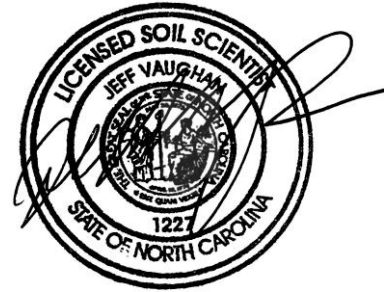




Agri-Waste Technology, Inc.  
501 N Salem Street, Suite 203, Apex, NC 27502  
agriwaste.com | 919.859.0669



**Soil Suitability for Domestic Sewage Treatment and Disposal Systems**  
**Birchwood Trails – Lot 81**  
**Olive Branch Rd. Fuquay Varina, NC 27526**  
**(Harnett County)**  
February 10, 2024

Soil suitability for domestic sewage treatment and disposal systems was evaluated on April 24, 2023, for the property located at Olive Branch Rd. in Fuquay Varina, NC (Harnett County). Jeff Vaughan, Heath Clapp, and Trent Bostic of Agri-Waste Technology, Inc. (AWT) conducted the soil evaluation. This evaluation was done to facilitate permitting for a septic system for a 4-bedroom home. This report and attached documents were prepared *to this application is to be used to issue an Improvement Permit in accordance with G.S. 130A-335(a2) and (a3). The LSS evaluation is being submitted pursuant to and meets the requirements of G.S. 130A-335(a2).*

A drawing of the site plan, septic layout, septic system design, and soil pit locations is included in Attachment 1. Profile descriptions for each soil boring are included in Attachment 2.

Site Conditions

The total property area is approximately .86 acres. The house and septic area are wooded. The proposed septic system for the property is a pressure manifold fed, accepted status system for initial and repair. The home is proposed near the front of the lot and the septic system is proposed to the rear of the house.

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

The drawing in Attachment 1 details the property boundaries, soil pit locations, and layout of drain field trenches. Multiple soil pits and borings were advanced within the proposed septic system area on the property. The site has been evaluated and meets the soil and site evaluations criteria set forth in 15A NCAC Subchapter 18E – Wastewater Treatment and Dispersal Systems.. All soil pits/borings were provisionally suitable for a conventional style trench. Soil pits/borings are within the proposed drainfield area.

The layout shown in Attachment 1 indicates there is available space for a four-bedroom accepted system. The initial system can be installed with the use of an accepted status drainfield based on the layout in the field.

The proposed LTAR (Long Term Acceptance Rate) by AWT is 0.4GPD/ft<sup>2</sup>. The soils on this property are group III soils within the distribution and treatment zone as used to define the LTAR. With an LTAR of 0.4GPD/ft<sup>2</sup>, 600 linear feet of trench is necessary to support a 4-bedroom home for the initial and repair system with the use of an accepted trench product. The maximum slope corrected trench depth is 14 inches. The attached drawings substantiate that the necessary linear footage of trench can be installed on the property for the initial and repair system.

Any logging, disturbances, or grading done in the usable area or within the proposed setbacks will change the potential of using the area designated for a drainfield. Prior to moving forward with the development on the property, the Harnett County Health Department should be contacted to complete the necessary Construction Oversight and to issue an OP (Operations Permit) for the property once the septic system has been installed.

#### Conclusions

An IP (Improvement Permit) and CA (Construction Authorization) for this property can be issued with the site plan that is in Attachment 1. A CA permit will be required to secure a building permit for the property. The county issues an Operation Permit after the system has been installed to meet the specifications of the Authorization to Construct. Additional septic layouts have been or will be performed as needed. It will be critical to not disturb any of the proposed septic area or there is a risk that the IP and CA will be revoked. The LSS/AOWE Evaluation and attached documents were prepared *to this application is to be used to issue an Improvement Permit in accordance with G.S. 130A-335(a2) and (a3). The LSS/AOWE evaluation is being submitted pursuant to and meets the requirements of G.S. 130A-335(a2) and (a5).*

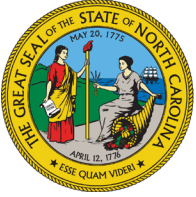
We appreciate the opportunity to assist you in this matter. Please contact us with any questions, concerns, or comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeff V", is positioned above the printed name.

Jeff Vaughan, NC LSS

Permit #: \_\_\_\_\_



NC DEPARTMENT OF  
**HEALTH AND  
HUMAN SERVICES**

ROY COOPER • Governor

KODY H. KINSLEY • Secretary

MARK BENTON • Deputy Secretary for Health

SUSAN KANSAGRA • Assistant Secretary for Public Health

Division of Public Health

Submittal Includes: ☐ (a2) Improvement Permit ☐ (a2) Construction Authorization ☐ Fee \$ \_\_\_\_\_

**IMPROVEMENT PERMIT FOR G.S. 130A-335(a2)**

County: \_\_\_\_\_

PIN/Lot Identifier: \_\_\_\_\_

Issued To: \_\_\_\_\_

Property Location: \_\_\_\_\_

Subdivision (if applicable) \_\_\_\_\_ Lot #: \_\_\_\_\_ Block: \_\_\_\_\_ Section: \_\_\_\_\_

LSS Report Provided: Yes ☐ No ☐

If yes, name and license number of LSS: \_\_\_\_\_

New ☐

Expansion ☐

System Relocation ☐

Change of Use ☐

Proposed Structure: \_\_\_\_\_

Number of bedrooms: \_\_\_\_\_ Number of Occupants: \_\_\_\_\_ Other: \_\_\_\_\_

Design Wastewater Strength: ☐ domestic ☐ high strength ☐ industrial process

Proposed Design Daily Flow: \_\_\_\_\_ GPD Proposed LTAR (Initial): \_\_\_\_\_ Proposed LTAR (Repair): \_\_\_\_\_

Proposed Wastewater System Type\*: \_\_\_\_\_ (Initial) Pump Required: ☐ Yes ☐ No ☐ May be required

Proposed Wastewater System Type\*: \_\_\_\_\_ (Repair) Pump Required: ☐ Yes ☐ No ☐ May be required

*\*Please include system classification for proposed wastewater system types in accordance with 15A NCAC 18A .1961 Table V(a)*

Saprolite System (initial): ☐ Yes ☐ No Saprolite System (repair): ☐ Yes ☐ No

Fill System (Initial): ☐ Yes ☐ No If yes, specify: ☐ New ☐ Existing (when adding more than 6 inches of fill to system area provide a fill plan)

Fill System (repair): ☐ Yes ☐ No If yes, specify: ☐ New ☐ Existing (when adding more than 6 inches of fill to system area provide a fill plan)

Usable Soil Depth (Initial): \_\_\_\_\_ Usable Soil Depth (Repair): \_\_\_\_\_

Max. Trench Depth (Initial)\*: \_\_\_\_\_ Max. Trench Depth (Repair)\*: \_\_\_\_\_ *\* Measured on the downhill side of the trench*

Artificial Drainage Required: ☐ Yes ☐ No If yes, please specify details: \_\_\_\_\_

Type of Water Supply: ☐ Private well ☐ Public well ☐ Shared well ☐ Municipal Supply ☐ Spring ☐ Other: \_\_\_\_\_

Drainfield location meets requirements of Rule .1945: Yes ☐ No ☐ Drainfield location meets requirements of Rule .1950: Yes ☐ No ☐

Permit valid for: ☐ Five years [site plan submitted pursuant to GS 130A-334(13a)] ☐ No expiration [plat submitted pursuant to GS 130A-334(7a)]

Permit conditions:

Licensed Soil Scientist Print Name: \_\_\_\_\_

Licensed Soil Scientist Signature: \_\_\_\_\_ Date: \_\_\_\_\_

The LSS evaluation is being submitted pursuant to and meets the requirements of G.S. 130A-335(a2).

**\*See attached site sketch\***

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES • DIVISION OF PUBLIC HEALTH

LOCATION: 5605 Six Forks Road, Building 3, Raleigh, NC 27609

MAILING ADDRESS: 1632 Mail Service Center, Raleigh, NC 27699-1632

www.ncdhhs.gov • TEL: 919-707-5854 • FAX: 919-845-3972

AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER

***This Section for Local Health Department Use Only***Initial submittal received: \_\_\_\_\_ by \_\_\_\_\_  
Date Initials

G.S. 130A-335(a3) states the following:

*When an applicant for an Improvement Permit submits to a local health department an Improvement Permit application, the permit fee charged by the local health department, the common form developed by the Department, and a soil evaluation pursuant to subsection (a2) of this section, the local health department shall, within five business days of receiving the application, conduct a completeness review of the submittal. A determination of completeness means that the Improvement Permit includes all of the required components. If the local health department determines that the Improvement Permit is incomplete, the local health department shall notify the applicant of the components needed to complete the Improvement Permit. The applicant may submit additional information to the local health department to cure the deficiencies in the Improvement Permit. The local health department shall make a final determination as to whether the Improvement Permit is complete within five business days after the local health department receives the additional information from the applicant. If the local health department fails to act within any period set out in this subsection, the applicant may treat the failure to act as a determination of completeness. The Department shall develop a common form for use as the Improvement Permit.*

The review for completeness of this Improvement Permit was conducted in accordance with G.S. 130A-335(a3). This Improvement Permit is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing:

\_\_\_\_\_  
\_\_\_\_\_Copies of this were sent to the LSS and the Applicant on \_\_\_\_\_  
Date

State Authorized Agent: \_\_\_\_\_ Date: \_\_\_\_\_

☐ Complete

State Authorized Agent: \_\_\_\_\_ Date: \_\_\_\_\_

**This Improvement Permit is issued pursuant to G.S. 130A-335 (a2) and (a3) using the signed and sealed LSS/LG evaluation(s) attached here. The issuance of this permit by the Health Department in no way guarantees the issuance of other permits. The permit holder is responsible for checking with appropriate governing bodies in meeting their requirements. This permit is subject to revocation if the site plan, plat, or the intended use changes. The Improvement Permit shall not be affected by a change in ownership of the site. This permit is subject to compliance with the provisions of the Laws and Rules for Sewage Treatment and Disposal and to the conditions of this permit.**

**The Department, the Department's authorized agents, and the local health departments shall be discharged and released from any liabilities, duties, and responsibilities imposed by statute or in common law from any claim arising out of or attributed to evaluations, submittals, or actions from a licensed soil scientist or licensed geologist pursuant to GS 130A-335(a2).**

Improvement Permit Expiration Date: \_\_\_\_\_

**\*See attached site sketch\***

**Re-submittal of Improvement Permit**

LHD USE ONLY: This IP resubmittal received: \_\_\_\_\_ by \_\_\_\_\_  
*Date* *Initials*

The following items are being resubmitted pursuant to G.S. 130A-335(a3) for issuance of the Improvement Permit:

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I, \_\_\_\_\_ hereby attest that the information required to be included with this re-submittal  
*Licensed Soil Scientist (Print Name)*  
is accurate and complete to the best of my knowledge and that the proposed Improvement Permit meets all applicable federal, State, and local laws, regulations, rules, and ordinances.

\_\_\_\_\_  
*Signature of Licensed Soil Scientist*

\_\_\_\_\_  
*Date*

*The section below is for Local Health Department use after submittal of items noted as missing above.*

**LHD Follow-up Completeness Review of Improvement Permit**

The review for completeness of this Improvement Permit re-submittal was conducted in accordance with G.S. 130A-335(a3). This Improvement Permit is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing:

---

---

Copies of this were sent to the LSS and the Applicant on \_\_\_\_\_  
*Date*

State Authorized Agent: \_\_\_\_\_

Date: \_\_\_\_\_

☐ Complete

State Authorized Agent: \_\_\_\_\_

Date: \_\_\_\_\_

## CONSTRUCTION AUTHORIZATION FOR G.S. 130A-335(a2)

County: \_\_\_\_\_

PIN/Lot Identifier: \_\_\_\_\_

Issued To: \_\_\_\_\_

Property Location: \_\_\_\_\_

AOWE/PE Plans/Evaluations Provided: Yes ☐ No ☐ If yes, name and license number of AOWE/PE: \_\_\_\_\_

Facility Type: \_\_\_\_\_

☐ New ☐ Expansion ☐ Repair ☐ System Relocation ☐ Change of Use

Basement? ☐ Yes ☐ No Basement Fixtures? ☐ Yes ☐ No

Type of Wastewater System\* \_\_\_\_\_ (Initial) \_\_\_\_\_ (Repair)

*\*Please include system classification for proposed wastewater system types in accordance with 15A NCAC 18A .1961 Table V(a)*

Design Daily Flow: \_\_\_\_\_ GPD Wastewater Strength: ☐ domestic ☐ high strength ☐ industrial process

Session Law 2014-120 Section 53, Engineering Design Utilizing Low-flow Fixtures and Low-flow Technologies? ☐ Yes ☐ No  
(if yes, please provide engineering documentation)

### Installation Requirements/Conditions

Septic Tank Size: \_\_\_\_\_ gallons Total Trench/Bed Length: \_\_\_\_\_ feet Trench/Bed Spacing: \_\_\_\_\_ feet on center

Trench/Bed Width: \_\_\_\_\_ inches LTAR: \_\_\_\_\_ gpd/ft<sup>2</sup>

Soil Cover: \_\_\_\_\_ inches Slope Corrected Maximum Trench/Bed Depth<sup>†</sup>: \_\_\_\_\_ inches *\* Measured on the downhill side of the trench*

Aggregate Depth: \_\_\_\_\_ inches above pipe \_\_\_\_\_ inches below pipe \_\_\_\_\_ inches total

Pump Tank Size (if applicable): \_\_\_\_\_ gallons Requires more than 1 pump? ☐ Yes ☐ No

Pump Requirements: \_\_\_\_\_ ft. TDH vs. \_\_\_\_\_ GPM Grease Trap Size (if applicable): \_\_\_\_\_ gallons

Distribution Method: ☐ Serial ☐ D-Box or Parallel ☐ Pressure Manifold(s) ☐ LPP ☐ Other: \_\_\_\_\_

Artificial Drainage Required: Yes ☐ No ☐ If yes, please specify details: \_\_\_\_\_

**Legal Agreements** (If the answer is "Yes" to any type of legal agreements, please attach a copy of the agreement.)

Multi-party Agreement Required [.1937(h)]: ☐ Yes ☐ No

Easement, Right-of-Way, or Encroachment Agreement Required [.1938(j)]: ☐ Yes ☐ No

Declaration of Restrictive Covenants: ☐ Yes ☐ No

Pre-Construction Conference Required: Yes ☐ No ☐

Conditions: \_\_\_\_\_

The construction and installation requirements of Rules .1950, .1952, .1954, .1955, .1956, .1957, .1958, and .1959 are incorporated by reference into this permit and shall be met. Systems shall be installed in accordance with the attached system layout.

