SOIL TEST PIT LOGS

Date: October13, 2015 (performed)
Location: 1154 Roscoe Road, Charlotte, VT
Present: Trafton Crandall, P.E. – Trafton Engineering Associates LLC
Owner: Stuart Bennett
Town of Charlotte Representative: Brian Tremback
Soils: Mapped as SuB Stockbridge and Nellis, NCRS
NOTES: NLTD = no ledge to depth
NLWTD = no ledge or groundwater to depth
NWTD = no groundwater to depth
SHWT = Estimated seasonal high water table

Test Pit TP-1

0" –8"	A_O- Medium brown fine loamy sand, many roots, fine blocky to granular, friable, dry, some gravel and cobbles, roots common.
8" – 18"	B_1 - Medium yellowish brown very fine sandy loam, fine granular, friable, moist, roots common.
18" – 42"	B_2 - Medium yellowish brown fine sandy loam, fine granular, friable, moist,some gravel and cobbles, few roots,mottles; medium distinct gray Fe depletions 20%, coarse distinct Fe concentrations 15%.
42" – 66"	C_1–Olive graybrown gravelly fine sandy loam, fine blocky, firm, dry, gravel and cobbles, mottles; coarse distinct gray Fe depletions 20%, medium distinct Fe concentrations 20% NLWTD, SHWT @ 18"

Test Pit TP-2

0" – 8"	A_O- Medium brown fine loamy sand, many roots, fine blocky to granular, friable, dry, some gravel and cobbles, roots common.
8" – 20"	B_1 - Medium yellowish brown very fine sandy loam, fine granular, friable, moist, roots common.
20" – 42"	B_2 - Medium yellowish brown fine sandy loam, fine granular, friable, moist,some gravel and cobbles, few roots,mottles; medium distinct gray Fe depletions 20%, coarse distinct Fe concentrations 15%.
42" – 66"	C_1 – Olive gray brown gravelly fine sandy loam, fine blocky, firm, dry, gravel and cobbles, mottles; coarse distinct gray Fe depletions 20%, medium distinct Fe concentrations 20% NLWTD, SHWT @ 20"

Test Pit TP-3

0" – 8"	A_O- Medium brown fine loamy sand, many roots, fine blocky to granular, friable, dry, some gravel and cobbles, roots common.
8" – 17"	B_1 - Medium yellowish brown very fine sandy loam, fine granular, friable, moist, roots common.
17" – 26"	B_2 - Medium yellowish brown fine sandy loam, fine granular, friable, moist,some gravel and cobbles, few roots,mottles; medium distinct gray Fe depletions 20%, coarse distinct Fe concentrations 15%.
26" – 56"	C_1 – Olive gray brown gravelly fine sandy loam, fine blocky, firm, dry, gravel, cobbles, and boulders, mottles; coarse distinct gray Fe depletions 20%, medium distinct Fe concentrations 20%. Ledge at 56". NWTD, SHWT @ 17"

Test Pit TP-4

0" – 8"	A_O- Medium brown fine sandyloam, many roots, fine blocky to granular, friable, dry, some gravel and cobbles, roots common.
8" – 20"	B_1 - Medium yellowish brown silty clay loam, fine granular, friable, moist, roots common.
20" – 30"	B_2 - Medium yellowish brown silty clay loam, fine granular, friable, moist, some gravel and cobbles, few roots, mottles; meaium distinct gray Fe depletions 20%, coarse distinct Fe concentrations 15%.
30" – 60"	C_1 – Olive gray brown gravelly fine sandy loam, fine blocky, firm, dry, gravel, cobbles, and boulders, mottles; coarse distinct gray Fe depletions 20%, medium distinct Fe concentrations 20%. NLWTD, SHWT @ 20"

Test Pit TP-5

0" – 7"	A_O - Medium brown fine loamy sand, many roots, fine blocky to granular, friable, dry, some gravel and cobbles, roots common.
7" – 19"	B_1 - Medium yellowish brown very fine sandy loam, fine granular, friable, moist, roots common.
19" – 30"	B_2 - Medium yellowish brown fine sandy loam, fine granular, friable, moist, some gravel and cobbles, few roots, mottles; medium distinct gray Fe depletions 20%, coarse distinct Fe concentrations 15%.
30" – 58"	C_1 – Olive gray brown gravelly fine sandy loam, fine blocky, firm, dry, gravel, cobbles, and boulders, mottles; coarse distinct gray Fe depletions 20%, medium distinct Fe concentrations 20%. Ledge at 58". NWTD, SHWT @ 19"

Test Pit TP-6

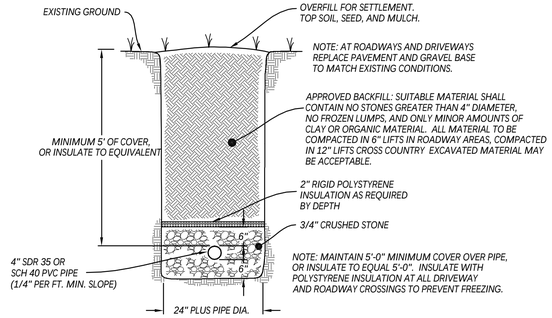
0" – 7"	A_O - Medium brown fine loamy sand, many roots, fine blocky to granular, friable, dry, some gravel and cobbles, roots common.
7" – 20"	B_1 - Medium yellowish brown very fine sandy loam, fine granular, friable, moist, roots common.
20" – 30"	B_2 - Medium yellowish brown fine sandy loam, fine granular, friable, moist, some gravel and cobbles, few roots, mottles; medium distinct gray Fe depletions 20%, coarse distinct Fe concentrations 15%.
30" – 52"	C_1 – Olive gray brown gravelly fine sandy loam, fine blocky, firm, dry, gravel, cobbles, and boulders, mottles; coarse distinct gray Fe depletions 20%, medium distinct Fe concentrations 20%. Ledge at 52". NWTD, SHWT @ 20"

Test Pit TP-7

0" – 8"	A_O - Medium brown fine loamy sand, many roots, fine blocky to granular, friable, dry, some gravel and cobbles, roots common.
8" – 18"	B_1 - Medium yellowish brown very fine sandy loam, fine granular, friable, moist, roots common.
18" – 24"	B_2 - Medium yellowish brown fine sandy loam, fine granular, friable, moist, some gravel and cobbles, few roots, mottles; medium distinct gray Fe depletions 10%, coarse distinct Fe concentrations 10%.
24" – 60"	C_1 – Olive gray brown gravelly fine sandy loam, fine blocky, firm, dry, gravel and cobbles, mottles; coarse distinct gray Fe depletions 20%, medium distinct Fe concentrations 20% NLWTD, SHWT @ 18"

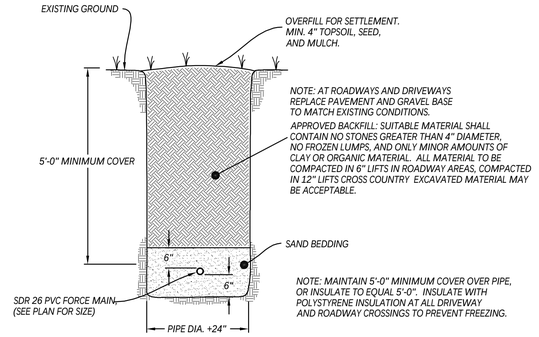
Test Pit TP-8

0" – 7"	A_O - Medium brown fine loamy sand, many roots, fine blocky to granular, friable, dry, some gravel and cobbles, roots common.
7" – 18"	B_1 - Medium yellowish brown very fine sandy loam, fine granular, friable, moist, roots common.
18" – 40"	C_1 – Olive gray brown gravelly fine sandy loam, fine blocky, firm, dry, gravel and cobbles, mottles; coarse distinct gray Fe depletions 20%, medium distinct Fe concentrations 20% NLWTD, SHWT @ 18"



GRAVITY SEWER TRENCH DETAIL

NTS



FORCE MAIN TRENCH DETAIL

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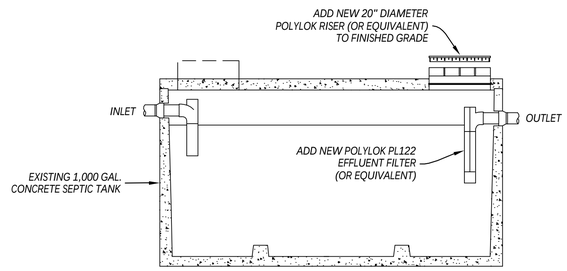

EXISTING SEPTIC TANK DETAIL

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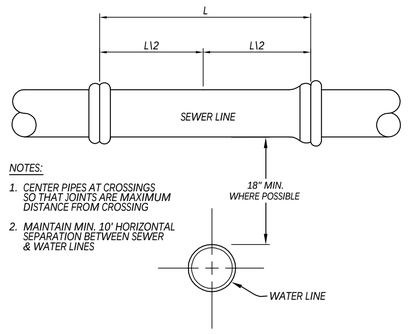

WATER/SEWER CROSSING

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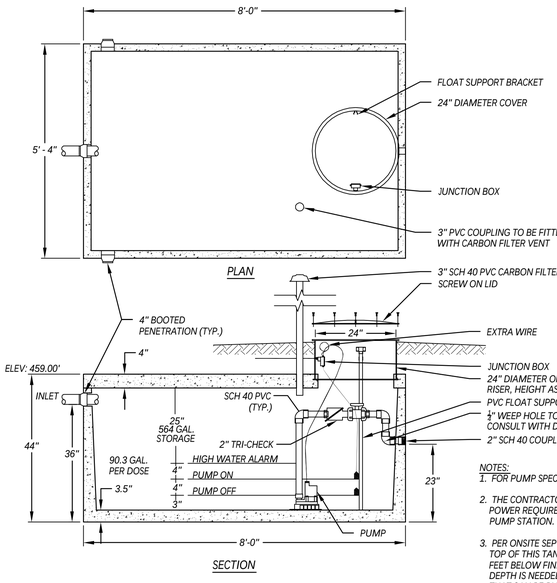

800 GALLON PUMP STATION (TOP SEAM) DETAIL

NTS

NOTES:
1. FOR PUMP SPECIFICATIONS REFER TO PUMP BASIS OF DESIGN.
2. THE CONTRACTOR AND SUPPLIER SHALL COORDINATE POWER REQUIREMENTS PRIOR TO ORDERING OF THE PUMP STATION.
3. PER ONSITE SEPTIC SOLUTIONS, LLC (SUPPLIER), THE TOP OF THIS TANK SHALL BE BURIED NO DEEPER THAN 3 FEET BELOW FINISHED GRADE. IF A DEEPER BURIAL DEPTH IS NEEDED SEE SUPPLIER FOR SIMILAR TANKS THAT CAN BE BURIED DEEPER THAN 3 FEET.

SPECIFICATIONS:
1. TANK TO MEET ASTM 1227C REQUIREMENTS
2. TOP SEAM CONSTRUCTION
3. JOINT SEALANT IS BUTYL RUBBER MASTIC TYPICAL OF CONSEAL CS-102.
4. NOT DESIGNED FOR TRAFFIC AREAS
5. ALL DIMENSIONS SHOW ARE PER ONSITE SEPTIC SOLUTIONS, LLC PRODUCTS 2011.

BASIS OF DESIGN – WASTEWATER

OWNER: Patricia B. Naritomi Trust, 1154 Roscoe Road, Charlotte, VT 05445
SITE LOCATION: Parcel 000 31 1154, 1154 Roscoe Road, Charlotte, VT 05445

DESCRIPTION: Existing three (3) bedroom single family home on 32.7 acre lot to have a replacement septic disposal design for a failed system. No change to pre-existing shallow water supply well (spring). Water supply well is shared with another single family 3-bedroom residence; Owner Erin Crouch, 1092 Roscoe Road (adjoining lot). Total septic capacity = 420 GPD. Total water supply capacity = 420 GPD. No change to capacity of wastewater or water is proposed. New performance based mound system proposed for onsite septic disposal replacement of failed system.

Wastewater disposal to be mound septic system using existing 1,000 septic tank with new 800 gallon pump station. Design is Performance based per 1-805 (d). Min. depth to Seasonal High Water Table (SHWT) = 18" in mound area. Percolation Rate t =12.5 min/in. Slope of ground in mound area is 8.5%.

Design Flow Q: based on VT EPR Chapter 1 — 3 BR SFR
3 BR x 140 GPD = 420
TOTAL FLOW Q = 420 GPD

Loading Rate Lr (mound) = **1.0 GPD/SqFt** (maximum allowed, mound)
Disposal Area Required: A = Q/Lr = 420/1.0 = **420 SqFt** (minimum)
DESIGN: Use A = 490 Sq Ft Actual Loading Rate Lr = 0.86 GPD/SqFt
(Allow for future expansion to 4 bedrooms, by future amendment)
Linear Loading Rate LLR (GPD/LF)
Desktop Mounding Analysis
Factors: Slope = 8.5% — Limiting SHWT = 18" (1.5 ft)
Soil = Fine Sandy Loam — Factor f = 13.5

LLR = h x (f) (GPD/LF) Where h = depth of soil above SHWT available for mounding
h = (SHWT – 0.5 ft) = Maintain 0.5 ft (6") of unsaturated soil column.
h = 1.5 – 0.5 = 1.0 ft
LLR = 1.0 x 13.5 = 13.5 (GPD/LF)
Minimum Disposal Bed Length L_{min} = Q/LLR = 420/13.5 = 31.1 ft
Actual Mounding H_a per Design Length L_d Where L_d = 49.0 ft
H_a = Q/(L_d x f) = 420/(49.0 x 13.5) = 0.63 ft = 7.62" Use 0.67 ft (8") for design.
Minimum Depth of Sand under disposal bed = 36" - (SHWT - H_a)
Design Minimum Depth Sand = 36" - (18"– 8") = 26 inches. Design use 27 inches
Depth to Bedrock = >30" (all pits) + 26" sand = >56" (OK > 48" bed to bedrock)

Disposal Bed Design: Width = 10.0 ft Length = 49.0 ft
Distribution Piping: Forcemain to be 1 ½" dia. SDR-26 pipe, leading to 1 ½" manifold at the end of stone bed, then to two (2) 1½" dia. SCH-40 PVC lateral pipes. Lateral pipe length = 47 ft each. Laterals to each have 12 orifices (24 total) 5/32" dia., spaced 4'–0" on center. (see detail). Minimum flow rate per orifice = 0.61 gpm. Total system flow rate =14.5 gpm. Flow differential between first and last orifice = 0.7%. Transport velocity in forcemain = 2.3 fps.

Step Type Septic Tank & Pump Station: System Design is 420 GPD. Use a 1,000 gallon pre-cast concrete septic tank (existing) with concrete manhole riser to finish grade (existing), add an effluent filter to outlet allowing maximum 1/8" diameter solids to pass. Use 800 gallon concrete pump station which provides minimum 420 gallon (24 hrs flow) of emergency storage volume above the high alarm float elevation.

DISCHARGE PUMP: Use 1/3 or 0.4 Hp effluent pump with minimum discharge rate as follows:

Total Lift	ΔH	=	5.0 ft
Friction Loss	f	=	2.8 ft
Residual Head	Hr	=	4.0 ft
Total Dynamic Head	**TDH**	**=**	**11.2 ft**
Flow Rate	**Q**	**=**	**14.5 GPM**

Dose Regime: A minimum of 4 dose cycles per day is required.
420/4 = 105.0 gallons (max. dose)
The minimum dose volume = 5 x the distribution pipe network volume. V dpn= 15.1 gallons
Min Dose = 15.1 x 5 = 75.5 gallons (min. dose).

Use **90 gallons dose volume**. Use On/Off float distance = 4.0"
Float heights above wet well floor to be; pump off = 3", pump on = 7", high alarm = 11"
Emergency storage volume above 11" = 561 gallons (24" x 23.4 gal/in = 561 gallons)

BASIS OF DESIGN – WATER SUPPLY:

Average Day Demand	ADD	=	420 GPD (per Vt EPR Chap 1)
Maximum Day Demand	MDD	=	ADD/720 min = 0.58 gpm
Instantaneous Peak Demand	IPD	=	5 gpm (per SFR unit, minimum)

Water Supply is existing spring (shallow well). Spring is housed in 12' by 12' concrete foundation with roofed weather-tight building protecting the water source. Interior dimension is 11 feet by 11 feet with water depth as of 04/10/17 = 32". Volume of water storage at this date is approximately 2,400 gallons. Waterline pressurized at 35 to 45 psi by 1.5 hp Century pump Model C48C53A06 with a 30 gal pressure tank located in the spring house.

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Wastewater Tank Details & Soils

Stuart Bennett Property

1154 Roscoe Road, Charlotte, VT

SIZE	DWG Date:	DWG NO.	REV
D	4/15/17		00

SCALE NOTED | Drawn by: SMS | Checked by: TMC | SHEET 3 of 3