

June 30, 2021

Don Wennerholm  
P.O. Box 357  
Carlotta, CA 95528RE: Proposed OWTS  
Residential Development  
139 Sunny Slope Lane  
Carlotta, CA 95528  
APN: 206-211-014

JN: WNM2101

**ONSITE WASTEWATER TREATMENT SYSTEM (OWTS) DESIGN****1. Project Description**

This proposed OWTS design will support a proposed 3-bedroom residence.

Estimated sewage flow for the proposed residence is 450 gallons per day. This sewage flow estimate is based on 150 gallons per day per bedroom up to three bedrooms. A detailed sewage disposal quantity calculation is shown in section 8 of this report. The daily sewage flow quantity is based on the current California Regional Water Quality Control Board (CRWQCB) standards. Note: this parcel will be subdivided and require a letter from the property owner of the remaining southern parcel to allow encroachment of the proposed OWTS to come less than 50 feet of the new common property line, while still maintaining a minimum 25 foot setback from the sloped bank.

**2. Project Location**

From Eureka proceed south on HWY 101. Take exit 685 for CA-36 E; continue for approximately 6.5 miles. Take a left turn at Sunny Slope Lane. The property is on right side, approximately 1,000 feet down the road.

**3. Site Map**

See attached septic system site plan.

**4. Site Description**

The area of this parcel where the proposed primary and reserve septic fields will be located is southwest of the proposed home site. The ground surface in the vicinity of the proposed septic fields, at test hole 1 (TH-1) and TH-2 slopes down toward the southeast at slopes of 1% - 2%. A bank slopes 50% - 60% southwest of the proposed septic fields. The remainder of the lot also generally slopes down toward the South/Southeast at slopes up to 2%. This area currently consists of mostly grasses used for cattle grazing.

## 5. Written Summary of Site Evaluation and Work Completed

### Investigations and Testing

On March 11, 2021, two test holes, TH-1 and TH-2, were excavated to approximately 4 feet with a back hoe, and a hand auger was used to dig to a depth of approximately 8 feet; soil boring logs and monitoring well installation were performed. See attachments for soil data and well diagrams.

### Groundwater Conditions

On March 11, 17, 23, 2021, groundwater monitoring was performed at TH-1 and TH-2. No groundwater was encountered down to the well installation limits throughout the 3-week monitoring period. TH-1 was set to 88" below grade, and TH-2 to 100" below grade.

### Percolation Testing

On April 1, 2019, Percolation testing was performed. PH-1 showed a 60 minute per inch (mpi) rate at 24" depth. PH-2 showed 60 mpi at 24" depth.

This testing was performed under the direction of Terry O'Reilly, P.E. RCE# 49506, qualified as described in section X.6 water quality control plan for the north coast region (basin plan).

## 6. Accurate Soil Profile Description, Percolation Test Data Groundwater Data.

See attached data.

## 7. Explanation of Appropriate Sewage Disposal System Design.

This property is located within the variance prohibition area as described in the Humboldt County OWTS Regulations and Technical Manual due to increased local hydrogeologic vulnerabilities. A low pressure graveled trench on-site waste treatment system will be used to protect local water quality.

## 8. Complete Sewage Disposal Design Calculations.

This design is based on current (November 7, 201) design manual for sewage disposal regulations, Humboldt County Department of Environmental Health (HCDEH)

### Sewage Disposal Daily Waste Flow Calculation

#### System Design - Primary Field

1. Design Flow Rate = 3 bedrooms x 150 gal/bedroom/day = 450 gpd

2. Effective adsorption area:

Maximum Loading Rate = 0.277 gpd/ ft<sup>2</sup> (Humboldt Co. OWTS RTM, Table 3)

Depth of gravel below pipe = 18"

Width of trench = 18"

Absorption Area:  $(1.5' \times 2 \text{ walls}) \times 1.5' = 4.5 \text{ ft}^2/\text{LF}$

3. Length of distribution line:  $450 \text{ gpd} / (0.277 \text{ gpd}/\text{ft}^2 \times 4.5 \text{ ft}^2/\text{LF}) = 361 \text{ LF}$

4. Minimum trench spacing:  $2 \times (1.5' + 1') = 5'$

Use (8) 18" Depth x 18" Width Trench, Each 47' Long @ 5' O.C.

Approximate field area =  $1551 \text{ ft}^2$

**9. Reserve Field Design**

Same as primary field

**10. Pressure Distribution Network Design**

Dosing and Distribution System

1) Total # of Holes = Use 5' hole spacing, (8) 47' long leach lines.

a. Holes per Line =  $47'/5' = 10 \text{ Holes}$

b. Total # of Holes =  $10 \text{ Holes} \times 8 \text{ Lines} = 80 \text{ Holes}$

2) Flow Rate per Hole

For 5/32" diameter hole with 3' pressure head (assumed), flow rate = 0.5 gpm (Table 2)

3) Total Dosing Rate

Flow rate per line =  $0.5 \text{ gpm} \times 10 \text{ holes} = 5 \text{ gpm per line}$

Total flow rate =  $5 \text{ gpm} \times 8 \text{ lines} = 40 \text{ gpm}$

Pump Selection

4) Pipe Friction =  $(30'/100') \times 0.65' = 0.195'$  for 3" Pipe Diameter for Manifold (Table 3)

5) Friction Head =  $1.2 \times 0.195' = 0.23'$

6) Elevation Head = 6'

7) Total Head =  $0.23' + 6' + 3' = 9.23'$

8) 

Pump Size: Per attached pump curve, min pump size 1/3 H.P. (Goulds WE0311)
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Dose Volume

Supply Line = 30 ft of 3 inch pipe

V supply =  $(30'/100') \times 42 \text{ gal} = 12.6 \text{ gal}$  (Table 4)

Lateral Lines = 368 ft of 1-1/4 inch pipe

V lateral =  $(368'/100') \times 9 \text{ gal} = 33.1 \text{ gal}$

V dosing =  $12.6 \text{ gal} + 5 (33.1 \text{ gal}) = 178.2 \text{ gal} \Rightarrow$  Use 180 g/dose

Minimum Dose:  $450 \text{ gpd} / 4 = 113 \text{ g}$

Maximum Dose:  $450 \text{ gpd} / 2 = 225 \text{ g}$

Dose Chamber - Use a 750 gal dose chamber and 1500 gal septic tank.