AOWE/PE Print Name: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

AOWE/PE Signature: \_\_\_\_\_

Date: \_\_\_\_\_

This AOWE/PE submittal is pursuant to and meets the requirements of G.S. 130A-335(a2) and (a5).



**\*See attached site sketch\***



***This Section for Local Health Department Use Only***Initial submittal received: \_\_\_\_\_ by \_\_\_\_\_  
Date Initials

G.S. 130A-335(a5) states the following:

*When an applicant for a Construction Authorization, or an Improvement Permit and Construction Authorization together, submits a Construction Authorization, or an Improvement Permit and Construction Authorization application together, the permit fee charged by the local health department, the common form developed by the Department, and any necessary signed and sealed plans or evaluations conducted by a person licensed pursuant to Chapter 89C of the General Statutes as a licensed engineer or a person certified pursuant to Article 5 of Chapter 90A of the General Statutes as an Authorized On-Site Wastewater Evaluator, the local health department shall, within five business days of receiving the application, conduct a completeness review of the submittal. A determination of completeness means that the Construction Authorization or Improvement Permit and Construction Authorization includes all of the required components. If the local health department determines that the Construction Authorization or Improvement Permit and Construction Authorization is incomplete, the local health department shall notify the applicant of the components needed to complete the Construction Authorization or Improvement Permit and Construction Authorization. The applicant may submit additional information to the local health department to cure the deficiencies in the Construction Authorization or Improvement Permit and Construction Authorization. The local health department shall make a final determination as to whether the Construction Authorization or Improvement Permit and Construction Authorization is complete within five business days after the local health department receives the additional information from the applicant. If the local health department fails to act within any period set out in this subsection, the applicant may treat the failure to act as a determination of completeness. The applicant may apply for the building permit for the project upon the decision of completeness of the Construction Authorization or Improvement Permit and Construction Authorization by the local health department or if the local health department fails to act within five business days. The Authorized On-Site Wastewater Evaluator or licensed engineer submitting the evaluation pursuant to this subsection may request that the local health department revoke or suspend the Construction Authorization or Improvement Permit and Construction Authorization for cause. Upon written request of the Authorized On-Site Wastewater Evaluator or licensed engineer, the local health department shall suspend or revoke the Construction Authorization or Improvement Permit and Construction Authorization pursuant to G.S. 130A-23. The Department shall develop a common form for use as the Construction Authorization.*

The review for completeness of this Construction Authorization was conducted in accordance with G.S. 130A-335(a5). This

Construction Authorization is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)The following items are missing: \_\_\_\_\_  
\_\_\_\_\_Copies of this were sent to the AOWE/PE and the Applicant on \_\_\_\_\_  
Date

State Authorized Agent: \_\_\_\_\_ Date: \_\_\_\_\_

☐ Complete

State Authorized Agent: \_\_\_\_\_ Date of Issuance: \_\_\_\_\_

**This Construction Authorization is issued pursuant to G.S. 130A-335(a2) and (a5) using the signed and sealed plans or evaluations attached here. This Construction Authorization is subject to revocation if the site plan, plat, or the intended use changes. The Construction Authorization shall not be affected by a change in ownership of the site. This Construction Authorization is subject to compliance with the provisions of the Laws and Rules for Sewage Treatment and Disposal and to the conditions of this permit.**

**The Department, the Department's authorized agents, and the local health departments shall be discharged and released from any liabilities, duties, and responsibilities imposed by statute or in common law from any claim arising out of or attributed to plans, evaluations, preconstruction conference findings, submittals, or actions from a person licensed pursuant to Chapter 89C of the General Statutes as a licensed engineer or a person certified pursuant to Article 5 of Chapter 90A of the General Statutes as an Authorized On-Site Wastewater Evaluator in GS 130A-335(a2), (a5), and (a7). The Department, the Department's authorized agents, and the local health departments shall be responsible and bear liability for their actions and evaluations and other obligations under State law or rule, including the issuance of the operations permit pursuant to GS 130A-337.**

Construction Authorization Expiration Date: \_\_\_\_\_

**\*See attached site sketch\***

**Re-submittal of Construction Authorization**

LHD USE ONLY: This CA resubmittal received: \_\_\_\_\_ by \_\_\_\_\_  
Date Initials

The following items are being resubmitted pursuant to G.S. 130A-335(a5) for issuance of the Construction Authorization:

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I, \_\_\_\_\_ hereby attest that the information required to be included with this re-submittal  
*Authorized Onsite Wastewater Evaluator (Print Name)*  
is accurate and complete to the best of my knowledge and that the proposed Construction Authorization meets all applicable federal, State, and local laws, regulations, rules, and ordinances.

\_\_\_\_\_  
*Signature of Authorized On-Site Wastewater Evaluator*

\_\_\_\_\_  
*Date*

*The section below is for Local Health Department use after submittal of items noted as missing above.*

**LHD Follow-up Completeness Review of Construction Authorization**

The review for completeness of this Construction Authorization re-submittal was conducted in accordance with G.S. 130A-335(a5). This Construction Authorization is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing:

---

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Copies of this were sent to the AOWE/PE and the Applicant on \_\_\_\_\_  
Date

State Authorized Agent: \_\_\_\_\_

Date: \_\_\_\_\_

☐ Complete

State Authorized Agent: \_\_\_\_\_

Date: \_\_\_\_\_



SOIL/SITE EVALUATION for ON-SITE WASTEWATER SYSTEM

OWNER: Ballentine Associates APPLICATION DATE: 2/10/2024

ADDRESS: 221 Providence Road, Chapel Hill, NC 27514 EVALUATION DATE: 4/24/2023 – 1/29/2024

PROPERTY ID: Lot 81 COUNTY: Harnett PROPERTY RECORDED: No

PROPOSED FACILITY: Single Family Residence PROPOSED DESIGN FLOW (.0400): 480 GPD PROPERTY SIZE: 0.86 ac

LOCATION OF SITE: Olive Branch Road, Fuquay Varina, NC 27526 PROPERTY RECORDED: No

WATER SUPPLY: ☒ Public ☐ Single Family Well ☐ Shared Well ☐ Spring ☐ Other WATER SUPPLY SETBACK:

EVALUATION METHOD: ☒ Auger Boring ☒ Pit ☐ Cut TYPE OF WASTEWATER: ☒ Domestic ☐ High Strength ☐ IPWW

P R O F I L E  #	.0502 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY		OTHER PROFILE FACTORS				.0509 PROFILE CLASS & LTAR*	.0502(d) SLOPE CORRECTIO N
			.0503 STRUCTURE/ TEXTURE	.0503 CONSISTE NCE/ MINERALOGY	.0504 SOIL WETNESS/ COLOR	.0505 SOIL DEPTH	.0506 SAPRO CLASS	.0507 RESTR HORIZ		
1, 4	2-3%	A 0-8"	LS; GR	NS; NP; VFr	10YR 3/3	33"	-	-	Suitable	32" Slope Corrected Depth
		E 8-18"	LS; GR	NS; NP; VFr	10YR 7/6					
		Bt1 18-33"	SCL; SBK	SS; SP; Fi-Fr	2.5YR 5/8					
		Bt2 33"+	SCL; SBK	S; SP; Fi	2.5YR 5/8					
					10YR 6/1					
2, 3	2-3%	A 0-5"	LS; GR	NS; NP; VFr	10YR 3/3	27"	-	-	Suitable	26" Slope Corrected Depth
		E 5-15"	LS; GR	NS; NP; VFr	10YR 7/6					
		Bt1 15-27"	SCL; SBK	SS; SP; Fi-Fr	2.5YR 5/8					
		Bt2 27"+	SCL; SBK	S; SP; Fi	2.5YR 5/8					
					10YR 6/1					
Pit 1, 2	2-3%	A 0-6	LS; GR	NS; NP; VFr	10YR 3/3	36"	-	-	Suitable	35" Slope Corrected Depth
		E 6-20"	LS; GR	NS; NP; VFr	10YR 7/6					
		Bt1 20-36"+	SCL; SBK	SS; SP; Fi-Fr	2.5YR 5/8					

DESCRIPTION	INITIAL SYSTEM	REPAIR SYSTEM	SITE CLASSIFICATION (.0509): Suitable EVALUATED BY: Jeff Vaughan OTHER(S) PRESENT: Heath Clapp
Available Space (.0508)	Suitable	Suitable	
System Type(s)	Accepted Pressure Manifold	Accepted Pressure Manifold	
Site LTAR	0.4 GPD/Ft2	0.4 GPD/Ft2	
Maximum Trench Depth	14"	14"	
Comments:			

LEGEND

LANDSCAPE POSITION	SOIL GROUP	SOIL TEXTURE	CONVENTIONAL LTAR (gpd/ft²)	SAPROLITE LTAR (gpd/ft²)	LPP LTAR (gpd/ft²)	MINERALOGY/ CONSISTENCE		STRUCTURE
CC (Concave slope)	I	S (Sand)	0.8 - 1.2	0.6 - 0.8	0.4 -0.6	MOIST	WET	SG (Single grain)
CV (Convex Slope)		LS (Loamy sand)		0.5 -0.7		Lo (Loose)	NS (Non-sticky)	M (Massive)
D (Drainage way)	II	SL (Sandy loam)	0.6 - 0.8	0.4 -0.6	0.3 - 0.4	VFR (Very friable)	SS (Slightly sticky)	GR (Granular)
FP (Flood plain)		L (Loam)		0.2 - 0.4		FR (Friable)	S (Sticky)	SBK (Subangular blocky)
FS (Foot slope)	III	SiL (Silt loam)	0.3 - 0.6	0.1 - 0.3	0.15 - 0.3	FI (Firm)	VS (Very sticky)	ABK (Angular blocky)
H (Head slope)		SCL (Sandy clay loam)		0.05 - 0.15**		VFI (Very firm)	NP (Non-plastic)	PR (Prismatic)
L (Linear Slope)		CL (Clay loam)		None		EFI (Extremely firm)	SP (Slightly plastic)	PL (Platy)
N (Nose slope)		SiCL (Silty clay loam)					P (Plastic)	
R (Ridge/summit)		Si (Silt)						
S (Shoulder slope)		IV				SC (Sandy clay)	0.1 - 0.4	
T (Terrace)	SiC (Silty clay)		EXP (Expansive)					
TS (Toe Slope)	C (Clay)							
		O (Organic)	None					

\* Adjust LTAR due to depth, consistence, structure, soil wetness, landscape, position, wastewater flow and quality.

\*\*Sandy clay loam saprolite can only be used with advanced pretreatment in accordance with 15A NCAC 18E .1200.

HORIZON DEPTH

In inches below natural soil surface

DEPTH OF FILL

In inches from land surface

RESTRICTIVE HORIZON

Thickness and depth from land surface

SAPROLITE

S(suitable) or U(unsuitable); Evaluation of saprolite shall be by pits.

SOIL WETNESS

Inches from land surface to free water or inches from land surface to soil colors with chroma 2 or less - record Munsell color chip designation

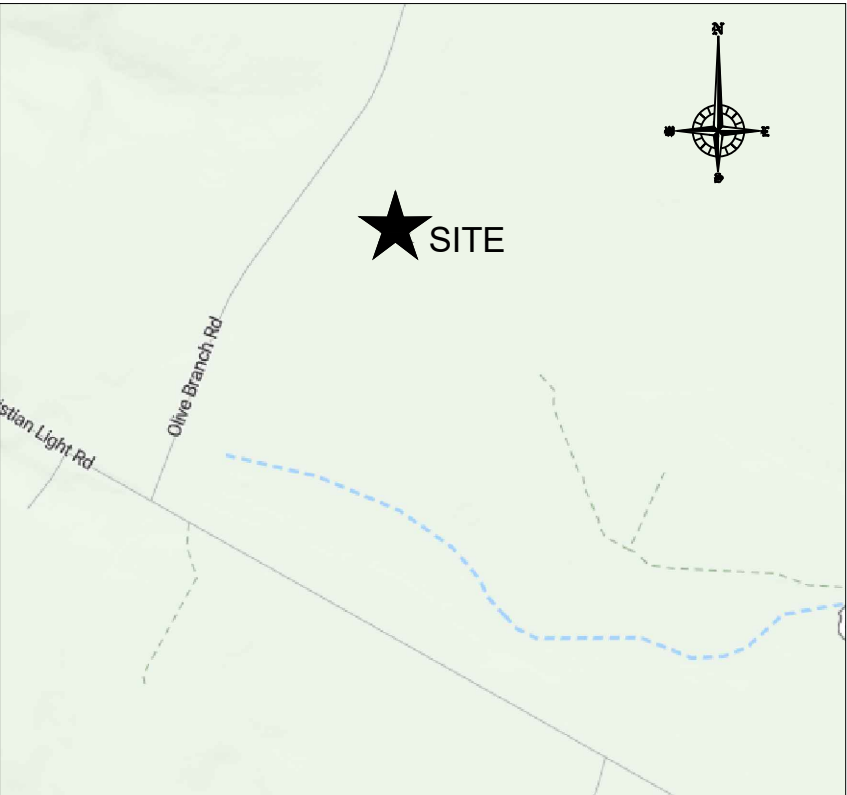
CLASSIFICATION

S (Suitable) or U (Unsuitable)

Show profile locations and other site features (dimensions, reference or benchmark, and North).

