HAL OWEN & ASSOCIATES, INC.

SOIL & ENVIRONMENTAL SCIENTISTS
P.O. Box 400, Lillington NC 27546-0400
Phone (910) 893-8743 / Fax (910) 893-3594
www.halowensoil.com

6 September 2023

Asset Development
3900 Dunn Road
Roseboro, NC

Reference: Soil Investigation and Septic System Design
165 Cotton Fields Lane, Fuquay Varina, Harnett Co., NC
PIN 0643-36-0736.000 Lot 25 Cotton Farms SD

Dear Asset Development,

A site investigation was conducted on 21 August 2023 for the above referenced property, which is located on the northern side of Cotton Fields Lane in Harnett County, North Carolina. The purpose of the investigation was to determine the ability of this lot to support a subsurface sewage waste disposal system and 100% repair area for a typical three-bedroom home. Public water supplies will be utilized for this lot.

All ratings and determinations were made in accordance with "Laws and Rules for Sewage Treatment and Disposal Systems, 15A NCAC 18A .1900". This report represents my professional opinion but does not guarantee or represent permit approval for any lot by the Local Health Department. The permit you receive from the Local Health Department may contain some modifications or amendments to our submitted design. Please carefully review your permit and adhere to all prescribed requirements.

SOIL INVESTIGATION

The soils were evaluated under moist soil conditions through the advancing of auger borings. This evaluation included observations of topography and landscape position, soil morphology (texture, structure, clay mineralogy, organics), soil wetness, soil depth, and restrictive horizons.

Soils in the proposed system area were observed to rate as provisionally suitable for subsurface sewage waste disposal systems (Figure 1). The subsoils were observed to be firm clays and extended to greater than 48 inches below ground surface. No evidence of a soil wetness condition was observed within 48 inches below surface or deeper. These soils appear adequate to support long-term acceptance rates of 0.3 gal/day/ft^2 for chamber drainlines.

SEPTIC SYSTEM DESIGN

A 1000 gallon (at minimum) septic tank and an approved septic effluent filter is required. A pump tank (1000 gallon at minimum) is required to lift effluent to the nitrification field.

The initial septic system is proposed as a pump driven system to 300 linear feet of Infiltrator Quick4 Plus standard chamber drainlines utilizing a 25% reduction in total drainline length (Figure 2). A long-term application rate (LTAR) of 0.3 gal/day/ft^2 was used to design the nitrification field. A pressure manifold will be used to deliver effluent to the drainfield. The last two drainlines are composed of two 28-foot-long runs, on different contours, connected by overflow pipes. The drainlines shall be installed on contour at 24 inches below surface (low side). The maximum trench bottom depth on the high side should not exceed 30 inches.

The repair septic system is proposed as a pump driven system to 300 linear feet of Infiltrator Quick4 Plus standard chamber drainlines utilizing a 25% reduction in total drainline length (Figure 2). A LTAR of 0.3 gal/day/ft^2 was used to design the nitrification field. Effluent will be serially distributed to five unequal length drainlines, connected by overflow pipes. The drainlines shall be installed on contour at 24 inches below surface (low side). The maximum trench bottom depth on the high side should not exceed 30 inches.

It is important that you do not disturb the septic areas during site construction. A staked line or protective fence should be placed around the system areas prior to construction to eliminate any potential damage to the soil or the layout of the system. Septic areas should not be used for staging construction materials or subjected to vehicular traffic. Do not cut, grade, fill, install utilities, or otherwise alter the designated septic areas.

CONCLUSION

This report and the attached septic system design information will need to be submitted to the Local Health Department for review and the permitting process. I appreciate the opportunity to provide this service and hope to be allowed to assist you again in the future. If you have any questions or need additional information, please contact me at your convenience.

Sincerely,

Britt Wilson
Licensed Soil Scientist

Figure 1. Soil Map showing Septic Suitability

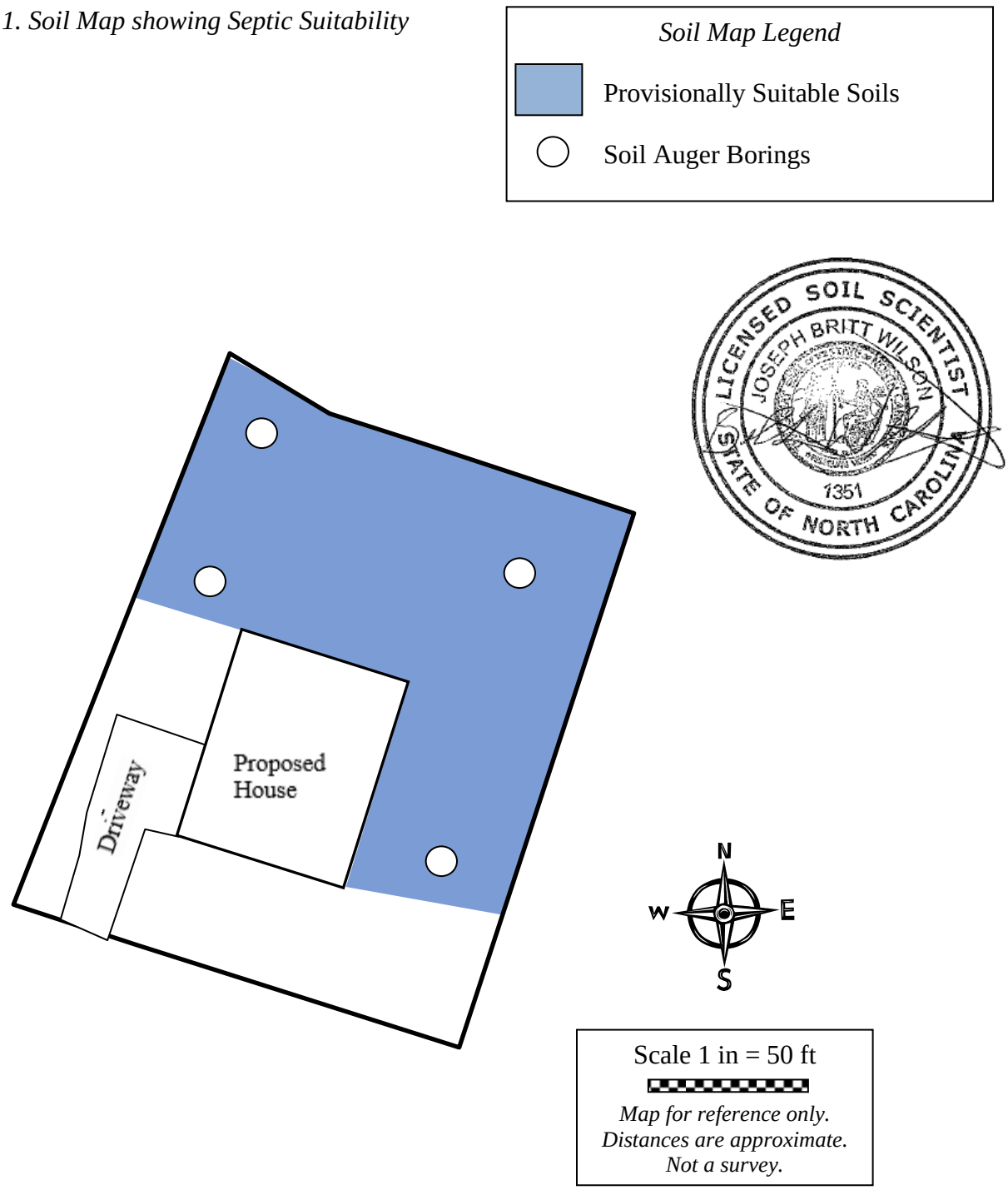


Figure 2. Septic System Layout

Map Legend

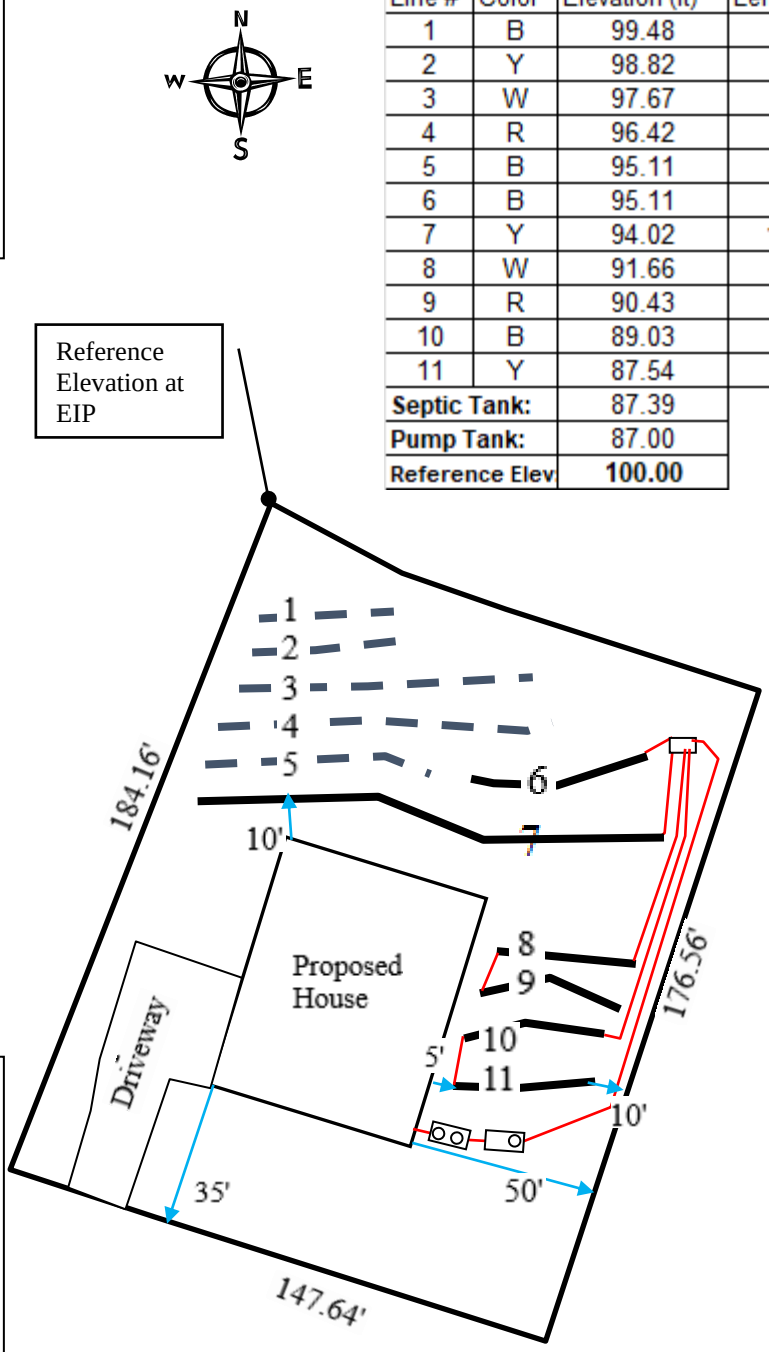
Pump Tank
Septic Tank
Supply Lines
Initial Drainline
Repair Drainline

Scale 1 in = 50 ft

Map for reference only. Distances are paced and approximate. Not a survey.

Potential Drainlines flagged at site on 9-ft centers.

Line #	Color	Relative Elevation (ft)	Drainline Length(ft)	Field Length(ft)
1	B	99.48	36	38
2	Y	98.82	48	50
3	W	97.67	84	87
4	R	96.42	84	112
5	B	95.11	48	127
6	B	95.11	68	127
7	Y	94.02	120	125
8	W	91.66	28	30
9	R	90.43	28	30
10	B	89.03	28	30
11	Y	87.54	28	30
Septic Tank:		87.39		
Pump Tank:		87.00		
Reference Elev		**100.00**		



Initial System
Pump to 1 X 300ft (3ft)
Quick4 Standard Plus Chambers
Installed on contour, MTD 24 inches.
LTAR 0.3 gpd/sf

*Initial drainlines must be at least 9ft on center, 10ft from property line, 5ft from home, and 10ft from a water line

Repair System
Pump to 1 X 300ft (3ft)
Quick4 Standard Plus Chambers
Installed on contour, MTD 24 inches.
LTAR 0.3 gpd/sf

DESIGN FLOW 360 gal/day **SOIL LTAR:** 0.30 gpd/ft^2

TANKS (minimum) Septic Tank: 1000 gallons Pump Tank: 1000 gallons

TRENCHES Drainline Type: Quick4 standard chamber (25% reduction)

Trench depth: 24 inches (low side) Trench width: 3 ft

Trench Length Factor: 75 % Effective Trench Width: 4 ft

Absorption Area: 900 ft^2 Minimum Linear Length: 300 ft

PRESSURE MANIFOLD DESIGN CRITERIA

MANIFOLD # Taps 4 Tap Configuration: 6in. spacing, 1 side of manifold

Length (ft): 3.5 Diameter: 4" sch 80 pvc Elevation: 96.11

TAP CHART

Tap #	Line Number	Color	Relative Elevation	Run Length (ft)	Drainline Length(ft)	Tap Size/ Schedule	Flow/tap (gpm)	LTAR (gpd/ft^2)
1	6	B	95.11	68	68	1/2"sch 40	7.11	0.410
2	7	Y	94.02	120	120	3/4"sch 40	12.50	0.409
3	8	W	91.66	28	56	1/2"sch 80	5.48	0.384
	9	R	90.43	28				
4	10	B	89.03	28	56	1/2"sch 80	5.48	0.384
	11	Y	87.54	28				

Total Drainline: 300 Total Flow: 30.57

Target LTAR*: 0.40

LTAR + 5%: 0.420

PUMP CALCULATIONS

Total Flow: 30.57 gpm Design Head (ft): 2.0

Daily Pump Run Time: 11.78 min (Daily Flow/Total Flow)

Dose Volume: 146.93 gallons with Pipe Volume at 75 % (65.3gal/100ft pipe)

Dose Pump Run 4.81 minutes (Dose Vol/Total Flow)

* Target LTAR: Convert LTAR for non-conventional drainline types by dividing by trench length factor

MANIFOLD DIAGRAM: