ICHD - ENVIRONMENTAL HEALTH DIVISION

Statesville Office (704) 878-5305 Mooresville Office (704) 660-3625

PERMIT # OSWP-2022-5308

SEPTIC: IMPROVEMENT PERMIT / AUTHORIZATION TO CONSTRUCT / OPERATION PERMIT / EXISTING SYSTEM

PIN # 4775-04-5138

APPLICANT / OWNER: Cornerstone III Properties Inc | APPLICANT ADDRESS: 4509 Faith Church Rd, Indian Trail, NC 28079

SITE ADDRESS: 175 WINDING BROOK WAY, STATESVILLE, NC 28625 | PHONE: 7043013229 | ALT. PHONE:

SITE DIRECTIONS: Hwy 64 to Sain Rd to Winding Brook Site on Left | SAP CONTROLLED: YES ☐ NO ☒

SUBDIVISION: Spring Forest | SECTION: - | LOT #: 18 | LOT AREA: .84 Ac | DESIGN FLOW: 360 | L.T.A.R.: .50

Septic Tank: (gal) 1000	STB: 760	Date: 9-20-2022	☑ New System ☐ Repair ☐ Expansion	System Type: III	☑ Residence	No. Bedrooms: 3	Water Supply: Other Public Water
Pump Tank: (gal) 1000	PT: 363	Date: 9-28-2022	System Description: PM - 25% Reduction.		☐ Business	No. Persons: 3	
Pump Make: GOULDS	Model: WE0312NU	Serial #:	Repair System Description: PM - 25% Reduction		☐ Other	No. Employees:	
# Nitrification Fields: 1	# Lines: 4	Linear Ft.: 300	Maintenance Agreement Required: ☐ YES ☑ NO		☐ Slab	☑ Crawl Space	
Trench Width: 36 in	Trench Bottom Depth (Low side): 22 in		Gravel Depth: -	☐ GRAVITY ☑ PRESSURE	☐ Basement w/ Plumbing	☐ Basement w/o Plumbing	

Comments / Conditions:

INITIAL SITE SKETCH

This permit is issued pursuant to G.S. 130A-335(a2), (a3) & (a4) using the signed and sealed LSS/LG Evaluation attached here, from:

Agri-Waste Technology, Inc

LSS# 1227

AS BUILT SKETCH

TANKS
DRAINLINES
ALARM
FLOATS
P.M.
P.H.
Electrical OK
12/7/22

Permit can be suspended or revoked if any false information is supplied toward securing the permit / any unauthorized changes are made to the site / any unauthorized changes are made in the installation of the system. CONTACT A LOCATOR SERVICE PRIOR TO ANY EXCAVATION

☐ IMPROVEMENT PERMIT with plat valid without expiration. ☑ IMPROVEMENT PERMIT with site plan valid for 60 mos. ☑ AUTHORIZATION TO CONSTRUCT valid for period equal to IMPROVEMENT PERMIT--not to exceed 60 mo.

Owner / Applicant Signature: _____ Date: _____ Installed By: LENTZ WASTEWATER

IMPROVEMENT PERMIT by: [signature] Date: 10-2-2022 OPERATION PERMIT by: [signature] Date: 12/7/22

AUTHORIZATION TO CONSTRUCT by: [signature] Date: 10-2-2022. Existing System Inspected By: _____ Date: _____

FOR SEPTIC FINAL INSPECTION CALL: 704-664-3703 BETWEEN 8am-9am the day the inspection is needed.

County: Iredell

This Section for Local Health Department Use Only

Initial submittal received: 10/2/2022 (Date) by BB (Initials)

Permit Number: OSWP 2022-5308

G.S. 130A-335(a4) states the following: *'If a local health department fails to act on an application for an improvement permit submitted pursuant to subsection (a3) of the section within 10 business days of receipt of a complete application, the local health department shall issue the improvement permit.'*

In accordance with G.S. 130A-335(a3) the improvement permit application is:

☐ 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 Owner on _____ (Date)

State Authorized Agent: _____ Date: _____

☐ Denied (See attached report.)

Copies of this were sent to the LSS and the Owner on _____ (Date)

State Authorized Agent: _____ Date: _____

☑ Complete

State Authorized Agent: Benjamin A Baker Date of Issuance: 10-2-2022

This Improvement Permit is issued pursuant to G.S. 130A-335 (a2), (a3), and (a4) 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 site is subject to revocation if the site plan, plat, or the intended use changes, or if information submitted in the application was falsified, inaccurate or misleading. 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 conditions of this permit. The location and identification of all property lines, easements, water lines, and other appropriate utilities shall be the responsibility of the owner.

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: 10-2-2027

See attached site sketch

County: Iredell

This Section for Local Health Department Use Only

Initial submittal received: 10/2/2022 (Date) by BB (Initials)

Permit Number: OSWP 2022-2525

G.S. 130A-335(a6) states the following: *'If a local health department fails to act on an application for a construction authorization submitted pursuant to subsection (a5) of the section within 10 business days of receipt of a complete application, the local health department shall issue the construction authorization.'*

In accordance with G.S. 130A-335(a5) the construction authorization application is:

☐ 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 Owner on _____ (Date)

State Authorized Agent: _____ Date: _____

☐ Denied (See attached report.)

Copies of this were sent to the AOWE/PE and the Owner on _____ (Date)

State Authorized Agent: _____ Date: _____

☑ Complete

State Authorized Agent: Benjamin A Bott Date of Issuance: 10-2-2022

This Construction Authorization is issued pursuant to G.S. 130A-335(a2), (a5), and (a6) 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, or if information submitted in the application was falsified, inaccurate or misleading. 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 location and identification of all property lines, easements, water lines, and other appropriate utilities shall be the responsibility of the owner. Final landscaping shall be constructed to divert water and establish vegetative cover.

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: 10-2-2027

See attached site sketch

County: Iredell

CONSTRUCTION AUTHORIZATION FOR G.S. 130A-335(a2)/SL2022-11

PIN/Lot Identifier: 4775-04-5138

Issued To: Cornerstone Properties, Stan Pressly

Property Location: 175 Winding Brook Way, Statesville, NC. 28625

AOWE/PE Plans/Evaluations Provided: Yes ☒ No ☐ If yes, name and license number of AOWE/PE: Jeff Vaughan, 10003E

Facility Type: Single Family Residence

☒ New ☐ Expansion ☐ Repair System Relocation ☐

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

Type of Wastewater System** Pressure Mainfold 25% Reduction (Initial) Pressure Mainfold 25% Reduction (Repair)

Design Daily Flow: 360 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

Installation Requirements/Conditions

Septic Tank Size: 1000 gallons Total Trench/Bed Length: 300 feet Trench/Bed Spacing: 9 feet on center

Drainfield square footage: 1200 Trench/Bed Width: 36 inches LTAR: 0.3 gpd/ft²

Soil Cover: 10 inches Slope Adjusted Maximum Trench/Bed Depth: 22 inches

Aggregate Depth: _____inches above pipe _____inches below pipe _____inches total

Pump Tank Size (if applicable): 1000 gallons Requires more than 1 pump? ☐ Yes ☒ No

Pump Requirements: 21.41 ft. TDH vs. 26.03 GPM Grease Trap Size (if applicable): NA 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

****If applicable:**

I understand the system type specified is different from the type specified on the application. I accept the specifications of this permit.

Owner/Legal Representative Print Name: _____

Owner/Legal Representative Signature: _____ Date: _____

Pre-Construction Conference Required: Yes ☐ No ☒

Conditions: Disturbed soil area should be filled back as a part of the system installation.

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: Jeff Vaughan

AOWE/PE Signature: Jeff Vaughan Date: 9/21/2022

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

See attached site sketch

County: Iredell

IMPROVEMENT PERMIT FOR G.S. 130A-335(a2)/SL2022-11

PIN/Lot Identifier: 4775-04-5138

Issued To: Cornerstone Properties, Stan Pressly

Property Location: 175 Winding Brook Way, Statesville, NC. 28625

Subdivision: Spring Forest Lot #: 18 Block: _____ Section: _____

LSS Report Provided: Yes ☒ No ☐

If yes, name and license number of LSS: Jeff Vaughan, 1227

New ☒ Repair ☐ Expansion ☐ System Relocation ☐

Proposed Structure: Single family residence

Proposed Wastewater System Type: Pressure Mainfold 25% Reduction (Initial) Pressure Manifold 25% Reduction (Repair)

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

Proposed Design Daily Flow: 360 GPD Proposed LTAR (Initial): 0.3GPD/ft2 Proposed LTAR (Repair): 0.3 GPD/ft2

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

Number of bedrooms: 3 Number of Occupants: 6 Other: _____

Pump Required: ☒ Yes ☐ No ☐ May be required based upon final location and elevations of facilities

Artificial Drainage Required: ☐ Yes ☒ No If yes, please specify details: _____

Type of Water Supply: ☐ Private well ☐ Public 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:

This disturbed area should be filled back in with soil to be brought back to natural grade

This area will not be reused as a part of the system.

Licensed Soil Scientist Print Name: Jeff Vaughan

Licensed Soil Scientist Signature: Jeff Vaughan Date: 9/21/2022

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

See attached site sketch

DocuSign Envelope ID: 407C4046-141D-4C37-81D9-071BE175ECED

Engineers and Soil Scientists

Agri-Waste Technology, Inc.
501 N. Salem Street, Suite 203
Apex, North Carolina 27502
919-859-0669
www.agriwaste.com

September 28, 2022

To: Stan Pressley - Cornerstone III Properties
175 Winding Brook Way
Statesville, NC 28625
Iredell County
Parcel/PIN: 4775045138

Re: Site/Soil Investigation for Iredell County
Parcel/PIN: 4775045138

I, Stan Pressley (*applicant name, print*), acknowledge that "the LSS Evaluation attached to this application is to be used to produce design and construction features for permitting in accordance with NC Session Law 2022-11/S372."

Applicant Signature: DocuSigned by: Stan Pressley F3CA223E8A0A49E...

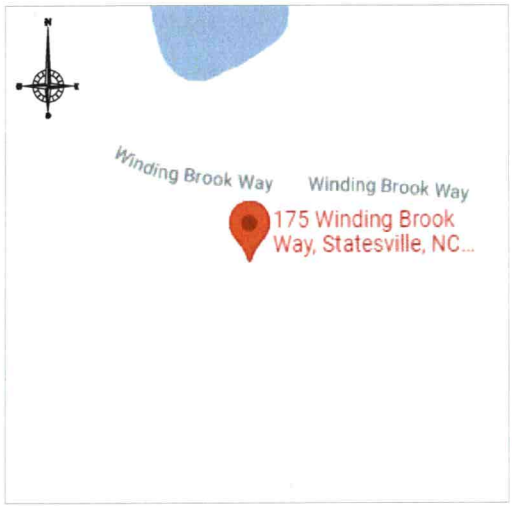
Date: 9/28/2022

Sincerley,

Chris McGee, LSS
Soil Scientist
Agri-Waste Technology, Inc.

SPRING FOREST - LOT 18

Project Location	175 Winding Brook Way Statesville, NC 28625 Iredell County PIN: 4775-04-5138
Project Owner	Buller River Development 29 Textile Way Fort Mill, SC 29715 704-301-3229 stan@cornerstone3p.com
Project Consultant	Trevor Hackeny (704) 268-9160 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 (3) Bedroom, 360 gpd Chambers Dispersal System w/ Pressure Manifold Distribution



VICINITY MAP

Sheet Index

Sheet 1	Cover Sheet
Sheet 2	Property Layout
Sheet 3	System Layout
Sheet 4	Detail Sheet
Sheet 5	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

Buller River Development
Spring Forest - Lot 18

Project Location:
175 Winding Brook Way
Statesville, NC 28625
Iredell County
PIN: 4775-04-5138

Project Owner:
Buller River Development
29 Textile Way
Fort Mill, SC 29715
704-301-3229
stan@cornerstone3p.com

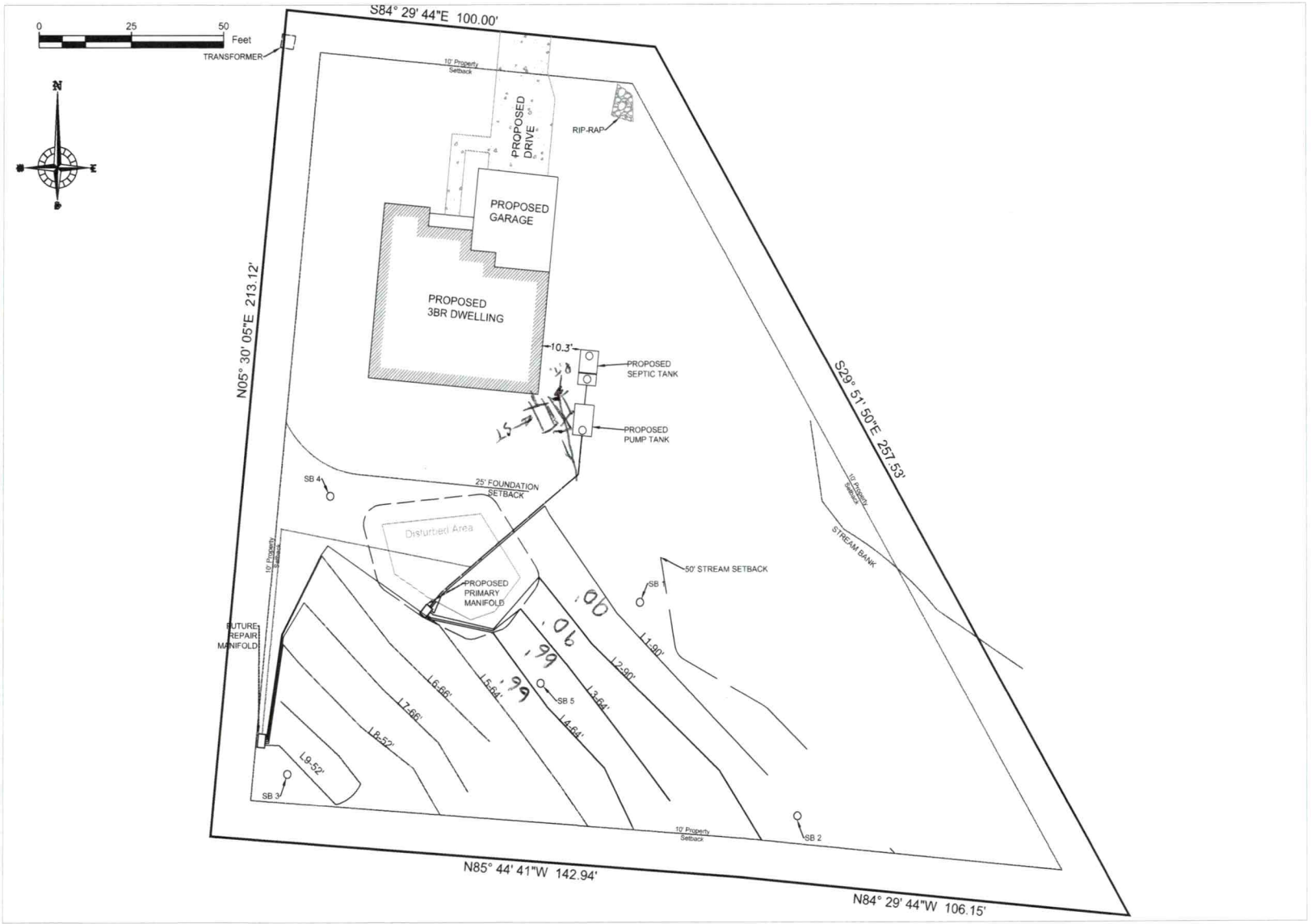
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REV.	ISSUED DATE	DESCRIPTION

SHEET TITLE
Cover Sheet

DRAWN BY: T. Bostic	CREATED ON: 9/20/2022
REVISED BY: ####	REVISED ON: ####
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DRAWING NUMBER
WW-1



PROPERTY LAYOUT

WW-2 N.T.S. SOURCE: AWT, Inc.

AWT
Engineers and Soil Scientists
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501 N. Salem Street, Suite 203
Apex, North Carolina 27502
919-859-0659
www.agriwaste.com

Buller River Development
Spring Forest - Lot 18

Project Location:
175 Winding Brook Way
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Iredell County
PIN: 4775-04-5136

Project Owner:
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29 Textile Way
Fort Mill, SC 29715
704-301-3229
stan@cornerstone3p.com

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REV.	ISSUED DATE	DESCRIPTION

SHEET TITLE

Property Layout

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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
8. 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.

Installation Notes:

Contractor to adjust tank placements as necessary to maintain:

1. 25' downslope/15' sideslope/10' upslope setback from foundation drain
2. Min. 12" cover over Septic Tank (Not to exceed 36")
3. Min. 18" cover over pipes
4. Min. 2% grade on gravity pipe from house to Septic Tank

DRAINFIELD INFO. - **Primary**

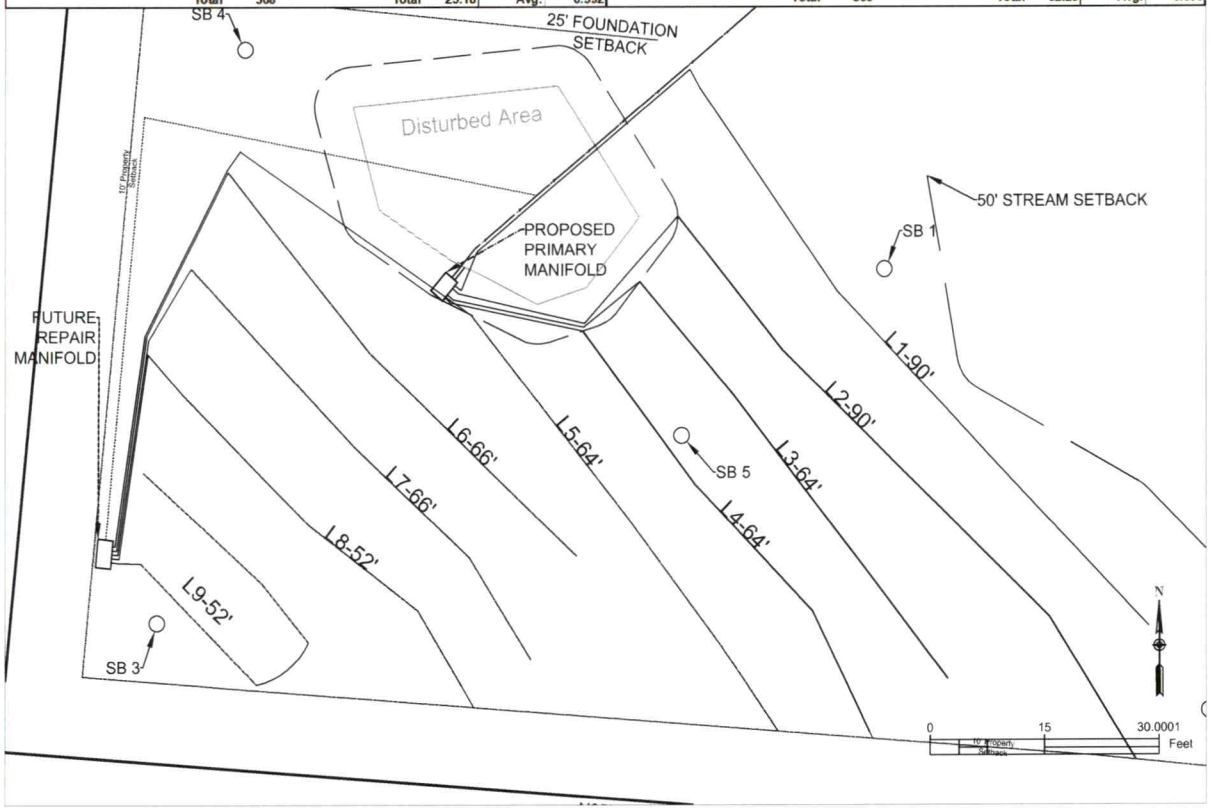
Proposed Type of System/Distribution: ***Pump to Pressure Manifold using Chambers***

Line No.	Flag Color	Line Length (ft)	Tap	Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
1	orange	90	1/2in SCH 40	7.11	0.079	0.376
2	red	90	1/2in SCH 40	7.11	0.079	0.376
3	blue	64	1/2in SCH 80	5.48	0.086	0.408
4	yellow	64	1/2in SCH 80	5.48	0.086	0.408
			1/2in SCH 80, Split	2.74		
	Total	**308**	**Total**	**25.18**	**Avg.**	**0.392**

DRAINFIELD INFO. - **Repair**

Proposed Type of System/Distribution: ***Pump to Pressure Manifold using Chambers***

Line No.	Flag Color	Line Length (ft.)		Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
5	purple	64	1/2in SCH 40	7.11	0.111	0.413
6	orange	66	1/2in SCH 40	7.11	0.108	0.400
7	red	66	1/2in SCH 40	7.11	0.108	0.400
8	blue	52	1/2in SCH 80	5.48	0.105	0.392
9	yellow	52	1/2in SCH 80	5.48	0.105	0.392
	Total	**300**	**Total**	**32.29**	**Avg.**	**0.399**



System Layout

SOURCE: Agri-Waste Technology, Inc.

AWT
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919-858-0699
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Buller River Development
Spring Forest - Lot 18

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stan@cornerstone3p.com

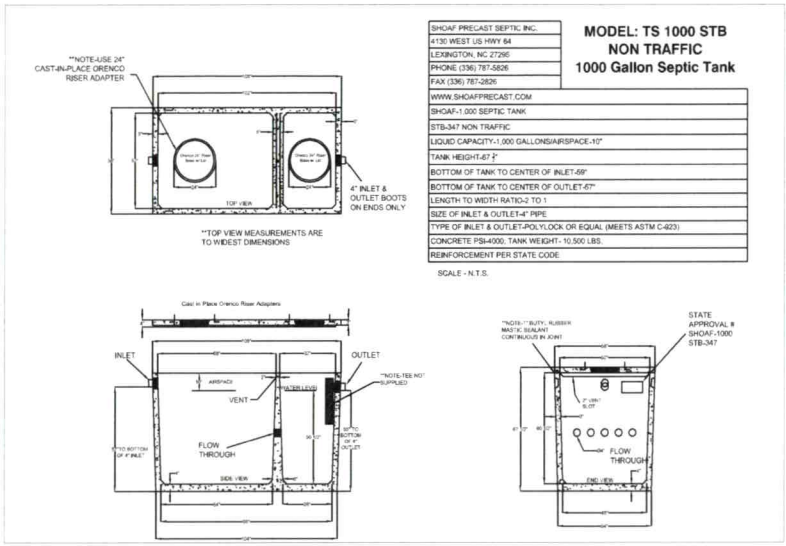
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SHEET TITLE: System Layout

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T. Bostic	9/20/2022
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####	####