Depending on location of new residence, siphon and/ or anti- back flow device may be required

**11. Detailed Schematic Drawings and Specifications for all Sewage Disposal System Components**

See attached septic system site plan

**12. Written Installation Instructions for Sewage Disposal System Proposed**

See detailed requirements from HCDEH

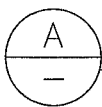
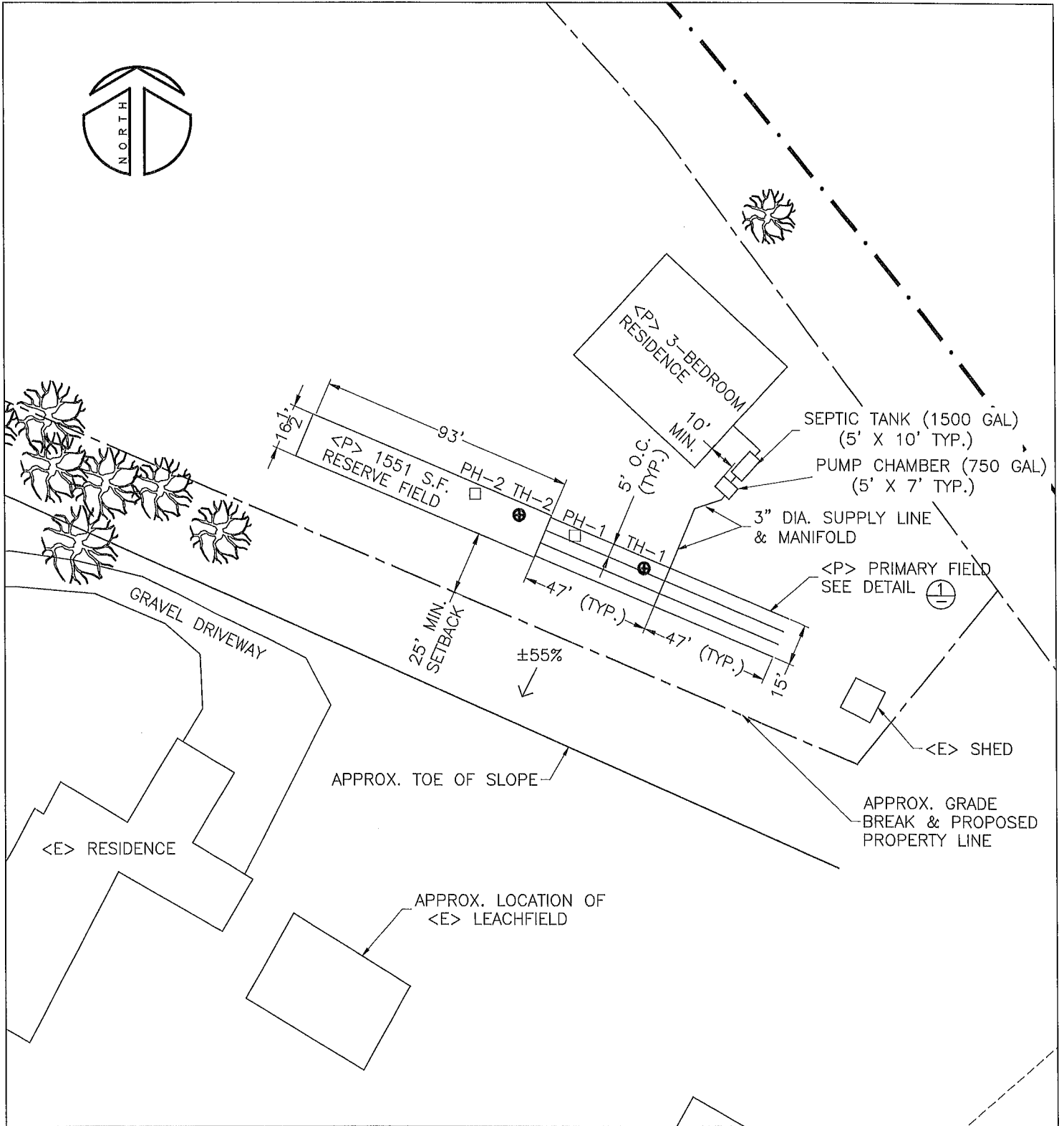


A circular professional engineer seal for Terry J. O'Reilly, No. 49506, State of California, Civil. The seal is stamped in black ink. Overlaid on the seal is a blue handwritten signature and the date "7-5-21".

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610 9th Street Fortuna, Ca. 95540  
(707) 725-6926 Fax. (707) 725-2959