BIRCHWOOD TRAILS - LOT 81

Project Location	Olive Branch Rd
	Fuquay Varina, NC 27526
	Harnett County
	PIN: ----
Project Owner	Ballentine Associates, PA
	221 Providence Rd
	Chapel Hill, NC 27514
	919-929-0481
	dillons@ballentineassociates
Project Consultant	Jeff Vaughan, L.S.S
	(919) 367-6313
	Trent Bostic
	(919) 367-6322
	Agri-Waste Technology, Inc.
	501 N. Salem Street, Suite 203
	Apex, NC 27502
	(919) 859-0669
	(919) 233-1970 Fax
System Overview	Single Family Residence
	Four (4) Bedroom, 480 gpd
	Pressure Manifold Distribution
	Accepted/Innovative Trench Product



VICINITY MAP

Sheet Index

Sheet 1	Cover Sheet
Sheet 2	Property Layout
Sheet 3	Primary Drain Field
Sheet 4	Repair Drain Field
Sheet 5	Detail Sheet 1
Sheet 6	Detail Sheet 2
Sheet 7	Excavation Safety



**AWT**  
Engineers and Soil Scientists  
Agri-Waste Technology, Inc.  
501 N. Salem Street, Suite 203 Apex,  
North Carolina 27502  
919-859-0669 www.agriwaste.com

Ballentine Associates, PA  
Birchwood Trails - Lot 81

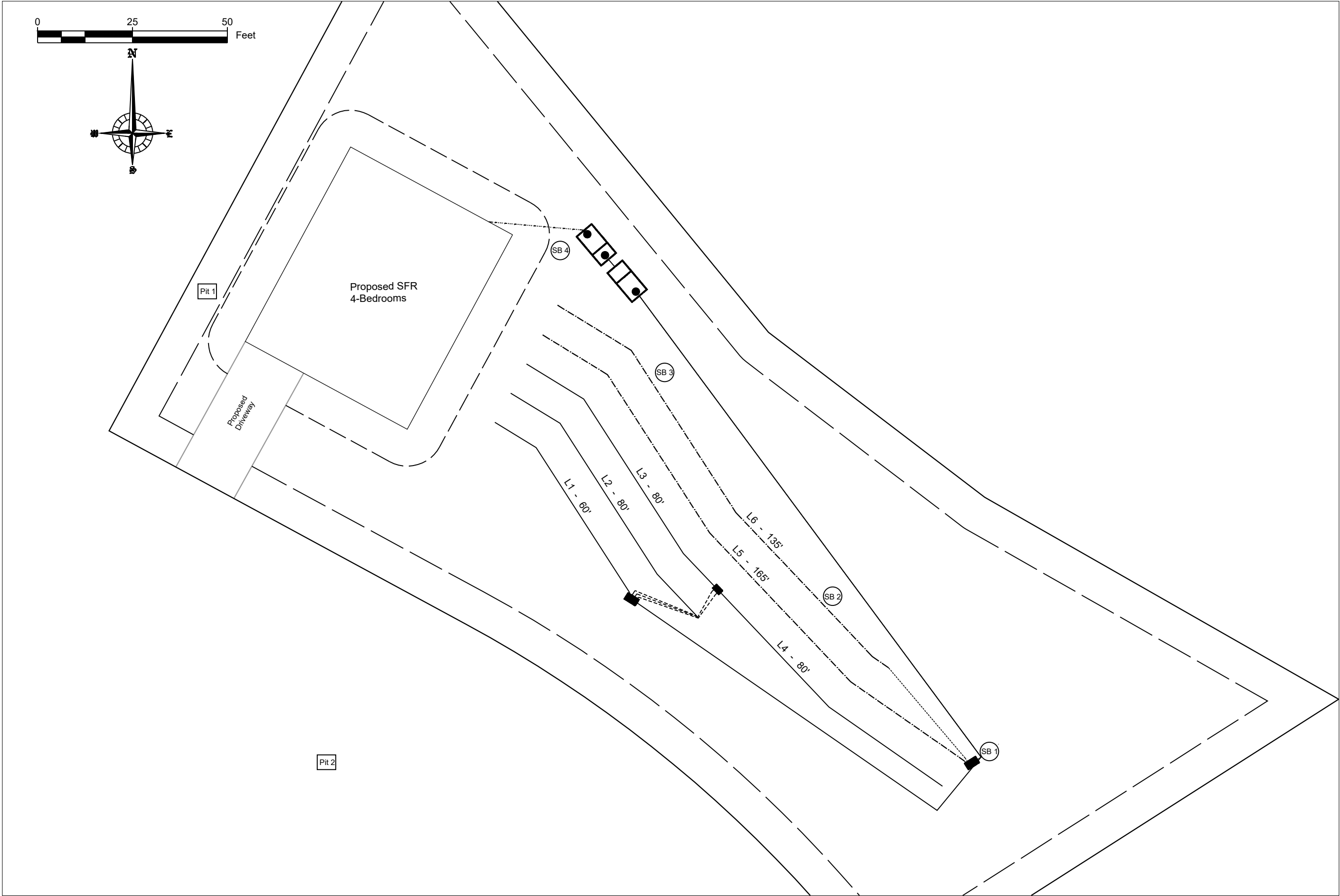
Project Location:  
Olive Branch Rd  
Fuquay Varina, NC 27526  
Harnett County  
PIN: ----

Project Owner:  
Ballentine Associates, PA  
221 Providence Rd  
Chapel Hill, NC 27514  
919-929-0481  
dillons@ballentineassociates

NC ONSITE WASTEWATER  
EVALUATOR SEAL



REV.	ISSUED DATE	DESCRIPTION
SHEET TITLE		
Cover Sheet		
DRAWN BY: H. Clapp	CREATED ON: 2/10/2024	
REVISED BY: ####	REVISED ON: ####	
RELEASED BY: ####	RELEASED ON: ####	
DRAWING NUMBER		
WW-1		



NC ONSITE WASTEWATER  
EVALUATOR SEAL



REV.	ISSUED DATE	DESCRIPTION

SHEET TITLE

Property Layout

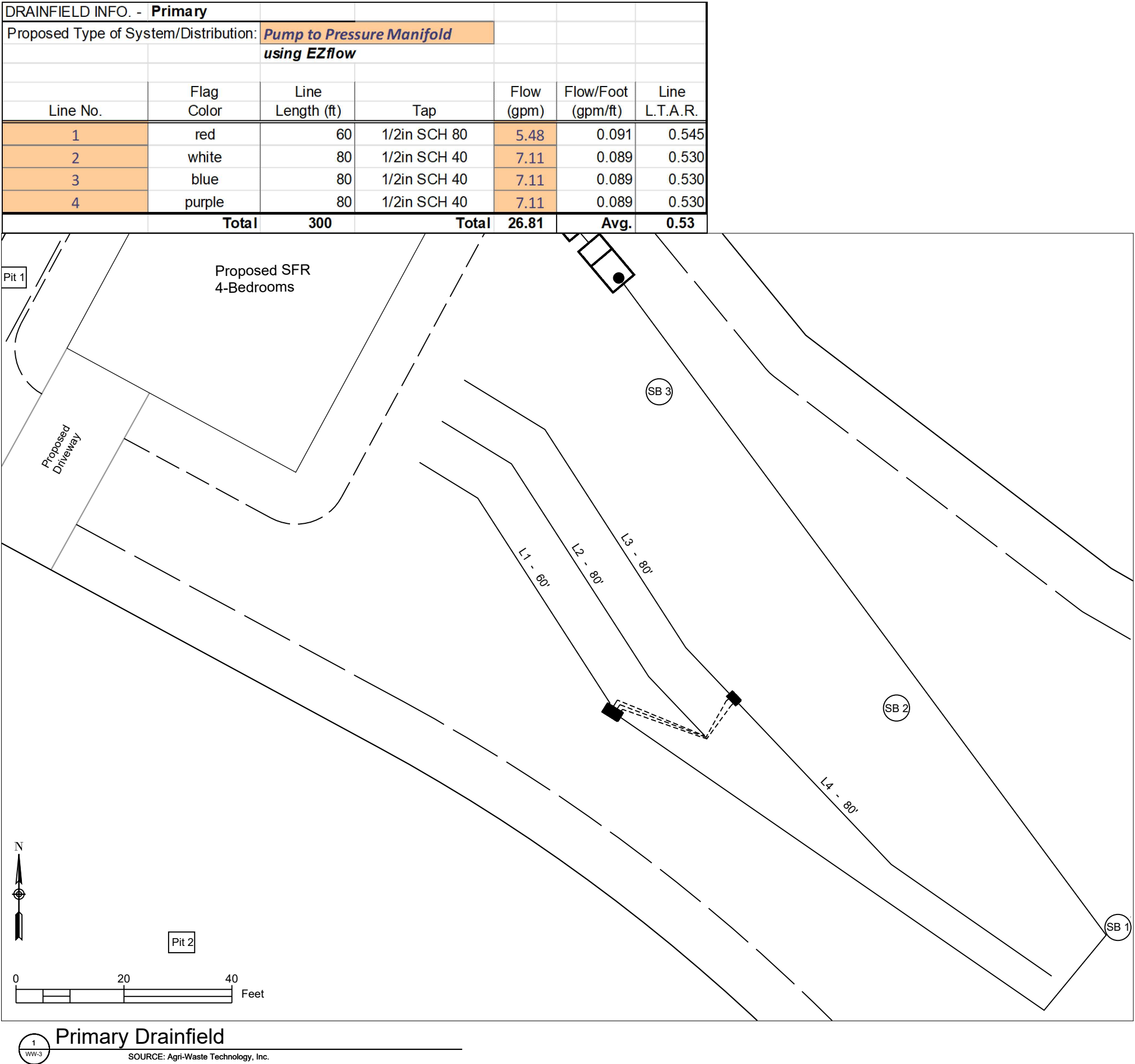
DRAWN BY: H. Clapp	CREATED ON: 2/10/2024
REVISED BY: ####	REVISED ON: ####
RELEASED BY: ####	RELEASED ON: ####

DRAWING NUMBER

WW-2

General Drainfield Notes:

1. Clear all trees less than 8" in diameter (measured at a height 3' from soil surface) from the drainfield.
2. Vegetation that will re-grow from a cut stump shall be stumped or pulled from the ground. Stumps shall not be pushed over.
3. Drainfield area shall be cleared of all leaves, pine straw, debris, etc. The accumulated material shall be removed from the drainfield.
4. In clayey soils, sides of trenches shall be raked and limed per manufacturer's instructions.
5. Supply lines shall be installed with a minimum of 18" cover.
6. The trenches shall be backfilled appropriately so that no low areas are present.
7. Apply lime over the drainfield area as needed. Seed fine fescue over the drainfield at the rate recommended by the seed manufacturer. Hand rake the seed into the soil surface. Straw the seeded area at the rate of 1.5-2 bales per 1000 sq. ft.



