVED

DESC 6089

20S/10W-25bb
Deep.

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

AUG - 2 1988
WATER RESOURCES DEPT.
SALEM, OREGON

Start Card # 2330 Driller # 398-86-10
436-14-88

(1) OWNER: Well Number: 436-88-14

Name Ore. Water Wonderland Imp. Dist.
Address 55841 Swan Drive
City Bend, Or. 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 546 ft.
Explosives used Yes ☐ No ☒ Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
5"	410	430				
4½"	430	546				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other Undistrubed
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:	N/A				☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	N/A				☐	☐	☐	☐
					☐	☐	☐	☐

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
100	100'	546	1 hr.

Temperature of water 54° Depth Artesian Flow Found 511
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 Sandy
Depth of strata: 511-546 & 575-600

(9) LOCATION OF WELL by legal description:
County Deschutes Latitude Longitude
Township 20 S, Range 10 W, WM.
Section 25 NW ¼ NW ¼
Tax Lot 4100 Lot Block Subdivision Ore
Street Address of Well (or nearest address) water wonderland

(10) STATIC WATER LEVEL:
13 ft. below land surface. Date 7-6-88
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 541

From	To	Estimated Flow Rate	SWL
541	546	100	13

(12) WELL LOG: Ground elevation

Material	From	To	SWL
Brkn Blk Rock-Sand-Clay	640	660	13
Red Cinder Clinkers, sand			
& clay - caving	660	730	13
Coarse Red Cinder	730	735	24
Drill hole was cemented			
from 735' up to 600' &			
back flowed up into the			
casing overnight locking			
tremie pipe in the hole			
from 410' to 546'. The			
tremie pipe was cored over			
& removed. The total depth			
of well is now 546' with			
channeled cement from 546'			
to 600' & cement from 600'			
to 735'			

Date started 5-6-88 Completed 7-8-88

(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 685
Signed [signature] Date 7-20-88

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.

ELKHORN CONSULTING LLC

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

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.

ELKHORN CONSULTING LLC

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

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 16854 Brenda Dr, Bend, OR 97707

You can enter notes here.

475 NE Bellevue Dr
Bend, OR 97701

Take NE Dalton St to US-20

26 sec (361 ft)

1. Head east toward NE Dalton St

125 ft

2. Turn right onto NE Dalton St

236 ft

Take SE 27th St, Knott Rd and US-97 S to Big River Dr

30 min (23.6 mi)

3. Turn right onto US-20

0.2 mi

4. Turn left onto SE 27th St

3.3 mi

5. Continue onto Knott Rd

4.2 mi

6. Slight right

0.3 mi

7. Merge onto US-97 S

12.0 mi

8. Slight right onto Vandevert Rd

1.0 mi

9. Turn left onto S Century Dr

1.1 mi

10. Turn right to stay on S Century Dr

1.5 mi

Follow Big River Dr to Brenda Dr in Three Rivers

2 min (0.6 mi)

11. Turn right onto Big River Dr

0.5 mi

12. Turn left onto Brenda Dr
Destination will be on the right

144 ft

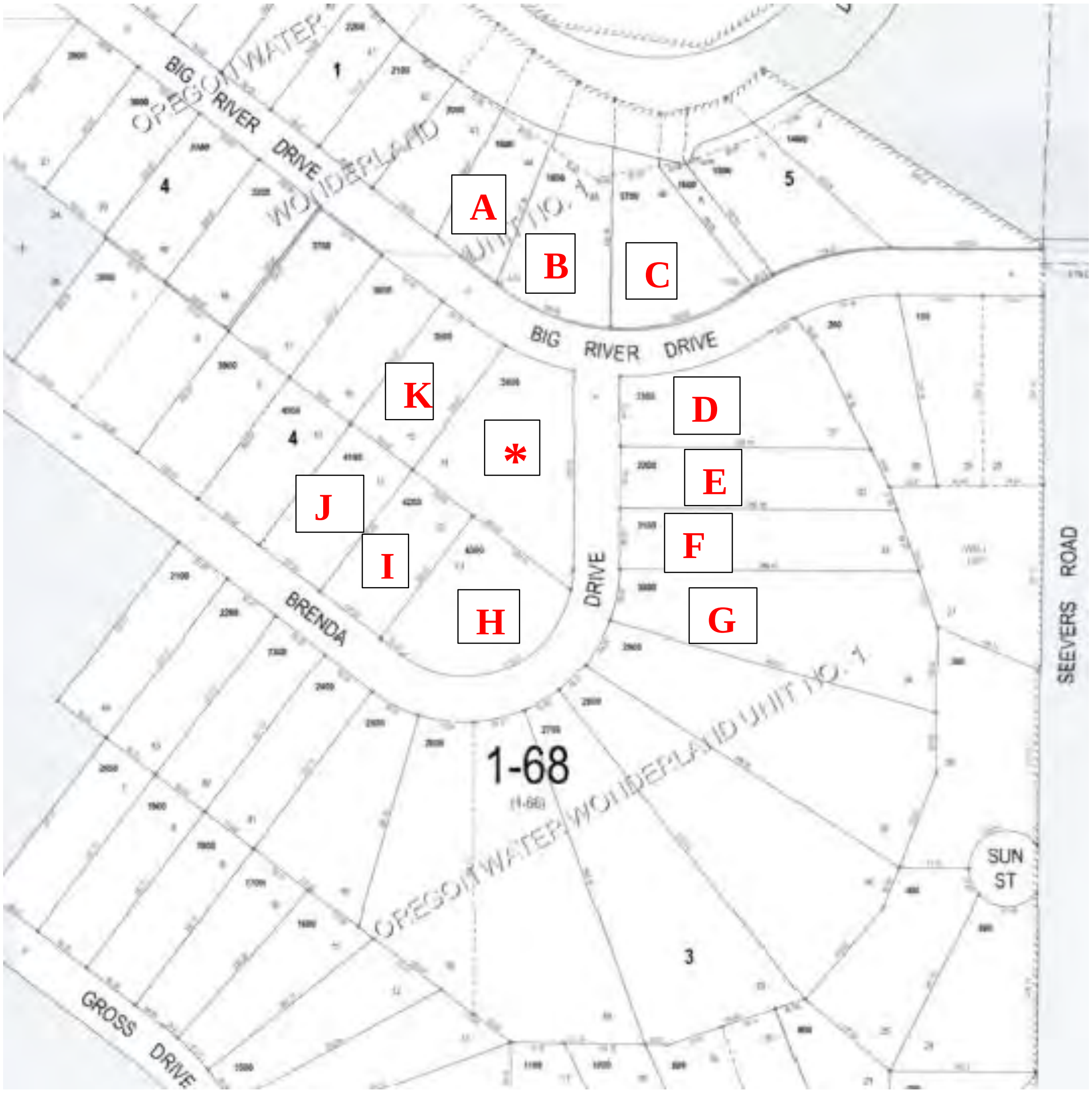
16854 Brenda Dr
Bend, OR 97707

Adjacent Parcels Property Owners

16854 Brenda Drive, Bend, Oregon
(T20S, R10E, Section 25BB, Tax Lot 3400, 1.01 acres

*	Tax Lot	3400	Wendell, Sharon M 3620 Spring Blvd Eugene, OR 97405
A.	Tax Lot	1900	Wendell, Sharon M 3620 Spring Blvd Eugene, OR 97405
B.	Tax Lot	1800	Schulze, Steffen F & Sabine P 55713 Big River Drive Bend, OR 97707
C.	Tax Lot	1700	Bunnell, Thomas & Karla 55717 Big River Drive Bend, OR 97707
D.	Tax Lot	3300	Bunnell, Karla & Tom 55717 Big River Drive Bend, OR 97707
E.	Tax Lot	3200	DKMartin Asset Management LLC PO Box 6643 Bend, OR 97708
F.	Tax Lot	3100	Martin, Dan & Kelly PO Box 6643 Bend, OR 97708
G.	Tax Lot	3000	Rummel, Bradley Gene & Lori Ann 16864 Brenda Dr Bend, OR 97707
H.	Tax Lot	4300	Gregory J Becker Rev Trust 16844 Brenda Dr Bend, OR 97707
I.	Tax Lot	4200	Gregory J Becker Rev Trust 16844 Brenda Dr Bend, OR 97707
J.	Tax Lot	4100	Staduhar, Darren Joseph et al

		1932 E Morrow Dr Phoenix, AZ 85024
K. Tax Lot	3500	Kramer, Haley Heather & David Stewart 55710 Big River Dr Bend, OR 97707



BIG RIVER DRIVE
OREGON WATER WONDERLAND UNIT NO. 1
A
B
C
D
E
F
G
H
I
J
K
*
BIG RIVER DRIVE
DRIVE
BRENDA
1-68
(1-66)
OREGON WATER WONDERLAND UNIT NO. 1
SEEVERS ROAD
SUN ST
GROSS DRIVE
1
4
5
4
3

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) Sharon M. Wendell

Mailing Address 3620 Spring Blvd

City, State, Zip Eugene, OR 97405

Phone (541) 521-7061 Email sw3620@gmail.com

Property Information:

County Deschutes

Township, Range, Section, Tax Lot T20S R10E S25BB Tax Lot 3400

Lot and Block Number Lot 14, Block 4 Subdivision Name Oregon Water Wonderland Unit No. 1

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
NOV 17 2023
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

11/10/23 Sharon M. Wendell

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.