Barnes, Kenric

From: James Tiger <james.tiger@chathamcountync.gov>
Sent: Wednesday, September 18, 2024 8:12 AM
To: Barnes, Kenric
Cc: Carl Kivett; Kimberly Tyson
Subject: RE: Hamlets Reserve First Plat Submittal

Good morning Kenric,

We can't provide much in the way of substantive comment since the proposed septic location/area (and system type) isn't shown on individual lots with proposed house boxes, driveways, water lines, etc.

However, the soils report suggests highly variable soils on the property with system types ranging from conventional to pretreatment drip. And several proposed lots appear to be undersized to support septic installation when considering house and property line setbacks along with wetland and stream buffers, SCM setbacks, and a cemetery (1, 9, 10, 39).

Ability to permit will depend on useable soil depth, available space, topography, bedroom count and final site development plans. And there is a possibility several lots will require additional work by a LSS/PE to permit.

Thanks,

James Tiger, REHS
Onsite Water Protection Program Supervisor
Chatham County Public Health Department
Division of Environmental Health
919.545.8316
www.chathamnc.org/environmentalhealth

*We appreciate your feedback! Please fill out our **Customer Feedback Survey** to tell us how we're doing.*

In keeping with NC Public Records Law, emails, including attachments, may be released to others upon request for inspection and copying.

From: Carl Kivett <carl.kivett@chathamcountync.gov>
Sent: Tuesday, September 17, 2024 3:16 PM
To: James Tiger <james.tiger@chathamcountync.gov>
Subject: FW: Hamlets Reserve First Plat Submittal

James Carl Kivett, REHS, LSS
Registered Environmental Health Specialist
NC Licensed Soil Scientist
Chatham County Public Health Dept.
Environmental Health Division

PO Box 130, 80 East St.
Pittsboro, NC 27312
919-542-8229
carl.kivett@chathamcountync.gov

In keeping with the NC Public Records Law, emails, including attachments, may be released to others upon request for inspection and copying.

From: Barnes, Kenric <k.barnes@batemancivilsurvey.com>
Sent: Tuesday, September 17, 2024 11:54 AM
To: Carl Kivett <carl.kivett@chathamcountync.gov>
Subject: Hamlets Reserve First Plat Submittal

Hello,

We are preparing first plat submittal for Hamlets Reserve subdivision located off Hamlets Chapel Road. As part of the checklist, we are required to provide the soils reports and site plan for your review. Please acknowledge receipt of this email and let us know of any questions/comments.

Thanks,

Kenric Barnes, PE
Project Manager

phone: 919-577-1080 EXT 106
fax: 919-577-1081

BCSC
BATEMAN CIVIL SURVEY COMPANY

2524 Reliance Avenue, Apex
27539, NC, US

www.batemancivilsurvey.com

Engineers and Soil Scientists

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

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

Hamlets Chapel Road, Pittsboro, NC Chatham County

Prepared For:	Mr. Jason Dell, Bold Development Group
Prepared By:	Jeff Vaughan, Ph.D., L.S.S. Senior Agronomist/Soil Scientist
	William Snoeyink Assistant GIS Technician
Report Date:	June 26, 2024

Engineers and Soil Scientists

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501 N Salem Street, Suite 203, Apex, NC 27502
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Soil Suitability for Domestic Sewage Treatment and Disposal Systems
Hamlets Chapel Road, Pittsboro, NC (Chatham County)

PREPARED FOR: Mr. Jason Dell, Bold Development Group

PREPARED BY: Jeff Vaughan
William Snoeyink

DATE: June 26, 2024

Soil suitability for domestic sewage treatment and disposal systems was evaluated on June 24, 2024, for property located off Hamlets Chapel Road near Pittsboro, NC. Jeff Vaughan, Jordan Harris, and McLean Davis of Agri-Waste Technology, Inc. (AWT) conducted the soil evaluation. The detailed soil evaluation of the land area will follow. A property reference map is in Attachment 1. Only a portion of the property was evaluated as requested by the client and this area is shown on the map in Attachment 1.

The total property area that was evaluated is approximately 7 acres. The property is completely wooded. There are several drainage features with 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. Soil borings were flagged in the field with blue ribbon (suitable). Approximately 9 soil borings were advanced within the suitable soils area on the property (Attachment 2). A portion of the property contained drainage features, complex topography, and/or unsuitable soils and, thus, are 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 possible 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.

One area (see map in Attachment 2) exhibited soil characteristics and soil depths (24" or greater) that is suitable for conventional or shallow conventional trench septic systems. This area is approximately 244,047ft^2.

A typical profile description of the suitable soil for this property is in Attachment 3. The typical soil profile observed in the soil borings on the property was a deep yellowish red clay subsoil.

The suitable soil borings had the following characteristics. No restrictive horizons were found in any provisionally soil borings within 24" of the soil surface. Soil texture was suitable and was estimated to be silt loam near the soil surface (A and E horizons) and clay loam to clay in the subsoil (B horizons). Soil structure was suitable and was estimated to be granular near the soil surface (A and E horizons) and subangular blocky in the subsoil (B horizons). Clay mineralogy was suitable with very friable to firm moist soil consistence and non-sticky to sticky and non-plastic to plastic wet soil consistence. Indications of saprolite were detected in some soil borings, but were not dominant in profiles.

The major soil type on this property is Wedowee sandy loam (map symbols WeB, WeD, WeE, and WdC). The Chatham County Soil Survey indicates that moderate to severe limitations exist for septic systems installed in these soils types (Attachment 4).

The land area required for a conventional or shallow 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/ft^2 based on the most restrictive soil texture in the subsoil. Table 1 below presents estimated conventional or shallow conventional septic system land area requirements for several home sizes and LTAR's on this property. The LTAR suggested by AWT for a majority of the provisionally suitable soil is 0.25 GPD/ft^2, but the final LTAR for specific septic system types and septic drainfield locations will be set by the Chatham County Health Department. The detailed computations are in Attachment 5.

Table 1. Estimated Conventional Septic System Land Requirements (including repair area) for Several Home Sizes and Long-Term Acceptance Rates (LTAR) on this Property.

House Size	Long-Term Acceptance Rate (LTAR)	Area Required for Conventional Septic System	Minimum Area Required for Innovative Conventional Septic System
	-----GPD/ft^2-----	-----ft^2-----	-----ft^2-----
3 bedrooms	0.1 – 0.4	6,750 – 32,400	8,100 – 24,300
3 bedrooms	0.25	~10,800	~7,020
4 bedrooms	0.1 – 0.4	9,000 – 43,200	6,750 – 32,400
4 bedrooms	0.25	~14,400	~10,800
5 bedrooms	0.1 – 0.4	11,250 – 54,000	8,438 – 40,500
5 bedrooms	0.25	~18,000	~13,500

Conclusions

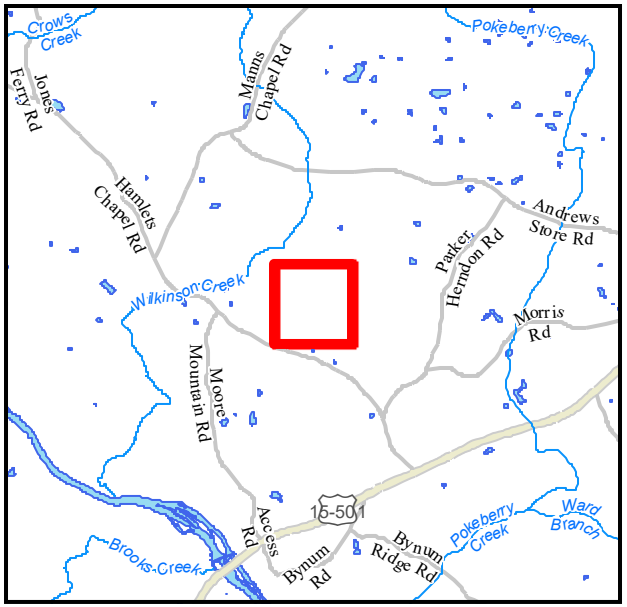
Based on the results of this evaluation, the installation of conventional or shallow conventional septic systems seems very probable on this property in the area designated on the map in Attachment 2.

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

bolddevelopment

ATTACHMENT 1: Property Reference Map

Aerial



Legend

- Parcel Pop-Up
- Address Points
- Parcels

0 0.075 0.15 mi

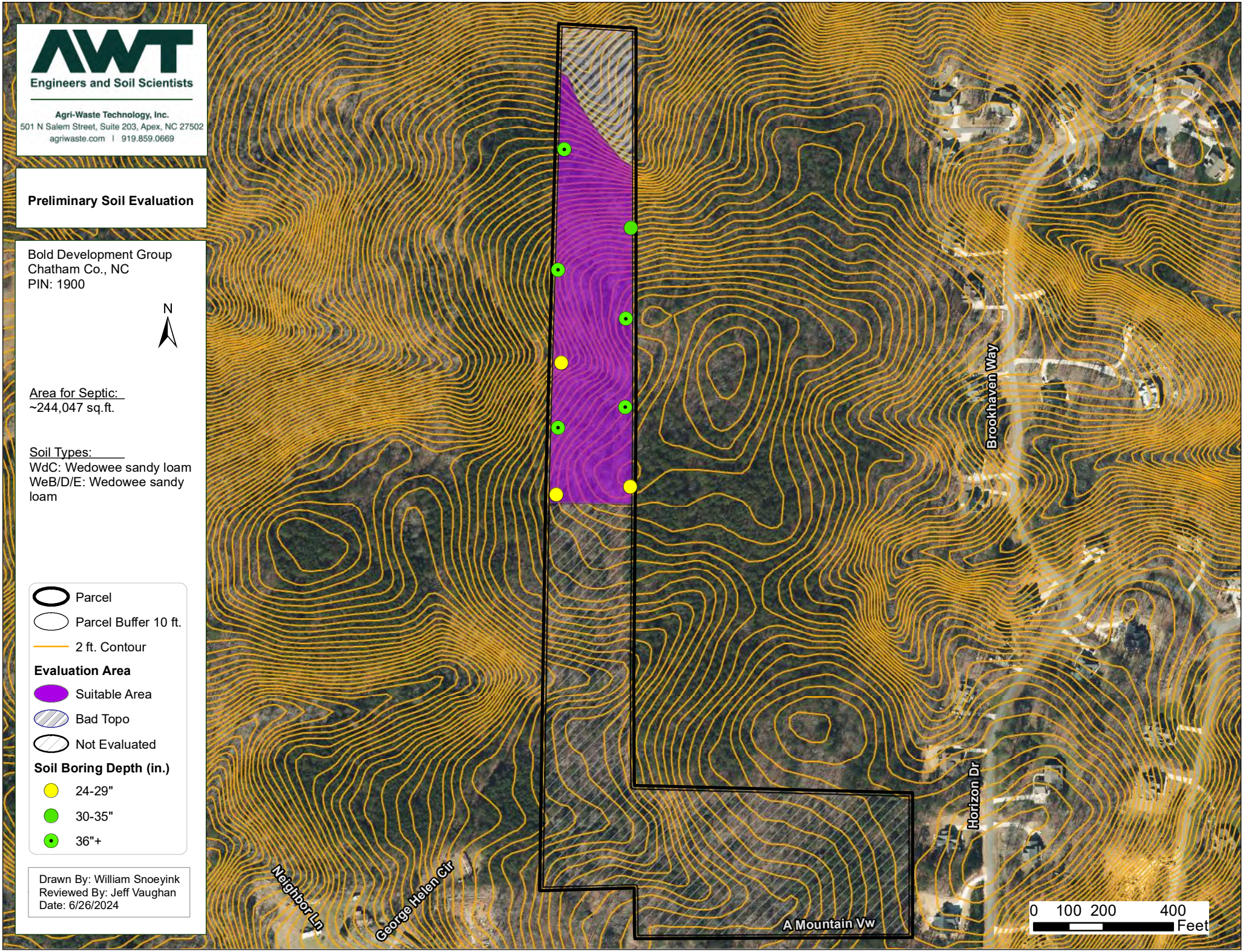
N

Service Layer Credits: Chatham County, Chatham County Tax Department

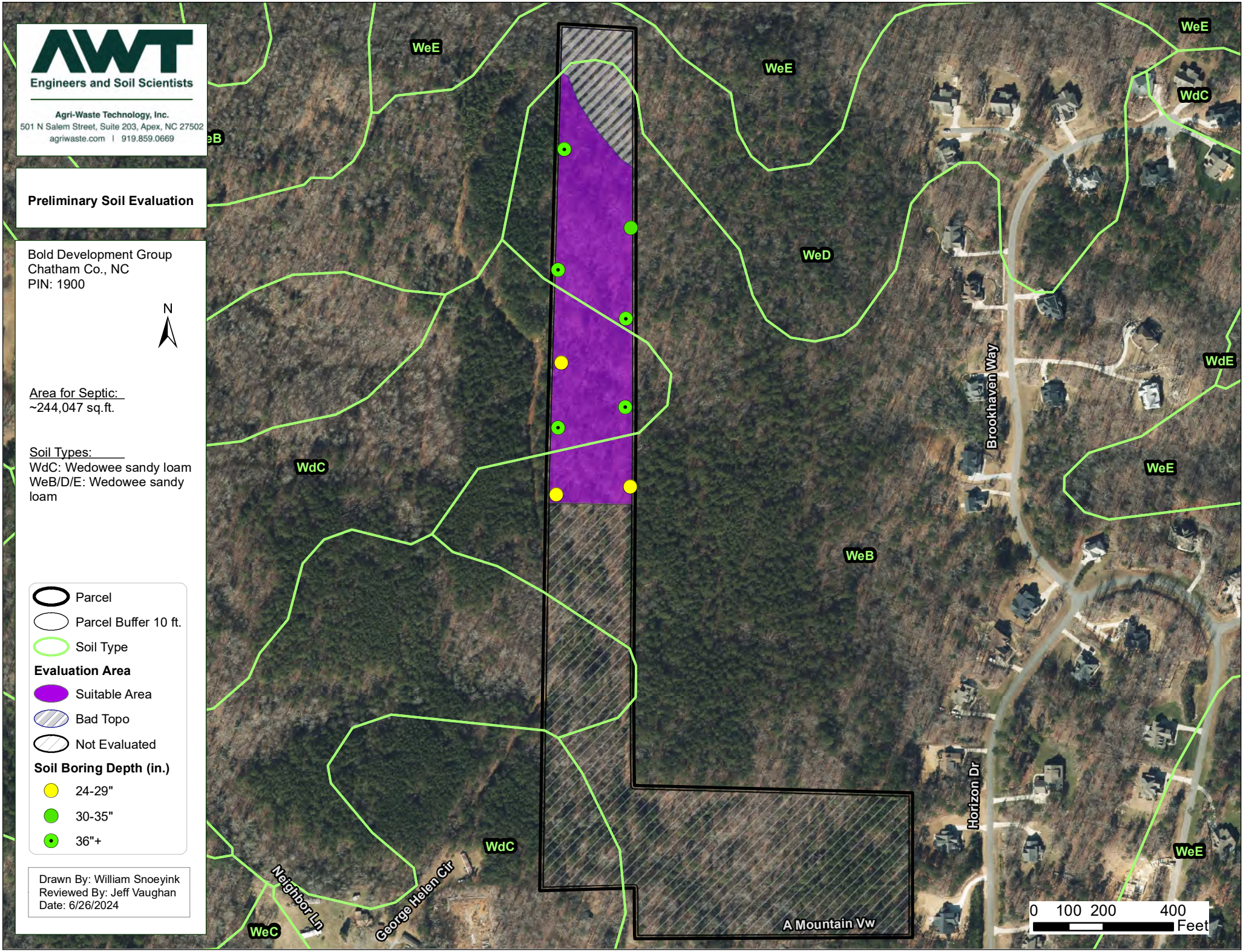
CHATHAM COUNTY
NORTH CAROLINA

Date: 6/12/2024
Time: 6:59:59 AM

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



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.



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.

ATTACHMENT 3: Typical Profile Descriptions of Provisionally Suitable Soil

Property ID#: 1900
Property Recorded: .
County: Chatham .

SOIL/SITE EVALUATION
FOR
ON-SITE WASTEWATER SYSTEM

Applicant: Mr. Jason Dell
Address: Bold Development Group
50051 Governors Drive
Chapel Hill, NC 27517

Owner: X Agent: Phone: (919)260-1857
Date Evaluated: 6/24/24
Proposed Facility: Residential
Property Size: Approximately 7 acres

Location Site: Hamlets Chapel Road, Pittsboro, NC
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 0-4"	**10YR 5/4**	**None**	**None**	**SiL**	**GR**	**NEXP**	**NS, NP**	**Vfr**
E 4-17"	**10YR 8/1**	**None**	**None**	**SiL**	**GR**	**NEXP**	**NS, NP**	**Vfr**
Bt1 17-30"	**7.5YR 5/8**	**None**	**None**	**C**	**SBK**	**SEXP**	**SS, SP**	**Fr**
Bt2 30-36"	**7.5YR 5/8**	**10YR 8/1; 2.5YR 5/8**	**2, m, D**	**C**	**SBK**	**SEXP**	**SS, SP**	**Fr**

.1940 Landscape Pos/Slope %	- Suitable, <15%	Profile LTAR	- 0.4 – 0.1 GPD/ft^2
.1942 Wetness Condition	- Suitable	System Type	- Suitable for shallow conventional systems due to texture, structure, and depth.
.1943/.1956 Saprolite	- Suitable		
.1944 Restrictive Horizon	- Suitable		
.1948 Profile Classification	- Suitable		

Comments: Some indications of saprolite beginning around 24", but not dominant. Lots of boulders and rock at soil surface and in soil profiles.

TYPICAL PROFILE

Horizon/ Depth (IN)	Matrix	Mottles	Mottle Abundance /Contrast	(a)(1) Tex-ture	(a)(2) Structure	(a)(3) Minerology	Consistence Wet	Consistence Moist

.1940 Landscape Pos/Slope %		Profile LTAR	
.1942 Wetness Condition		System Type	
.1943/.1956 Saprolite			
.1944 Restrictive Horizon			
.1948 Profile Classification			

Comments:

EVALUATED BY: **Jordan Harris, McLean Davis, and Jeff Vaughan**
COMMENTS:

LEGEND OF ABBREVIATIONS FOR SITE EVALUATION FORM

LANDSCAPE POSITION

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

TEXTURE GROUP

I
II
III
IV

TEXTURE CLASS

S - Sand
LS - Loamy Sand
SL - Sandy Loam
L - Loam
SCL - Sandy Clay Loam
CL - Clay Loam
SiL - Silt Loam
Si - Silt
SiCL - Silt Clay Loam
SC - Sandy Clay
C - Clay
SiC - Silty Clay
O - Organic

.1955 LTAR (gal/day/sqft)

1.2 - .08
0.8 - 0.6
0.6 - 0.3
0.4 - 0.1

STRUCTURE

G - Single Grain
M - Massive
CR - Crumb
GR - Granular
SBK - Subgranular Blocky
ABK - Angular Blocky
PL - Platy
PR - Prismatic

MOIST CONSISTENCE

Vfr - Very Friable
Fr - Friable
Fi - Firm
Vfi - Very Firm
Efi - Extremely Firm

MOTTLES

1 - Few
2 - Common
3 - Many

F - Faint
D - Distinct
P - Prominent

f - Fine
m - Medium
c - Coarse

WET CONSISTENCE

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

Sewage Disposal—Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons	
	Rating class and limiting features	Value	Rating class and limiting features	Value
TuA:				
Turbeville	Somewhat limited		Somewhat limited	
	Slow water movement	0.50	Seepage	0.50
UdC:				
Udorthents, loamy	Somewhat limited		Very limited	
	Slow water movement	0.82	Slope	1.00
	Slope	0.01	Seepage	0.18
VaB:				
Vance	Very limited		Very limited	
	Slow water movement	1.00	Seepage	1.00
	Seepage, bottom layer	1.00	Slope	0.32
WdC:				
Wedowee, bouldery	Somewhat limited		Somewhat limited	
	Slow water movement	0.50	Slope	0.92
			Seepage	0.50
WdE:				
Wedowee, bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
WeB:				
Wedowee	Somewhat limited		Somewhat limited	
	Slow water movement	0.50	Seepage	0.50
			Slope	0.32
WeC:				
Wedowee	Somewhat limited		Very limited	
	Slow water movement	0.50	Slope	1.00
	Slope	0.01	Seepage	0.50
WeD:				
Wedowee	Somewhat limited		Very limited	
	Slope	0.84	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
WeE:				
Wedowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.50	Seepage	0.50
WhB:				
White Store	Very limited		Very limited	
	Slow water movement	1.00	Depth to saturated zone	1.00
	Depth to saturated zone	1.00	Depth to soft bedrock	0.96
	Depth to bedrock	0.99	Seepage	0.50

ATTACHMENT 5: Septic System Area Computation Spreadsheets

Conventional Septic System Area Computation

Created by: JV
Created on: 6/20/2001
Updated on: 6/24/2024

Client Name:	*Bold Development*	
Number Bedrooms:	*3*	
Design Flow (gal/day):	360	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.1*	
Trench Bottom Area (ft^2):	3600	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	1200	
Minimum Field Area Required (ft^2):	10800	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	8100	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	27000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	20250	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	32400	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	24300	(25% reduction from above)

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

Client Name:	*Bold Development*	
Number Bedrooms:	*3*	
Design Flow (gal/day):	360	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.4*	
Trench Bottom Area (ft^2):	900	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	300	
Minimum Field Area Required (ft^2):	2700	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	2025	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	6750	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	5062.5	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	8100	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	6075	(25% reduction from above)

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

Client Name:	*Bold Development*	
Number Bedrooms:	*3*	
Design Flow (gal/day):	360	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.25*	
Trench Bottom Area (ft^2):	1440	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	480	
Minimum Field Area Required (ft^2):	4320	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	3240	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	10800	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	8100	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	12960	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	9720	(25% reduction from above)

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

Conventional Septic System Area Computation

Created by: JV
Created on: 6/20/2001
Updated on: 6/24/2024

Client Name:	*Bold Development*	
Number Bedrooms:	*4*	
Design Flow (gal/day):	480	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.1*	
Trench Bottom Area (ft^2):	4800	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	1600	
Minimum Field Area Required (ft^2):	14400	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	10800	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	36000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	27000	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	43200	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	32400	(25% reduction from above)

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

Client Name:	*Bold Development*	
Number Bedrooms:	*4*	
Design Flow (gal/day):	480	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.4*	
Trench Bottom Area (ft^2):	1200	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	400	
Minimum Field Area Required (ft^2):	3600	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	2700	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	9000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	6750	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	10800	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	8100	(25% reduction from above)

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

Client Name:	*Bold Development*	
Number Bedrooms:	*4*	
Design Flow (gal/day):	480	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.25*	
Trench Bottom Area (ft^2):	1920	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	640	
Minimum Field Area Required (ft^2):	5760	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	4320	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	14400	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	10800	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	17280	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	12960	(25% reduction from above)

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

Conventional Septic System Area Computation

Created by: JV
Created on: 6/20/2001
Updated on: 6/24/2024

Client Name:	*Bold Development*	
Number Bedrooms:	*5*	
Design Flow (gal/day):	600	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.1*	
Trench Bottom Area (ft^2):	6000	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	2000	
Minimum Field Area Required (ft^2):	18000	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	13500	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	45000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	33750	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	54000	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	40500	(25% reduction from above)

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

Client Name:	*Bold Development*	
Number Bedrooms:	*5*	
Design Flow (gal/day):	600	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.4*	
Trench Bottom Area (ft^2):	1500	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	500	
Minimum Field Area Required (ft^2):	4500	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	3375	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	11250	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	8437.5	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	13500	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	10125	(25% reduction from above)

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

Client Name:	*Bold Development*	
Number Bedrooms:	*5*	
Design Flow (gal/day):	600	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.25*	
Trench Bottom Area (ft^2):	2400	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	800	
Minimum Field Area Required (ft^2):	7200	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	5400	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	18000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	13500	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	21600	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	16200	(25% reduction from above)

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

Engineers and Soil Scientists

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

Soils & Site Evaluation Report – On-site Wastewater Systems

John Coffey
Chatham County, NC
(Parcels: 1795 & 68866)

PREPARED FOR: John Coffey, Client

PREPARED BY: Christopher McGee, Licensed Soil Scientist
Heath Clapp, Environmental Scientist

DATE: October 9, 2020

Agri-Waste Technology, Inc. (AWT) was contracted to perform a preliminary soils & site evaluation for the above-named parcels in Chatham County, NC. Municipal wastewater services are not available at this property; therefore, on-site wastewater (septic) will be required. Surrounding properties are served by on-site systems also; however, no significant setback adjustments are anticipated based on the location of their components. The following report and attachments summarize the findings of the evaluation performed by Chris McGee, Trent Bostic, Heath Clapp, and Trevor Hackney of Agri-Waste Technology on September 22, 2020.

The subject properties are approximately 26.5 acres in size. The entirety of both parcels was evaluated for this project, and the notes below and accompanying map show the results of this evaluation. The exact location of the soil borings can be found on the attached site and soils map. Also, the site map shows other site features which have relevance for development and septic system siting.

The following information describes the findings of the soil evaluation. The evaluated areas are in woods. The property has rolling topography, and side slopes approaching drainageways where slope ranges up to 14 percent.

Findings

The soils are formed in the geology known as the Chapel Hill pluton which is mainly granitic rock and various related variations with differing minerals. These rock types give rise to soils typically with a clay subsoil. This particular parcel has a very complex and intricate bedrock pattern, giving rise to a high variety of soil types and features. Soil variability is extremely high, with a percentage of the soil borings and fairly broad areas having soils that are unsuitable for conventional type septic systems. The limitation is that the underlying bedrock weathers into saprolite at shallow depths and massive structure. Some areas also contained shallow indications of seasonal high water tables and unsuitable clay minerology. The next section focuses on specific areas of the parcel and details about septic potential. Please also refer to the attached site map.

Area 1 has a predominance of soils that exceed 24 inches to soil limitations, and exceed 30 inches in places. These soils can support conventional to shallow conventional septic systems. The area on the map shows as about 374,000 square feet of useable area. Area 4 will likely fit a shallow conventional system, but due to the limited amount of space in area 4, further investigation is recommended.

Areas 2 and 3 have a predominance of soils that are from 18 to 23 inches in depth to soil limiting feature, which is typically soil wetness. These soils may support alternative types of septic systems such as anaerobic TS-I drip irrigation, or low-pressure pipe systems with wastewater pretreatment. Select areas may qualify for other alternatives such as low-profile chambers or fill systems, but detailed additional work is required to determine this potential. Area 3, as mapped by AWT, has the best potential for supporting a semi-conventional low-profile chamber system, but this will need to be confirmed. Anaerobic drip and any pre-treatment septic systems would require a certified subsurface system operator to maintain the system for the owner at a cost of approximately $600-$800 per year. The cost of such septic systems ranges from $20,000 to about $28,000. For general planning purposes, you should allow about 20,000 square feet of soil area for each proposed building lot. This area includes the required septic repair area.

Areas 5A and 5B have a predominance of soils that are from 13-23 inches in depth to soil limiting features, which is typically wetness, or shallow depth to saprolite. These soils may support alternative types of septic systems such as (TS-II) drip irrigation, or surface spray systems. The types of septic systems that would be permissible in these soils would require a certified subsurface system operator to maintain the system for the owner at a cost of approximately $600-$800 per year. The cost of such septic systems to be installed ranges from $25,000 to about $40,000. Additionally, detailed soil testing and engineering is required for these systems in order for a permit to be obtained. The approximate cost to achieve full permitting for these systems is $6,000-$9,000 per lot. For general planning purposes, you should allow about 20,000 square feet of soil area for each proposed building lot. This area includes the required septic repair area.

All other areas on the map are unsuitable for septic systems, either by virtue of the soil conditions or the topography, or both.

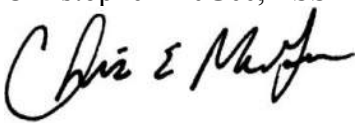
Conclusions

There are several general areas noted for planning based on soil conditions. Some areas are totally unsuitable due to surface water setbacks and topography. One dominant area (Area 1) generally contains soils suitable for shallow conventional systems, which Area 4 may also support a conventional system or low-profile chamber system with further review. A considerable portion of the remaining area (areas 2 and 3) are potentially suitable for some types of septic alternatives costing $20,000 to $28,000 per single family home. Note that this cost is based on today's market and may not be accurate in the future. One small section of soils (areas 5A and 5B) may support alternative type septic systems such as TS-II drip irrigation, or surface spray systems.

We appreciate the opportunity to assist you. Please contact us with any questions, concerns, or comments upon review of this package.

Sincerely,

Christopher McGee, LSS



Summary of Attachments

Attachment 1: AWT Evaluation Map

Agri-Waste Technology, Inc.
501 N. Salem St. Suite 203
Apex NC 27502
P: 919.859.0669
www.agriwaste.com

Preliminary Soil Evaluation Map

John Coffey
Chatham Co., NC
Parcel ID:
1795 & 68866

N

Important Notes

The surface waters and wetlands identified on this map are a product of Sage Environmental.

Suitable Area:

Area 1~ 374,310 sq. ft
Area 2~ 102,901 sq. ft.
Area 3~ 25,949 sq. ft.
Area 4~ 19,457 sq. ft.
Area 5A~ 26,638 sq. ft.
Area 5B~ 29.173 sq. ft.

Drawn By: Trevor Hackney
Reviewed By: Chris McGee
Date: 10/5/20

Legend

- Spring
- 2 ft. Contour
- Surface Water (Sage Env.)
- Property Buffer 10'
- Wetland Buffer 50'
- Spring Buffer 100'
- Surface Water 50'
- Rock Outcrop 30'
- Area 1
- Area 2
- Area 3
- Area 4
- Area 5A
- Area 5B
- Unsuitable Topography
- Wetland (Sage Env.)
- Parcel

Soil Boring Depth (in.)

- <12"
- =12"
- 13-17"
- 18-23"
- 24-29"
- 30-35"
- 36"+

State Rd 1525
Hamlet Chapel Rd
Neighbor Ln
George Helen Cir
8 in

0 125 250 500 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.

Engineers and Soil Scientists

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

Soils & Site Evaluation Report – On-site Wastewater Systems

Chatham County, NC. Parcel 61669

Prepared For: John Coffey, (client)

Prepared By: Christopher McGee, LSS
Senior Soil Scientist

Alex Thompson, SSIT
Associate Agronomist/Soil Scientist

Report date: February 14, 2020

Engineers and Soil Scientists

Agri-Waste Technology, Inc.
501 North Salem Street, Suite 203
Apex, NC 27502
919-859-0669
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Soils & Site Evaluation Report – On-site Wastewater Systems

Chatham County, NC. Parcel 61669

PREPARED FOR: John Coffey, (client)

PREPARED BY: Christopher McGee, LSS
Senior Soil Scientist

Alex Thompson, SSIT
Associate Agronomist/Soil Scientist

DATE: February 14, 2020

Agri-Waste Technology, Inc. (AWT) was contracted by John Coffey to perform a soils & site evaluation for property located at Chatham County, NC. Parcel 61669. Single-family residences via a new property subdivision are proposed for this property. Municipal water and wastewater services are not available in the area; therefore, on-site wastewater (septic systems) and water (wells) will be required. The following report and attachments summarize the findings of the evaluation performed by Chris McGee, Alex Thompson, and Trevor Hackney on January 09, 2020 and January 17, 2020.

The subject property is approximately 67.54 acres in size. The existing property boundaries, as shown on Chatham County GIS, are included on the evaluation map in this report. Within these boundaries, there is natural undulating topography that has given rise to both large scale, and micro features. One product of these features are low-lying drainage areas and buffer areas that are considered unsuitable for all wastewater systems. Soils on the remainder of the property were evaluated in order to determine the feasibility of single family residences with an on-site (septic) system. The majority of the property contains moderate-to-steep slopes ranging from 2 to 25 percent. The property is wooded and there is evidence of both natural and anthropogenic topographic features. The entire property was thoroughly traversed by AWT. All items requiring setbacks and which cannot be utilized were mapped using GPS during the evaluation.

Findings

Soils on the property are mapped the Wedowee series in the Soil Survey issued by the Natural Resources Conservation Service. The soils observed on the property are similar to the typical characteristics of the Wedowee soil series, as well as, other competing variants. The influence of drainage features, rock outcrops, and topography on certain areas of the property make the soils in these areas poorly suited for conventional on-site wastewater (septic) systems in North Carolina. The flat to moderate sideslopes and gently sloping convex ridges on the parcel were the locations that proved to have the more suitable soils for on-site wastewater (septic) systems. Hand auger borings were advanced during the evaluation and from these collective borings, typical profile descriptions were developed. The typical profile descriptions can be found in Attachment 1 of this report. Eight consistent areas throughout the tract with usable soil depths ranging from 18-36 inches were delineated by AWT during the evaluation. The suitable areas are identified on the evaluation map in Attachment 2. Areas A, C, E, F, G, and H are the best suited for conventional and shallow conventional on-site wastewater (septic) systems. Areas B, and D may be better candidates for alternative/advanced on-site wastewater (septic) systems. (More detailed evaluation work can be utilized to identify areas within these two areas that may be able to support conventional and/or shallow conventional septic systems.) The soil characteristics and properties that are unsuitable for septic systems and were identified on this parcel are as follows: saprolite, and/or redoximorphic features (chroma 2 colors). These were generally observed from <12-17 inches in depth from the surface. There are areas on the map that borings were advanced in, but are not labeled as suitable areas. These areas may support alternative/advanced septic systems. If utilization of these areas are desired, more detailed evaluation work will be required. All usable areas are estimated based on GPS/GIS mapping. Any unusable or unsuitable areas are also shown on the evaluation map.

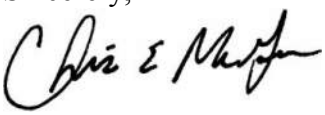
Soil borings were flagged in the field and their locations/depths are noted on the attached evaluation map. An estimate of required space for different sizes of septic systems is included in Attachment 3. Typically, a four bedroom conventional septic system requires about 9,000-11,000ft^2 (9,000-11,000ft^2 is also needed for the required repair/reserve area). It's important to note that these estimates assume contiguous usable soils areas and are only intended for rough/preliminary planning purposes.

Conclusions

Based on the site findings specific areas have been identified as having soils suitable to support conventional and or shallow conventional type on-site wastewater (septic) systems. Suitable areas were also located that would be more appropriate for alternative/advanced on-site wastewater (septic) systems. The square footage of the suitable areas are noted on the soils evaluation map. These areas do not include future setbacks from other features that can only be factored in during detailed evaluation work. It's important to remember to consider the space occupied by the proposed home, driveways/roads, wells (if necessary), and other factors. A field layout may be required in order to obtain permits to install the systems, especially if large footprint homes or greater than four bedrooms are desired.

We appreciate the opportunity to assist you. Please contact us with any questions, concerns, or comments upon review of this package.

Sincerely,



Christopher McGee, LSS

Summary of Attachments

Attachment 1: Typical Profile Descriptions
Attachment 2: AWT Evaluation Map
Attachment 3: Example Loading Rate & Area Calculations

ATTACHMENT 1: Typical Profile Descriptions

Property PIN#: 61669
County: Chatham

SOIL/SITE EVALUATION
FOR
ON-SITE WASTEWATER SYSTEM

Applicant: John Coffey – CoffeyGrounds Inc.
Address: 127 Araya Lane
Chapel Hill, NC 27516

Owner: X Agent: ___ Phone: (919) 942-6677
Dates Evaluated: 01/09/20, 01/17/20
Proposed Facility: Single Family Residences
Property Size: 67.54 acres

Location Site: Chatham County Parcel 61669
Water Supply: On Site Well___ Comm. Well___ Public___ Other___ Evaluation Method: Auger Boring: X Pit___

PROFILE 1: Typical Profile Description (Wedowee sandy loam)

Horizon/ Depth (IN)	Matrix	Mottles	Mottle Abundance / Contrast	(a)(1) Texture	(a)(2) Structure	(a)(3) Minerology	Consistence (Wet)	Consistence (Moist)
A 0-7"	**10YR 4/3**	**-**	**-**	**SL**	**GR**	**NEXP**	**NS, NP**	**Fr**
Bt1 7-12"	**10YR 5/4**	**-**	**-**	**CL**	**2SBK**	**NEXP**	**SS, SP**	**Fi**
Bt2 12-36+''	**7.5YR 5/6**	**C2D 5YR 4/8**	**20%**	**C**	**2SBK**	**NEXP**	**SS, SP**	**Fi**

.1940 Landscape Pos/Slope %	S	Profile LTAR	0.25 GPD/Ft^2
.1942 Wetness Condition	S	System Type	Conventional/Shallow Conventional
.1943/.1956 Saprolite	S		
.1944 Restrictive Horizon	S		
.1948 Profile Classification	S		

Comments: Ridge and sideslopes 6-15%

PROFILE 2: Typical Profile Description (Chewacla and Wahadkee)

Horizon/ Depth (IN)	Matrix	Mottles	Mottle Abundance / Contrast	(a)(1) Texture	(a)(2) Structure	(a)(3) Minerology	Consistence (Wet)	Consistence (Moist)
A 0-7"	**10YR 4/3**	**-**	**-**	**SL**	**GR**	**NEXP**	**NS, NP**	**Fr**
Bt1 7-18"	**10YR 5/6**	**-**	**-**	**CL**	**2SBK**	**NEXP**	**SS, SP**	**Fi**
BC 18-30"	**7.5YR 5/6**	**C2D 10YR 6/3, 6/2**	**20 %**	**C**	**2SBK**	**NEXP**	**S, SP**	**Fi**

.1940 Landscape Pos/Slope %	S	Profile LTAR	0.1-0.125 GPD/Ft^2
.1942 Wetness Condition	US	System Type	Non-coventional/Advanced Treatment Septic Systems
.1943/.1956 Saprolite	S		
.1944 Restrictive Horizon	US		
.1948 Profile Classification	US		

Comments: "This represents one condition on the property defined with unsuitable soils. Other constraints include saprolite or expansive clay within 24 inches of the soil surface. Soils less than 13 inches are unsuitable for any subsurface septic option."

EVALUATED BY: Chris McGee, Alex Thompson, Trevor Hackney
COMMENTS: *Profile Description by Karl Schaffer

LEGEND OF ABBREVIATIONS FOR SOIL/SITE EVALUATION FORM

LANDSCAPE POSITION
CC – Concave Slope
CV – Convex Slope
DS – Debris Slump
D – Depression
DW – Drainage Way
FP – Flood Plain
FS – Foot Slope
H – Head Slope
I – Interfluve
L – Linear Slope
N – Nose Slope
P – Pocosin
R – Ridge
S – Shoulder
T – Terrace

STRUCTURE
G – Single Grain
M – Massive
CR – Crumb
GR – Granular
SBK – Subangular Blocky
ABK – Angular Blocky
PL – Platy
PR – Prismatic
(w in front denotes "weak")

MOTTLES
1 – Few
2 – Common
3 – Many

f – Fine
m – Medium
c – Coarse

F – Faint
D – Distinct
P – Prominent

MOIST CONSISTENCE
VFr – Very Friable
Fr – Friable
Fi – Firm
VFi – Very Firm
EFi – Extremely Firm

WET CONSISTENCE
NS – Non Sticky
SS – Slightly Sticky
S – Sticky
VS – Very Sticky

NP – Non Plastic
SP – Slightly Plastic
P – Plastic
VP – Very Plastic

MINERALOLOGY
NEXP – Non Expansive
SEXP – Slightly Expansive
EXP – Expansive

TEXTURE GROUP	TEXTURE CLASS	.1955 LTAR (gal/day/sq.ft.)
I	S – Sand LS – Loamy Sand	1.2 – 0.8
II	SL – Sandy Loam L – Loam	0.8 – 0.6
III	SCL – Sandy Clay Loam CL – Clay Loam SiL – Silt Loam Si – Silt SiCL – Silty Clay Loam	0.6 – 0.3
IV	SC – Sandy Clay SiC – Silty Clay C – Clay	0.4 – 0.1

ATTACHMENT 2: AWT Evaluation Map

Agri-Waste Technology, Inc.
501 N. Salem St. Suite 203
Apex NC 27502
P: 919.859.0669
www.agriwaste.com

Preliminary Soil Evaluation Map

John Coffey
Chatham Co., NC
PIN: 61669

N

Suitable Area:

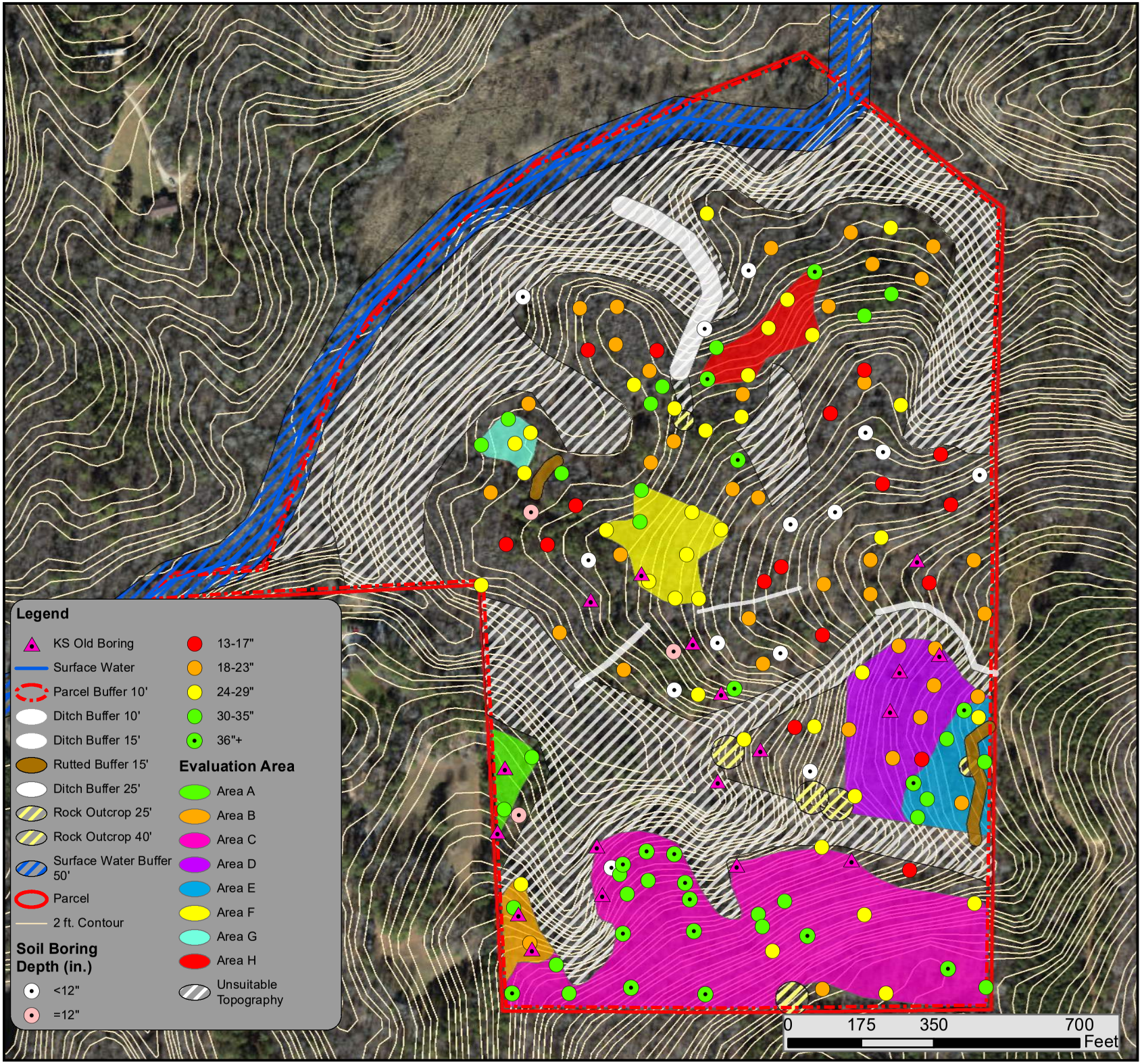
Area A~ 15,121 sq. ft
Area B~ 17,323 sq ft.
Area C~ 320,512 sq. ft.
Area D~ 89,612 sq. ft.
Area E~ 37,566 sq. ft.
Area F~ 49,046 sq. ft.
Area G~ 12,806 sq. ft.
Area H~ 33,880 sq. ft.

Soil Type:

ChA- Chewacla and Wahadkee
WdC/Web/WeD/WeE- Wedowee sandy loam

Soil Boring Depths are not corrected for slope

Drawn By: Trevor Hackney
Reviewed By: Chris McGee
Date: 1/24/20



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.

ATTACHMENT 3: Example Loading Rate & Area Calculations

Conventional Septic System Area Computation

Created by: JV
Created on: 6/20/2001
Updated on: 2/10/2020

Client Name:	*Coffey*	
Number Bedrooms:	*3*	
Design Flow (gal/day):	360	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.25*	
Trench Bottom Area (ft^2):	1440	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	480	
Minimum Field Area Required (ft^2):	4320	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	3240	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	10800	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	8100	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	12960	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	9720	(25% reduction from above)

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

Client Name:	*Coffey*	
Number Bedrooms:	*4*	
Design Flow (gal/day):	480	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.25*	
Trench Bottom Area (ft^2):	1920	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	640	
Minimum Field Area Required (ft^2):	5760	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	4320	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	14400	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	10800	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	17280	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	12960	(25% reduction from above)

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

Client Name:	*Coffey*	
Number Bedrooms:	*5*	
Design Flow (gal/day):	600	(120 gal/day/bedroom, minimum 240 gal/day/dwelling)
LTAR (gal/day/ft^2)	*0.25*	
Trench Bottom Area (ft^2):	2400	(Design flow/LTAR)
Trench Width (ft):	3	
On-center distance between trenches (ft):	9	
Trench Bottom Length (ft):	800	
Minimum Field Area Required (ft^2):	7200	(Trench Bottom Length*Trench on-center distance)
Minimum Field Area Required (Innovative) (ft^2):	5400	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	18000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	13500	(25% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	21600	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	16200	(25% reduction from above)

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

Engineers and Soil Scientists

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

Soils & Site Evaluation Report – On-site Wastewater Systems

CoffeyGrounds, Inc.
John Coffey
Chatham County, NC
Parcel 1900

Prepared for:	John Coffey- CoffeyGrounds Inc., Client
Prepared by:	Karl Shaffer, LSS Senior Soil Scientist
Report date:	March 6, 2018

Engineers and Soil Scientists

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

Soils & Site Evaluation Report – On-site Wastewater Systems

John Coffey- CoffeyGrounds, Inc.
Chatham County, NC
(PIN: 1900)

PREPARED FOR: CoffeyGrounds, Inc., Client

PREPARED BY: Karl Shaffer, LSS
Senior Soil Scientist

DATE: March 6, 2018

Agri-Waste Technology, Inc. (AWT) was contracted to perform a preliminary soils & site evaluation for the above named parcel in Chatham County, NC. Municipal water and wastewater services are not available at this property; therefore, on-site water (well) and wastewater (septic) will be required. Surrounding properties are served by on-site systems also; however, no significant setback adjustments are anticipated based on the location of their components. The following report and attachments summarize the findings of the evaluation performed by Karl Shaffer and Heath Clapp on February 23, 2018.

The subject property is approximately 21.9 acres in size. The northern portion of this parcel is long and narrow, and had been previously evaluated for another client. That information is available pending approval of the previous client. The southern portion of the property was evaluated for this project, and the notes below and accompanying map show the results of this evaluation. The southern portion of the parcel was evaluated to assess its soil resources and potential for development with homes being served by on-site wastewater (septic) systems. The exact location of the soil borings can be found on the attached site and soils map. Also, the site map shows other site features which have relevance for development and septic system siting.

The following information describes the findings of the soil evaluation. The evaluated areas are in woods. The property has gentle topography with nearly level uplands, and sideslopes approaching drainageways where slope ranges up to 10 percent.

Findings

The soils are formed in the geology known as the Chapel Hill pluton which is mainly granitic rock and various related variations with differing minerals. These rock types give rise to soils typically with a clay subsoil. This particular parcel has a very complex and intricate bedrock pattern, giving rise to a high variety of soil types and features. Soil variability is extremely high, with a large percentage of the soil borings and fairly broad areas having soils that are unsuitable for septic systems. The limitation is that the underlying bedrock weathers into a very tight and sticky clay soil that restricts water movement. We classify these soils as having expansive clay mineralogy and seasonal high water table- both conditions are severe limitations and render the classification of these areas as unsuitable for septic systems of most types. The next section focuses on specific areas of the parcel and details about septic potential. Please also refer to the attached site map.

Areas A, B, and D have a predominance of soils that are from 18 to 23 inches in depth to soil limiting feature, which is typically both soil wetness and expansive clay. These soils may support alternative types of septic systems such as anaerobic (TS-I) drip irrigation or low pressure pipe systems with wastewater pretreatment. Select areas may qualify for other alternatives such as low profile chambers or fill systems, but detailed additional work is required to determine this potential. The types of septic systems that would be permissible in these soils would require a certified subsurface system operator to maintain the system for the owner at a cost of approximately $400-$600 per year. The cost of such septic systems ranges from $17,000 to about $23,000. For general planning purposes, you should allow about 20,000 square feet of soil area for each proposed building lot. This area includes the required septic repair area.

Area C has a predominance of soils that exceed 24 inches to soil limitations, and mainly exceed 30 inches. These soils can support conventional to shallow conventional septic systems. Because this area is tucked against the property line and on the highest elevation locally, a pump system would be required. The area on the map shows as about 29,000 square feet of useable area which might support 2 septic systems (both primary and repair), however, separating this section would result in an area loss due to property line setbacks. It is unlikely that this area could be split and still support 2 septic systems with both primary and repair areas as conventional types of systems. One alternative to still allow 2 septic systems in this area is to use adjacent soils in the B area for the septic repair areas. A pump to conventional or shallow conventional septic system costs approximately $7,000 - $9,000.

All other areas on the map are unsuitable for septic systems, either by virtue of the soil conditions or the topography, or both. The area near the north end of this evaluation had significant soil removed at some point in the past- which renders this area unsuitable by topography/past site disturbance.

Conclusions

There are three general areas noted for planning based on soil conditions. One area is totally unsuitable. A considerable portion of the remaining area is potentially suitable for some types of septic alternatives costing $17,000 to $23,000 per single family home. Note that this cost is based on today's market and may not be accurate in the future. One small section of suitable soils can support pump to conventional or shallow conventional septic systems and may support up to 2 lots.

We appreciate the opportunity to assist you. Please contact us with any questions, concerns, or comments upon review of this package.

Sincerely,

Karl Shaffer, LSS

Summary of Attachments

Attachment 1: AWT Evaluation Map

ATTACHMENT 1: AWT Evaluation Map

Agri-Waste Technology, Inc.
501 N. Salem St. Suite 203
Apex NC 27502
P: 919.859.0669
www.agriwaste.com

Preliminary Soil Evaluation Map

John Coffey
Chatham Co., NC

PID: 1900

N

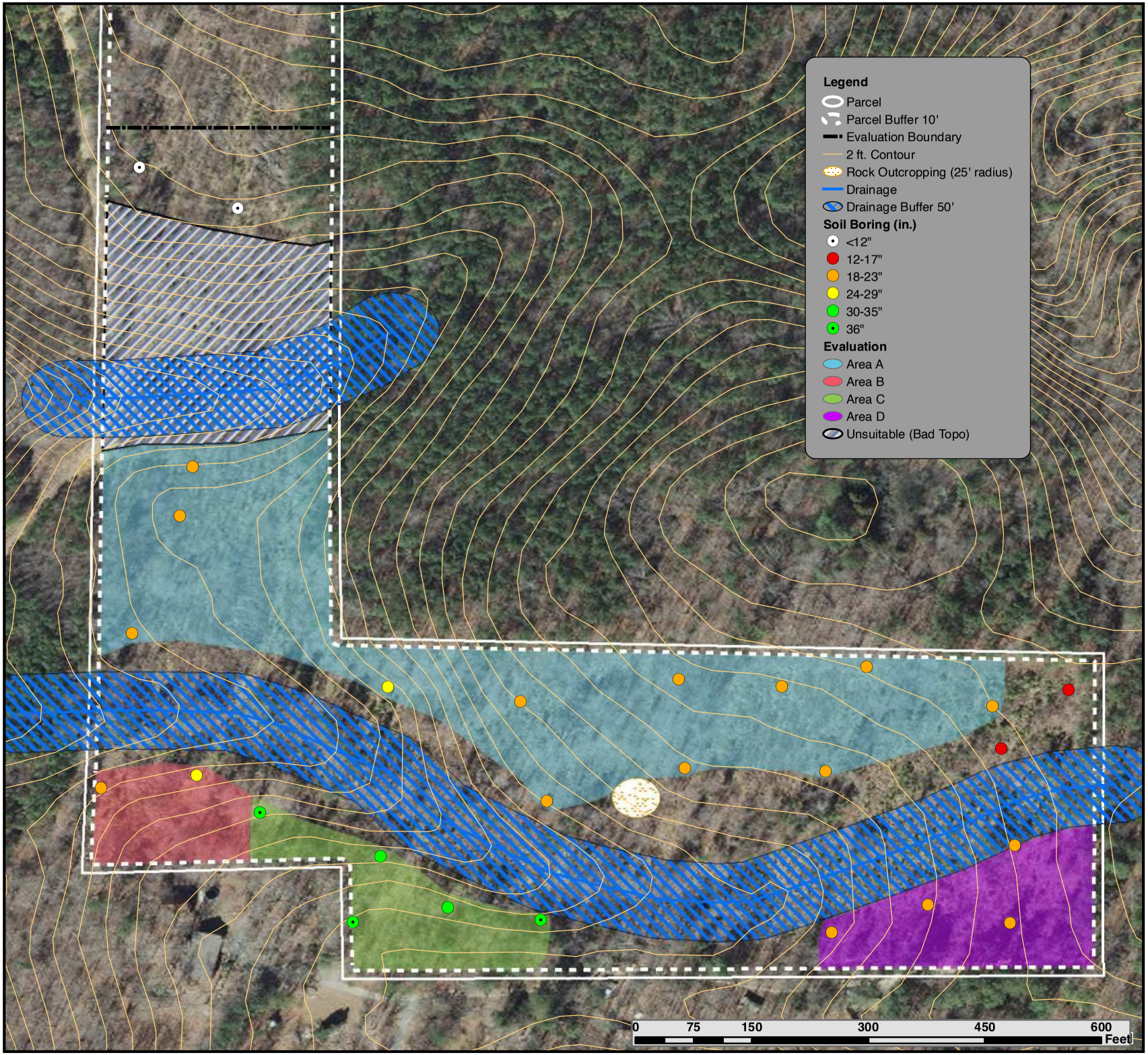
Suitable Area:

Area A = ~ 158,852 sq.ft.
Area B = ~ 19 620 sq.ft.
Area C = ~ 29,186 sq.ft.
Area D = ~ 36,452 sq.ft.

Soil Types:

WeB/WeD/WeE-Wedowee sandy loam
WdC-Wedowee sandy loam

Drawn By: Julie Davidson
Reviewed By: Karl Shaffer
Date: 3/6/18



*** This map was created for proposed planning purposes only. It is not intended to be used as a plat or survey map of any type.***

Engineers and Soil Scientists

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

Soils & Site Evaluation Report – On-site Wastewater Systems

CoffeyGrounds, Inc.
John Coffey
Chatham County, NC
Parcels 1913 and 2012

Prepared for:	John Coffey- CoffeyGrounds Inc., Client
Prepared by:	Karl Shaffer, LSS Senior Soil Scientist
Report date:	May 9, 2018

Engineers and Soil Scientists

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

Soils & Site Evaluation Report – On-site Wastewater Systems

John Coffey- CoffeyGrounds, Inc.
Chatham County, NC
(PIN: 1913 and 2102)

PREPARED FOR: CoffeyGrounds, Inc., Client

PREPARED BY: Karl Shaffer, LSS
Senior Soil Scientist

DATE: May 9, 2018

Agri-Waste Technology, Inc. (AWT) was contracted to perform a preliminary soils & site evaluation for the above-named parcels in Chatham County, NC. Municipal water and wastewater services are not available at this property; therefore, on-site water (well) and wastewater (septic) will be required. Surrounding properties are served by on-site systems also; however, no significant setback adjustments are anticipated based on the location of their components. The following report and attachments summarize the findings of the evaluation performed by Karl Shaffer, Chris McGee, and Heath Clapp on May 4, 2018.

Both parcels were evaluated to assess the soil resources and potential for development with homes being served by on-site wastewater (septic) systems. The exact location of the soil borings can be found on the attached site and soils map. Also, the site map shows other site features which have relevance for development and septic system siting.

The following information describes the findings of the soil evaluation. The evaluated areas are in woods. The property has gentle topography with nearly level uplands, and sideslopes approaching drainageways where slope ranges up to 18 percent.

Findings

The soils are formed in the geology known as the Chapel Hill pluton which is mainly granitic rock and various related variations with differing minerals. These rock types give rise to soils typically with a clay subsoil. This particular parcel has a very complex and intricate bedrock pattern, giving rise to a high variety of soil types and features. Soil variability is extremely high, but some general planning areas have been identified for development planning with homes served by septic systems. The next section focuses on specific areas of the parcel and details about septic potential. Please also refer to the attached site maps. These maps are the same, with one using a topography overlay as the base.

The parcels have been segregated into six potential zones that may allow septic systems (labeled as Zones A through F) and the remaining areas have unsuitable soil or topographic issues that preclude the use of septic systems.

Area A

This area has soils with depth to seasonal high water table between 18 and 23 inches. The area is approximately 18,000 square feet. This area could be served by a septic system with pretreated wastewater or a drip irrigation system without pretreatment (called anaerobic). Such systems would run from about $20,000 to $25,000. This area is adequate to support only one septic system, with repair area.

Area B

This area has soils that have limitations from 24 to 29 inches in depth. Mainly these soils would support a septic system referred to as “at-grade” or “ultra-shallow”. These systems are of a conventional type design but are installed shallower, and thus have soil backfill for septic system cover that adds additional expense of up to $1,500. It is possible that some areas within this B area may have to have alternative types of septic repair systems where soil depth is less than 24 inches, or where the slope factor makes the effective soil depth less than 24 inches. The most efficient way to utilize this area is to design improvements (roads, homes) away from these soils and use these as efficiently as possible for the septic areas. Because this area is significant in size -131,000 square feet- naturally some of the homes and driveways must be within this soils area. For general planning purposes, allocate about 16,000 square feet of suitable soils area for each proposed 4-bedroom home. This area must be outside all well and property line setbacks. Well setback is 100 feet; property line setback is 10 feet.