**AWT**  
Engineers and Soil Scientists

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Apex, North Carolina 27502  
919-859-0669  
www.agriwaste.com

Ballentine Associates, PA  
Birchwood Trails - Lot 81

Project Location:  
Olive Branch Rd  
Fuquay Varina, NC 27526  
Harnett County  
PIN: ---

Project Owner:  
Ballentine Associates, PA  
221 Providence Rd  
Chapel Hill, NC 27514  
919-929-0481  
dillons@ballentineassociates

NC ONSITE WASTEWATER  
Certification  
Number  
10003E  
EVALUATOR

REV.	ISSUED DATE	DESCRIPTION

SHEET TITLE  
Primary Drainfield

DRAWN BY:  
H. Clapp

CREATED ON:  
2/10/2024

REVISED BY:  
####

REVISED ON:  
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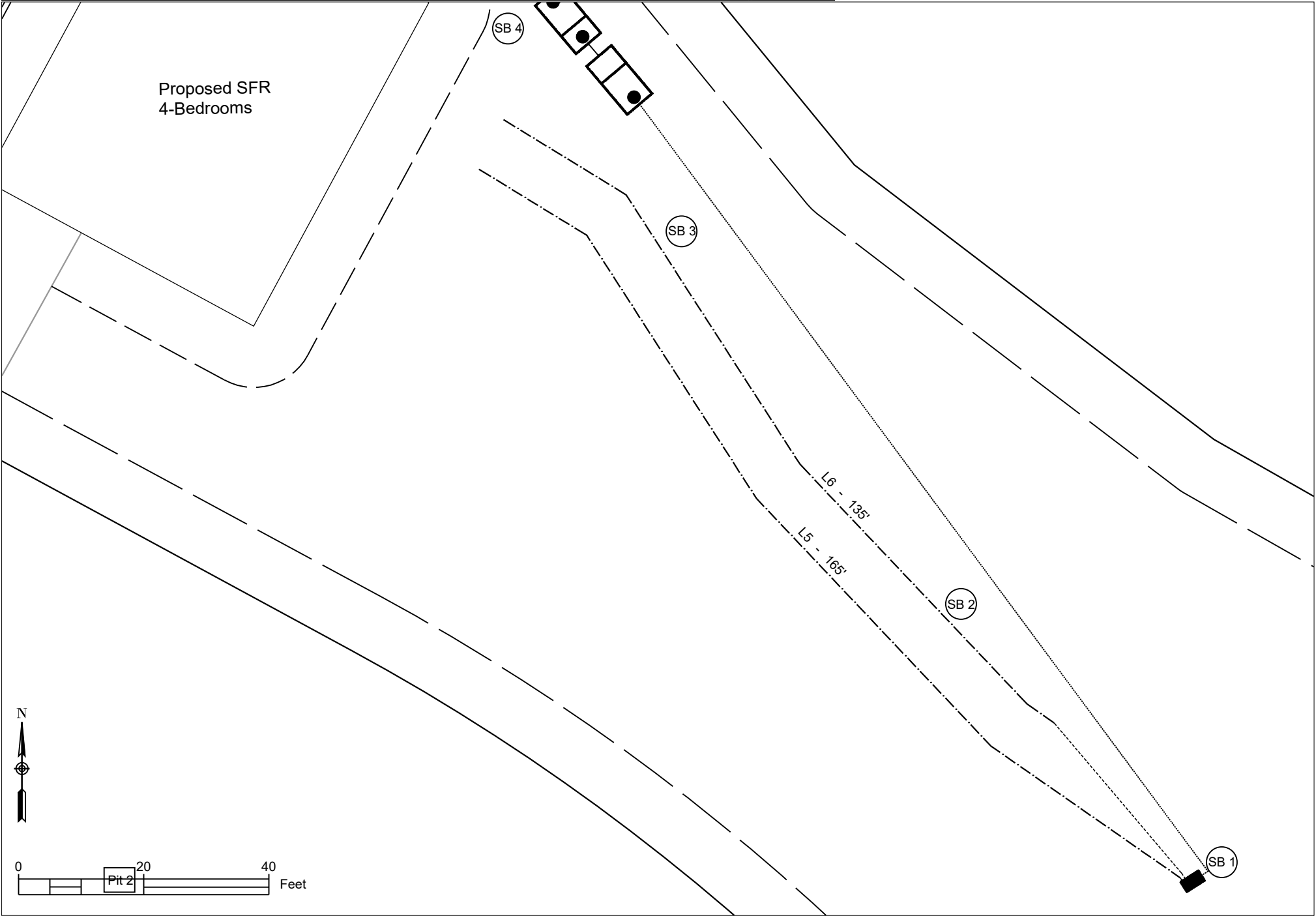
RELEASED ON:  
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DRAWING NUMBER  
WW-3

General Drainfield Notes:

1. Clear all trees less than 8” in diameter (measured at a height 3’ from soil surface) from the drainfield.
2. Vegetation that will re-grow from a cut stump shall be stumped or pulled from the ground. Stumps shall not be pushed over.
3. Drainfield area shall be cleared of all leaves, pine straw, debris, etc. The accumulated material shall be removed from the drainfield.
4. In clayey soils, sides of trenches shall be raked and limed per manufacturer’s instructions.
5. Supply lines shall be installed with a minimum of 18” cover.
6. The trenches shall be backfilled appropriately so that no low areas are present.
7. Apply lime over the drainfield area as needed. Seed fine fescue over the drainfield at the rate recommended by the seed manufacturer. Hand rake the seed into the soil surface. Straw the seeded area at the rate of 1.5–2 bales per 1000 sq. ft.

DRAINFIELD INFO. - Repair						
Proposed Type of System/Distribution:				Pump to Pressure Manifold using EZflow		
Line No.	Flag Color	Line Length (ft.)		Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
5	yellow	165	3/4in SCH 40	12.50	0.076	0.536
6	red	135	3/4in SCH 80	10.10	0.075	0.530
Total		300	Total	22.60	Avg.	0.53

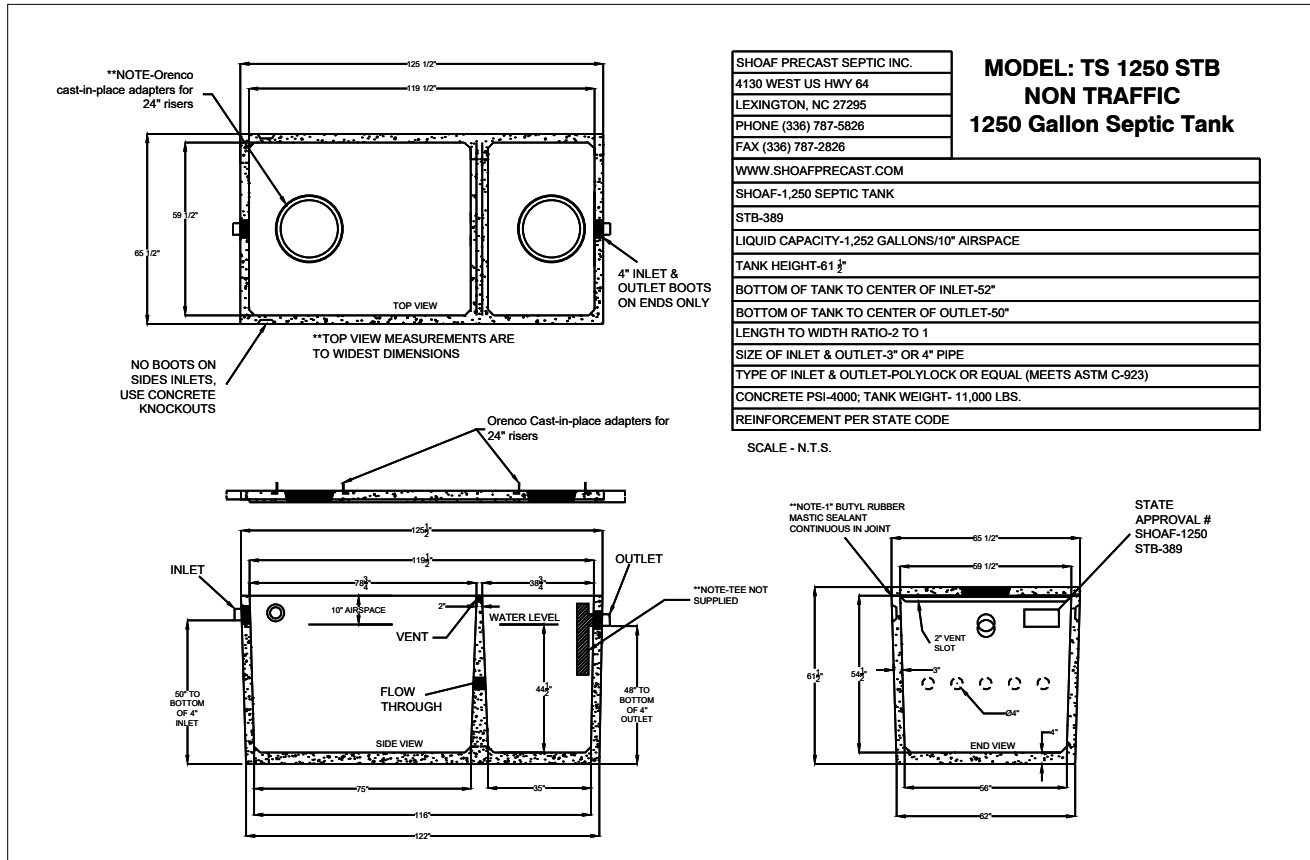


1 Repair Drainfield  
SOURCE: Agri-Waste Technology, Inc.



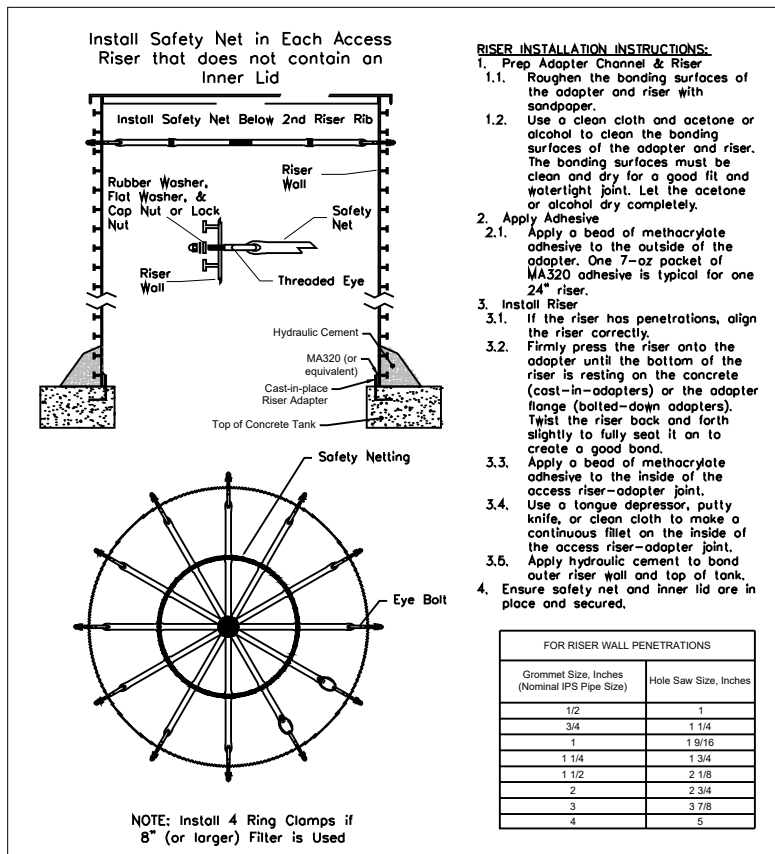
REV.	ISSUED DATE	DESCRIPTION
SHEET TITLE		
Repair Drainfield		
DRAWN BY:	CREATED ON:	
H. Clapp	2/10/2024	
REVISED BY:	REVISED ON:	
####	####	
RELEASED BY:	RELEASED ON:	
####	####	
DRAWING NUMBER		
WW-4		





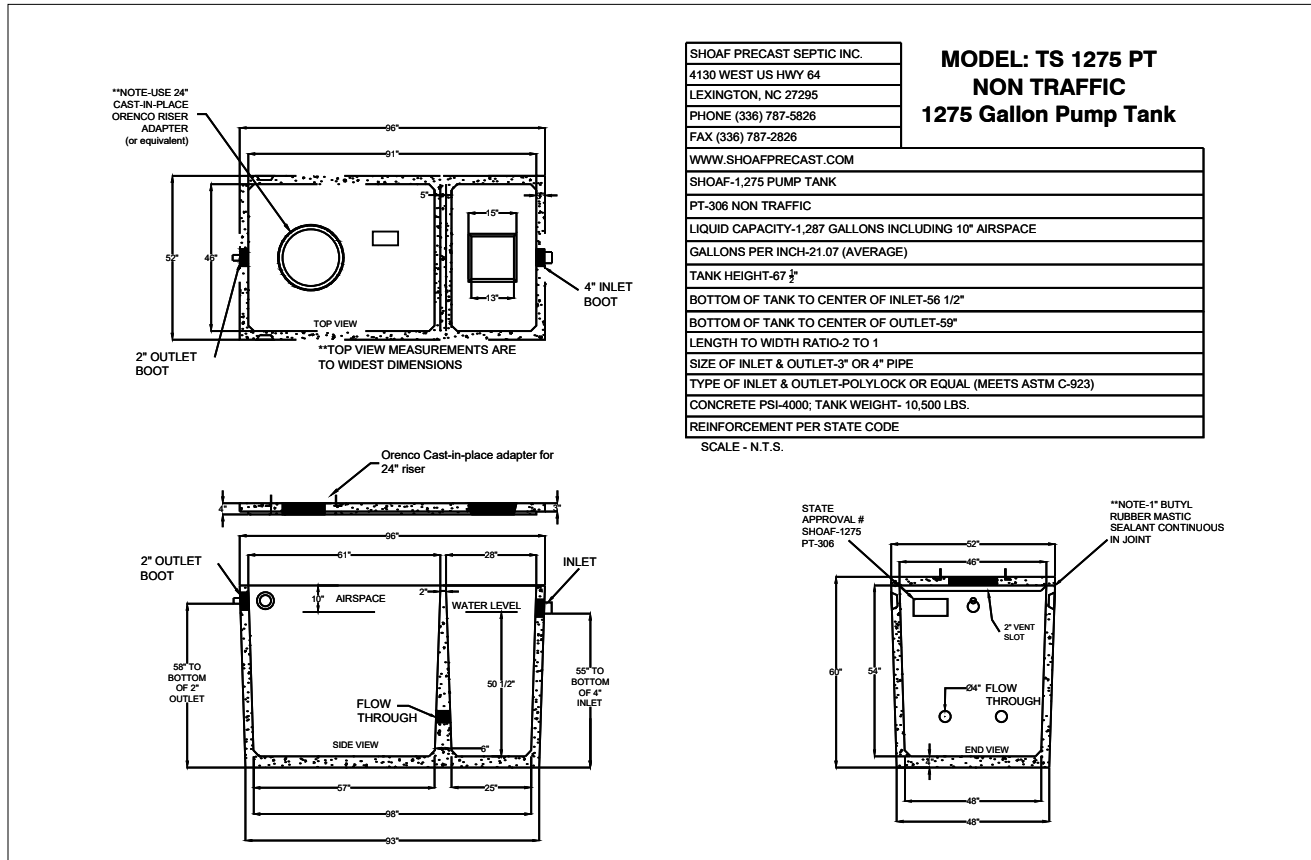
## 1 Septic Tank

SOURCE: Shoaf Precast Septic, Inc.



