



Soil Suitability for Domestic Sewage Treatment and Disposal Systems

Jones Cousins Way.
Zebulon, NC 27597
Wake County PIN: 1767937955

Prepared For:

Rodrigo Ramirez, Client

Prepared By:

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Brent Purdum, Assistant Soil Scientist

Report Date:

February 5, 2025



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PREPARED FOR: Rodrigo Ramirez, Client

PREPARED BY: Jeff Vaughan
Brent Purdum

DATE: February 5, 2025

Soil suitability for domestic sewage treatment and disposal systems was evaluated on February 5, 2025, for property located at Jones Cousins Way, located near Zebulon, NC. Brent Purdum of Agri-Waste Technology, Inc. (AWT) conducted the soil evaluation. A detailed soil evaluation of the land area will follow. A property reference map is in Attachment 1. The property map detailing soil suitability for septic systems and soil types can be found in Attachment 2.

Approximately 2 acres of the property were evaluated. The property is partially wooded, but mostly open fields. There is a powerline easement and moderate slopes on the property (Attachment 2).

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

The aerial map in Attachment 2 details the approximate property boundaries, soil boring locations, soil types, and soil areas for septic systems. Numerous soil borings were advanced on the property and the soil evaluated (Attachment 3). A portion of the property contained a powerline easement and a drainage, which is unsuitable for septic systems. However, this evaluation was merely a preliminary review to determine what potential this land might have for domestic sewage treatment and disposal systems. Therefore, specific types of septic systems, exact locations of future drainfields and repair areas, plus buffers from property lines (current and potential future lot lines), building foundations, wells, etc. are not fully considered. These things will need to be more fully considered as the plans develop for the potential future of this site. It is likely that additional soil evaluations will be required once lot layouts are considered and developed for this property so that septic system types and the location of a septic drainfield can be more fully and appropriately considered.

The purple area (see map in Attachment 2) evaluated on the property exhibited soil characteristics and soil depths (24" or greater) that are suitable for shallow conventional trench septic systems. The area is approximately 83,324 ft².

Typical profile descriptions of the suitable soil for this property are in Attachment 3. Two distinct soil profiles were observed in the soil borings on the property with conventional soil depths: a brownish-yellow subsoil with redoximorphic features; a reddish-brown subsoil with parent material.

The suitable soil borings had the following characteristics. No restrictive horizons were found in any soil borings within 24" of the soil surface. Soil texture was suitable and was estimated to be sandy loam to loamy sand near the soil surface (A horizons) and sandy clay loam in the subsoil (B horizons). Soil structure was suitable and was estimated to be granular near the soil surface (A horizons) and subangular in the subsoil (B horizons). Clay mineralogy was suitable with very friable to firm moist soil consistence and non-sticky to slightly sticky and non-plastic to slightly plastic wet soil consistence.

The mapped soil types on this property are predominantly Rawlings-Rion Complex (labelled as RgC) and Helena sandy loam (labelled as HeB). The Wake County Soil Survey indicates that moderate to severe limitations exist for septic systems installed in these soil types (Attachment 4).

The land area required for a conventional septic system is calculated based on the size of the proposed home and the Long-Term Acceptance Rate (LTAR) of the soil. The LTAR range for the suitable soils on this property is 0.1 – 0.4 GPD/ft² for shallow conventional and conventional septic systems based on the most restrictive soil texture in the subsoil. The LTAR suggested by AWT is 0.3 GPD/ft², but the final LTAR for specific septic system types and septic drainfield locations will be set by the Wake County Health Department. The detailed computations are in Attachment 5.

Conclusions

Based on the results of this evaluation, the installation of conventional septic systems seems very probable on this property in the area designated on the map in Attachment 2.

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

ATTACHMENT 1: Property Reference Map

Jones Cousins Way

Jones Cousins Way

Jones Cousins Way

Dealous Dr

Reidsville Dr



**ATTACHMENT 2: Property Map Detailing Soil Suitability
for Septic Systems and Soil Types**

Preliminary Soil Evaluation

Rodrigo Ramirez
Wake Co., NC
PIN: 1767937955

GIS Acres: 11.68



Area for Septic:

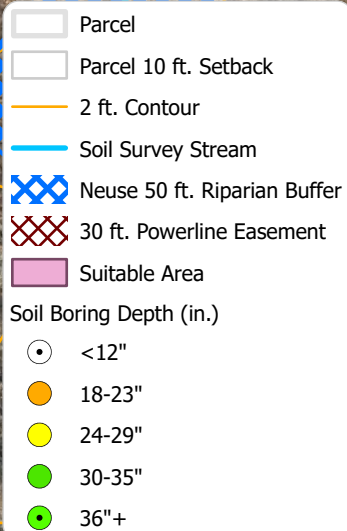
~83,324 sq. ft.

Soil Types:

WfB- Wedowee-Saw complex
RgC- Rawlings-Rion complex
HeB- Helena sandy loam
ChA-
Chewacla and Wehadkee

Notes:

No NWI mapped wetlands
In Neuse Riparian Buffer Area



Drawn By: Clara Frickmann
Reviewed By: Brent Purdum
Date: 02/05/2025

0 25 50 100
Feet



Engineers and Soil Scientists

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Area for Septic:

~83,324 sq. ft.

Soil Types:

WfB- Wedowee-Saw complex
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ChA- Chewacla and Wehadkee

Notes:

No NWI mapped wetlands
In Neuse Riparian Buffer Area

- Parcel
- Parcel 10 ft. Setback
- Soil Type
- Soil Survey Stream
- Neuse 50 ft. Riparian Buffer
- 30 ft. Powerline Easement
- Suitable Area
- Soil Boring Depth (in.)
 - <12"
 - 18-23"
 - 24-29"
 - 30-35"
 - 36"+

Drawn By: Clara Frickmann
Reviewed By: Brent Purdum
Date: 02/05/2025

0 25 50 100
Feet

**ATTACHMENT 3: Typical Profile Descriptions of
Suitable Soil**

Property ID#: 1767937955
Property Recorded: _____
County: Wake

**SOIL/SITE EVALUATION
FOR
ON-SITE WASTEWATER SYSTEM**

Applicant: Rodrigo Ramirez
Address: 10108 San Remo Pl.
Wake Forest, NC 27587

Buyer: _____ Agent: X Phone: (919) 390-5728
Date Evaluated: 02/05/2025
Proposed Facility: Residential
Property Size: Approximately 2 acres evaluated

Location Site: 0 Jones Cousins Way, Zebulon, NC 27597

Water Supply: On Site Well X Comm. Well _____ Public _____ Other _____ Evaluation Method: Auger Boring X Pit _____ Cut _____

TYPICAL PROFILE

Horizon/ Depth (IN)	Matrix	Mottles	Mottle Abundance/ Contrast	.0503 Texture	.0503 Structure	.0503 Minerology	.0504 Consistence Wet	Consistence Moist
A 0-4"	10YR 3/2	None	None	LS	GR	NEXP	NS, NP	Vfr
E 4-12"	10YR 4/3	None	None	LS	GR	NEXP	NS, NP	Fr
Bt1 12-16"	10YR 6/6	None	None	L	GR	NEXP	NS, NP	Fr
Bt2 16-24"	10YR 6/6	2.5YR 4/6	1, c, D	SCL	SBK	SEXP	SS, SP	Fr
Bt3 24-32"	7.5YR 6/8	10YR 6/6; 10YR 7/6;	2, m, D	SCL	SBK	SEXP	SS, SP	Fr

.0503 Landscape Pos/Slope %	- Suitable, <15%	Profile LTAR	- 0.3 GPD/ft ²
.0504 Wetness Condition	- Suitable	System Type	- Suitable for shallow conventional systems due to texture, structure, and depth.
.0506 Saprolite	- Suitable		
.0507 Restrictive Horizon	- Suitable		
.0509 Profile Classification	- Suitable		

Comments: Redoximorphic features became present between 24 and 32 inches.

TYPICAL PROFILE

Horizon/ Depth (IN)	Matrix	Mottles	Mottle Abundance/ Contrast	.0503 Texture	.0503 Structure	.0503 Minerology	.0504 Consistence Wet	Consistence Moist
A 0-10"	7.5YR 4/3	None	None	SL	SBK	NEXP	NS, NP	Fr
Bt1 10-15"	7.5YR 4/4	None	None	SL	SBK	SEXP	SS, SP	Fr
Bt2 15-24"	5YR 4/4	7.5YR 5/3	1, c, D	SCL	SBK	SEXP	SS, SP	Fr
BC 24-30"	7.5YR 5/3	10YR 5/3	2, m, D	SCL	SBK	SEXP	SS, SP	Fi

.0503 Landscape Pos/Slope %	- Suitable, <15%	Profile LTAR	- 0.3 GPD/ft ²
.0504 Wetness Condition	- Suitable	System Type	- Suitable for shallow conventional and conventional systems due to texture, structure, and depth.
.0506 Saprolite	- Suitable		
.0507 Restrictive Horizon	- Suitable		
.0509 Profile Classification	- Suitable		

Comments: Saprolite became present between 24 and 30 inches.

EVALUATED BY: Brent Purdum

COMMENTS: _____

LEGEND OF ABBREVIATIONS FOR SITE EVALUATION FORM

<u>LANDSCAPE POSITION</u>	<u>TEXTURE GROUP</u>	<u>TEXTURE CLASS</u>	<u>.1955 LTAR</u> (gal/day/sqft)
CC - Concave Slope CV - Convex Slope DS - Debris Slump D - Depression DW - Drainage Way FP - Flood Plain FS - Foot Slope H - Head Slope I - Interflueve L - Linear Slope N - Nose Slope P - Pocosin R - Ridge S - Shoulder T - Terrace	I	S - Sand LS - Loamy Sand	1.2 - .08
	II	SL - Sandy Loam L - Loam	0.8 - 0.6
	III	SCL - Sandy Clay Loam CL - Clay Loam SiL - Silt Loam Si - Silt SiCL - Silt Clay Loam	0.6 - 0.3
	IV	SC - Sandy Clay C - Clay SiC - Silty Clay O - Organic	0.4 - 0.1
<u>STRUCTURE</u>	<u>MOIST CONSISTENCE</u>	<u>MOTTLES</u>	<u>WET CONSISTENCE</u>
G - Single Grain M - Massive CR - Crumb GR - Granular SBK - Subgranular Blocky ABK - Angular Blocky PL - Platy PR - Prismatic	Vfr - Very Friable Fr - Friable Fi - Firm Vfi - Very Firm Efi - Extremely Firm	1 - Few 2 - Common 3 - Many F - Faint D - Distinct P - Prominent f - Fine m - Medium c - Coarse	NS - Non Sticky SS - Slightly Sticky S - Sticky VS - Very Sticky NP - Non Plastic SP - Slightly Plastic P - Plastic VP - Very Plastic

ATTACHMENT 4: Soil Survey Information

TABLE 6.—*Engineering*

[Dashed lines indicate that information is not available, or that the practice is not applicable. Miscellaneous land types Gullied land

Soil series and map symbols	Suitability as source of—		Degree of limitation for—		
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Recreation
					Campsites
Altavista (AfA)-----	Fair-----	Fair-----	Severe: flooding-----	Severe: flooding-----	Moderate: flooding; fair trafficability.
Appling: (AgB, AgB2)-----	Fair-----	Fair-----	Moderate: coarse fragments.	Moderate: medium percolation rate.	Moderate: coarse fragments.
(AgC, AgC2)-----	Fair-----	Fair-----	Moderate: coarse fragments.	Moderate: medium percolation rate.	Moderate: coarse fragments; slopes of 6 to 10 percent.
(ApB, ApB2, AsB, AsB2)-----	Fair-----	Fair-----	Slight-----	Moderate: medium percolation rate.	Slight-----
(ApC, ApC2, AsC, AsC2)-----	Fair-----	Fair-----	Slight-----	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.
(ApD)-----	Fair-----	Fair-----	Moderate: slopes greater than 10 percent.	Moderate: medium percolation rate; slopes greater than 10 percent.	Severe: slopes greater than 10 percent.
Augusta (Au)-----	Poor-----	Poor-----	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.
Bibb (Mapped only in an undifferentiated unit with Wehadkee soils).	Poor-----	Fair-----	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table; poor trafficability.
Buncombe (Bu)-----	Poor-----	Good-----	Severe: flooding-----	Severe: flooding-----	Severe: flooding-----
Cecil: (CeB, CeB2)-----	Fair-----	Fair-----	Slight-----	Moderate: medium percolation rate.	Slight-----
(CeC, CeC2)-----	Fair-----	Fair-----	Slight-----	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.
(CeD)-----	Fair-----	Fair-----	Moderate: slopes of 10 to 15 percent.	Moderate: medium percolation rate; slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
(CeF)-----	Fair-----	Fair-----	Moderate to severe: slopes of 15 to 45 percent.	Severe: slopes greater than 15 percent.	Severe: slopes greater than 15 percent.
(CgB, CgB2, CgC, CgC2)-----	Fair-----	Fair-----	Moderate: coarse fragments.	Moderate: medium percolation rate.	Moderate: coarse fragments.
(CIB3, CIC3)-----	Poor-----	Fair-----	Moderate: clayey surface layer.	Moderate: medium percolation rate.	Moderate: clayey surface layer.
(CIE3)-----	Poor-----	Fair-----	Moderate: clayey surface layer; slopes of 10 to 20 percent.	Moderate to severe: medium percolation rate; slopes of 10 to 20 percent.	Severe: slopes greater than 10 percent.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as source of—		Degree of limitation for—		
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Recreation
					Campsites
Granville: (GrB, GrB2)-----	Fair-----	Fair-----	Slight-----	Slight-----	Slight-----
(GrC, GrC2)-----	Fair-----	Fair-----	Slight-----	Slight-----	Moderate: slopes of 6 to 10 percent.
(GrD)-----	Fair-----	Fair-----	Moderate: slopes greater than 10 percent.	Moderate: slopes greater than 10 percent.	Severe: slopes greater than 10 percent.
Helena: (HeB, HeB2)-----	Fair-----	Poor-----	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: fair trafficability.
(HeC, HeC2)-----	Fair-----	Poor-----	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: slopes of 6 to 10 percent; fair trafficability.
(HeD)-----	Fair-----	Poor-----	Severe: shrink-swell potential.	Severe: slow percolation rate.	Severe: slopes greater than 10 percent.
Herndon: (HrB, HrB2)-----	Fair-----	Fair-----	Slight-----	Moderate: medium percolation rate.	Slight-----
(HrC, HrC2)-----	Fair-----	Fair-----	Slight-----	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.
(HrD2)-----	Fair-----	Fair-----	Moderate: slopes of 10 to 15 percent.	Moderate: medium percolation rate; slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
(HrE)-----	Fair-----	Fair-----	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.	Severe: slopes greater than 15 percent.
Lloyd: (LdB2)-----	Fair-----	Fair-----	Slight-----	Moderate: medium percolation rate.	Slight-----
(LdC2)-----	Fair-----	Fair-----	Slight-----	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.
(LdD2)-----	Fair-----	Fair-----	Moderate: slopes greater than 10 percent.	Moderate: medium percolation rate; slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
Louisburg: (LoB, LwB, LwB2)----- (For interpretations of the Wedowee soils in LwB and LwB2, refer to the Wedowee series.)	Fair-----	Fair-----	Moderate: depth to rock is 2 to 5 feet.	Severe: depth to rock is 2 to 5 feet.	Slight-----

**ATTACHMENT 5: Septic System Area Computation
Spreadsheets**

Conventional Septic System Area Computation

Client Name: *Ramirez*
Number Bedrooms: 3
Design Flow (gal/day): 360 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.3
Trench Bottom Area (ft²): 1200 (Design flow/LTAR)
Trench Width (ft): 3
On-center distance between trenches (ft): 9
Trench Bottom Length (ft): 400

Minimum Field Area Required (ft²): 3600 (Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft²): 2700 (25% reduction from above)
Total Field Area Required (ft²)⁽¹⁾: 9000 (Minimum field area*2.5)
Total Field Area Required (Innovative) (ft²)⁽¹⁾: 6750 (25% reduction from above)
Total Field Area Required (ft²)⁽¹⁾: 10800 (Minimum field area*3)
Total Field Area Required (Innovative) (ft²)⁽¹⁾: 8100 (25% reduction from above)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Client Name: *Ramirez*
Number Bedrooms: 4
Design Flow (gal/day): 480 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.3
Trench Bottom Area (ft²): 1600 (Design flow/LTAR)
Trench Width (ft): 3
On-center distance between trenches (ft): 9
Trench Bottom Length (ft): 533.3333

Minimum Field Area Required (ft²): 4800 (Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft²): 3600 (25% reduction from above)
Total Field Area Required (ft²)⁽¹⁾: 12000 (Minimum field area*2.5)
Total Field Area Required (Innovative) (ft²)⁽¹⁾: 9000 (25% reduction from above)
Total Field Area Required (ft²)⁽¹⁾: 14400 (Minimum field area*3)
Total Field Area Required (Innovative) (ft²)⁽¹⁾: 10800 (25% reduction from above)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.

Client Name: *Ramirez*
Number Bedrooms: 5
Design Flow (gal/day): 600 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.3
Trench Bottom Area (ft²): 2000 (Design flow/LTAR)
Trench Width (ft): 3
On-center distance between trenches (ft): 9
Trench Bottom Length (ft): 666.6667

Minimum Field Area Required (ft²): 6000 (Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft²): 4500 (25% reduction from above)
Total Field Area Required (ft²)⁽¹⁾: 15000 (Minimum field area*2.5)
Total Field Area Required (Innovative) (ft²)⁽¹⁾: 11250 (25% reduction from above)
Total Field Area Required (ft²)⁽¹⁾: 18000 (Minimum field area*3)
Total Field Area Required (Innovative) (ft²)⁽¹⁾: 13500 (25% reduction from above)

(1) Provides for reserve area and soil irregularity, 2.5 to 3 is multiplier.