



Soil Suitability for Domestic Sewage Treatment and Disposal Systems

3213 Marie Dr.
Raleigh, NC 27604
Wake County PIN: 1724175896

Prepared For:	Bonnie Reeder
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Report Date:	July 23, 2024



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PREPARED BY: Jeff Vaughan
Brent Purdum

DATE: July 23, 2024

Soil suitability for domestic sewage treatment and disposal systems was evaluated on July 17, 2024, for property located at 3213 Marie Dr. located near Raleigh, NC. Brent Purdum and Connor Britt 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 0.56 acres of the property were evaluated. The property is mostly a wooded area. There is thick vegetation throughout the property (Attachment 3).

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. Approximately 5 soil borings were advanced on the property and the soil evaluated (Attachment 3). A portion of the property contained a ditch, 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 3) evaluated on the property exhibited soil characteristics and soil depths (20" or greater) that are suitable for shallow conventional or drip septic systems. Three soil borings had auger refusal around 20". However, there were no restrictive features to these depths. The area is approximately 18,384 ft².

Typical profile descriptions of the suitable soil for this property are in Attachment 3. One distinct soil profile was observed in the soil borings on the property with conventional soil depths: a reddish yellow subsoil with parent material.

The suitable soil borings had the following characteristics. No restrictive horizons were found in any suitable soil borings within 20" of the soil surface. Soil texture was suitable and was estimated to be sandy loam near the soil surface (A horizons) and sandy clay loam to 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 provisionally 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 RgD). The Wake County Soil Survey indicates that moderate limitations exist for septic systems installed in these soil types (Attachment 4).

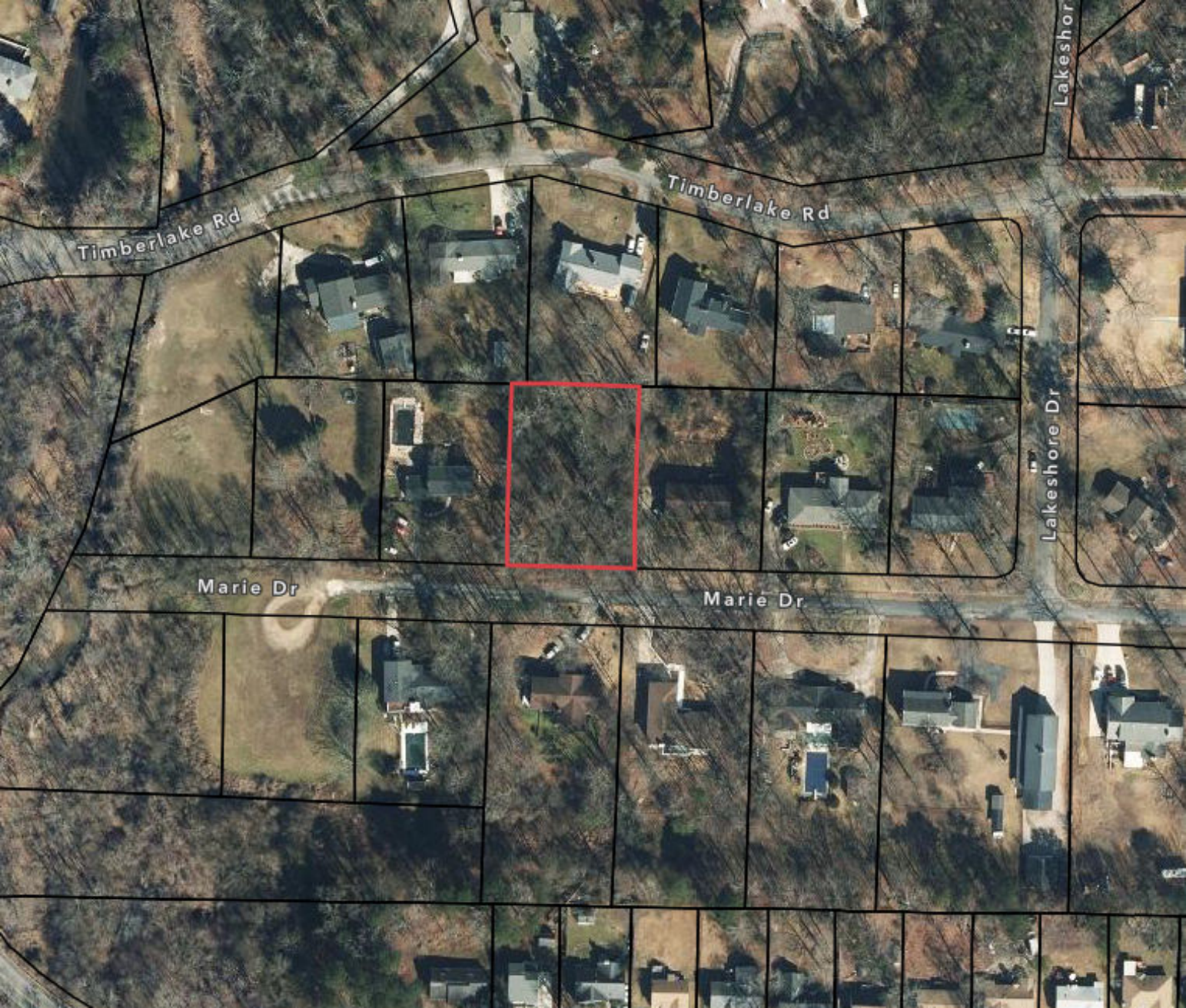
The land area required for a conventional septic system is calculated based on the size of the proposed home and the Long-Term Acceptance Rate (LTAR) of the soil. The LTAR range for the suitable soils on this property is 0.1 – 0.4 GPD/ft² for shallow conventional septic systems based on the most restrictive 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 shallow conventional or drip septic systems seems very probable on this property in the area designated on the map in Attachment 2. It is likely that pits will be required when future plans develop and a permit is pursued.

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

ATTACHMENT 1: Property Reference Map



Timberlake Rd

Timberlake Rd

Lakeshore Dr

Lakeshore Dr

Marie Dr

Marie Dr

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



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Preliminary Soils Evaluation

Bonnie Reeder
Wake Co., NC
PIN: 1724175896

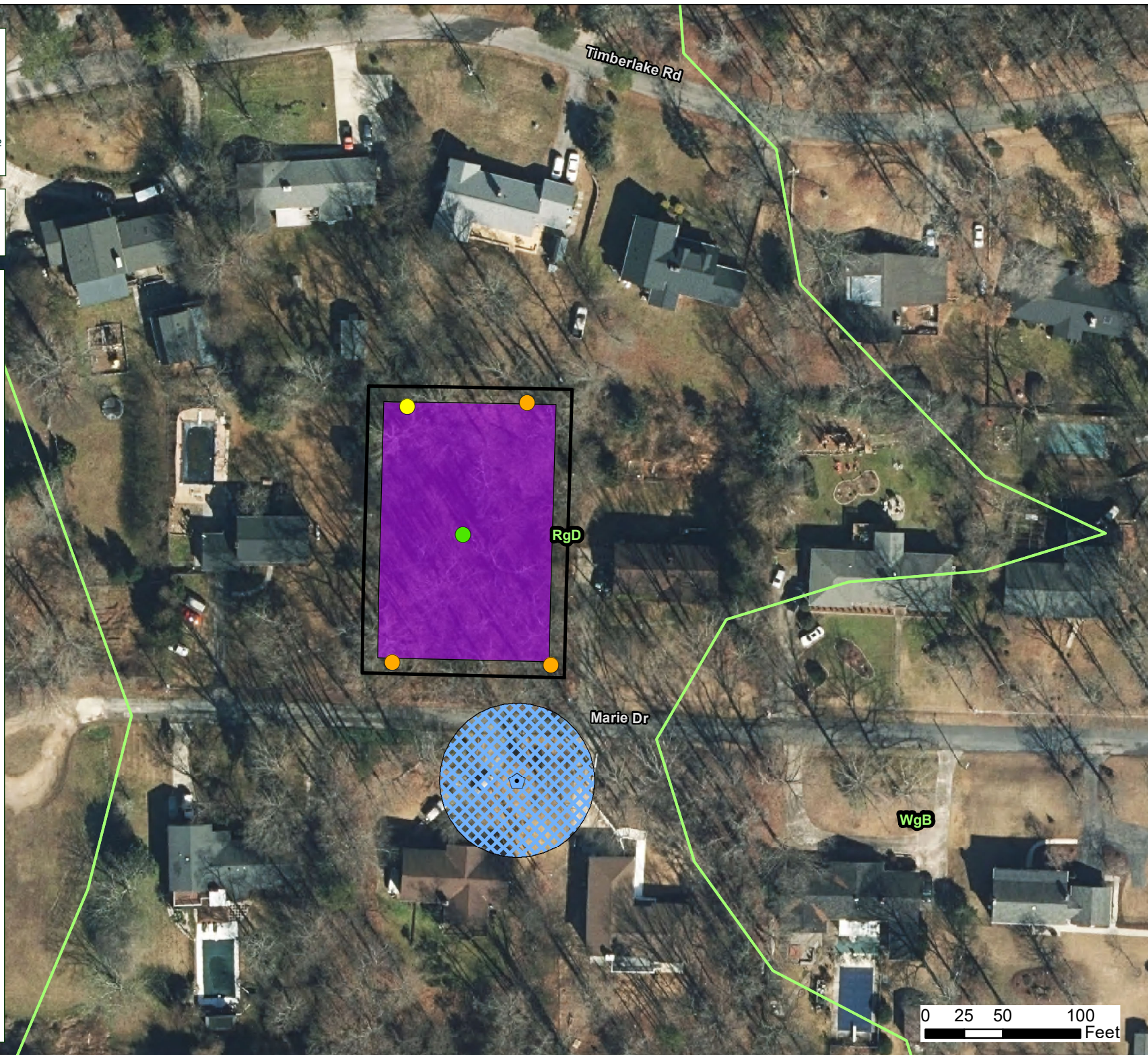


Area for Septic:
~18,384 sq.ft.