DRAWING NUMBER: **WW-3**

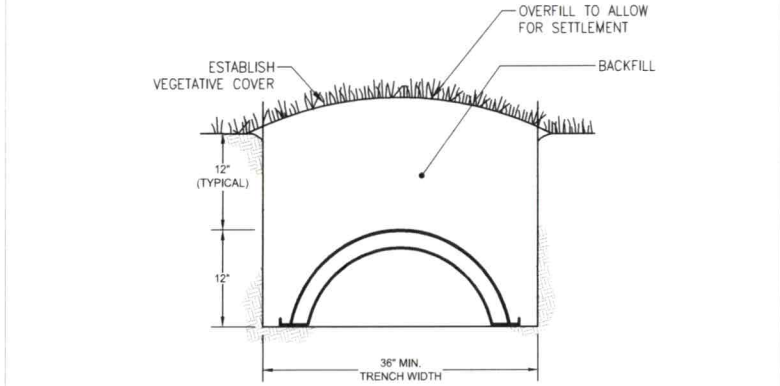


SHOAF PRECAST SEPTIC INC.	**MODEL: TS 1000 STB NON TRAFFIC 1000 Gallon Septic Tank**
4130 WEST US HWY 64	
LEXINGTON, NC 27295	
PHONE (336) 787-5826	
FAX (336) 787-2826	
WWW.SHOAFPRECAST.COM	
SHOAF-1,000 SEPTIC TANK	
STB-347 NON TRAFFIC	
LIQUID CAPACITY-1,000 GALLONS/AIRSPACE-10"	
TANK HEIGHT-67 ½"	
BOTTOM OF TANK TO CENTER OF INLET-59"	
BOTTOM OF TANK TO CENTER OF OUTLET-57"	
LENGTH TO WIDTH RATIO-2 TO 1	
SIZE OF INLET & OUTLET-4" PIPE	
TYPE OF INLET & OUTLET-POLYLOCK OR EQUAL (MEETS ASTM C-923)	
CONCRETE PSI-4000, TANK WEIGHT- 10,500 LBS.	
REINFORCEMENT PER STATE CODE	

SCALE - N.T.S.

1 WW-4 Septic Tank (or equivalent 1,000-gal tank)

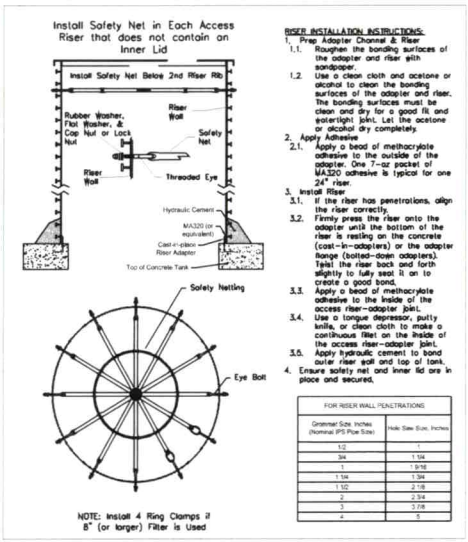
SOURCE: Shoaf Precast Septic, Inc.



NOTES:
1. Mound backfill above the Natural Ground Surface to allow for settlement.
2. Perforated corrugated plastic pipe shall meet requirements of ASTM D 2729.
3. Pipe shall be level, 0.00% slope.
4. End cap shall be provided at end of all corrugated plastic lines.
5. Trench bottom shall be level.

2 WW-4 Chambers - Trench Cross-Section (Typical)

INFILTRATOR Water Technologies, LLC



3 WW-4 Riser Safety Nets

SOURCE: SIM-TECH, Inc.

NOTES

1. Installation to follow all NC DHHS and Iredell County applicable rules and regulations.
2. Iredell 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. 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.
13. 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.
14. All penetrations to be sealed.
15. Spigot to be located on outside of building within 50' of tanks.
16. Contractor to adjust tank placement to meet site constraints.

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For Review Only

REV.	ISSUED DATE	DESCRIPTION

SHEET TITLE
Detail Sheet

DRAWN BY: T. Bostic	CREATED ON: 9/20/2022
REVISED BY: ####	REVISED ON: ####
RELEASED BY: ####	RELEASED ON: ####

DRAWING NUMBER
WW-4

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 sheer 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.

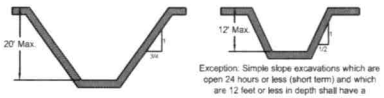
(i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material material is cohesive material. Soil composed primarily of coarse-grained 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.

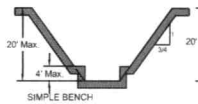
(i) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8-inch thread can be held on one end 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.

EXCAVATIONS IN TYPE A SOILS

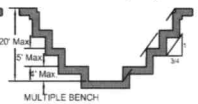
All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of ½:1.

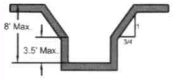


SIMPLE BENCH

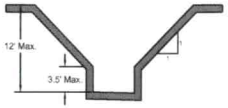


MULTIPLE BENCH

All benched excavations 20 feet or less in depth shall have a maximum allowable slope of ¾:1 and maxium bench dimensions as follows:

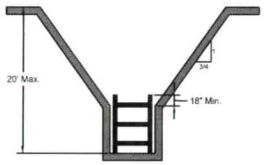


All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3½ feet.



All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3½ feet.

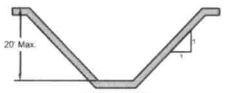
All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of ¾:1. The support or shield system must extend at least 18 inches above the top of the vertical side.



All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under § 1926.652(b).

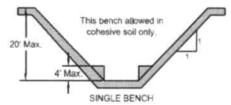
EXCAVATIONS IN TYPE B SOILS

All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

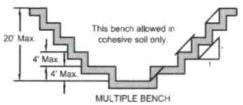


SIMPLE SLOPE

All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maxium bench dimensions as follows:

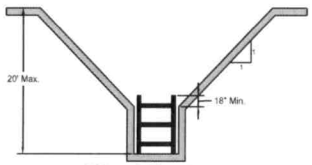


SINGLE BENCH



MULTIPLE BENCH

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of 1:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

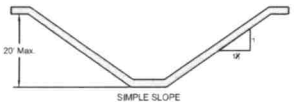


VERTICALLY SIDED LOWER PORTION

All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

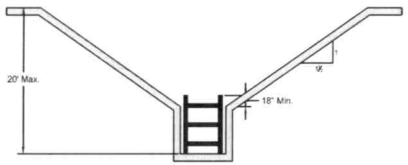
EXCAVATIONS IN TYPE C SOILS

All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1.



SIMPLE SLOPE

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of 1½:1. The support or shield system must extend at least 18 inches above the top of the vertical side.



VERTICALLY SIDED LOWER PORTION

All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

EXCAVATIONS IN LAYERED SOILS

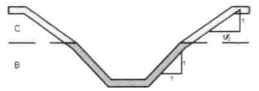
All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below:



B OVER A



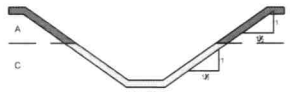
C OVER A



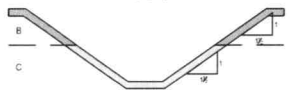
C OVER B



A OVER B



A OVER C



B OVER C

All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

AWT
Engineers and Soil Scientists
Agri-Waste Technology, Inc.
501 N. Salem Street, Suite 201
Apex, North Carolina 27502
919-859-0669
www.agriwaste.com

Buller River Development
Spring Forest - Lot 18

Project Location:
175 Winding Brook Way
Statesville, NC 28625
Iredell County
PIN: 4775-04-6136

Project Owner:
Buller River Development
29 Textile Way
Fort Mill, SC 29715
704-301-3229
stan@cornerstone3p.com

For Review Only

REV.	ISSUED DATE	DESCRIPTION

SHEET TITLE
Excavation Safety

DRAWN BY:	CREATED ON:
T. Bostic	9/20/2022
REVISED BY:	REVISED ON:
####	####
RELEASED BY:	RELEASED ON:
####	####

DRAWING NUMBER
WW-5

Engineers and Soil Scientists

Agri-Waste Technology, Inc.
501 N. Salem Street, Suite 203
Apex, North Carolina 27502
919-859-0669
www.agriwaste.com





Soil Suitability for Domestic Sewage Treatment and Disposal Systems
175 Winding Brook Way, Statesville, NC 28625
Iredell County PIN: 4775-04-5138

PREPARED FOR: Cornerstone Properties, Client

PREPARED BY: Jeff Vaughan, Licensed Soil Scientist
Trevor Hackney, Environmental Scientist

DATE: September 21, 2022

Soil suitability for domestic sewage treatment and disposal systems was evaluated from September 15, 2022, for the property located at 175 Winding Brook Way, Statesville, NC. Jeff Vaughan and Trevor Hackney of Agri-Waste Technology, Inc. (AWT) conducted the soil evaluation. This evaluation was done to facilitate permitting for a 3-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, and boring locations is included in Attachment 1. Profile descriptions for each boring are included in Attachment 2. Additional documentation about the property is included in Attachment 3.