## 3 Riser Safety Nets

SOURCE: SIM-TECH, Inc.



## 2 Pump Tank (or equiv. tank with 1-day storage)

SOURCE: Shoaf Precast Septic, Inc.

### NOTES

1. Installation to follow all NC DHHS and Harnett County applicable rules and regulations.
2. Harnett County to perform construction inspections and final system certification.
3. Septic Tank to have approved effluent filter.
4. Contractor to abide by all safety regulations during system installation.
5. Contractor shall backfill around all access areas such that storm water is shed away from potential entry points.
6. Invert elevations of all components to be verified in field by contractor to insure proper operation.
7. All system piping to be SCH40 PVC (except where noted).
8. All gravity elbows to be long radius or long sweeping type elbows.
9. Actual installation and placement of treatment system to be overseen by Contractor.
10. Tanks to be set on 6" minimum gravel base. Use #5 or #57 stone for base.

11. Contractor to seed and/or mulch disturbed areas to coincide with existing landscape. Area shall not be left with uncovered soil.
12. Mount Control Panel a minimum of 24" above grade.
13. Power to panel to be installed by licensed electrician per code. One 15-amp circuit and one 20-amp circuit with individual neutrals to be run from house to control panel.
14. All risers to have cast-in-place tank adapters and be single-piece riser. Risers to extend 6" above soil surface and be designed to prevent surface water inflow.
15. Backfill around tank(s) shall be gravel or tank hole shall be over-excavated a minimum of 2' in all directions to allow for mechanical tamping of backfill.
16. All penetrations to be sealed.
17. Spigot to be located on outside of building within 50' of tanks.
18. All pressure lines to maintain 18" min. cover.
19. Contractor to adjust tank placement to meet site constraints.

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221 Providence Rd  
Chapel Hill, NC 27514  
919-929-0481  
dillons@ballentineassociates.com



REV. ISSUED DATE DESCRIPTION

SHEET TITLE

Detail Sheet 1

DRAWN BY:  
H. Clapp

CREATED ON:  
2/10/2024

REVISED BY:  
####

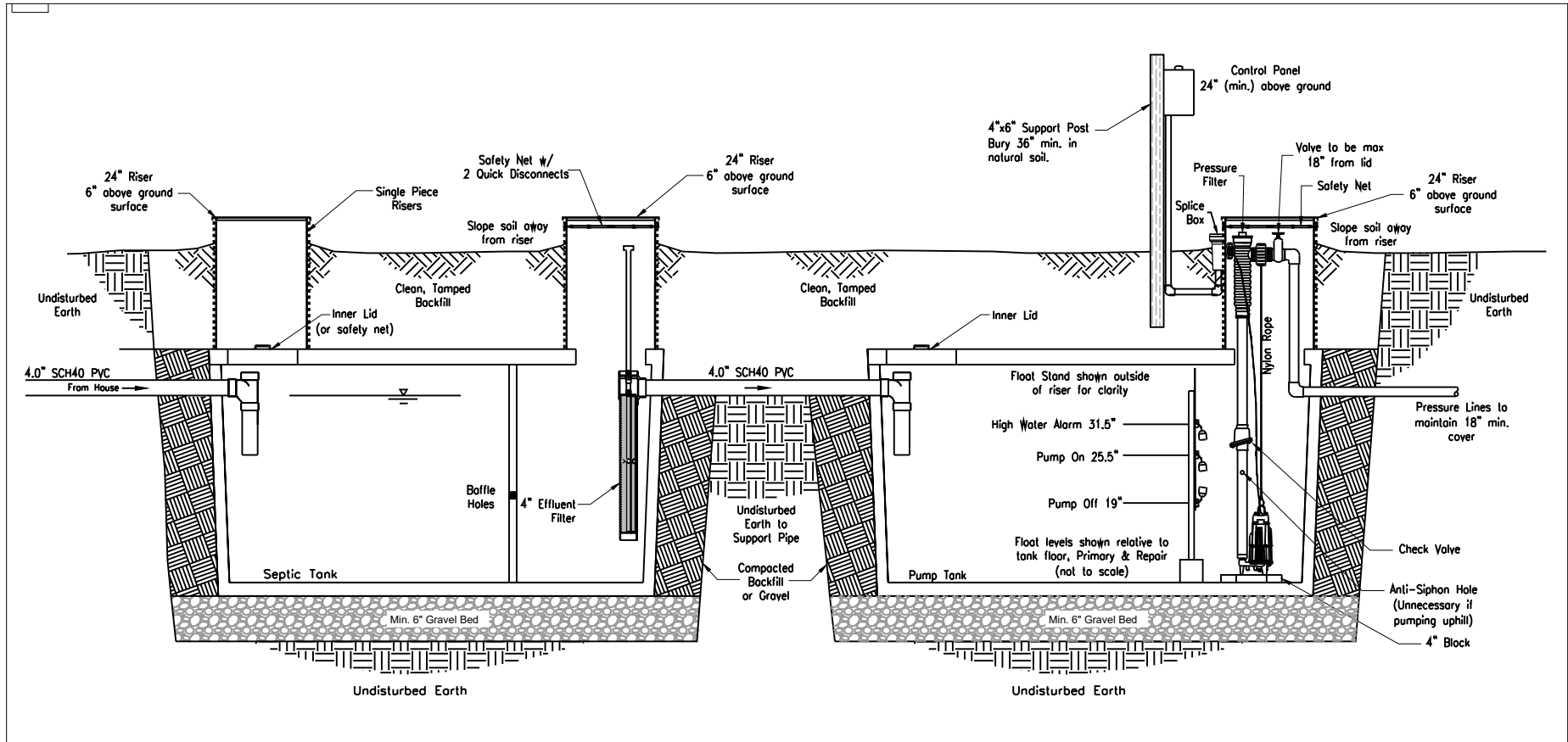
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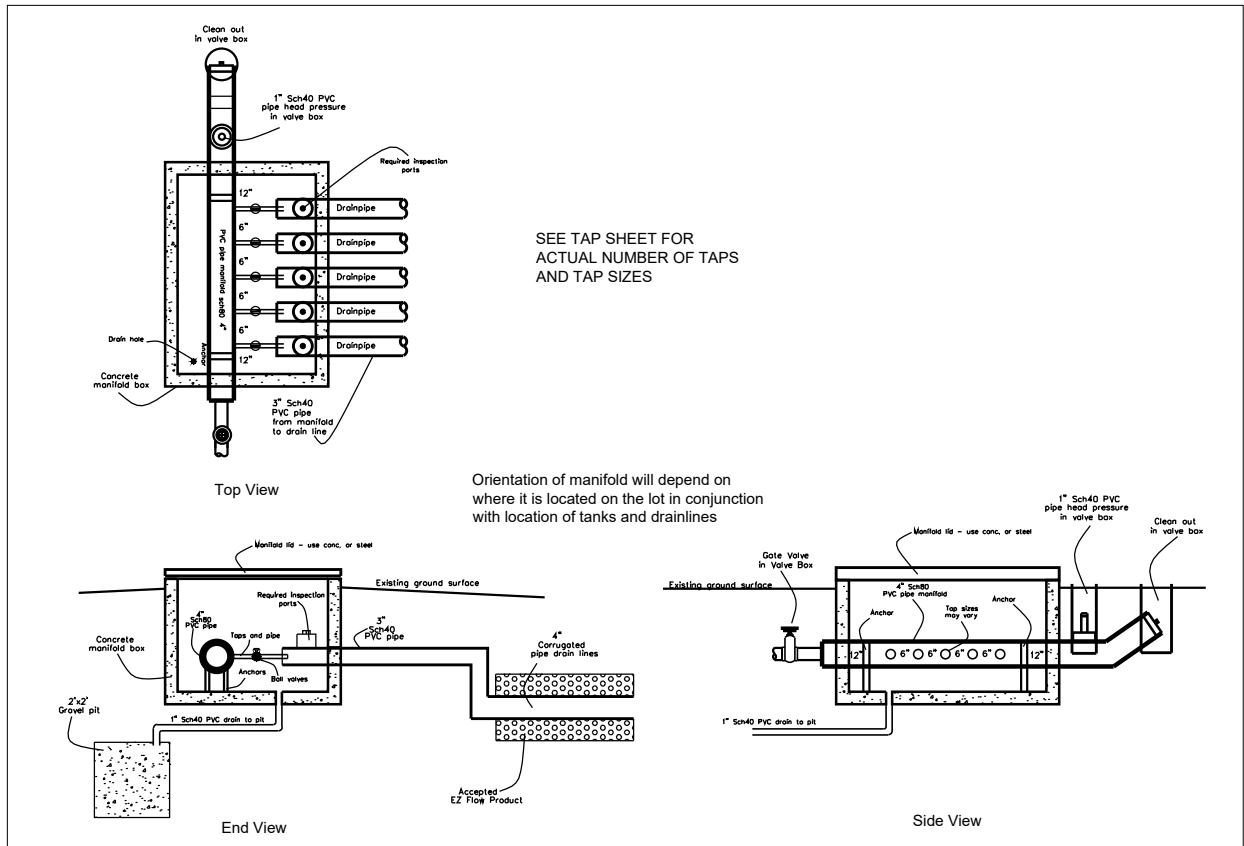
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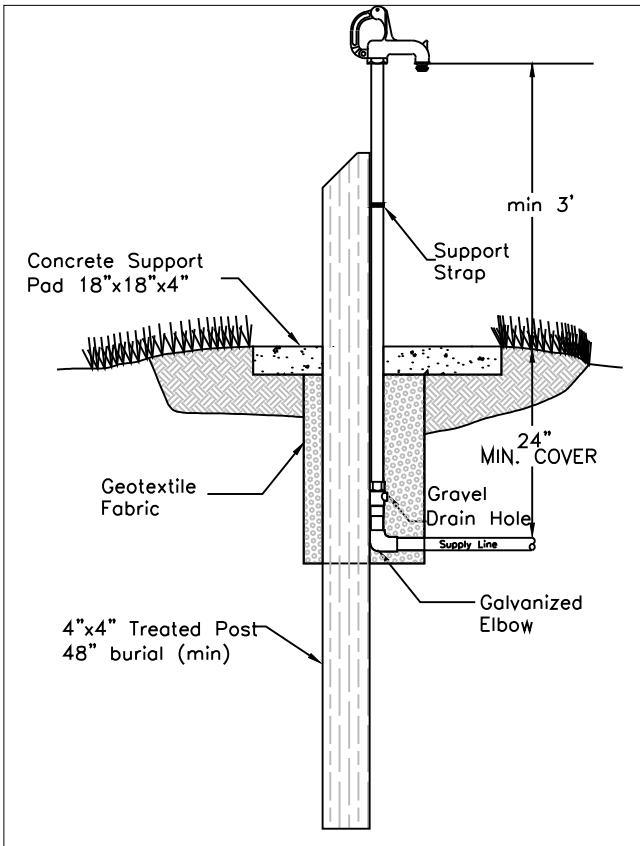
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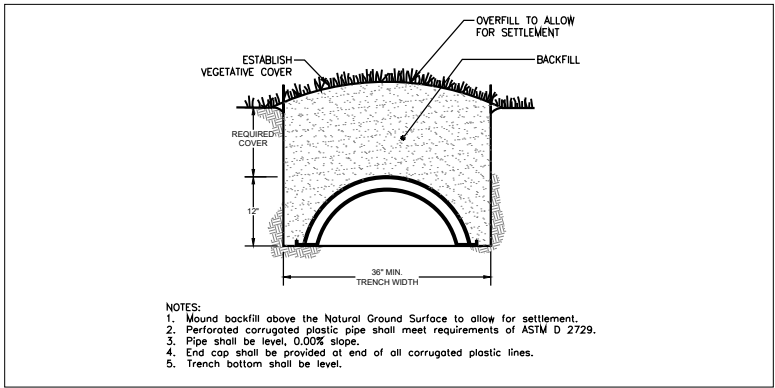
**1 SYSTEM PROFILE VIEW**  
 WW-6 N.T.S.



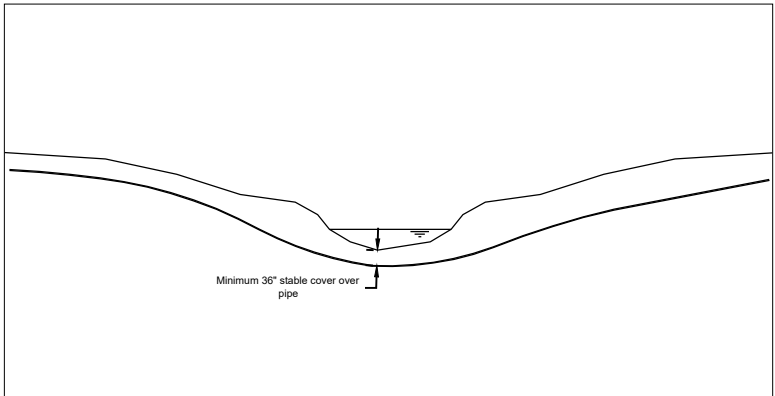
**4 PRESSURE MANIFOLD INSTALLATION (Typical) - For Illustration Only**  
 WW-6 N.T.S. SOURCE: AWT



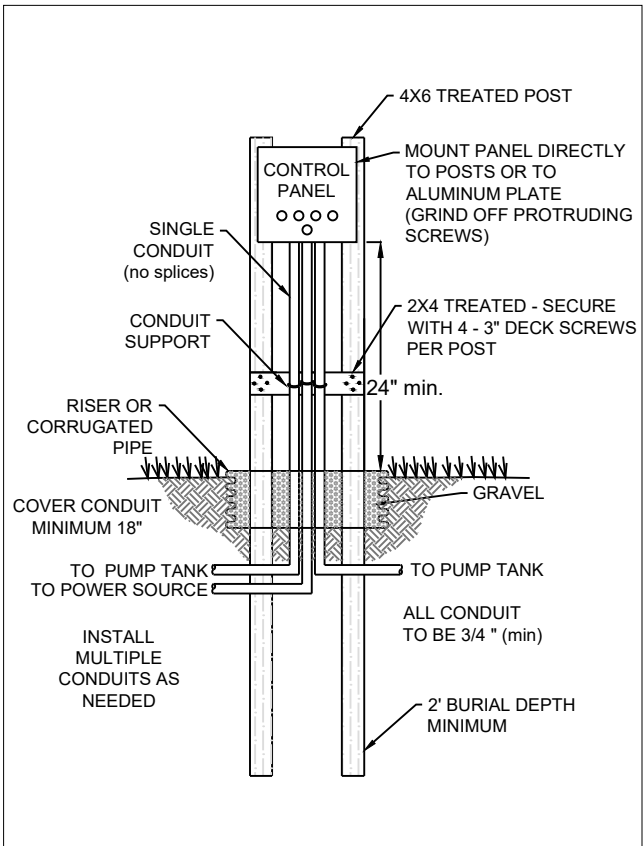
**5 YARD HYDRANT (if required)**  
 WW-6 N.T.S. SOURCE: AWT



**2 TRENCH X-SECTION (Typical)**  
 WW-6 N.T.S. Source: AWT



**3 STREAM CROSSING MIN. DEPTH**  
 WW-6 N.T.S. Source: AWT



**6 CONTROL PANEL SUPPORT**  
 WW-6 N.T.S. SOURCE: AWT



REV.	ISSUED DATE	DESCRIPTION

SHEET TITLE  
 Detail Sheet 2

DRAWN BY: H. Clapp	CREATED ON: 2/10/2024
REVISED BY: ####	REVISED ON: ####
RELEASED BY: ####	RELEASED ON: ####

DRAWING NUMBER  
**WW-6**



Trenching and Excavation Safety

The employer must comply with the trenching and excavation requirements of 29 CFR 1926.651 and 1926.652 or comparable OSHA-approved state plan requirements.

Inspection of Excavations  
OSHA standards require that a competent person inspect trenches daily and as conditions change before worker entry to ensure elimination of excavation hazards. A competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers, soil types and protective systems required, and who is authorized to take prompt corrective measures to eliminate these hazards and conditions.

Access and Egress  
OSHA standards require safe access and egress to all excavations, including ladders, steps, ramps, or other safe means of exit for employees working in trench excavations 4 feet (1.22 meters) or deeper. These devices must be located within 25 feet (7.6 meters) of all workers.

Recommendations  
Heavy equipment and trucks should stay as far as possible from the edge of any trench. Always use pads under stabilizers to minimize ground pressures that could lead to failures.

(b) Definitions

**"Cemented soil"** means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.  
**"Cohesive soil"** means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.  
**"Dry soil"** means soil that does not exhibit visible signs of moisture content.  
**"Fissured"** means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.  
**"Granular soil"** means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.  
**"Layered system"** means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.  
**"Moist soil"** means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.  
**"Plastic"** means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.  
**"Saturated soil"** means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or shear vane.

**"Soil classification system"** means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.  
**"Stable rock"** means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.  
**"Submerged soil"** means soil which is underwater or is free seeping.  
**"Type A"** means cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:  
(i) The soil is fissured; or  
(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or  
(iii) The soil has been previously disturbed; or  
(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or  
(v) The material is subject to other factors that would require it to be classified as a less stable material.

**"Type B"** means:  
(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or  
(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.  
(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.  
(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or  
(v) Dry rock that is not stable; or  
(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

**"Type C"** means:  
(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or  
(ii) Granular soils including gravel, sand, and loamy sand; or  
(iii) Submerged soil or soil from which water is freely seeping; or  
(iv) Submerged rock that is not stable, or  
(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

**"Unconfined compressive strength"** means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.  
**"Wet soil"** means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

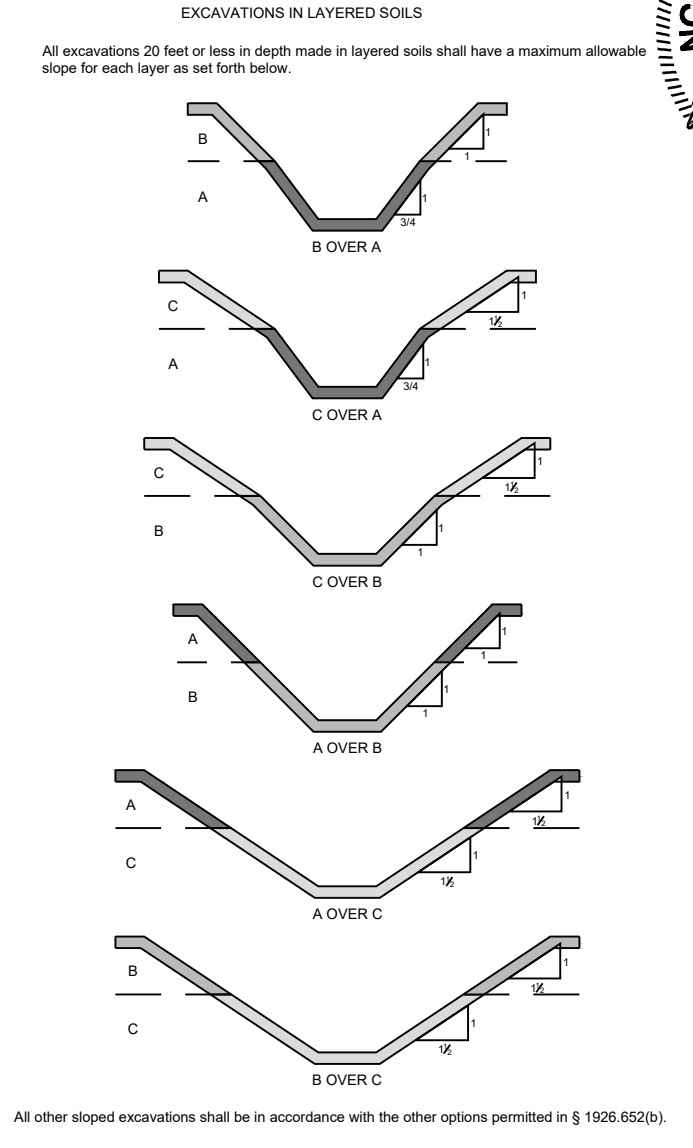
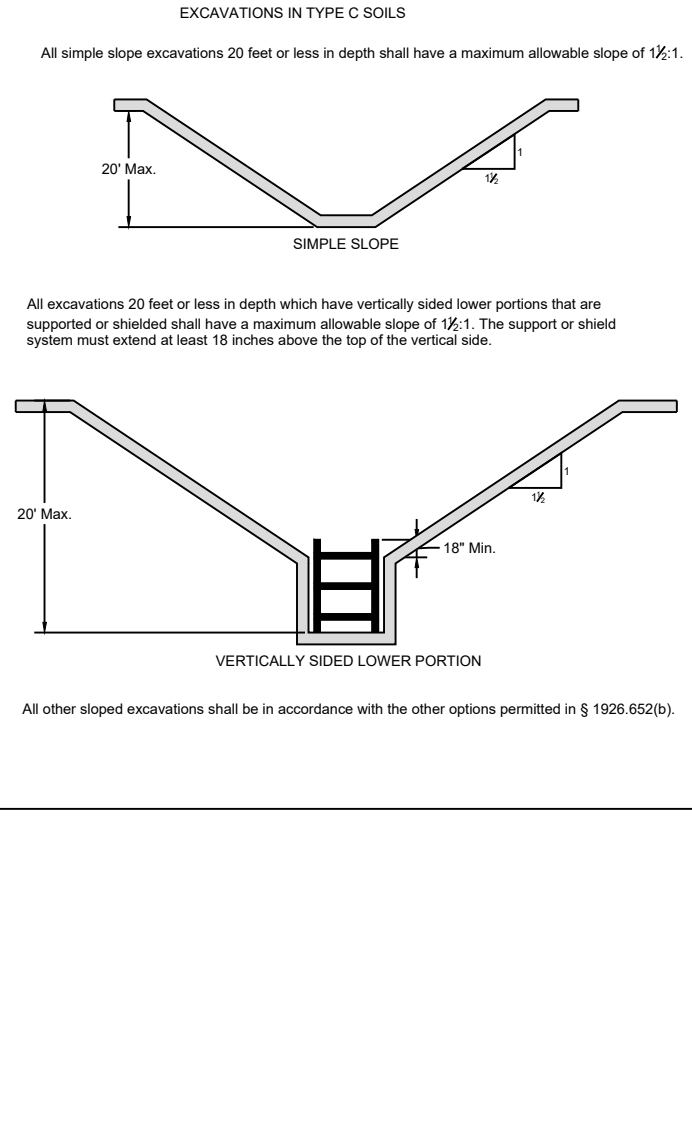
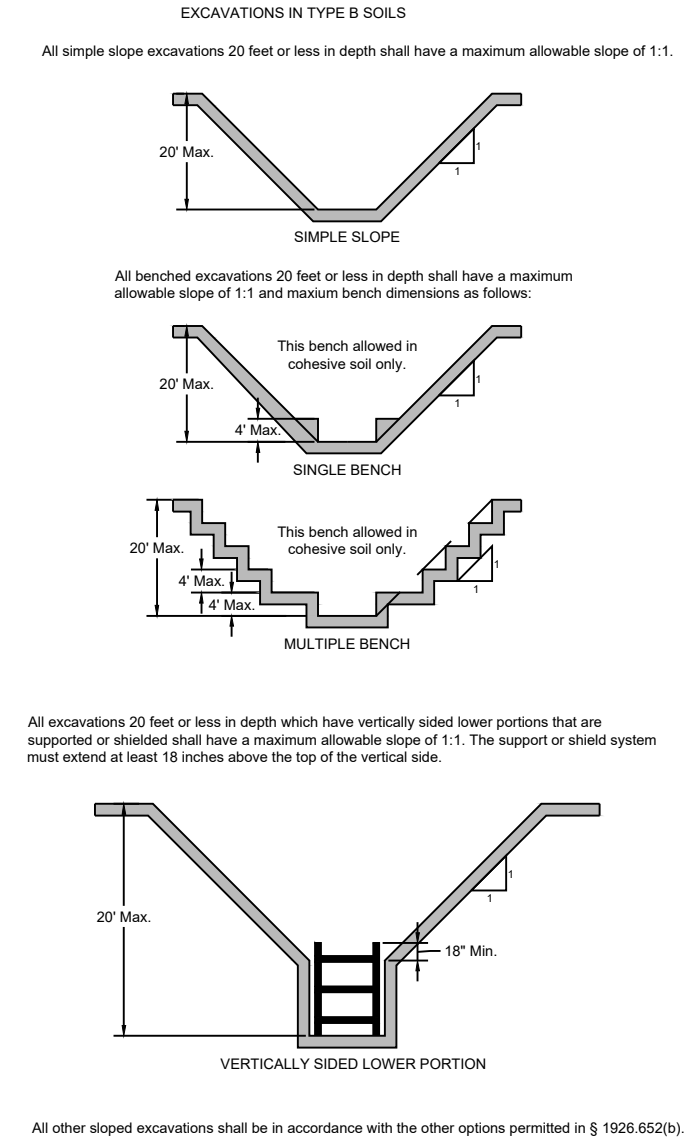
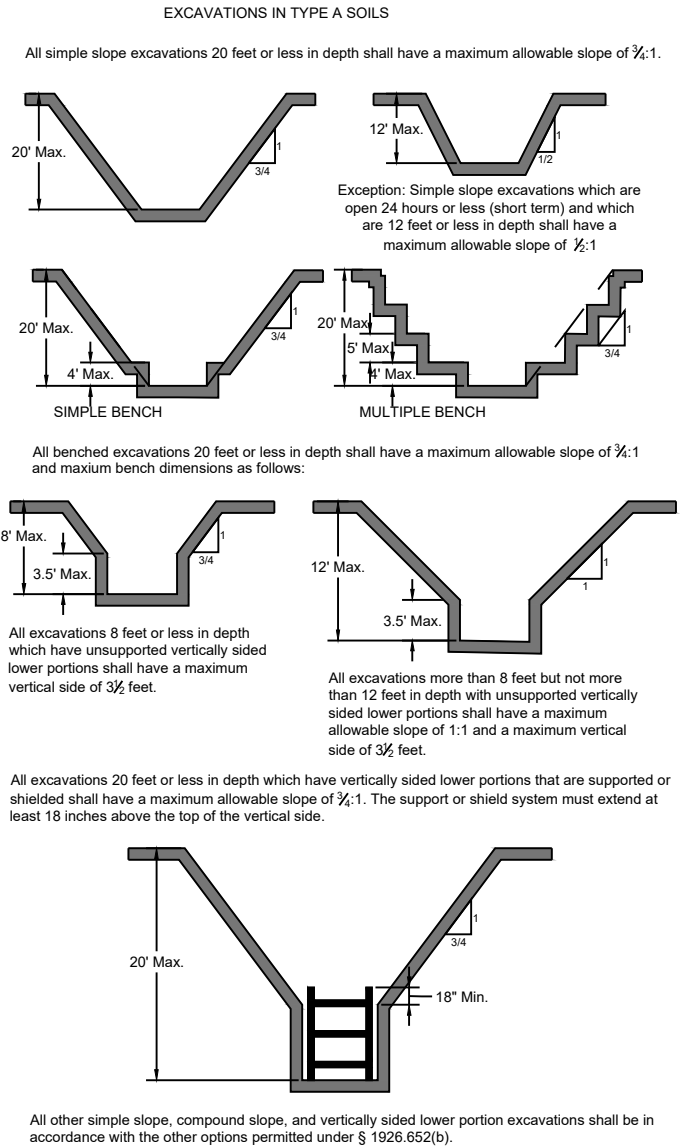
(c) Requirements

- (1) Classification of soil and rock deposits. Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.
- (2) Basis of classification. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person using tests described in paragraph (d) below, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.
- (3) Visual and manual analyses. The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of this appendix, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits.
- (4) Layered systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.
- (5) Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

(d) Acceptable visual and manual tests

- (1) Visual tests. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.
  - (i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.
  - (ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.
  - (iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.
  - (iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.
  - (v) Observe the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.
  - (vi) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.
  - (vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

- (2) Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.
  - (i) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.
  - (ii) Dry strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.
  - (iii) Thumb penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488 - "Standard Recommended Practice for Description of Soils (Visual - Manual Procedure).") Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb, however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences.If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.
  - (iv) Other strength tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.
  - (v) Drying test. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:
    - (A) If the sample develops cracks as it dries, significant fissures are indicated.
    - (B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined.
    - (C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures.If they pulverize easily into very small fragments, the material is granular.



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Birchwood Trails - Lot 81

Project Location:  
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Harnett County  
PIN: ----

NC ONSITE WASTEWATER  
EVALUATOR SEAL



REV.	ISSUED DATE	DESCRIPTION
SHEET TITLE		
Excavation Safety		
DRAWN BY: H. Clapp		CREATED ON: 2/10/2024
REVISED BY: ####		REVISED ON: ####
RELEASED BY: ####		RELEASED ON: ####
DRAWING NUMBER		
WW-7		

## Septic System Design - Summary Page

**Project Manager:**

Jeff Vaughan, PhD, LSS  
jvaughan@agriwaste.com  
919-859-0669

**Engineer:**

Heath Clapp  
hclapp@agriwaste.com

**Project:** Birchwood Trails  
**Property:** Olive Branch Road,  
Fuquay Varina, NC 27526

**Date:** 2/10/2024

**County:** Harnett

**Subdiv.:**

**Lot #:** 81

**Permit #:**

**Owner:** Ballentine Associates, PA

**Address:** 221 Providence Road,  
Chapel Hill, NC 27514

**Type of System:** II a

**Phone:** 919-929-0481

**Email:** dillons@ballentine Associates.com

**PIN:** 0

**EHS:**

## Soil Parameters

**Soil Evaluation By:**

Heath Clapp

**Special Conditions/Notes:**

**LTAR:** 0.40 gpd/ft<sup>2</sup>

## Design Parameters

**Type of Establishment:** Residence, 5 or fewer bedrooms

**Unit:** Bedroom

**# of Units:** 4

## Septic Tank Specifications

**Min. Tank Capacity:** 1,000 gal

**Actual Tank Volume:** 1,250 gal

**Tank Manufacturer:** Shoaf

**Tank Model:** TS 1250 STB

	Exterior	Interior
<b>Length:</b>	125.5	119.5 in.
<b>Width:</b>	65.5	59.5 in.
<b>Depth:</b>	61.5	54.5 in.

## Primary Drainfield Specifications

**Type of Distribution:** Parallel Pressure Manifold

**Trench Media:** EZflow

**Trench Width:** 3 ft

**Trench Depth:** 14 in.

(or as specified on permit)

**Trench Bottom Area:** 1200 ft<sup>2</sup>

**Minimum Drain Line:** 300 ft

**Actual Drain Line:** 300 ft

**Number of Lines:** 4

**Minimum Line Spacing:** 9 ft O.C.

## Wastewater Treatment System Design Calculations

**Project:** Birchwood Trails  
**Location:** Olive Branch Road,  
Fuquay Varina, NC 27526  
**County:** Harnett

### Septic Tank Sizing

---

Daily Flow Estimate:

Unit	# of Units	Flow/Unit	Flow/Day
Bedroom	4	120	480
Q=			480

gpd

Septic Tank Minimum Capacity:

Per NCAC T15A:18A .1952(b)(1):

For individual residences with 4 bedrooms,

Minimum Liquid Capacity (V)= 1,000 gal

Septic Tank Specs:

Manufacturer: Shoaf  
Model: TS 1250 STB  
Volume: 1,250 gal  
Weight: 11,000 lbs

	Exterior	Interior	
Length:	125.5	119.5	in.
Width:	65.5	59.5	in.
Depth:	61.5	54.5	in.

Shape of Risers: Circular

Diameter: 2.00 ft

## Pump Tank Storage & Float Settings

**Project:** Birchwood Trails  
**Location:** Olive Branch Road,  
Fuquay Varina, NC 27526  
**County:** Harnett

Tank Manufacturer Shoaf  
Tank Model TS 1275 PT

**Interior Height (in.)** 60.5 in.  
**Avg. Storage** 21.07 gal/in.

### **Primary System**

#### **Elevations, measured from bottom towards top (0 = Interior Bottom of Tank):**

Top of pump (including 4" block)	16.8 in.	(Pump height = 12 3/4")
Pump Off	19.0 in.	
Pump On	25.5 in.	(set for dose volume)
Alarm On	31.5 in.	(6 in. above On Float)

Emergency Storage Available

Pump Tank 611 gal

Days of Storage 1.27 days

(determined from "interior top of tank" - "High Water Alarm")

### **Repair System**

#### **Elevations, measured from bottom towards top (0 = Interior Bottom of Tank):**

Top of pump (including 4" block)	16.1 in.	(Pump height = 12 1/8")
Pump Off	18.0 in.	
Pump On	24.5 in.	(set for dose volume)
Alarm On	30.5 in.	(6 in. above On Float)

Emergency Storage Available

Pump Tank 632 gal

Days of Storage 1.32 days

(determined from "interior top of tank" - "High Water Alarm")



## ELEVATIONS

**Project:** Birchwood Trails

**Location:** Olive Branch Road,  
Fuquay Varina, NC 27526

**County:** Harnett

**Benchmark** 0  
**BM Elev** 0 ft

**Septic Tank** 1,250 gal

Ground Surface		291.00 ft
Depth of Soil Cover	18 in.	1.50 ft
Overall Ht of Tank	61.5 in.	5.13 ft
Elev, Base of Tank		284.38 ft
Ht to 4" Inlet Invert	50 in.	4.17 ft
Elev, 4" Inlet Invert		288.54 ft
Ht to 4" Outlet Invert	48 in.	4.00 ft
Elev, 4" Outlet Invert		288.38 ft
Gravel Base	6 in.	0.50 ft
Elev, Bot of Excavation		283.88 ft

**Pump Tank** 1287 gal

Ground Surface		291.00 ft
Depth of Soil Cover	22 in.	1.83 ft
Overall Ht of Tank	67.5 in.	5.63 ft
Elev, Base of Tank		283.54 ft
Ht to 4" Inlet Invert	57 in.	4.75 ft
Elev, 4" Inlet Invert		288.29 ft
Ht to 2" Outlet Invert	58 in.	4.83 ft
Elev, 2" Outlet Invert		288.38 ft
Gravel Base	6 in.	0.50 ft
Elev, Bot of Excavation		283.04 ft

**ST Inlet Pipe**

Grade @ Stub-out		291 ft
Depth of Stub-out, top		1.5 ft
Elev, Stub-out Invert		289.15 ft
Elev @ ST Inlet Invert		288.54 ft
Length		26 ft
Slope		2.3 %

**Pipe, ST to PT**

ID	4 in.	0.33 ft
OD	4.5 in.	0.38 ft
Elev, ST Outlet Invert		288.38 ft
Elev, PT Inlet Invert		288.29 ft
Length		2.5 ft
Slope		3.3 %
Cover over inlet pipe		2.10 ft

**Pump Reqmt.**

Floor Thickness	4 in.	0.33 ft
Elev, Pump Tank Floor		283.88 ft
Pump Block Ht.	4 in.	0.33 ft
Elev, Pump Intake		284.21 ft

Grade @ Primary Manifold		291.50 ft
Grade @ Repair Manifold		293.00 ft
Min. Cover	18 in.	1.50 ft
Max Elev, Primary		290.00 ft
Max Elev, Repair		291.50 ft
Elev Diff, Primary		5.79 ft
Elev Diff, Repair		7.29 ft

Drainfield Design

Project Birchwood Trails  
Location Olive Branch Road,  
Fuquay Varina, NC 27526  
County Harnett

Drainfield Sizing

Primary			
LTAR	0.4 gpd/ft <sup>2</sup>		
Daily Design Flow	480 gpd	Type of Drainfield Media	EZflow
Req. Drainfield Area	1,200 ft <sup>2</sup>	Required Drainline	
Trench Width, Eff.	3 ft	After 25% Reduction	300 ft
Required Drainline	400 ft	Minimum Line Spacing	9 ft (O.C.)

Repair			
LTAR	0.4 gpd/ft <sup>2</sup>		
Daily Design Flow	480 gpd	Type of Drainfield Media	EZflow
Req. Drainfield Area	1,200 ft <sup>2</sup>	Required Drainline	
Trench Width, Eff.	3 ft	After 25% Reduction	300 ft
Required Drainline	400 ft	Minimum Line Spacing	9 ft (O.C.)

Drainfield Layout

Line	Use	Flag Color	Elevation (ft)	Line Length (ft)	Used as Primary (ft)	Used as Repair (ft)
1	Layout Line	red		60	60.0	
2	Layout Line	white		80	80.0	
3	Layout Line	blue		80	80.0	
4	Layout Line	purple		80	80.0	
5	Layout Line	yellow		165		165.0
6	Layout Line	red		135		135.0
Total				600	300	300
Count				6	4	2

Note: Line length totals are shown to the nearest foot.

## PRESSURE MANIFOLD DESIGN (Primary)

### Site Information

**Project:** Birchwood Trails  
**Location:** Olive Branch Road,  
 Fuquay Varina, NC 27526  
**County:** Harnett

### Design Information

Estimated Daily Flow	480 gal/day
L.T.A.R. (from Harnett Co.)	0.4 gal/day/ft <sup>2</sup>
L.T.A.R. + 5%	0.420 gal/day/ft <sup>2</sup>
Trench Width	3 ft.
Line Length Required	400 ft.
Length after 25% Reduction	300 ft
L.T.A.R. Reduced	0.533 gal/day/ft <sup>2</sup>
L.T.A.R. Reduced + 5%	0.560 gal/day/ft <sup>2</sup>

<b>DRAINFIELD INFO. - Primary</b>						
Proposed Type of System/Distribution: <b>Pump to Pressure Manifold using EZflow</b>						
Line No.	Flag Color	Line Length (ft)	Tap	Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
1	red	60	1/2in SCH 80	5.48	0.091	0.545
2	white	80	1/2in SCH 40	7.11	0.089	0.530
3	blue	80	1/2in SCH 40	7.11	0.089	0.530
4	purple	80	1/2in SCH 40	7.11	0.089	0.530
<b>Total</b>		<b>300</b>	<b>Total</b>	<b>26.81</b>	<b>Avg.</b>	<b>0.53</b>
<i>Note: Line lengths are calculated in 5' increments to reflect use of EZflow product.</i>						
Total Run Time	17.90 min.					
Drainfield Capacity	195.9 gal					
% of Drainfield Cap	69.9% (Req. Range 66-75%)					
Dose Volume	136.9 gal/dose					
<b>Run Time/Dose</b>	<b>5.1 minutes</b> Range 5-7 minutes unless uphill, checked					
Volume/depth	21.07 gal/in. (Per tank manufacturer's specifications)					
Estimated Drawdown	6.50 in.					
<b>Manifold Box</b>						
Number of Taps	4	with	0	Split(s)		
Manifold Length	3.5	ft.	(approximate)			

## PRESSURE MANIFOLD SYSTEM DESIGN (Repair)

### Site Information

**Project:** Birchwood Trails  
**Location:** Olive Branch Road,  
 Fuquay Varina, NC 27526  
**County:** Harnett

### Design Information

Estimated Daily Flow	480 gal/day
L.T.A.R. (from Harnett Co.)	0.4 gal/day/ft <sup>2</sup>
L.T.A.R. + 5%	0.420 gal/day/ft <sup>2</sup>
Trench Width	3 ft.
Line Length Required	400 ft.
Length after 25% Reduction	300 ft
L.T.A.R. Reduced	0.533 gal/day/ft <sup>2</sup>
L.T.A.R. Reduced + 5%	0.560 gal/day/ft <sup>2</sup>

<b>DRAINFIELD INFO. - Repair</b>						
Proposed Type of System/Distribution: <b>Pump to Pressure Manifold using EZflow</b>						
Line No.	Flag Color	Line Length (ft.)		Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
5	yellow	165	3/4in SCH 40	12.50	0.076	0.536
6	red	135	3/4in SCH 80	10.10	0.075	0.530
<b>Total</b>		<b>300</b>	<b>Total</b>	<b>22.60</b>	<b>Avg.</b>	<b>0.53</b>
<i>Note: Line lengths are calculated in 5' increments to reflect use of EZflow product.</i>						
Total Run Time	21.24 min.					
Drainfield Capacity	195.9 gal					
% of Drainfield Cap	69.9% (Req. Range 66-75%)					
Dose Volume	136.9 gal/dose					
<b>Run Time/Dose</b>	<b>6.1 minutes</b> Range 5-7 minutes unless uphill, checked					
Volume/depth	21.07 gal/in. (Per tank manufacturer's specifications)					
Estimated Drawdown	6.50 in.					
<b>Manifold Box</b>						
Number of Taps	2	with	0	Split(s)		
Manifold Length	2.5	ft.	(approximate)			

## PUMP DESIGN

System (initial/repair): **Primary**

**Project:** Birchwood Trails  
**Location:** Olive Branch Road,  
Fuquay Varina, NC 27526  
**County:** Harnett

### Friction Losses

Suction Head	0 ft	(submersible 0)
Elev. Difference (highest point from pump)	5.79 ft	
Design Pressure At Outlet	2 ft	
<b>Supply Line - 1.5" Schedule 40 PVC</b>		
Pipe Diameter, Nominal	1.5 in.	
Pipe Diameter (ID)	1.59 in.	
Pipe Length	157 ft	
Pipe Length for Fittings	15.7 ft	
Equivalent Length	172.7 ft	
Estimated Friction Loss in Supply Line	7.83 ft	
Flow	26.81 gpm	
Velocity	4.33 ft/sec	
Meets requirement that $2 \text{ ft/s} < v < 5 \text{ ft/s}$ .		
Pressure Filter Friction Loss	0.43 ft	(from manufacturer)
Friction Loss - Taps/Special Fittings	3.5 ft	
<b>TOTAL</b>	<b>19.55 ft.</b>	

Flow for Anti-Siphon Hole

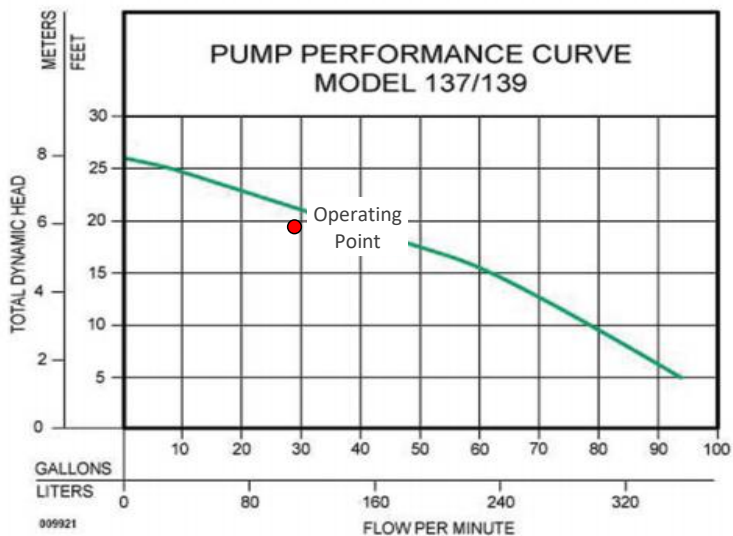
Hole Diameter 3/16 in.  
Hole Flowrate 1.83 gpm

Pump Efficiency 0.7 (assumed, typical)  
Motor Efficiency 0.9 (assumed for electric pumps)  
**Flow 28.64 gpm**

Required Horsepower 0.22 hp  
**TDH 19.55 ft**

### Pump Selection

Manufacturer:	Zoeller
Model:	N137
Horsepower:	0.5



## PUMP DESIGN

System (initial/repair): **Repair**

**Project:** Birchwood Trails  
**Location:** Olive Branch Road,  
Fuquay Varina, NC 27526  
**County:** Harnett

### Friction Losses

Suction Head	0 ft	(submersible 0)
Elev. Difference (highest point from pump)	7.29 ft	
Design Pressure At Outlet	2 ft	
<b>Supply Line - 1.5" Schedule 40 PVC</b>		
Pipe Diameter, Nominal	1.5 in.	
Pipe Diameter (ID)	1.59 in.	
Pipe Length	273.5 ft	
Pipe Length for Fittings	27.35 ft	
Equivalent Length	300.85 ft	
Estimated Friction Loss in Supply Line	9.95 ft	
Flow	22.6 gpm	
Velocity	3.65 ft/s	Meets requirement that 2 ft/s < v < 5 ft/s.
Pressure Filter Friction Loss	0.23 ft	(from manufacturer)
Friction Loss - Taps/Special Fittings	3.5 ft	
<b>TOTAL</b>		<b>22.97 ft.</b>

Flow for Anti-Siphon Hole

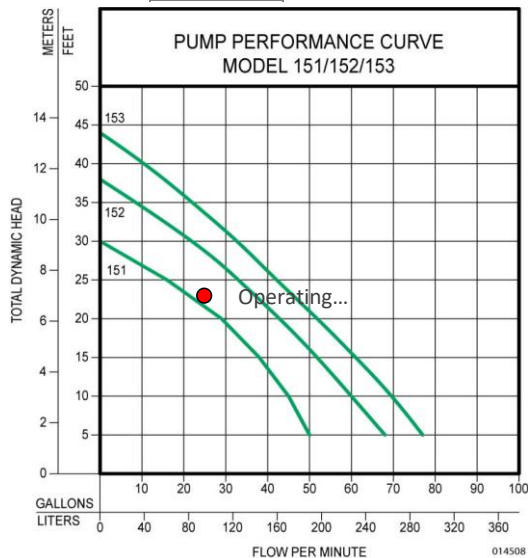
Hole Diameter 3/16 in.  
Hole Flowrate 1.99 gpm

Pump Efficiency 0.7 (assumed, typical)  
Motor Efficiency 0.9 (assumed for electric pumps)  
**Flow 24.59 gpm**

Required Horsepower 0.23 hp  
**TDH 22.97 ft.**

### Pump Selection

Manufacturer: Zoeller  
Model: N152





## Septic Tank Buoyancy Calculation

**Project:** Birchwood Trails  
**Location:** Olive Branch Road,  
 Fuquay Varina, NC 27526  
**County:** Harnett

Tank Size (nominal) 1250 gal

### Properties/Assumptions:

Min. liquid level to be maintained in tank at all times after initial installation.

Min. depth to water table	12.0 in.	from ground surface
Effluent Density	62.4 lb/ft <sup>3</sup>	(Specific Weight of Water)
Concrete Density	142.6 lb/ft <sup>3</sup>	
Soil App. Sp. Grav.	1.3	(typical value)
Soil Cover Over Tank	12 in.	(minimum)
Additional Cover	4 in.	for pipe grade
Unsubmerged wt of soil	81.1 lb/ft <sup>3</sup>	
Submerged wt of soil	49.9 lb/ft <sup>3</sup>	50% Porosity Assumed

### Tank Dimensions (from supplier):

		<u>Exterior</u>		<u>Interior</u>	
		Top	Bottom	Top	Bottom
Tank	Length	125.5	122.0	119.5	116.0 in.
	Width	65.5	62.0	59.5	56.0 in.
	Height	58.5	(w/o lid)	54.5	in.
Lid	Length	125.5 in.			
	Width	65.5 in.			
	Height	3.0 in.			
Area of Riser Openings		6.28 ft <sup>2</sup>			
Permanent Liquid Depth in Tank		0.0 in.			0.00 ft
Tank Weight		11,000 lb		(per manufacturer)	

### Buoyancy Force Calculation:

Buoyancy Force Specific Weight of Water x Displaced Volume

Displaced Volume	283.5 ft <sup>3</sup> *
<b>Buoyancy Force</b>	<b>17,689 lb.</b>

### Weight Calculation:

Tank Weight	11000 lb		
Water Weight in Tank	0 lb	Volume	0.0 ft <sup>3</sup> *
Soil Weight Over Tank	4966 lb		
Soil Friction Force	4037 lb		
<b>Total Weight</b>	<b>20,004 lb</b>		

**Factor of Safety = 1.13**

Note: Total weight must be greater than buoyancy force so that tank will not float during high water table conditions.

\* Volume calculated by the prismoidal formula.

## Pump Tank Buoyancy Calculation

**Project:** Birchwood Trails  
**Location:** Olive Branch Road,  
 Fuquay Varina, NC 27526  
**County:** Harnett

Tank Size (nominal) 1287 gal

### Properties/Assumptions:

Min. liquid level to be maintained in tank at all times after initial installation.

Min. depth to water table	12 in.	from ground surface
Effluent Density	62.4 lb/ft <sup>3</sup>	(Specific Weight of Water)
Concrete Density	142.6 lb/ft <sup>3</sup>	
Soil App. Sp. Grav.	1.3	(typical value)
Soil Cover Over Tank	12 in.	(minimum)
Additional Cover	6 in.	for pipe grade
Unsubmerged wt of soil	81.1 lb/ft <sup>3</sup>	
Submerged wt of soil	49.9 lb/ft <sup>3</sup>	50% porosity assumed

### Tank Dimensions (from supplier):

		<u>Exterior</u>		<u>Interior</u>	
		Top	Bottom	Top	Bottom
Tank	Length	108.0	104.0	102.0	98.0 in.
	Width	58.0	54.0	52.0	48.0 in.
	Height	64.5	(w/o lid)	60.5	in.
Lid	Length	108.0 in.			
	Width	58.0 in.			
	Height	3.0 in.			
Area of Riser Openings		3.14 ft <sup>2</sup>			
Permanent Liquid Depth in Tank		0.0 in.		0.00 ft	
Tank Weight		10500 lb		(per manufacturer)	

### Buoyancy Force Calculation:

Buoyancy Force Specific Weight of Water x Displaced Volume

Displaced Volume	234.1 ft <sup>3</sup> *
<b>Buoyancy Force</b>	<b>14,606 lb</b>

### Weight Calculation:

Tank Weight	10500 lb		
Water Weight in Tank	0 lb	Volume	0.0 ft <sup>3</sup> *
Soil Weight Over Tank	4281 lb		
Soil Friction Force	4227 lb		
<b>Total Weight</b>	<b>19,008 lb</b>		

**Factor of Safety = 1.30**

Note: Total weight must be greater than buoyancy force  
 so that tank will not float during high water table conditions.

\* Volume calculated by the prismatic formula.



AGRITEC-01

GKROHL

## CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

1/23/2023

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Hartsfield & Nash Agency, Inc. 10405 Ligon Mill Rd., Ste H Wake Forest, NC 27587	CONTACT NAME: <b>Connie Garkalns</b>	
	PHONE (A/C, No, Ext): <b>(919) 556-3698</b> FAX (A/C, No): <b>(919) 556-8758</b>	
	E-MAIL ADDRESS: <b>Connie@hartsfield-nash.com</b>	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : <b>Selective Insurance Company of the Southeast</b>	<b>39926</b>
INSURED  <b>Agri-Waste Technology Inc</b> <b>501 N. Salem St Ste 203</b> <b>Apex, NC 27502</b>	INSURER B : <b>ACCIDENT FUND INSURANCE COMPANY OF AMERICA</b>	<b>10166</b>
	INSURER C : <b>Evanston Insurance Company</b>	
	INSURER D :	
	INSURER E :	
	INSURER F :	

## COVERAGES

## CERTIFICATE NUMBER:

## REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR  GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC OTHER:			S 2253659	1/18/2023	1/18/2024	EACH OCCURRENCE \$ <b>2,000,000</b> DAMAGE TO RENTED PREMISES (Ea occurrence) \$ <b>300,000</b> MED EXP (Any one person) \$ <b>10,000</b> PERSONAL & ADV INJURY \$ <b>2,000,000</b> GENERAL AGGREGATE \$ <b>4,000,000</b> PRODUCTS - COMP/OP AGG \$ <b>4,000,000</b> \$
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY			S 2253659	1/18/2023	1/18/2024	COMBINED SINGLE LIMIT (Ea accident) \$ <b>1,000,000</b> BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input type="checkbox"/> RETENTION \$			S 2253659	1/18/2023	1/18/2024	EACH OCCURRENCE \$ <b>2,000,000</b> AGGREGATE \$ <b>2,000,000</b> \$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y / N <input checked="" type="checkbox"/> N	N / A	100003072	1/18/2023	1/18/2024	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ <b>1,000,000</b> E.L. DISEASE - EA EMPLOYEE \$ <b>1,000,000</b> E.L. DISEASE - POLICY LIMIT \$ <b>1,000,000</b>
C	Prof & Pollution			MKL3ENV103400	8/22/2022	8/22/2023	Each Claim \$ <b>5,000,000</b>
A	Leased / Rented			S 2253659	1/18/2023	1/18/2024	Equipment \$ <b>25,000</b>

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

## CERTIFICATE HOLDER

## CANCELLATION

\*\*\*This is ONLY For Informational Purposes  
Contact Agency for Specific Holder info to be added  
\*\*\*\*

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE