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1227
STATE OF NORTH CAROLINA

4/18/05

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

Knoll Ridge Estates, Oakley Church Rd, Bear Creek, NC, 27207 Chatham County

Prepared for:	Mr. Willis Wrenn, Owner
XCOPY:	Mr. Ed Pryor, Realtor Mr. Rufus Johnson, Professional Land Surveyor
Prepared By:	Jeff Vaughan, Ph.D., L.S.S. Senior Agronomist/Soil Scientist
	Enrique Cachafeiro Soils/GIS Specialist
	Mark Smith Soil Specialist
Report Date:	April 18, 2005

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Enrique Cachafeiro
Mark Smith

DATE: April 18, 2005

Soil suitability for domestic sewage treatment and disposal systems was evaluated on April 10, 2005 and April 12, 2005, for Knoll Ridge Estates located on Oakley Church Road in Bear Creek, NC. Jeff Vaughan and Mark Smith of Agri-Waste Technology, Inc. (AWT) conducted the soil evaluation. The detailed soil evaluation of the land area will follow. A review of the soil and landscape characteristics that dictate soil suitability for domestic sewage treatment and disposal systems can be found in Attachment 1.

The property is approximately 130 acres. The aerial maps in Attachment 2 details the approximate property boundaries, creeks, soil boring locations, location of provisionally suitable septic system area, and soil types.

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

Approximately seventy soil borings were advanced within the northern three quarters of the property (Attachment 2). The area evaluated was approximately 110 acres (Attachment 2). All of the soil borings exhibited soil characteristics and soil depths (30" or greater) that are provisionally suitable for conventional or shallow conventional septic systems. Large parts of the property contained drainage features and, thus are unsuitable for septic systems. The best soil and landscape locations for septic systems were found between these drainage features and on hilltops or hillsides. 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 fully not 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 evaluation 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.

Typical profile descriptions of the provisionally suitable soil for this property are in Attachment 3. All the soil borings had very similar characteristics, but some soil borings had a redder subsoil than others. All soil borings were provisionally suitable with respect to restrictive horizons, i.e. no restrictive horizons were found in any provisionally soil borings within 36" of the soil surface. Soil texture was provisionally suitable and was estimated to be silt loam to a clay loam near the soil surface (A horizons) and clay in the subsoil (B horizons). Soil structure was provisionally suitable and was estimated to be granular near the soil surface (A horizons) and subangular blocky in the subsoil (B horizons). Clay mineralogy was provisionally suitable with friable to firm moist soil consistence and slightly-sticky to sticky and slightly-plastic to plastic wet soil consistence. Some rocks were located on the soil surface in some areas and within some soil borings. These rocks were about 2cm to 10cm in diameter within the soil and about 2cm to 50cm on the soil surface.

The major soil types on this property are Georgeville silt loam (map symbols 205B, 205C, and 232C), Georgeville silty clay loam (map symbol 205C2), and Georgeville–Badin complex (map symbols 232D and 232E). The Chatham County Soil Survey indicates that only moderate 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 provisionally 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	4,388 – 21,060
3 bedrooms	0.25	~10,800	~7,020
4 bedrooms	0.1 – 0.4	9,000 – 43,200	5,850 – 28,080
4 bedrooms	0.25	~14,400	~9,360
5 bedrooms	0.1 – 0.4	11,250 – 54,000	7,313 – 35,100
5 bedrooms	0.25	~18,000	~11,700

Based on the results of this evaluation, the installation of conventional or shallow conventional septic systems seems most probable on the evaluated area of this property. We appreciate the opportunity to assist you in this matter. Please contact us with any questions, concerns, or comments.

wrenn

ATTACHMENT 1: Review of Rules Pertaining to Domestic Sewage Treatment and Disposal Systems

Five categories of soil and landscape characteristics are evaluated to determine soil suitability for domestic sewage treatment and disposal systems and include: topography and landscape position, soil morphological characteristics, soil wetness conditions, soil depth, and restrictive horizons. The soil and landscape characteristics found in a particular location dictate the type(s) of domestic sewage treatment and disposal system that can be used on a parcel of land. The detailed rules can be found in Section .1900 – Sewage Treatment and Disposal Systems, but a general review of the five categories and other relevant rules can be found in the sections below.

.1940 TOPOGRAPHY AND LANDSCAPE POSITION

Uniform slopes less than 15 percent are considered suitable, uniform slopes between 15 and 30 percent are considered provisionally suitable, and slopes greater than 30 percent are considered unsuitable for domestic sewage treatment and disposal systems. Complex slope patterns and slopes dissected by gullies and ravines are considered unsuitable for domestic sewage treatment and disposal systems. Depressions and wetlands are also considered unsuitable for domestic sewage treatment and disposal systems.

.1941 SOIL MORPHOLOGICAL CHARACTERISTICS

Sandy and coarse loamy textured soils (sand, loamy sand, sandy loam, and loam) are considered suitable for domestic sewage treatment and disposal systems. Fine loamy and clayey textured soils (silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay) are considered provisionally suitable for domestic sewage treatment and disposal systems.

Crumb, granular, and single-grained soil structures are considered suitable for domestic sewage treatment and disposal systems. Blocky soil structures are considered provisionally suitable for domestic sewage treatment and disposal systems. Platy, prismatic, and massive soil structures are considered unsuitable for domestic sewage treatment and disposal systems.

Slightly expansive clay mineralogy is considered suitable for domestic sewage treatment and disposal systems. Slightly expansive clay minerals exhibit loose, very friable, friable, or firm moist soil consistence. Expansive clay mineralogy is considered unsuitable for domestic sewage treatment and disposal systems. Expansive clay minerals exhibit very firm or extremely firm moist soil consistence. Organic soils are considered unsuitable for domestic sewage treatment and disposal systems.

.1942 SOIL WETNESS CONDITIONS

Soil wetness conditions are caused by seasonal high water table, perched water table, tidal water, seasonally saturated soils, or lateral water movement. Soil wetness conditions are indicated by soil colors, either in mottles or mass, with a chroma of 2 or less according to the Munsell color charts. Soil wetness conditions detected 48 inches in depth or deeper are considered suitable for domestic sewage treatment and disposal systems. Soil wetness conditions detected between 36 to 48 inches in depth are considered provisionally suitable for domestic sewage treatment and disposal systems. Soil wetness conditions detected 36 inches in depth or shallower are considered unsuitable for domestic sewage treatment and disposal systems.

.1943 SOIL DEPTH
Soil depths to rock, parent material, or saprolite greater than 48 inches are considered suitable for domestic sewage treatment and disposal systems. Soil depths to rock, parent material, or saprolite between 36 and 48 inches are considered provisionally suitable for domestic sewage treatment and disposal systems. Soil depths to rock, parent material, or saprolite less than 36 inches are considered unsuitable for domestic sewage treatment and disposal systems. Saprolite has a massive, rock-controlled structure, and retains the mineral arrangement of its parent rock in at least 50 percent of its volume. Saprolite only forms from metamorphic and igneous rock parent materials and is typically referred to as “rotten rock”.

.1944 RESTRICTIVE HORIZONS
Restrictive horizons are capable of perching ground water or sewage effluent and are strongly compacted or cemented. Restrictive horizons resist soil excavation or augering. Soils with restrictive horizons three inches or more in thickness at depths greater than 48 inches are considered suitable for domestic sewage treatment and disposal systems. Soils with restrictive horizons three inches or more in thickness at depths between 36 and 48 inches are considered provisionally suitable for domestic sewage treatment and disposal systems. Soils with restrictive horizons three inches or more in thickness at depths less than 36 inches are considered unsuitable for domestic sewage treatment and disposal systems.

.1950 LOCATION OF SANITARY SEWAGE SYSTEMS
WAKE COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES NOTICE
No area for domestic sewage treatment and disposal system installation (or repair in Wake County) may be disturbed by clearing, excavation, filling, vehicle or equipment traffic, or storage of building materials.

.1947 DETERMINATION OF OVERALL SITE SUITABILITY
.1948 SITE CLASSIFICATION
All of the criteria for the five categories above are to be determined and classified as suitable, provisionally suitable, or suitable according to the respective rules described above. If all criteria are classified the same, that overall site classification will prevail. If there is a variation in the classification of several criteria, the most limiting classification will be used to determine the overall site classification.

A suitable classification generally indicates soil and landscape conditions favorable for the operation of a domestic sewage treatment and disposal system or slight limitations that can be readily overcome by proper design and installation. A provisionally suitable classification indicates soil and/or landscape conditions have moderate limitations for the operation of a domestic sewage treatment and disposal system, but modifications and careful planning, design, and installation can result in satisfactory system function. An unsuitable classification indicates severe soil and/or landscape limitations for the operation of a domestic sewage treatment and disposal system.

SUMMARY
Suitable/provisionally suitable landscapes and soils to a depth of 36 inches can, in general, be used for conventional gravity driven septic systems. Suitable/provisionally suitable landscapes

and soils to a depth of 24 –36 inches can, in general, be used for alternative septic systems such as shallow conventional and low pressure pipe systems, among others. All alternative systems for provisionally suitable landscapes and soils must be proposed to and approved by the Chatham County Health Department. Any landscapes or soils classified as unsuitable may be reclassified as provisionally suitable by the Chatham County Health Department after a site investigation by department personnel.

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

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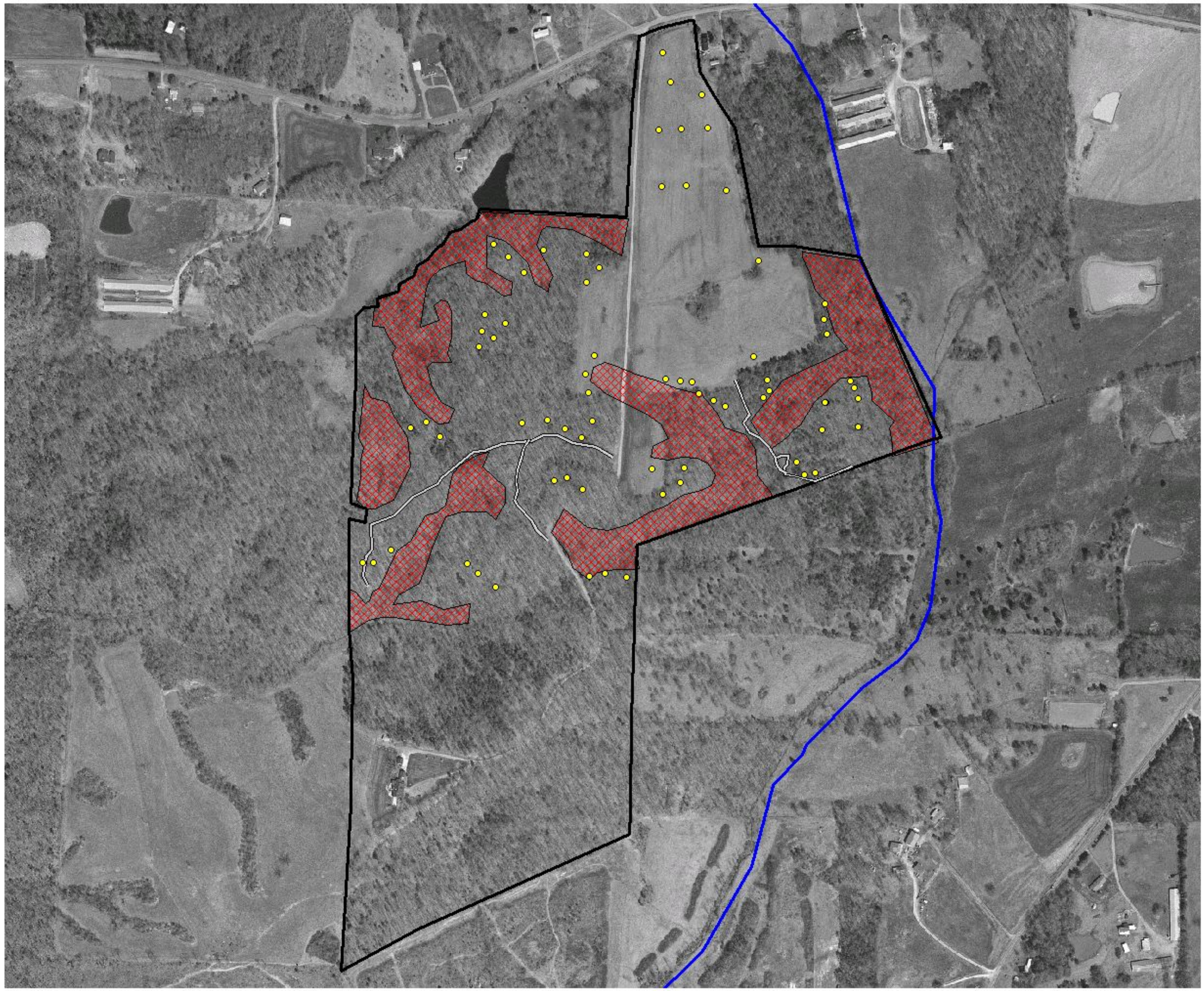
Property Map

Wrenn Brothers Vicinity

Chatham Co., NC

N
W E
S



Legend

- Creek
- Path (15' wide)
- Property Boundary
- Soil Borings
- Unsuitable Area

Drawn By:
Enrique Cachafeiro
Revised By:
Jeff Vaughan
Date:
11/01/2005

1000 0 1000 2000 Feet

Scale: 1:8000

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Soils Map

Wrenn Brothers Vicinity

Chatham Co., NC

N
W E
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Soil Types:
205B,C - Georgeville silt loam
205C2 - Georgeville silty clay loam
232C - Georgeville silt loam
232E,D - Georgeville-Badin complex

Drawn By:
Enrique Cachafeiro
Revised By:
Jeff Vaughan
Date:
03/25/2005

ATTACHMENT 3: Typical Profile Description of Provisionally Suitable Soil

Property ID#:_____.
Property Recorded:_____.
County:___Chatham_____.

SOIL/SITE EVALUATION
FOR
ON-SITE WASTEWATER SYSTEM

Applicant: Mr. Willis Wrenn
Address: P.O. Box 546
Siler City, NC, 27344

Owner: X Agent: ___ Phone: (919)742-3329.
Date Evaluated: April 10 and 12, 2005.
Proposed Facility: Residential Subdivision.
Property Size: Approximately 130 acres.

Location Site: Knoll Ridge Estates located on Oakley Church Rd and Knoll Ridge Lane, Bear Creek NC, 27207
Water Supply: On Site Well X Comm. Well___ Public___ Other___ Evaluation Method: Auger Boring X Pit X Cut___.

TYPICAL PROFILE – Majority of Soil Borings

Horizon/ Depth (IN)	Matrix	Mottles	Mottle Abundance / Contrast	(a)(1) Texture	(a)(2) Structure	(a)(3) Minerology	Consistence Wet	Consistence Moist
A 0-4”	**7.5YR 3/4**	**None**	**None**	**SiL - CL**	**GR**	**SEXP**	**SS, SP**	**Fr**
Bt1 4-10”	**5YR 3/4**	**None**	**None**	**C**	**SBK**	**SEXP**	**S, P**	**Fi**
Bt2 10-36”+	**2.5YR 3/6**	**7.5YR 4/6, 10YR 2/1**	**1,P,f**	**C**	**SBK**	**SEXP**	**S, P**	**Fi**

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

Comments: There were rocks in some holes and on soil surface (~ 1cm - 10cm in diameter) and appeared to be quartz. There were some indications of saprolite in some borings, but the saprolite was not dominant until 40”+.

TYPICAL PROFILE – Minority of Soil Borings

Horizon/ Depth (IN)	Matrix	Mottles	Mottle Abundance/ Contrast	(a)(1) Texture	(a)(2) Structure	(a)(3) Minerology	Consistence Wet	Consistence Moist
A 0-4”	**5YR 3/4**	**None**	**None**	**SiL - CL**	**GR**	**SEXP**	**SS, SP**	**Fr**
Bt1 4-12”	**2.5YR 3/6**	**None**	**None**	**C**	**SBK**	**SEXP**	**S, P**	**Fi**
Bt2 12-36”+	**10R 3/6**	**10Y 4/8**	**1, D, f**	**C**	**SBK**	**SEXP**	**S, P**	**Fi**

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

Comments: The soil borings typical of this profile description were very similar to those described in the profile above, but these soil borings had a redder subsoil.

EVALUATED BY: **Jeff Vaughan, Mark Smith**
COMMENTS:

LEGEND OF ABBREVIATIONS FOR SITE EVALUATION FORM

LANDSCAPE POSITION	TEXTURE GROUP	TEXTURE CLASS	.1955 LTAR (gal/day/sqft)
	I	S - Sand	1.2 - .08
CC - Concave Slope		LS - Loamy Sand	
CV - Convex Slope			
DS - Debris Slump	II	SL - Sandy Loam	0.8 - 0.6
D - Depression		L - Loam	
DW - Drainage Way			
FP - Flood Plain	III	SCL - Sandy Clay Loam	0.6 - 0.3
FS - Foot Slope		CL - Clay Loam	
H - Head Slope		SiL - Silt Loam	
I - Interflueve		Si - Silt	
L - Linear Slope		SiCL - Silt Clay Loam	
N - Nose Slope			
P - Pocosin	IV	SC - Sandy Clay	0.4 - 0.1
R - Ridge		C - Clay	
S - Shoulder		SiC - Silty Clay	
T - Terrace		O - Organic	

STRUCTURE	MOIST CONSISTENCE	MOTTLES	WET CONSISTENCE
G - Single Grain	Vfr - Very Friable	1 - Few	NS - Non Sticky
M - Massive	Fr - Friable	2 - Common	SS - Slightly Sticky
CR - Crumb	Fi - Firm	3 - Many	S - Sticky
GR - Granular	Vfi - Very Firm		VS - Very Sticky
SBK - Subgranular Blocky	Efi - Extremely Firm	F - Faint	
ABK - Angular Blocky		D - Distinct	NP - Non Plastic
PL - Platy		P - Prominent	SP - Slightly Plastic
PR - Prismatic			P - Plastic
		f - Fine	VP - Very Plastic
		m - Medium	
		c - Coarse	

ATTACHMENT 4: Soil Survey Information

205B=Georgeville silt loam, 2 to 6 percent slopes

Setting

Landscape: Piedmont uplands in the Carolina Slate Belt mainly in the central and western parts of the county
Landform: Interstream divides and broad ridges
Shape of areas: Rounded or irregular
Size of areas: 5 to 300 acres

Composition

Georgeville and similar soils: 95 percent
Dissimilar soils: 5 percent

Typical Profile

Surface layer:
0 to 7 inches=brown silt loam
Subsoil:
7 to 10 inches=yellowish red silty clay loam
10 to 36 inches=red clay
36 to 44 inches=red clay that has strong brown mottles
44 to 53 inches=red silty clay loam that has yellow and brown mottles
Underlying material:
53 to 62 inches=red, yellow and brown saprolite that has white mottles

Soil Properties and Qualities

Depth class: Very deep
Agricultural drainage class: Well drained
Permeability: Moderate
Available water capacity: High to very high
Depth to seasonal high water table; kind: More than 60 inches
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Low
Hazard of water erosion: Severe
Soil reaction: Very strongly acid to strongly acid, except where the surface has been limed
Parent material: Residuum weathered from fine-grained metavolcanic rocks
Depth to bedrock: More than 60 inches

Minor Components

Dissimilar:
Random areas of Tarrus and Nanford soils that have depth to soft bedrock 40 to 60 inches
Moderately well drained and somewhat poorly drained Lignum soils that have depth to soft bedrock 40 to 60 inches, and Cid soils that have depth to soft bedrock 20 to 40 inches along drainageways and heads of drainageways.

Random areas of moderately eroded Georgeville soils with silty clay loam or clay loam surface layers
Random areas of surface stones and boulders shown with special symbols
Badin soils that have depth to soft bedrock 20 to 40 inches on small knolls and on the outer edge of map units

Similar:
Random areas of Herndon soils that have yellowish red or yellower subsoils
Random areas of very deep soils that have clayey subsoil layers less than 24 inches thick or less than 30 inches in depth.
Random areas of Georgeville soils that have loam or very fine sandy loam surface layers
Random areas of Georgeville soils with gravelly or cobbly surface layers

Land Use

Dominant uses: woodland, pasture and hayland, and cropland
Other uses: Urban development

Agriculture

Cropland
Suitability: Well suited
Commonly grown crops: Corn, soybeans, small grain and tobacco
Management concerns: Erodibility and soil fertility
Management measures and considerations:
Resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, and sod-based rotations help to control soil erosion and surface runoff and maximize the infiltration of water.
Applying lime and fertilizer according to recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Pasture and hayland
Suitability: Well suited
Commonly grown crops: Tall fescue, orchardgrass and clover
Management concerns: Erodibility
Management measures and considerations:
Preparing seedbeds on the contour or across the slope helps to control soil erosion and increase germination.
Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
Planting adapted species helps to ensure the production of high-quality forage and minimize soil erosion.
The timely removal of livestock from pastures so that forage plants can recover before winter dormancy helps to maintain pasture and increase productivity.
Rotational grazing and a well planned clipping and harvesting schedule help to maintain pasture and increase productivity.
When establishing, maintaining, or renovating hay and pasture, applying lime and fertilizer according to recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland
Suitability: Well suited
Productivity class: Moderately high for loblolly pine
Management concerns: No significant limitations affect woodland management.
Management measures and considerations:
Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and improve aquatic habitat by providing shade for the water surface.

Urban Development

Dwellings
Suitability: Well suited
Management concerns: No significant limitations affect use for dwellings
Management measures and considerations:
Vegetating disturbed areas and providing erosion-control structures, such as sediment fences and catch basins helps to keep eroding soil on site.

Septic tank absorption fields
Suitability: Moderately suited
Management concerns: Restricted permeability
Management measures and considerations:
The Chatham County Health Department should be contacted for guidance on sanitary facilities.
Increasing the size of septic tank absorption field helps to improve performance.
Installing septic system distribution lines only during dry periods helps to reduce smearing and sealing of trench walls.

Local roads and streets
Suitability: Moderately suited
Management concerns: Low strength
Management measures and considerations:
Incorporating sand and gravel with the soil material and compacting roadbeds helps to improve soil strength.

Recreation

Camp areas
Suitability: Well suited
Management concerns: No significant limitations affect camp areas.
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Picnic areas
Suitability: Well suited
Management concerns: No significant limitations affect picnic areas.
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Playgrounds

Suitability: Moderately suited
Management concerns: Steepness of slope and small stones
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.
Leaving a buffer zone of grass, trees, and shrubs adjacent to streams and drainageways helps to reduce siltation and provides shade.
Cutting, filling, or grading only areas requiring excavation improves soil stability and reduces equipment limitations caused by the slope.
Rake playground areas to remove small stones

Paths and trails
Suitability: Poorly suited
Management concerns: Erodibility
Management measures and considerations:
Designing paths and trails on the contour and providing adequate water-control structures, such as culverts, help to maintain the stability of trails.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 8A for loblolly pine

205C2=Georgeville silt clay loam, 6 to 10 percent slopes, moderately eroded

Setting

Landscape: Piedmont uplands in the Carolina Slate Belt
Landform: Ridges, hills and side slopes
Shape of areas: Long and narrow, rounded or irregular
Size of areas: 5 to 150 acres

Composition

Georgeville and similar soils: 86 percent
Dissimilar soils: 14 percent

Typical Profile

Surface layer:
0 to 7 inches=red silty clay loam
Subsoil:
7 to 44 inches=red clay
44 to 52 inches=red silty clay loam that has strong brown mottles
Underlying material:
52 to 62 inches=reddish yellow silt loam saprolite that has red mottles

Soil Properties and Qualities

Depth class: Very deep
Agricultural drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table; kind: More than 60 inches
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Low
Hazard of water erosion: Severe
Soil reaction: Very strongly acid to strongly acid, except where the surface has been limed
Parent material: Residuum weathered from fine-grained metavolcanic rocks of the Carolina Slate Belt
Depth to bedrock: More than 60 inches

Minor Components

Dissimilar:
Random areas of Tarrus and Nanford soils that have depth to soft bedrock 40 to 60 inches
Moderately well drained and somewhat poorly drained Lignum soils that have depth to soft bedrock 40 to 60 inches along drainageways and heads of drainageways.
Random areas of non-eroded Georgeville or Herndon soils that have silt loam, loam, very fine sandy loam, fine sandy loam or sandy loam surface layers
Random areas of surface stones and boulders shown with special symbols

Badin soils that have depth to soft bedrock 20 to 40 inches on small knolls, nose slopes, and on the outer edge of map units

Similar:
Random areas of Herndon soils that have yellowish red or yellower subsoils
Random areas of very deep soils that have clayey subsoil layers less than 24 inches thick or that extend to less than 30 inches in depth.
Random areas of Georgeville soils that have gravelly or cobbly surface layers

Land Use

Dominant uses: woodland, pasture and hayland, and cropland
Other uses: Urban development

Agriculture

Cropland
Suitability: Moderately suited
Commonly grown crops: Corn, soybeans, small grain and tobacco
Management concerns: Erodibility and soil fertility
Management measures and considerations:
Resource management systems including contour farming, conservation tillage, crop residue management, stripcropping, and sod-based rotations help to prevent further erosion by stabilizing the soil, controlling runoff, and maximizing water infiltration.
Applying lime and fertilizer according to recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Pasture and hayland
Suitability: Well suited for pasture and moderately suited for hayland
Commonly grown crops: Tall fescue, orchardgrass and clover
Management concerns: Erodibility
Management measures and considerations:
Preparing seedbeds on the contour or across the slope helps to control soil erosion and increase germination.
Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
Planting adapted species helps to ensure the production of high-quality forage and minimize soil erosion.
The timely removal of livestock from pastures so that forage plants can recover before winter dormancy helps to maintain pasture and increase productivity.
Rotational grazing and a well planned clipping and harvesting schedule help to maintain pasture and increase productivity.
When establishing, maintaining, or renovating hay and pasture, applying lime and fertilizer according to recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland
Suitability: Well suited
Productivity class: Moderately high for loblolly pine
Management concerns: Equipment use and seedling survival.
Management measures and considerations:

Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and improve aquatic habitat by providing shade for the water surface.
Unsurfaced roads may be impassible during wet periods because of the high content of clay in these soils.
Restricting logging operations to dry periods helps to prevent rutting of the surface layer and possible root damage from compaction.

Urban Development

Dwellings
Suitability: Moderately suited
Management concerns: Steepness of slope
Management measures and considerations:
Designing structures that conform to the natural slope helps to improve soil performance.
Grading or shaping land prior to construction helps to reduce damage from surface water and prevent soil erosion.
Vegetating disturbed areas and providing erosion-control structures, such as sediment fences and catch basins helps to keep eroding soil on site.

Septic tank absorption fields
Suitability: Moderately suited
Management concerns: Restricted permeability and steepness of slope
Management measures and considerations:
The Chatham County Health Department should be contacted for guidance on sanitary facilities.
Increasing the size of septic tank absorption field helps to improve performance.
Installing septic system distribution lines only during dry periods helps to reduce smearing and sealing of trench walls.
Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets
Suitability: Moderately suited
Management concerns: Low strength, steepness of slope and erodibility
Management measures and considerations:
Incorporating sand and gravel with the soil material, compacting roadbeds, and designing roads that conform to the natural slope help to improve soil strength.
Constructing roads on the contour and providing adequate water-control structures, such as culverts, helps to maintain road stability.
Vegetating cut and fill slopes as soon as possible after construction helps to stabilize the soil and prevent excessive soil erosion.

Recreation

Camp areas
Suitability: Moderately suited
Management concerns: Steepness of slope
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Providing a level pad that has a gravel surface helps to improve the suitability of these soils for tents and other facilities.
Designing roads and trails on the contour and locating camping facilities in the less sloping areas helps to overcome the slope limitation.

Picnic areas
Suitability: Moderately suited
Management concerns: steepness of slope
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.
Providing a level pad that has a gravel surface for picnic tables and other facilities helps to improve soil performance.
Designing roads and trails on the contour and locating picnic facilities in the less sloping areas help to overcome the slope limitation.

Playgrounds
Suitability: Poorly suited
Management concerns: Steepness of slope and small stones
Management measures and considerations:
Extensive grading, including cutting and filling slopes, will be required.
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.
Rake playground areas to remove small stones
Leaving a buffer zone of grass, trees, and shrubs adjacent to streams and drainageways helps to reduce siltation and provides shade.

Paths and trails
Suitability: Poorly suited
Management concerns: Erodibility, and steepness of slope
Management measures and considerations:
Designing paths and trails on the contour and providing adequate water-control structures, such as culverts, help to maintain the stability of trails.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 8A for loblolly pine

232D=Georgeville-Badin Complex, 10 to 15 percent slopes

Setting

Landscape: Piedmont uplands in the Carolina Slate Belt
Landform: Narrow ridges and side slopes
Slope shape: Convex
Shape of areas: Long and narrow or irregular
Size of areas: 5 to 200 acres

Composition

Georgeville and similar soils: 66
Badin and similar soils: 19 percent
Dissimilar soils: 15 percent

Typical Profile

Georgeville soils
Surface layer:
0 to 7 inches=brown silt loam
Subsoil:
7 to 10 inches=yellowish red silty clay loam
10 to 36 inches=red clay
36 to 44 inches=red clay that has strong brown mottles
44 to 53 inches=red silty clay loam that has yellow and brown mottles
Underlying material:
53 to 62 inches=red, yellow and brown saprolite that has white mottles

Badin soils
Surface layer:
0 to 4 inches; brown silt loam
Subsoil:
4 to 16 inches; strong brown clay
16 to 24 inches; strong brown silty clay loam
24 to 32 inches; strong brown clay loam that has reddish yellow mottles
Bedrock:
32 to 60 inches; weathered, moderately fractured fine-grained metavolcanic rock

Soil Properties and Qualities

Depth class: Georgeville=very deep; Badin=moderately deep
Agricultural drainage class: Well drained
Permeability: Moderate
Available water capacity: Georgeville=high; Badin=moderate
Depth to seasonal high water table; kind: More than 6.0 feet below the soil surface
Shrink-swell potential: Georgeville=low; Badin=moderate
Hazard of flooding: None
Surface runoff: Medium
Hazard of water erosion: Very severe

Parent material: Residuum weathered from fine-grained metavolcanic rock of the Carolina Belt
Depth to bedrock: Georgeville=more than 60 inches; Badin=20 to 40 inches to soft bedrock and 40 inches or more to hard bedrock

Minor Components:

Dissimilar:
Random areas of Tarrus and Nanford soils with depth to soft bedrock 40 to 60 inches
Random areas of shallow, well drained to excessively drained Goldston soils with depth to soft bedrock less than 20 inches
Somewhat poorly drained Cid, Callison and Lignum soils in concave areas at the head of drains and on foot slopes along drainageways
Random areas of surface stones and boulders shown with special symbols
Random areas of soils with channery or gravelly surface textures

Similar:
Random areas of very deep soils that have clayey subsoil layers less than 24 inches thick or that extend less than 30 inches in depth.
Random areas of Herndon soils that have reddish yellow or yellower subsoil and depth to bedrock greater than 60 inches
Random areas of Nanford soils that have reddish yellow or yellower subsoil and depth to soft bedrock 40 to 60 inches
Random areas of Georgeville, Badin and similar soils with loam, fine sandy loam or very fine sandy loam surface textures

Land Use

Dominant uses: Woodland
Other uses: Pasture and hayland

Agricultural Development

Cropland
Suitability: Moderately suited
Commonly grown crops: Corn, soybeans, small grain, and tobacco
Management concerns: Georgeville=erodibility; Badin=erodibility and rooting depth;
Management measures and considerations:
Resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, and sod-based rotations help to control soil erosion and surface runoff and maximize the infiltration of water. Returning plant residue to the soil helps to improve the water-holding capacity, and planting shallow-rooted crops helps to overcome the moderately deep rooting depth.

Pasture and hayland
Suitability: Well suited for pasture and moderately suited for hayland;
Commonly grown crops: Tall fescue, orchardgrass, and clover
Management concerns: Erodibility and equipment use
Management measures and considerations:

Preparing seedbeds on the contour or across the slope helps to control soil erosion and increase germination.
Planting adapted species helps to ensure the production of high-quality forage and minimize soil erosion.
Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
In the steeper areas the slope may limit the use of equipment for harvesting hay crops.
Rotational grazing and a well planned clipping and harvesting schedule help to maintain pasture and increase productivity.

Woodland
Suitability: Well suited
Productivity: Moderately high for loblolly pine
Management concerns: Georgeville=no significant limitations affect woodland management; Badin=windthrow hazard
Management measures and considerations:
Productivity may be increased by periodic harvesting of windthrown trees caused by high winds and limited rooting depth of the Badin soil.
Planting the appropriate species, as recommended by a forester, helps to achieve maximum productivity and ensure planting success.
Restricting logging operations to periods when the soil is not saturated helps to prevent rutting of the surface layer and damage to tree roots resulting from soil compaction.
Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and improve aquatic habitat by providing shade for the water surface.

Urban Development

Dwellings
Suitability: Moderately suited
Management concerns: Georgeville=steepness of slope; Badin=steepness of slope, depth to rock and shrink-swell potential;
Management measures and considerations:
Designing structures that conform to the natural slope helps to improve soil performance.
Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and prevent damage caused by shrinking and swelling in the Badin soils
The soft bedrock underlying the Badin soils in this map unit does not require special equipment for excavation but is difficult to revegetate or to pack if used in fill slopes.
Vegetating disturbed areas and providing erosion-control structures, such as sediment fences and catch basins, helps keep eroding soil on site.

Septic tank absorption fields
Suitability: Poorly suited;

Management concerns: Georgeville=steepness of slope and restricted permeability; Badin=steepness of slope, restricted permeability, depth to rock
Management measures and considerations:
The Chatham County Health Department should be contacted for guidance on sanitary facilities.
Locating and installing septic tank absorption fields in the deeper Georgeville soils may improve the performance of filter fields.
Increasing the size of septic tank absorption fields and installing distribution lines on the contour helps to improve performance.
Installing septic system distribution lines only during dry periods helps to reduce smearing and sealing of trench walls.

Local roads and streets
Suitability: Moderately suited
Management concerns: Georgeville=low strength and steepness of slope; Badin=low strength, steepness of slope, and shrink-swell potential
Management measures and considerations:
Incorporating sand and gravel, compacting roadbeds, and designing roads to conform with natural slopes helps to improve soil strength.
Constructing roads on the contour and providing adequate water-control structures, such as culverts, help to maintain road stability.
Vegetating cut and fill slopes as soon as possible after construction helps to stabilize the soil and prevent excessive soil erosion.

Recreational Development

Camp areas
Suitability: Moderately suited
Management concerns: Steepness of slope and erodibility
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Picnic areas
Suitability: Moderately suited
Management concerns: Steepness of slope and erodibility
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Playgrounds
Suitability: Poorly suited
Management concerns: steepness of slope
Management measures and considerations:
Cutting, filling, or grading only areas requiring excavation improves soil stability and reduces equipment limitations caused by the slope.

Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Paths and trails
Suitability: Moderately suited
Management concerns: Erodibility
Management measures and considerations:
Designing paths and trails on the contour and providing adequate water-control structures, such as culverts, help to maintain the stability of trails.

Interpretive Groups

Land capability classification: Georgeville=IVe; Badin=IVe
Woodland ordination symbol: Georgeville=8A for loblolly pine; Badin=8D for loblolly pine

232E=Georgeville-Badin Complex, 15 to 30 percent slopes

Setting

Landscape: Piedmont uplands in the Carolina Slate Belt
Landform: Narrow ridges and side slopes
Shape of areas: Long and narrow or irregular
Size of areas: 5 to 200 acres

Composition

Georgeville and similar soils: 54
Badin and similar soils: 16 percent
Dissimilar soils: 30 percent

Typical Profile

Georgeville soils
Surface layer:
0 to 7 inches=brown silt loam
Subsoil:
7 to 10 inches=yellowish red silty clay loam
10 to 36 inches=red clay
36 to 44 inches=red clay that has strong brown mottles
44 to 53 inches=red silty clay loam that has yellow and brown mottles
Underlying material:
53 to 62 inches=red, yellow and brown saprolite that has white mottles

Badin soils
Surface layer:
0 to 4 inches; brown silt loam
Subsoil:
4 to 16 inches; strong brown clay
16 to 24 inches; strong brown silty clay loam
24 to 32 inches; strong brown clay loam that has reddish yellow mottles
Bedrock:
32 to 60 inches; weathered, moderately fractured fine-grained metavolcanic rock