The total property area is approximately 0.84 acres. The property has been cleared and a home has been constructed on the property. The previous septic permit was revoked due to soil disturbance within the drain field area. AWT has re-evaluated the property and have proposed a new design accounting for the soil disturbance. The proposed system is a pump to pressure manifold septic system.

Soil Suitability for Domestic Sewage Treatment and Disposal Systems
The drawing in Attachment 1 details the property boundaries (as surveyed by Bateman Civil Survey Company), soil boring locations, and layout of drain field trenches (Completed by AWT). Five soil borings were assessed on the property. Soil borings were examined to determine soil suitability for on-site sewage disposal systems in accordance with 15A 18A .1900 Rules for Sewage Treatment and Disposal Systems. These borings were advanced with a hand auger.

A septic layout was performed to demonstrate available space (.1945). The layout in Attachment 1 indicates there is available space for a three-bedroom pressure manifold primary and repair septic system utilizing the 25% reduction of innovative drain field material for the primary and repair system.

The proposed LTAR (Long Term Acceptance Rate) by AWT is 0.3 GPD/ft^2. The soils on this property are group IV soils within the distribution and treatment zone as used to define the LTAR. Since usable soil depths meet or exceed 34" AWT is recommending the use of innovative style trench to utilize the 25% reduction for the initial and repair system. With an LTAR of 0.3 GPD/ft^2, 300 linear feet of innovative trench are necessary to support a three-bedroom home initial system. The repair field will require 300 linear feet of 25% reduction trench. The maximum trench bottom should not exceed 22". The attached drawing proves that 308 linear feet of trench can be installed for the primary system and 300 linear feet of trench can be installed for the repair system with the proposed home and pool location.

Any disturbances or grading done in the usable area will change the potential of using the area designated for a drain field. Prior to moving forward with building on the property, Iredell County Environmental Health Department should be contacted to complete the necessary review of this documentation to issue an IP (Improvement Permit) for the property and the CA (Construction Authorization).

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 in order 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)*

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

Sincerely,

Jeff Vaughan

Trevor Hackney

Trevor Hackney

Attachment 1: Site Plan/Drawing

Septic System Design - Summary Page

Engineers and Soil Scientists
Agri-Waste Technology, Inc.

Project Manager:
Trevor Hackney
thackney@agriwaste.com
704-268-9160
Engineer:
Trent Bostic
tbostic@agriwaste.com

Project: Spring Forest - Lot 18
Property: 175 Winding Brook Way
Statesville, NC 28625
Subdiv.: Spring Forest
Lot #: 18
Owner: Buller River Development
Address: 29 Textile Way
Fort Mill, SC 29715
Phone: 704-301-3229
Email: stan@cornerstone3p.com
EHS:

Date: 9/20/2022
County: Iredell
Permit #:
Type of System: III b
PIN: 4775-04-5138

Soil Parameters

Soil Evaluation By:

-

Special Conditions/Notes:

LTAR: 0.30 gpd/ft^2

Design Parameters

Type of Establishment: Residence, 5 or fewer bedrooms
Unit: Bedroom
# of Units: 3

Septic Tank Specifications

Min. Tank Capacity: 900 gal
Actual Tank Volume: 1,000 gal
Tank Manufacturer: Shoaf
Tank Model: TS 1000 STB

	Exterior	Interior	
Length:	108.0	102.0	in.
Width:	58.0	52.0	in.
Depth:	67.5	60.5	in.

Primary Drainfield Specifications

Type of Distribution: Parallel Pressure Manifold
Trench Media: Chambers
Trench Width: 3 ft
Trench Depth: 30 in.
(or as specified on permit)

Trench Bottom Area: 1200 ft^2
Minimum Drain Line: 300 ft
Actual Drain Line: 308 ft
Number of Lines: 4
Minimum Line Spacing: 9 ft O.C.

Wastewater Treatment System Design Calculations

Project: Spring Forest - Lot 18
Location: 175 Winding Brook Way
Statesville, NC 28625
County: Iredell

Septic Tank Sizing

Daily Flow Estimate:

Unit	# of Units	Flow/Unit	Flow/Day
Bedroom	3	120	360
			0
			0
		Q=	360 gpd

Septic Tank Minimum Capacity: Per NCAC T15A:18A .1952(b)(1):

For individual residences with 3 or fewer bedrooms,

Minimum Liquid Capacity (V)= 900 gal

Septic Tank Specs:

Manufacturer:	Shoaf	
Model:	TS 1000 STB	
Volume:	1,000	gal
Weight:	9,500	lbs

	Exterior	Interior	
Length:	108.0	102.0	in.
Width:	58.0	52.0	in.
Depth:	67.5	60.5	in.

Shape of Risers: Circular
Diameter: 2.00 ft

Pump Tank Storage & Float Settings

Project: Spring Forest - Lot 18
Location: 175 Winding Brook Way
Statesville, NC 28625
County: Iredell

Tank Manufacturer	Shoaf
Tank Model	TS 1000 PT

Interior Height (in.) **50.0** in.
Avg. Storage **20.16** gal/in.

Primary System

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

Top of pump (including 4" block)	16.4 in.	(Pump height = 12 13/32")
Pump Off	18.5 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 373 gal
Days of Storage 1.04 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)	16.4 in.	(Pump height = 12 13/32")
Pump Off	18.5 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 373 gal
Days of Storage 1.04 days
(determined from "interior top of tank" - "High Water Alarm")

ELEVATIONS

Project: Spring Forest - Lot 18
Location: 175 Winding Brook Way
Statesville, NC 28625
County: Iredell

Benchmark SW Property Corner
BM Elev 103.209 ft

Septic Tank	1,000 gal	
Ground Surface		79.00 ft
Depth of Soil Cover	12 in.	1.00 ft
Overall Ht of Tank	67.5 in.	5.63 ft
Elev, Base of Tank		72.38 ft
Ht to 4" Inlet Invert	57 in.	4.75 ft
Elev, 4" Inlet Invert		77.13 ft
Ht to 4" Outlet Invert	55 in.	4.58 ft
Elev, 4" Outlet Invert		76.96 ft
Gravel Base	6 in.	0.50 ft
Elev, Bot of Excavation		71.88 ft

Pump Tank	1000 gal	
Ground Surface		80.00 ft
Depth of Soil Cover	26 in.	2.17 ft
Overall Ht of Tank	57 in.	4.75 ft
Elev, Base of Tank		73.08 ft
Ht to 4" Inlet Invert	46 in.	3.83 ft
Elev, 4" Inlet Invert		76.92 ft
Ht to 2" Outlet Invert	58 in.	4.83 ft
Elev, 2" Outlet Invert		77.92 ft
Gravel Base	6 in.	0.50 ft
Elev, Bot of Excavation		72.58 ft

ST Inlet Pipe		
Grade @ Stub-out		79.5 ft
Depth of Stub-out, top		1.5 ft
Elev, Stub-out Invert		77.65 ft
Elev @ ST Inlet Invert		77.13 ft
Length		10 ft
Slope		5.2 %

Pipe, ST to PT		
ID	4 in.	0.33 ft
OD	4.5 in.	0.38 ft
Elev, ST Outlet Invert		76.96 ft
Elev, PT Inlet Invert		76.92 ft
Length		4 ft
Slope		1.0 %
Cover over inlet pipe		1.52 ft

Pump Reqmt.		
Floor Thickness	4 in.	0.33 ft
Elev, Pump Tank Floor		73.42 ft
Pump Block Ht.	4 in.	0.33 ft
Elev, Pump Intake		73.75 ft
Grade @ Primary Manifold		90.00 ft
Grade @ Repair Manifold		99.00 ft
Min. Cover	18 in.	1.50 ft
Max Elev, Primary		88.50 ft
Max Elev, Repair		97.50 ft
Elev Diff, Primary		14.75 ft
Elev Diff, Repair		23.75 ft

Drainfield Design

Project	Spring Forest - Lot 18
Location	175 Winding Brook Way
	Statesville, NC 28625
County	Iredell

Drainfield Sizing

Primary

LTAR	0.3 gpd/ft^2		
Daily Design Flow	360 gpd	**Type of Drainfield Media**	Chambers
Req. Drainfield Area	1,200 ft^2	**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	0.3 gpd/ft^2		
Daily Design Flow	360 gpd	**Type of Drainfield Media**	Chambers
Req. Drainfield Area	1,200 ft^2	**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	orange		106	90.0	
2	Layout Line	red		90	90.0	
3	Layout Line	blue		66	64.0	
4	Layout Line	yellow		64	64.0	
5	Layout Line	purple		63		64.0
6	Layout Line	orange		64		66.0
7	Layout Line	red		88		66.0
8	Layout Line	blue		72		52.0
9	Layout Line	yellow		52		52.0
10	Layout Line					
			Total	665	308	300
			Count	9	4	5

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

For Chambers or Low-profile Chambers:

Effective trench lengths are shown. Add 1' for total installation length.

PRESSURE MANIFOLD DESIGN (Primary)

Site Information

Project: Spring Forest - Lot 18
Location: 175 Winding Brook Way
Statesville, NC 28625
County: Iredell

Design Information

Estimated Daily Flow	360 gal/day
L.T.A.R. (from Iredell Co.)	0.3 gal/day/ft^2
L.T.A.R. + 5%	0.315 gal/day/ft^2
Trench Width	3 ft.
Line Length Required	400 ft.
Length after 25% Reduction	300 ft
L.T.A.R. Reduced	0.400 gal/day/ft^2
L.T.A.R. Reduced + 5%	0.420 gal/day/ft^2

DRAINFIELD INFO. - **Primary**

Proposed Type of System/Distribution: ***Pump to Pressure Manifold using Chambers***

Line No.	Flag Color	Line Length (ft)	Tap	Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
1	orange	90	1/2in SCH 40	7.11	0.079	0.376
2	red	90	1/2in SCH 40	7.11	0.079	0.376
3	blue	64	1/2in SCH 80	5.48	0.086	0.408
4	yellow	64	1/2in SCH 80	5.48	0.086	0.408
	Total	**308**	**Total**	**25.18**	**Avg.**	**0.392**

Note: Line lengths are calculated in 4' increments to reflect use of Chambers product. 2' added for endcaps.

Total Run Time	14.30 min.	
Drainfield Capacity	201.1 gal	
% of Drainfield Cap	67.7%	(Req. Range 66-75%)
Dose Volume	136.2 gal/dose	
Run Time/Dose	**5.4 minutes**	Range 5-7 minutes unless uphill, checked
Volume/depth	20.16 gal/in.	(Per tank manufacturer's specifications)
Estimated Drawdown	6.75 in.	

Manifold Box

Number of Taps: 4 with 0 Split(s)
Manifold Length: 3.5 ft. (approximate)

PRESSURE MANIFOLD SYSTEM DESIGN (Repair)

Site Information

Project: Spring Forest - Lot 18
Location: 175 Winding Brook Way
Statesville, NC 28625
County: Iredell

Design Information

Estimated Daily Flow	360 gal/day
L.T.A.R. (from Iredell Co.)	0.3 gal/day/ft^2
L.T.A.R. + 5%	0.315 gal/day/ft^2
Trench Width	3 ft.
Line Length Required	400 ft.
Length after 25% Reduction	300 ft
L.T.A.R. Reduced	0.400 gal/day/ft^2
L.T.A.R. Reduced + 5%	0.420 gal/day/ft^2

DRAINFIELD INFO. - **Repair**

Proposed Type of System/Distribution: ***Pump to Pressure Manifold using Chambers***

Line No.	Flag Color	Line Length (ft.)		Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
5	purple	64	1/2in SCH 40	7.11	0.111	0.413
6	orange	66	1/2in SCH 40	7.11	0.108	0.400
7	red	66	1/2in SCH 40	7.11	0.108	0.400
8	blue	52	1/2in SCH 80	5.48	0.105	0.392
9	yellow	52	1/2in SCH 80	5.48	0.105	0.392
	Total	**300**	**Total**	**32.29**	**Avg.**	**0.399**

Note: Line lengths are calculated in 4' increments to reflect use of Chambers product. 2' added for endcaps.

Total Run Time	11.15 min.	
Drainfield Capacity	195.9 gal	
% of Drainfield Cap	74.6%	(Req. Range 66-75%)
Dose Volume	146.1 gal/dose	
Run Time/Dose	**4.5 minutes**	Range 5-7 minutes unless uphill, checked
Volume/depth	20.16 gal/in.	(Per tank manufacturer's specifications)
Estimated Drawdown	7.25 in.	

Manifold Box

Number of Taps: 5 with 0 Split(s)
Manifold Length: 4.0 ft. (approximate)

PUMP DESIGN

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

Project: Spring Forest - Lot 18
Location: 175 Winding Brook Way
Statesville, NC 28625
County: Iredell

Friction Losses

Suction Head	0 ft		*(submersible 0)*
Elev. Difference (highest point from pump)	14.75 ft		
Design Pressure At Outlet	2 ft		

Supply Line - 2" Schedule 40 PVC

Pipe Diameter, Nominal	2 in.		
Pipe Diameter (ID)	2.047 in.	Flow	25.18 gpm
Pipe Length	63 ft	Velocity	2.45 ft/sec
Pipe Length for Fittings	6.3 ft		Meets requirement that 2 ft/s < v < 5 ft/s.
Equivalent Length	69.3 ft		
Estimated Friction Loss in Supply Line	0.82 ft		
Pressure Filter Friction Loss	0.34 ft		*(from manufacturer)*
Friction Loss - Taps/Special Fittings	3.5 ft		
TOTAL	**21.41 ft.**		

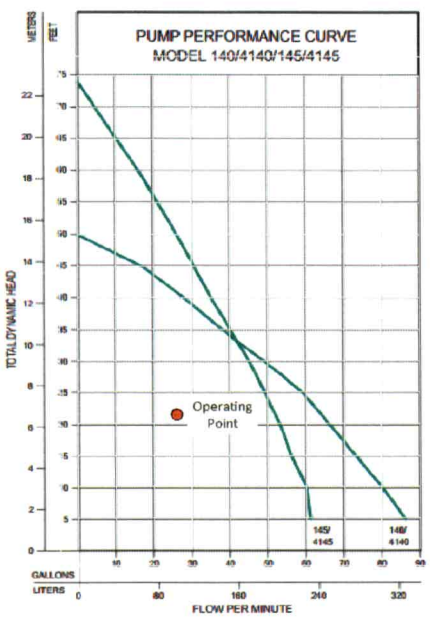
Flow for Anti-Siphon Hole

Hole Diameter	1/8	in.
Hole Flowrate	0.85	gpm

Pump Efficiency	0.7	*(assumed, typical)*
Motor Efficiency	0.9	*(assumed for electric pumps)*
Flow	**26.03 gpm**	
Required Horsepower	0.22 hp	
TDH	**21.41 ft**	

Pump Selection

Manufacturer:	Zoeller
Model:	N145
Horsepower:	**0.75**



PUMP DESIGN

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

Project: Spring Forest - Lot 18
Location: 175 Winding Brook Way
Statesville, NC 28625
County: Iredell

Friction Losses

Suction Head	0 ft		*(submersible 0)*
Elev. Difference (highest point from pump)	23.75 ft		
Design Pressure At Outlet	2 ft		

Supply Line - *2.0" Schedule 40 PVC*

Pipe Diameter, Nominal	2 in.		
Pipe Diameter (ID)	2.047 in.	Flow	32.29 gpm
Pipe Length	152 ft	Velocity	3.15 ft/s
Pipe Length for Fittings	15.2 ft		Meets requirement that 2 ft/s < v < 5 ft/s.
Equivalent Length	167.2 ft		
Estimated Friction Loss in Supply Line	3.13 ft		

Pressure Filter Friction Loss	0.23 ft	*(from manufacturer)*
Friction Loss - Taps/Special Fittings	3.5 ft	
TOTAL	**32.61 ft.**	

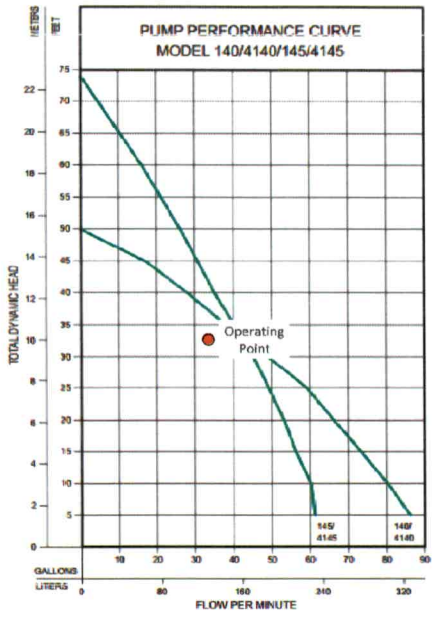
Flow for Anti-Siphon Hole

Hole Diameter	1/8 in.
Hole Flowrate	1.05 gpm

Pump Efficiency	0.7	*(assumed, typical)*
Motor Efficiency	0.9	*(assumed for electric pumps)*
Flow	**33.34 gpm**	
Required Horsepower	0.44 hp	
TDH	**32.61 ft.**	

Pump Selection

Manufacturer:	Zoeller
Model:	N145
Horsepower:	**0.75**



Septic Tank Buoyancy Calculation

Project: Spring Forest - Lot 18
Location: 175 Winding Brook Way
Statesville, NC 28625
County: Iredell

Tank Size (nominal) 1000 gal

Properties/Assumptions:

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

Min. depth to water table	42.0 in.	from ground surface
Effluent Density	62.4 lb/ft^3	(Specific Weight of Water)
Concrete Density	142.6 lb/ft^3	
Soil App. Sp. Grav.	1.3	*(typical value)*
Soil Cover Over Tank	12 in.	(minimum)
Additional Cover	0 in.	for pipe grade
Unsubmerged wt of soil	81.1 lb/ft^3	
Submerged wt of soil	49.9 lb/ft^3	50% Porosity Assumed

Tank Dimensions (from supplier):

		Exterior Top	Exterior Bottom	Interior Top	Interior 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 6.28 ft^2

Permanent Liquid Depth in Tank 0.0 in. 0.00 ft

Tank Weight 9,500 lb (per manufacturer)

Buoyancy Force Calculation:

Buoyancy Force Specific Weight of Water x Displaced Volume

Displaced Volume	125.9 ft^3 *
Buoyancy Force	**7,856 lb.**

Weight Calculation:

Tank Weight	9500 lb		
Water Weight in Tank	0 lb	Volume	0.0 ft^3 *
Soil Weight Over Tank	3019 lb		
Soil Friction Force	4227 lb		
Total Weight	**16,746 lb**		

Factor of Safety = 2.13

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: Spring Forest - Lot 18
Location: 175 Winding Brook Way
Statesville, NC 28625
County: Iredell

Tank Size (nominal) 1000 gal

Properties/Assumptions:

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

Min. depth to water table	42	in.	from ground surface
Effluent Density	62.4	lb/ft^3	(Specific Weight of Water)
Concrete Density	142.6	lb/ft^3	
Soil App. Sp. Grav.	1.3		*(typical value)*
Soil Cover Over Tank	12	in.	(minimum)
Additional Cover	14	in.	for pipe grade
Unsubmerged wt of soil	81.1	lb/ft^3	
Submerged wt of soil	49.9	lb/ft^3	50% porosity assumed

Tank Dimensions (from supplier):

		Exterior		Interior		
		Top	Bottom	Top	Bottom	
Tank	Length	96.0	92.0	90.0	86.0	in.
	Width	62.0	56.0	56.0	50.0	in.
	Height	54.0	(w/o lid)	50.0		in.
Lid	Length	96.0	in.			
	Width	62.0	in.			
	Height	3.0	in.			

Area of Riser Openings 3.14 ft^2

Permanent Liquid Depth in Tank 0.0 in. 0.00 ft

Tank Weight 8000 lb (per manufacturer)

Buoyancy Force Calculation:

Buoyancy Force Specific Weight of Water x Displaced Volume

Displaced Volume	129.3 ft^3 *	
Buoyancy Force	**8,071 lb**	

Weight Calculation:

Tank Weight	8000 lb		
Water Weight in Tank	0 lb	Volume	0.0 ft^3 *
Soil Weight Over Tank	6713 lb		
Soil Friction Force	2869 lb		
Total Weight	**17,581 lb**		

Factor of Safety = 2.18

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.*

Attachment 2: Soil Boring Description Sheets

PROPERTY ID #: 4775045138
COUNTY: Iredell Co.

SOIL/SITE EVALUATION
***for* ON-SITE WASTEWATER SYSTEM**
(Complete all fields in full)

CLIENT: Cornerstone (Buller River Development) APPLICATION DATE
ADDRESS: 175 Winding Brook Way (Lot 18) DATE EVALUATED: 9/15/2022
PROPOSED FACILITY: Single Family Residence PROPOSED DESIGN FLOW (.1949): 360 GPD PROPERTY SIZE: 0.84 ac.
LOCATION OF SITE: 175 Winding Brook Way (Lot 18) PROPERTY RECORDED:
WATER SUPPLY: ☐ Private ☒ Public ☐ Well ☐ Spring ☐ Other
EVALUATION METHOD: ☒ Auger Boring ☐ Pit ☐ Cut TYPE OF WASTEWATER: ☒ Sewage ☐ Industrial Process ☐ Mixed

PROFILE #	.1940 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY (.1941) .1941 STRUCTURE/ TEXTURE	.1941 CONSISTENCE/ MINERALOGY	OTHER PROFILE FACTORS .1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	PROFILE CLASS & LTAR
SB 1	23%	0-6"	SL; GR	SS; SP; Fr	7.5 YR 4/4	44+"			Provisionally Suitable
		6-15"	SCL; WSBK	SS; SP; Fr	2.5 YR 4/6				0.3
		15-33"	C; SBK	SS; SP; FI	2.5 YR 4/6				
		33-44"	CL; SBK	SS; SP; Fr	2.5 YR 4/6				
SB 2	18%	0-6"	SL; GR	SS; SP; Fr	7.5 YR 4/4	42+"		Chroma 2	Provisionally Suitable
		6-18"	SCL; WSBK	SS; SP; Fr	2.5 YR 4/5				0.3
		18-38"	SC; SBK	SS; SP; FI	2.5 YR 4/6				
		38-42"	SC; SBK	SS; SP; FI	2.5 YR 5/8				
		42-48+"	SC; SBK	SS; SP; FI	2.5 YR 5/8 2.5 YR 7/2				
SB 3	12%	0-12"	SL; Gr	SS; SP; Fr	7.5 YR 4/4	45+"			Provisionally Suitable
		12-30"	C; SBK	SS; SP; FI	2.5 YR 4/6				0.3
		30-45+"	CL; SBK	SS; SP; Fr	2.5 YR 4/6				
SB 4	16%	0-11"	SL; Gr	SS; SP; Fr	7.5 YR 4/4	48+"			Provisionally Suitable
		11-36"	C; SBK	SS; SP; FI	2.5 YR 4/6				0.3
		36-45+"	CL; WSBK	SS; SP; Fr	2.5 YR 4/6				