6/30/21  
JN: WNM2101  
APN: 206-211-014  
Page 5 of 17



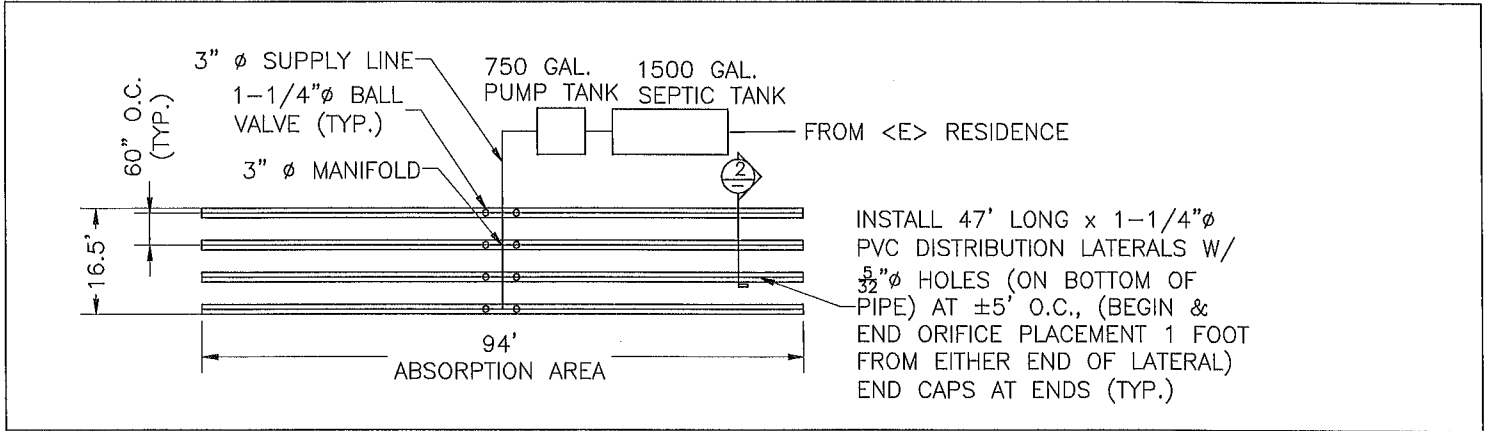
**OWTS SITE PLAN**

SCALE: 1"=50'

**WHITCHURCH ENGINEERING, INC.**

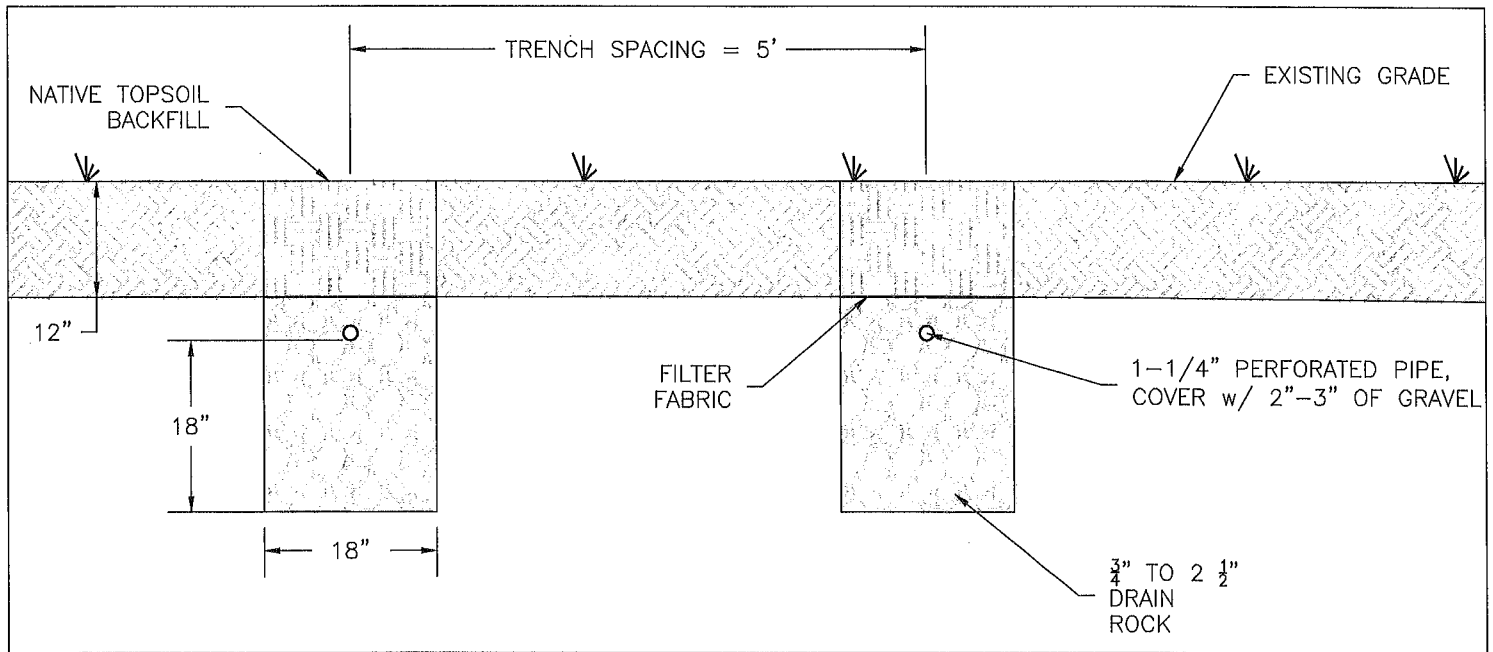
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6/30/21  
 JN: WNM2101  
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 Page 6 of 17



**PRIMARY FIELD DETAIL**

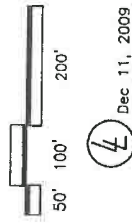
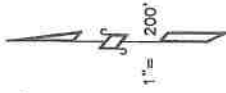
SCALE: 1"=30'



**TYP. DISPERSAL LATERAL TRENCH SECTION**

SCALE: 1"=20'

PTN NW1/4 SEC 26 T2N R1E H.B.& M. 206-21



Dec 11, 2009

Assessor's Map Bk. 206, Pg.21  
County of Humboldt, CA.

NOTE - Assessor's Block Numbers Shown in Ellipses  
Assessor's Parcel Numbers Shown in Circles.

RS Bk 20 of surveys, Pg 24  
PM1088 of PM Bk 9, Pg 116  
PM2575 of PM Bk 23, Pgs 41-42  
RS, Bk 51 of surveys, Pg 88  
RS, Bk 65 of surveys, Pg 144

**ASSESSOR'S PARCEL MAP**  
1. THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY.  
2. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN.  
3. RESSESSORS SHALL COMPLY WITH LOCAL LOT-SPOT OR BUILDING SITE ORDINANCES.

Whitchurch Engineering, Inc. 610 9th Street Fortuna, CA 95540 (707) 725-1553						SHEET <u>1</u> OF <u>2</u> <b>EXPLORATION TEST LOG</b> APN: 206-211-014			
PROJECT NAME: Wennerholm Septic				JOB NO: WNM2101					
HOLE #: 1		HOLE TYPE: BACKHOE & HAND AUGER		LOGGED BY: RAO		SAMPLE DATE: 3/11/2021			
LAB DATA				SOIL DESCRIPTION					
MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (TONS/SF)	LIQUID LIMIT	PLASTICITY INDEX	RELATIVE COMPACTION	SAMPLE	SOIL TYPE	DEPTH (FEET)	SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM)
						X		-- 1 --	SILTY CLAY, DARK BROWN, DENSE/BRITTLE, MOIST 16"
						X		-- 2 --	SILTY CLAY, BROWN W/ SPARSE RED/ORANGE MOTTLING, DENSE/BRITTLE, MOIST 22"
						X		-- 3 --	SILTY CLAY, DARK BROWN W/ SLIGHT RED/ORANGE MOTTLING DENSE, MOIST  (MOISTURE INCREASES W/ DEPTH)
								-- 4 --	
								-- 5 --	
								-- 6 --	
								-- 7 --	
								-- 8 --	85" RIVER RUN COARSE SAND, W/ SILT & CLAY TRACES & ROCK UP TO 3" DIA. 88" DENSE, GROUNDWATER ENCOUNTERED
								-- 9 --	BOTTOM OF HOLE AT 88"
								-- 10 --	
								-- 11 --	



Whitchurch Engineering, Inc. 610 9th Street Fortuna, CA 95540 (707) 725-1553	SHEET <u>2</u> OF <u>2</u> <b>EXPLORATION TEST LOG</b> APN: 206-211-014
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PROJECT NAME: Wennerholm Septic	JOB NO: WNM2101
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HOLE #: 2	HOLE TYPE: BACKHOE & HAND AUGER	LOGGED BY: RAO	SAMPLE DATE: 3/11/2021
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LAB DATA								SOIL DESCRIPTION	
MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (TONS/SF)	LIQUID LIMIT	PLASTICITY INDEX	RELATIVE COMPACTION	SAMPLE	SOIL TYPE	DEPTH (FEET)	SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOILS CLASSIFICATION SYSTEM)
						X		-- 1 --	SILTY CLAY W/ ROOTS, DARK BROWN, DENSE/BRITTLE, MOIST
								14"	
						X		-- 2 --	(CLAY CONTENT INCREASES W/ DEPTH)
								-- 3 --	SILTY CLAY, TAN BROWN (SPARSE ORANGE MOTTLING BEGINS AT 27") DENSE, MOIST
								-- 4 --	
								57"	
								-- 5 --	SANDY SILTY CLAY, TAN BROWN W/ ORANGE MOTTLING DAMP, DENSE
								68"	
								-- 6 --	SILTY CLAY W/ SAND, TAN BROWN, DAMP, MEDIUM DENSITY
								78"	
								-- 7 --	SANDY SILTY CLAY, TAN BROWN W/ ORANGE MOTTLING DAMP, DENSE
								97"	
								-- 8 --	100" COARSE SAND W/ SILT & CLAY TRACES & ROCK UP TO 3", DENSE, DAMP
								-- 9 --	BOTTOM OF HOLE AT 100" NO GROUNDWATER ENCOUNTERED
								-- 10 --	
								-- 11 --	

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JOB SUNNY SLOPE LANE SEPTIC

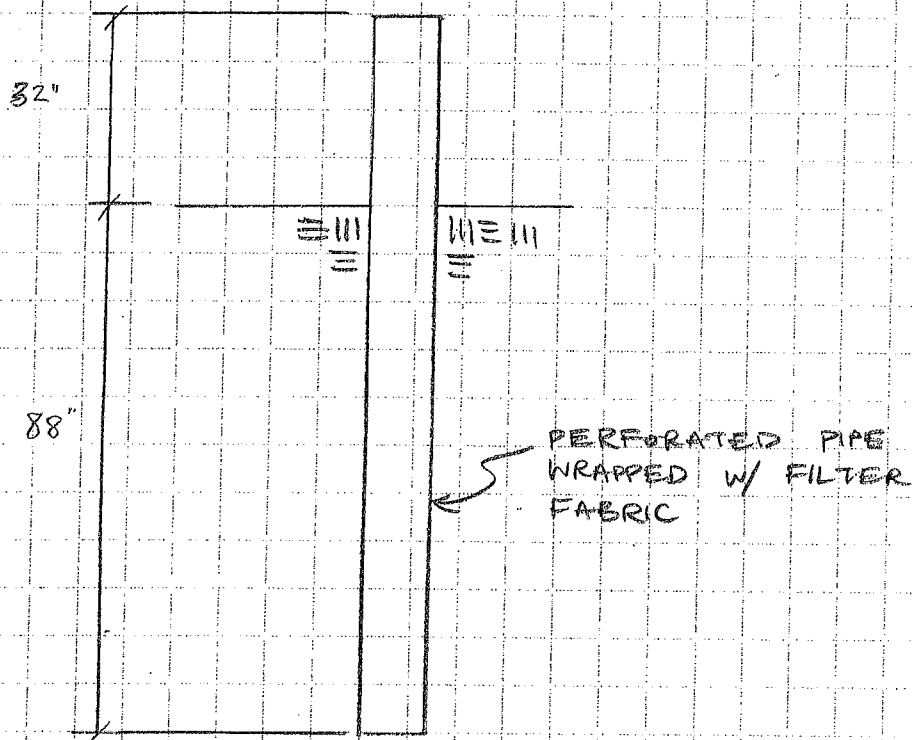
ELEMENT WELL DIAGRAM

SHEET NO. 10 OF 17

CALCULATED BY RAO DATE 3-15-21

CHECKED BY JTL JN WNM 2101

## MONITORING WELL INSTALLATION



MONITORING WELL I.D. : TH-1  
APPLICANT : DON WENNERHOLM  
APN : 206-211-014

# WHITCHURCH ENGINEERING

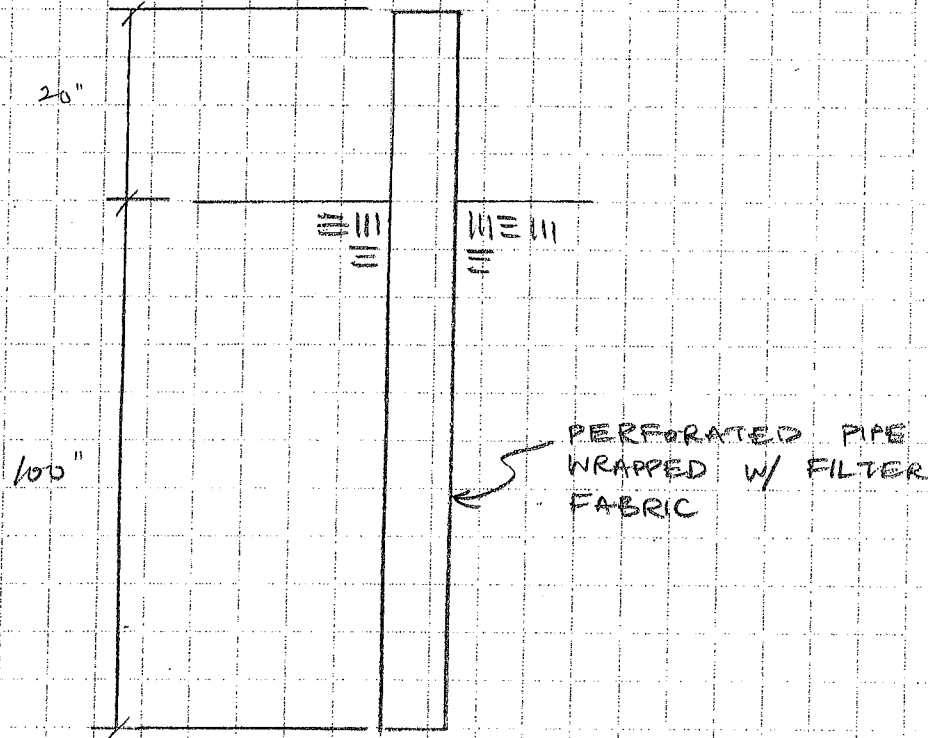
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JOB SUNNY SLOPE LANE SEPTIC  
ELEMENT WELL DIAGRAM  
SHEET NO. 11 OF 17  
CALCULATED BY RAO DATE 3-15-21  
CHECKED BY JTL JN WNM2101

## MONITORING WELL INSTALLATION



MONITORING WELL I.D. : TH-2  
APPLICANT : DON WENNER HOLM  
APN : 206-211-014



**OBSERVATION WELL LOG**

Job Number WNM 2101

Project SUNNY SLOPE LANE SEPTIC

AP # 206-211-014

Test Hole # 1

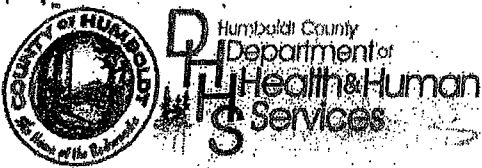
Elevation of Rim 32"

Depth of Well 88"

Date	Time	Depth to Water Surface	Total Rainfall (to date)	Rainfall Past 24 hours*	Comments
3-11-21	4 PM	88"	20.79"	0	
3-17-21	5 PM	88"	21.57"	T	NO DATA ON NOAA
3-23-21	11 PM	88"	22.15"	0	

\* Data from Weather Bureau – (707) 443-7062 (Eureka measurements)

\*\* Please attach site plan showing locations of observation wells



**OBSERVATION WELL LOG**

Job Number WNM 2101

Project SUNNY SLOPE LANE SEPTIC

AP # 206-211-014

Test Hole # 12

Elevation of Rim 20"

Depth of Well 100"

Date	Time	Depth to Water Surface	Total Rainfall (to date)	Rainfall Past 24 hours*	Comments
3-11-21	5 PM	100"	20.79"	0	
3-17-21	5 PM	100"	21.57"	T	NO DATA ON NOAA
3-23-21	11 PM	100"	22.15"	0	

\* Data from Weather Bureau -- (707) 443-7062 (Eureka measurements)

\*\* Please attach site plan showing locations of observation wells

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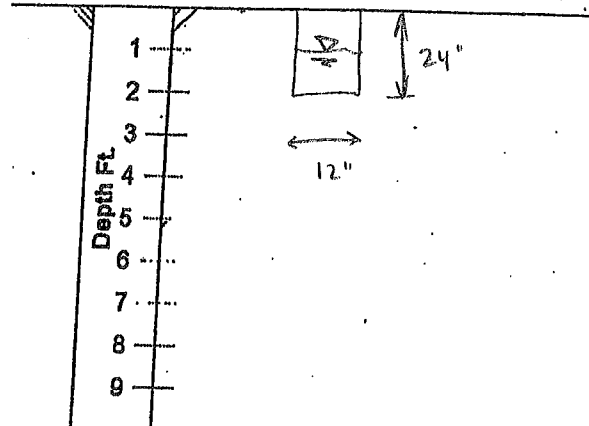
JOB SUNNYSLOPE LANE SEPTIC  
 ELEMENT PERCOLATION TEST  
 SHEET NO. 14 OF 17  
 CALCULATED BY RAO DATE 3-23-21  
 CHECKED BY JTL JN WNM2101

**SOILS PERCOLATION TEST DATA**

Test Hole No. 1

Presoak N/A - WET WEATHER

Saturation 10:18 AM - 11:18 AM



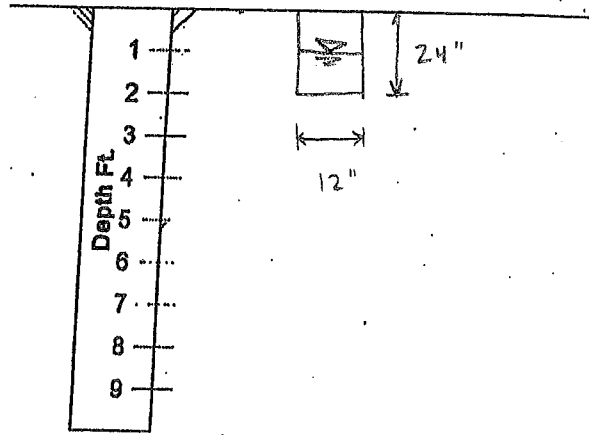
Test #	Time	Fill	Meas.	Min.	Drop (in)	Rate
1	11:18	—	12 $\frac{3}{8}$	—	—	—
2	11:33	—	12 $\frac{7}{8}$	15	$\frac{3}{8}$	40
3	11:48	—	13 $\frac{1}{8}$	↓	$\frac{7}{8}$	40
4	12:03	—	13 $\frac{7}{8}$	↓	$\frac{1}{4}$	60
5	12:18	—	13 $\frac{5}{8}$	↓	$\frac{1}{4}$	60
6	12:33	—	13 $\frac{15}{16}$	↓	$\frac{5}{16}$	54
7	12:48	—	14 $\frac{7}{16}$	↓	$\frac{1}{4}$	60
8	1:03	—	14 $\frac{7}{16}$	↓	$\frac{1}{4}$	60
9	1:10:30	—	14 $\frac{9}{16}$	7.5	$\frac{1}{8}$	60
10						
11						
12						
13						
14						

Stabilized Rate 60 min/inch

**SOILS PERCOLATION TEST DATA**

Test Hole No. 2

Presoak N/A - WET WEATHER  
 Saturation 10:23 AM - 11:23 AM



Test #	Time	Fill	Meas. (in)	Min.	Drop (in)	Rate (MIN/IN)
1	11:23	—	13 $\frac{5}{16}$	—	—	—
2	11:38	—	13 $\frac{13}{16}$	.15	$\frac{1}{2}$	30
3	11:53	—	14 $\frac{7}{16}$		$\frac{5}{8}$	24
4	12:08	—	14 $\frac{5}{16}$		$\frac{1}{2}$	30
5	12:23	—	15 $\frac{5}{16}$		$\frac{3}{8}$	40
6	12:38	—	15 $\frac{5}{8}$		$\frac{5}{16}$	48
7	12:53	—	16		$\frac{3}{8}$	40
8	1:08	—	16 $\frac{5}{16}$		$\frac{5}{16}$	48
9	1:23	—	16 $\frac{9}{16}$		$\frac{1}{4}$	60
10	1:30:30	—	16 $\frac{11}{16}$	7.5	$\frac{1}{8}$	60
11	1:38	—	16 $\frac{13}{16}$	7.5	$\frac{1}{8}$	60
12						
13						
14						

Stabilized Rate 60 min/inch

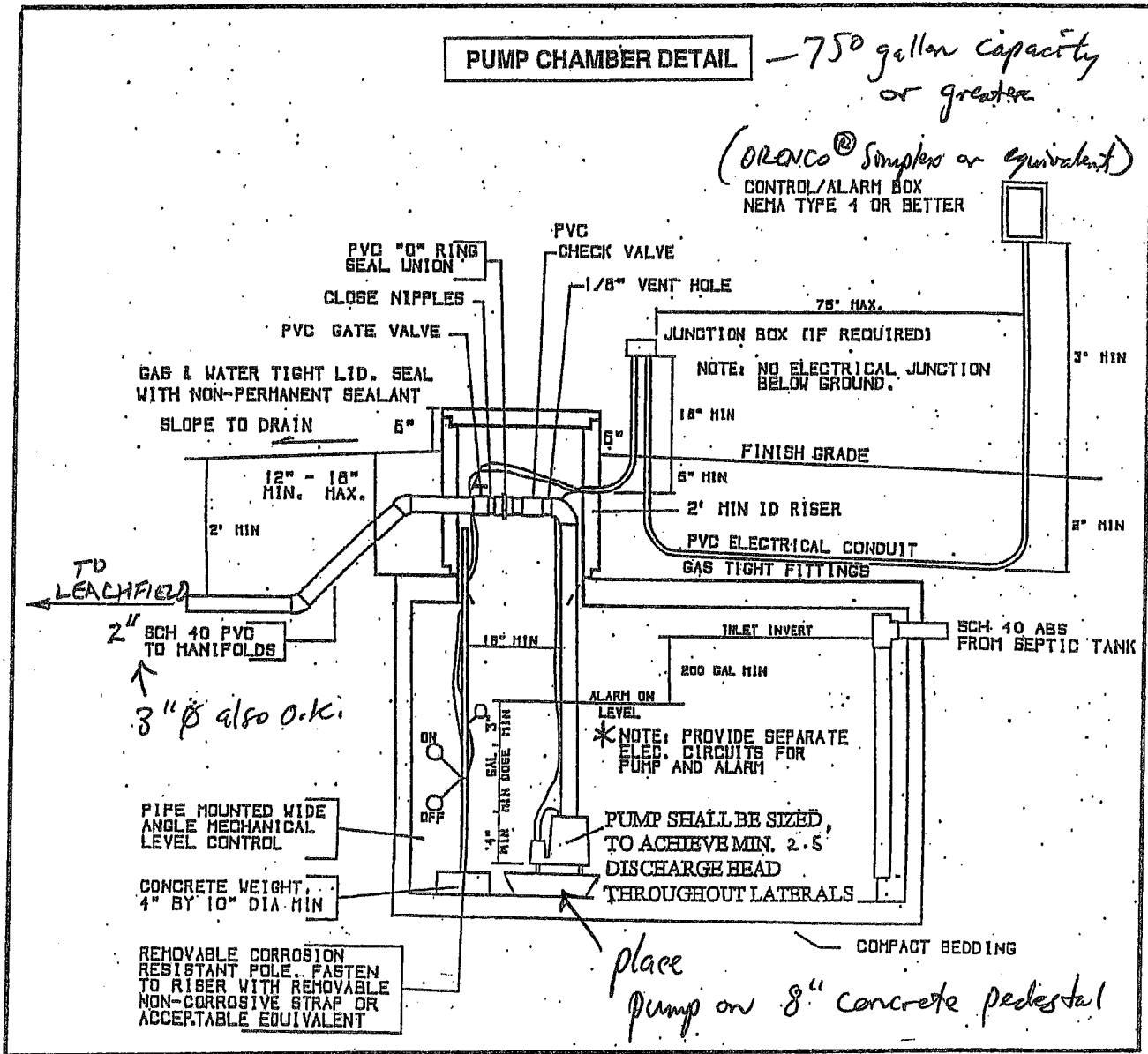
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JOB SUNNY SLOPE CARLOTTA SEPTIC  
ELEMENT PUMP CHAMBER  
SHEET NO. 16 OF 17  
CALCULATED BY RAO DATE 6-29-21  
CHECKED BY TOR JN WMM2101





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JOB SUNNY SLOPE CARLOTTA SEPTIC  
ELEMENT SETBACKS  
SHEET NO. 17 OF 17  
CALCULATED BY RAO DATE 6-29-21  
CHECKED BY TOR JN WNM2101

## APPENDIX E – OWTS SETBACK REQUIREMENTS

### Minimum Setback Distance Requirements

Tanks and dispersal fields must be located to meet the minimum setback distances shown below. See page reverse for required OWTS horizontal setbacks to public water wells and surface water intakes.

Minimum Horizontal Distance (ft.)	Public Water Well	Private Water Well	Surface Intake Public Water	Perennial Stream, Wetland & Other Waters*	Ephemeral Stream or Drainage Swale*
Septic Tank	100	100		50	25
Pump Tank	100	100		50	25
Dispersal System	150	100	200-400 (see table below)	100	50

Minimum Horizontal Distance (ft.)	Property Lines Public Water	Property Lines (Private Water)	Buildings or Structures	Cut Banks Unstable Land Steep Slopes > 30%	Large Trees
Septic Tank	5	25	5	25	10
Pump Tank	5	25	5	25	10
Dispersal System	10	50	10	25	10

\* Setback distances from surface waters is determined based on the US Army Corps of Engineers' definition of Ordinary High Water Mark, 33 CFR 328.3(e).

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 (707) 725-1553

SHEET 1 OF 2

**EXPLORATION  
 TEST LOG**

APN: 206-211-014

PROJECT NAME: Wennerholm Septic

JOB NO: WNM2101

HOLE #:

1

HOLE TYPE:

BACKHOE & HAND AUGER

LOGGED BY:

RAO

SAMPLE DATE:

3/11/2021

LAB DATA

SOIL DESCRIPTION

MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (TONS/SF)	LIQUID LIMIT	PLASTICITY INDEX	RELATIVE COMPACTION	SAMPLE	SOIL TYPE	DEPTH (FEET)
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SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS,  
 WATER LEVEL(S) AND DATE(S)  
 (UNIFIED SOILS CLASSIFICATION SYSTEM)

SILTY CLAY, DARK BROWN, DENSE/BRITTLE, MOIST

16"

SILTY CLAY, BROWN W/ SPARSE RED/ORANGE MOTTLING,  
 DENSE/BRITTLE, MOIST

22"

SILTY CLAY, DARK BROWN W/ SLIGHT RED/ORANGE MOTTLING  
 DENSE, MOIST

(MOISTURE INCREASES W/ DEPTH)

85"

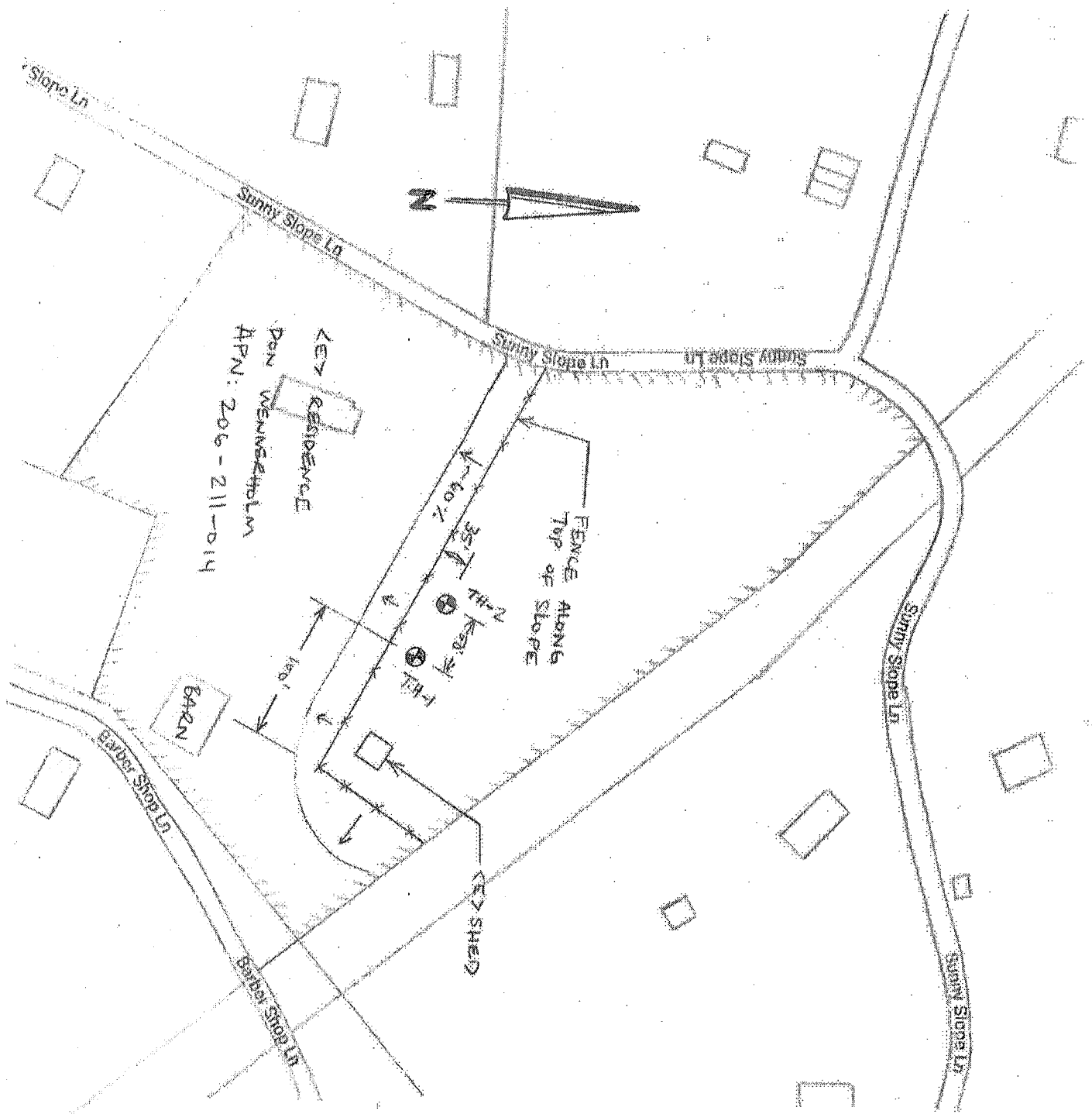
RIVER RUN COARSE SAND, W/ SILT & CLAY TRACES & ROCK UP TO 3" DIA.  
 DENSE, GROUNDWATER ENCOUNTERED