Area C

This area is small and may support one home (3-4 bedroom) with a shallow conventional septic system with an alternative repair. More work is required to specifically define this area.

Area D

This large area of about 8 acres has a complex mix of soils with depths from 18 to over 36 inches. It is highly likely that a number of lots can be served by septic systems in this area. Many lots could use a conventional or shallow conventional type of septic system. The repair area may be the same or may require some alternative septic system type. More site work should be performed once a general lot layout is proposed to develop the best possible septic scenarios. For general planning purposes, allocate about 16,000 square feet of suitable soils area for each

proposed 4-bedroom home. This area must be outside all well and property line setbacks. Well setback is 100 feet; property line setback is 10 feet. In areas where an alternative septic system type is required for repair area, additional area may be required.

Several rock outcrop areas were noted. These areas must be avoided for septic installation, but these areas are not extensive and typically deep soils are adjacent. These areas can be defined in detail at the next phase of development.

Area E
This area has soils that have limitations from 24 to 29 inches in depth. Mainly these soils would support a septic system referred to as "at-grade" or "ultra-shallow". These systems are of a conventional type design but are installed shallower, and thus have soil backfill for septic system cover that adds additional expense of up to $1,500. The area is approximately 23,000 square feet, but must be better defined before lot layout. This area may possibly serve two shallow septic systems, but again this can only be determined with additional field work. For planning purposes, I would assume one septic system here, unless you choose to split this area, and use alternative septic systems in the poor soils as repair areas. Those septic repairs might be aerobic drip irrigation systems which cost $35,000 to $40,000.

Area F
This area has soils with depth to seasonal high water table between 18 and 23 inches. The area is approximately 34,000 square feet. This area could be served by a septic system with pretreated wastewater or a drip irrigation system without pretreatment (called anaerobic). Such systems would run from about $20,000 to $25,000. This area may be adequate to support two septic systems with repair area, however, that would leave no room for homes and driveways. A better assumption is that this area serves one home.

General Comments
All other areas on the map are unsuitable for septic systems or would require a septic alternative of innovative type with engineered design. Such systems typically range from $35,000 to $50,000 per single family home.

Pump systems can be used where the more suitable soils occur higher in elevation than the proposed homesite. Using a pump with a septic system adds about $2,500 to the cost.

Conclusions
This site evaluation is very preliminary and offers general planning information. Detailed site work is further needed to assess specific septic alternatives for specific lots. At this stage, a general subdivision plan can aid in future site assessment. If a high density of lots is required, this often takes several iterations between developer, soil scientist, and surveyor to attain maximum lot density. The discussion above about area required for each lot is general and varies with topography and specific soils information on each lot.

We appreciate the opportunity to assist you. Please contact us with any questions, concerns, or comments upon review of this package.

Sincerely,

Karl Shaffer

Karl Shaffer, LSS

Summary of Attachments

Attachment 1: AWT Evaluation Maps (2)

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Agri-Waste Technology, Inc.
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Apex NC 27502
P: 919.859.0669
www.agriwaste.com

Preliminary Soil Evaluation Map

John Coffey
Chatham Co., NC

PID: 1913 and 2102

Suitable Area:

Area A- ~ 18,213 sq.ft.
Area B- ~ 131,136 sq.ft.
Area C- ~ 14,010 sq.ft.
Area D- ~ 287,814 sq.ft.
Area E- ~ 23,723 sq.ft.
Area F- ~ 34,562 sq.ft.

Total- ~ 509,461 sq.ft.

Soil Types:

WeB/WeD/WeE-Wedowee sandy loam
WdC-Wedowee sandy loam

Drawn By: Julie Davidson
Reviewed By: Chris McGee
Date: 5/9/18

Legend

- Parcel
- Parcel Buffer 10'
- Draigage
- Drainage Buffer 50'
- 2 ft. Contour

Soil Boring Depth (in.)/Feature

- <12"
- 12-17"
- 18-23"
- 24-29"
- 30-35"
- 36"+
- Disturbed Soil
- Rock Outcropping

Evaluation

- Provisionally suitable for conventional or alternative septic system types
- Unsuitable Position
- Unsuitable Soil Type
- Unsuitable Soil/Contour

Area A
Area B
Area C
Area D
Area E
Area F

0 100 200 400 600 800 Feet

*** This map was created for proposed planning purposes only. It is not intended to be used as a plat or survey map of any type.***

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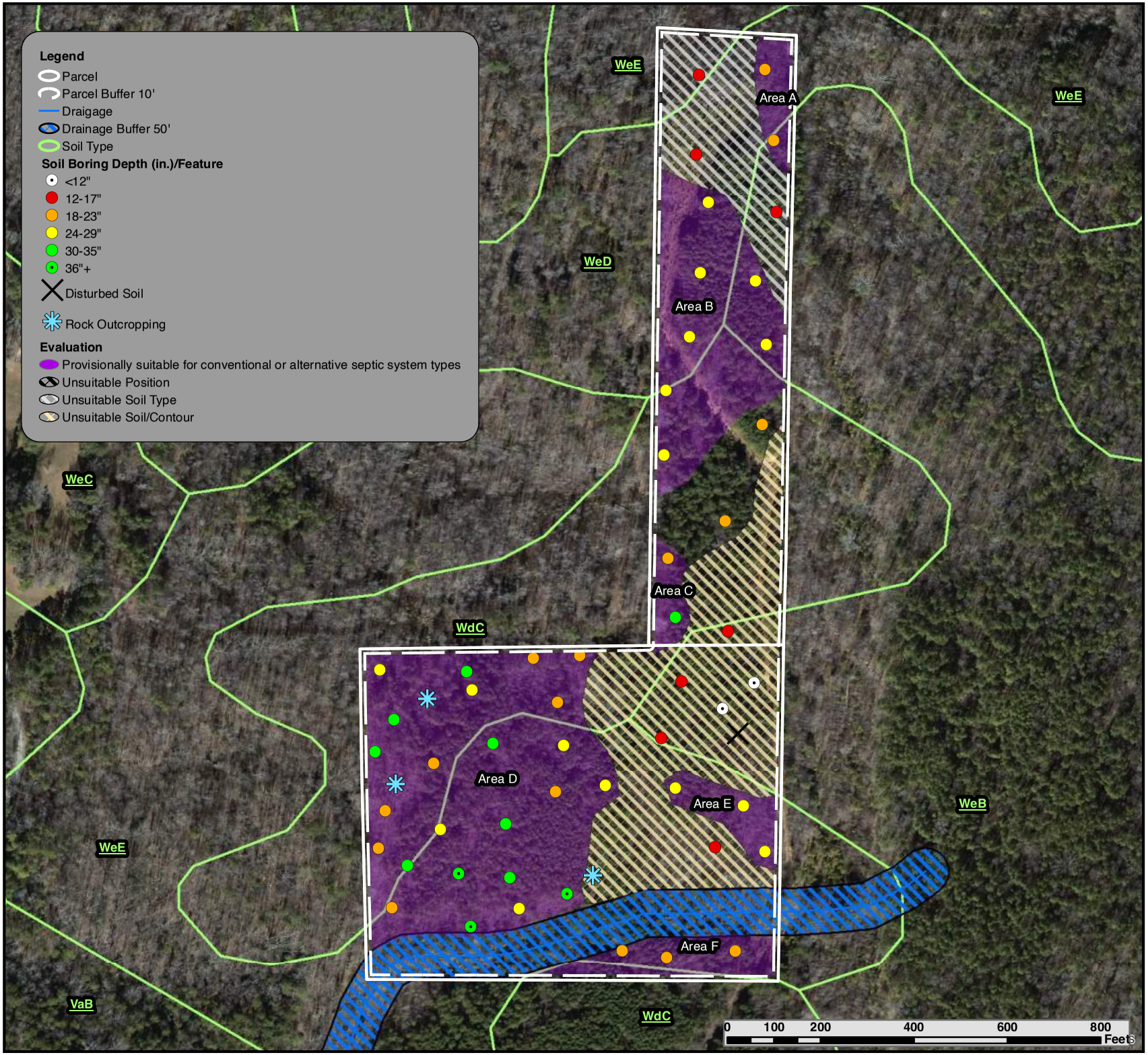

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