DESCRIPTION	INITIAL SYSTEM	REPAIR SYSTEM
Available Space (.1945)	Provisionally Suitable	Provisionally Suitable
System Type(s)	Conventional Innovative	Conventional Innovative
Site LTAR	0.3 GPD/Ft^2	0.3 GPD/Ft^2

OTHER FACTORS (.1946):
SITE CLASSIFICATION (.1948):

EVALUATED BY: Jeff Vaughan
OTHER(S) PRESENT: Trevor Hackney

COMMENTS

LEGEND

use the following standard abbreviations

LANDSCAPE POSITION	GROUP	SOIL TEXTURE	CONVENTIONAL .1955 LTAR*	LPP .1957 LTAR*	MINERALOGY/ CONSISTENCE	STRUCTURE
CC (Concave Slope)	I	S (Sand)	1.2 - 0.8	0.6 - 0.4	SEXP (Slightly Expansive)	G (Single Grain)
CV (Convex Slope)		LS (Loamy Sand)			EXP (Expansive)	M (Massive)
D (Drainage Way)						CR (Crumb)
DS (Debris Slump)	II	SL (Sandy Loam)	0.8 - 0.6	0.4 - 0.3		GR (Granular)
FP (Flood Plain)		L (Loam)				SBK (Subangular Blocky)
FS (Foot Slope)						ABK (Angular Blocky)
H (Head Slope)	III	Si (Silt)	0.6 - 0.3	0.3 - 0.15		PL (Platy)
L (Linear Slope)		SiCL (Silty Clay Loam)				PR (Prismatic)
N (Nose Slope)		CL (Clay Loam)				
R (Ridge)		SCL (Sandy Clay Loam)			**MOIST**	**WET**
S (Shoulder Slope)		SiL (Silt Loam)				
T (Terrace)					VFR (Very Friable)	NS (Non-sticky)
	IV	SC (Sandy Clay)	0.4 - 0.1	0.2 - 0.05	FR (Friable)	SS (Slightly Sticky)
		SiC (Silty Clay)			FI (Firm)	S (Sticky)
		C (Clay)			VFI (Very Firm v. Very Sticky)	VS (Very Sticky)
		O (Organic)	None	None	EFI (Extremely Firm)	NP (Non-plastic)
						SP (Slightly Plastic)
						P (Plastic)
						VP (Very Plastic)

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

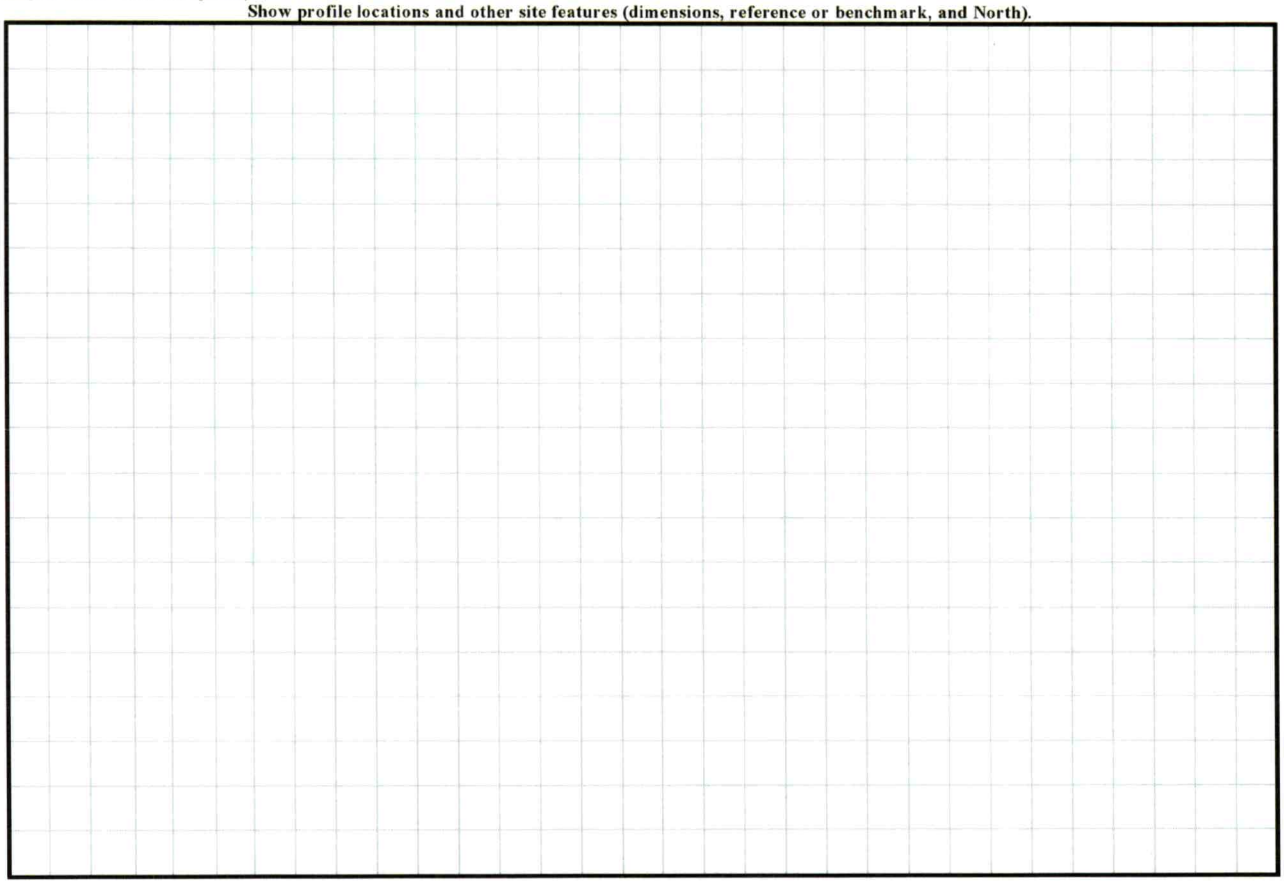
NOTES

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)
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), PS (Provisionally Suitable), or U (Unsuitable)

Evaluation of saprolite shall be by pits.

Long-term Acceptance Rate (LTAR): gal/day/ft^2

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



SOIL/SITE EVALUATION

(Continuation Sheet-Complete all field in full)

PROPERTY ID #: _4775045138_
DATE OF EVALUATION: ___9/15/2022__
COUNTY: _ Iredell Co.__

PROFILE #	.1940 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY (.1941)		OTHER PROFILE FACTORS				PROFILE CLASS & LTAR
			.1941 STRUCTURE/ TEXTURE	.1941 CONSISTENCE/ MINERALOGY	.1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	
SB 5	24%	0-6"	SL; Gr	SS; SP; Fr	7.5 YR 4/4	48+"			Provisionally Suitable 0.3
		6-15"	SCL; WSBK	SS; SP; Fr	2.5 YR 4/6				
		15-40"	C; SBK	SS; SP; FI	2.5 YR 4/6				
		40-48"	CL; WSBK	SS; SP; Fr	2.5 YR 4/6				

COMMENTS: _____

Attachment 3: Additional Documentation