Soil Types:
RgD: Rawlings-Rion complex

-  Parcel
-  Parcel Buffer 10 ft.
-  Soil Type
-  Well
-  Well Buffer 50 ft.
-  Suitable Area
- Soil Boring Depth (in.)**
 -  18-23"
 -  24-29"
 -  30-35"

Drawn By: William Shoeyink
Reviewed By: Brent Purdum
Date: 7/18/2024



0 25 50 100
Feet

Surface water and/or bad topo areas have not been officially evaluated for stream ID according to local regulatory requirements. This map is intended for preliminary purposes only and not to be used as a plat/survey or can it be assumed all streams are identified on this property.

Preliminary Soils Evaluation

Bonnie Reeder
Wake Co., NC
PIN: 1724175896

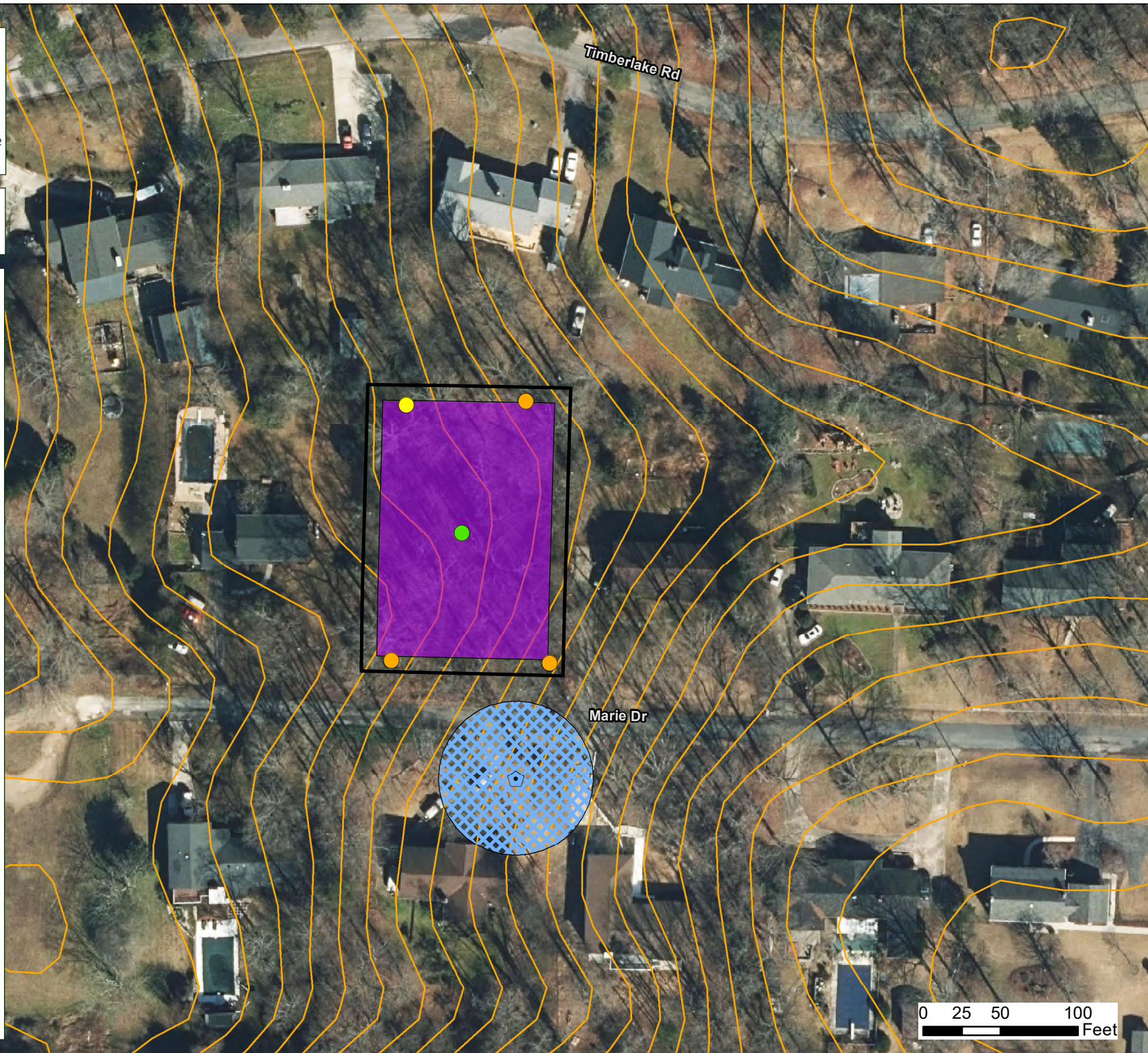


Area for Septic:
~18,384 sq.ft.

Soil Types:
RgD: Rawlings-Rion complex

-  Parcel
-  Parcel Buffer 10 ft.
-  2 ft. Contour
-  Well
-  Well Buffer 50 ft.
-  Suitable Area
- Soil Boring Depth (in.)**
 -  18-23"
 -  24-29"
 -  30-35"

Drawn By: William Shoeyink
Reviewed By: Brent Purdum
Date: 7/18/2024



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

Property ID#: 1724175896
Property Recorded: _____
County: Wake

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

Applicant: Bonnie Reeder
Address: 513 S Summit Ave.
Charlotte, NC 28208

Buyer: _____ Agent: X Phone: (410) 533-9339
Date Evaluated: 07/17/2024
Proposed Facility: Residential
Property Size: Approximately 0.56 acres

Location Site: 3213 Marie Dr. Raleigh, NC 27604

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	(a)(1) Texture	(a)(2) Structure	(a)(3) Minerology	Consistence Wet	Consistence Moist
A 0-6"	10YR 4/3	None	None	SL	GR	SEXP	NS, NP	Vfr
Bt1 6-16"	10YR 6/4	None	None	SCL	SBK	SEXP	SS, SP	Fr
Bt2 16-24"	7.5YR 6/6	10YR 7/4	1, m, F	SCL	SBK	SEXP	SS, SP	Fi
BC 24-32"+	7.5YR 6/6	10YR 7/4; 10YR 7/6	3, d, M	CL	SBK	SEXP	NS, NP	Fr

.1940 Landscape Pos/Slope %	- Suitable, <15%	Profile LTAR	- Suitable for shallow conventional and drip systems due to texture, structure, and depth.
.1942 Wetness Condition	- Suitable	System Type	
.1943/.1956 Saprolite	- Suitable		
.1944 Restrictive Horizon	- Suitable		
.1948 Profile Classification	- Provisionally suitable		

Comments: Auger Refusal was noted in some borings due to gravel in the Bt2 horizon.

EVALUATED BY: Brent Purdum and Connor Britt

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

Wake County, North Carolina

RgD—Rawlings-Rion complex, 10 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2xhb8

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Rawlings and similar soils: 55 percent

Rion and similar soils: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rawlings

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from granite

Typical profile

Ap - 0 to 8 inches: sandy loam

Bt - 8 to 20 inches: sandy clay loam

C - 20 to 40 inches: gravelly sandy loam

R - 40 to 80 inches: bedrock

Properties and qualities

Slope: 10 to 15 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: F136XY830NC - Acidic upland forest, depth restriction, dry-moist

Hydric soil rating: No

Description of Rion

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Saprolite derived from granite and gneiss

Typical profile

Ap - 0 to 8 inches: sandy loam

Bt1 - 8 to 17 inches: sandy clay loam

Bt2 - 17 to 38 inches: sandy loam

C - 38 to 80 inches: sandy loam

Properties and qualities

Slope: 10 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: F136XY820GA - Acidic upland forest, moist

Hydric soil rating: No

Data Source Information

Soil Survey Area: Wake County, North Carolina

Survey Area Data: Version 25, Oct 2, 2023

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

Conventional Septic System Area Computation

Created by: BP
Created on: 7/23/2024
Updated on: 7/23/2024

Client Name: Reeder
Number Bedrooms: 2
Design Flow (gal/day): 240 (120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft²): 0.3
Trench Bottom Area (ft²): 800 (Design flow/LTAR)
Trench Width (ft): 3
On-center distance between trenches (ft): 9
Trench Bottom Length (ft): 266.6667

Minimum Field Area Required (ft²): 2400 (Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft²): 1800 (25% reduction from above)
Total Field Area Required (ft²)⁽¹⁾: 6000 (Minimum field area*2.5)
Total Field Area Required (Innovative) (ft²)⁽¹⁾: 4500 (25% reduction from above)
Total Field Area Required (ft²)⁽¹⁾: 7200 (Minimum field area*3)
Total Field Area Required (Innovative) (ft²)⁽¹⁾: 5400 (25% reduction from above)

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

Client Name: Reeder
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: Reeder
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.