88"

BOTTOM OF HOLE AT 88"







TEST HOLE PLOT PLAN

NTS

SITE ADDRESS:  
 139 SUNNYSLOPE LANE  
 CARLOTTA, CA 95528

# WHITCHURCH ENGINEERING

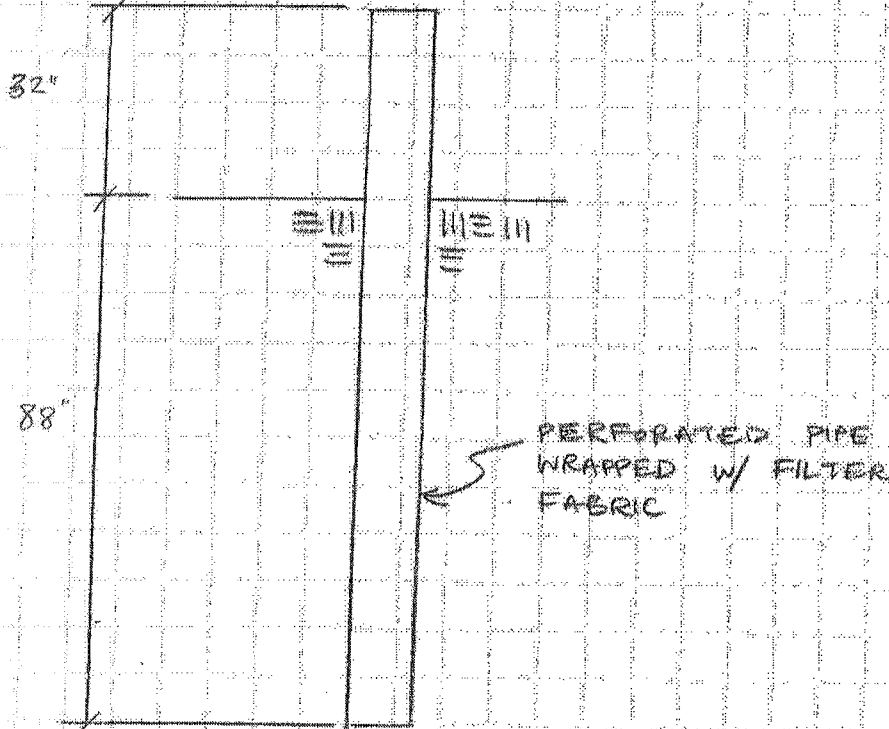
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JOB SUNNY SLOPE LANE SEPTIC  
ELEMENT WELL DIAGRAM  
SHEET NO. 1 OF 2  
CALCULATED BY RAO DATE 3-15-21  
CHECKED BY JTL JN WNM 2.101

## MONITORING WELL INSTALLATION



MONITORING WELL I.D. : TH-1  
APPLICANT : DON WENNERHOLM  
APN : 206-211-014

# WHITCHURCH ENGINEERING

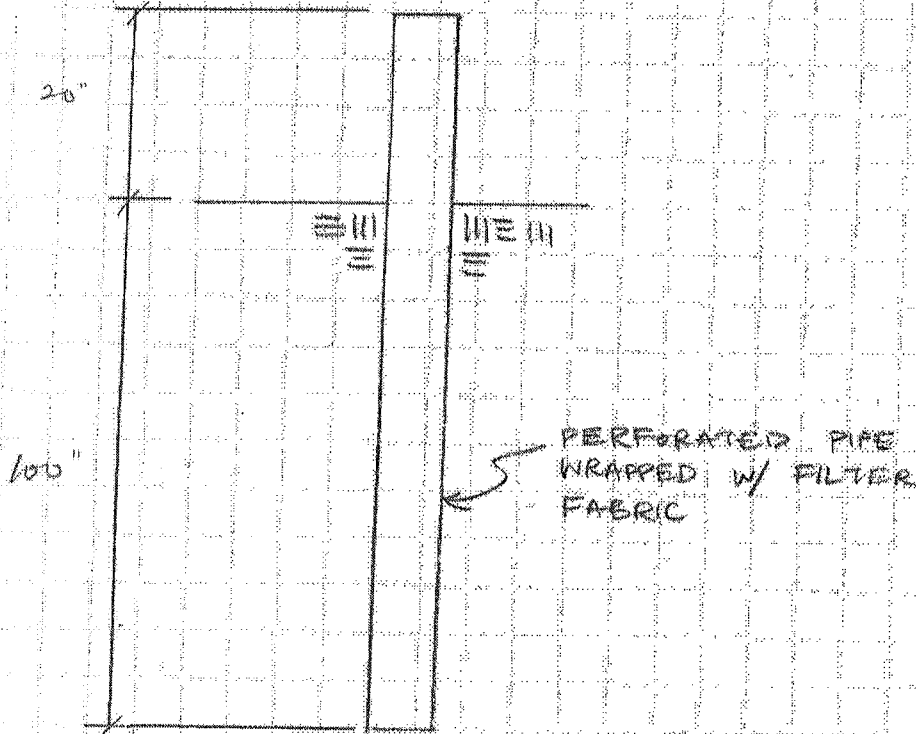
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JOB SUNNY SLOPE LANE SEPTIC  
ELEMENT WELL DIAGRAM  
SHEET NO. 2 OF 2  
CALCULATED BY RAO DATE 3-15-21  
CHECKED BY JTL JN WVIM2101

## MONITORING WELL INSTALLATION



MONITORING WELL I.D. : TH-2  
APPLICANT : DON WENNER HOLM  
APN : 206-211-014