Soil Properties and Qualities

Depth class: Georgeville=very deep; Badin=moderately deep
Agricultural drainage class: Well drained
Permeability: Moderate
Available water capacity: Georgeville=high; Badin=moderate
Depth to seasonal high water table; kind: More than 6.0 feet below the soil surface
Shrink-swell potential: Georgeville=low; Badin=moderate
Hazard of flooding: None
Surface runoff: Medium
Hazard of water erosion: Very severe
Parent material: Residuum weathered from fine-grained metavolcanic rock of the Carolina Belt

Depth to bedrock: Georgeville=more than 60 inches; Badin=20 to 40 inches to soft bedrock and 40 inches or more to hard bedrock

Minor Components:

Dissimilar:
Random areas of Nanford and Tarrus soils that have depth to soft bedrock 40 to 60 inches
Random areas of shallow, well drained to excessively drained Goldston soils with depth to soft bedrock less than 20 inches
Somewhat poorly drained Cid, Callison and Lignum soils in concave areas at the head of drains and on foot slopes along drainageways
Random areas of surface stones and boulders shown with special symbols
Random areas of soils with channery or gravelly surface textures

Similar:
Random areas of very deep soils that have clayey subsoil layers less than 24 inches thick or that extend to less than 30 inches in depth.
Random areas of Herndon soils that have reddish yellow or yellower subsoil and depth to bedrock greater than 60 inches
Random areas of Georgeville, Badin or similar soils with loam, fine sandy loam or very fine sandy loam surface textures

Land Use

Dominant uses: Woodland, and pasture and hayland
Other uses: Urban development, and cropland

Agricultural Development

Cropland
Suitability: Poorly suited
Commonly grown crops: Few if any commodity crops are currently grown on areas of this map unit
Management concerns: Georgeville=erodibility and equipment use;
Badin=erodibility, equipment use and rooting depth;
Management measures and considerations:
This map unit is difficult to manage for cultivated crops because the slope limits the use of equipment.
Resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, and sod-based rotations help to control soil erosion and surface runoff and maximize the infiltration of water. Returning plant residue to the soil helps to improve the water-holding capacity, and planting shallow-rooted crops helps to overcome the moderately deep rooting depth in Badin soils.

Pasture and hayland
Suitability: Moderately suited for pasture and poorly suited for hayland;
Commonly grown crops: Tall fescue, orchardgrass, and clover
Management concerns: Erodibility and equipment use;
Management measures and considerations:

Preparing seedbeds on the contour or across the slope helps to control soil erosion and increase germination.
Planting adapted species helps to ensure the production of high-quality forage and minimize soil erosion.
Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
The slope limits the use of equipment in the steeper areas.
The timely removal of livestock from pastures so that forage plants can recover before winter dormancy helps to maintain pasture and increase productivity.
Rotational grazing and a well planned clipping and harvesting schedule help to maintain pasture and increase productivity.

Woodland
Suitability: Well suited
Productivity: Moderately high for loblolly pine
Management concerns: Georgeville=erodibility and equipment use;
Badin=erodibility, equipment use, and windthrow hazard
Management measures and considerations:
Planting the appropriate species, as recommended by a forester, helps to achieve maximum productivity and ensure planting success.
Restricting logging operations to periods when the soil is not saturated helps to prevent rutting of the surface layer and damage to tree roots resulting from soil compaction.
Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and improve aquatic habitat by providing shade for the water surface.
Installing broad-based dips, water bars, and culverts helps to stabilize logging roads, skid trails, and landings. Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion and siltation of streams.
Water should not be directly diverted across fill slopes because the concentrated flow of water can undercut roads and landings.
Constructing roads, fire lanes, and skid trails on the contour helps to overcome slope limitations.
Productivity may be increased by periodic harvesting of windthrown trees caused by high winds and limited rooting depth of the Badin soils.
Extra care is needed in maintaining roads and fire lanes because of the hazard of windthrow.

Urban Development

Dwellings
Suitability: Moderately suited
Management concerns: Georgeville=steepness of slope; Badin=steepness of slope, depth to rock and shrink-swell potential;
Management measures and considerations:
Designing structures on the contour that conform to the natural slope or building in the less sloping areas helps to improve soil performance.

Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and prevent damage caused by shrinking and swelling in the Badin soils
Drilling and blasting of hard rock or the use of special earth-moving equipment may be needed to increase the soil depth in areas of Badin soils, or the shallow Goldston soils that occur as a minor component in this map unit.
The soft bedrock underlying the Badin soils in this map unit does not require special equipment for excavation but is difficult to revegetate or to pack if used in fill slopes.
Vegetating disturbed areas and providing erosion-control structures, such as sediment fences and catch basins helps to keep eroding soil on site.

Septic tank absorption fields
Suitability: Poorly suited
Management concerns: Georgeville=steepness of slope and restricted permeability; Badin=steepness of slope, restricted permeability, depth to rock
Management measures and considerations:
This map unit has severe limitations affecting septic tank absorption fields. The Chatham County Health Department should be contacted for additional guidance.
Accessing outlets of public sewage systems will eliminates the need to use these severely limited soils for septic tank systems.
Locating and installing septic tank absorption fields in the deeper Georgeville soils may improve the performance of filter fields.
Increasing the size of septic tank absorption fields and installing distribution lines on the contour helps to improve performance.
Installing septic system distribution lines only during dry periods helps to reduce smearing and sealing of trench walls.

Local roads and streets
Suitability: Poorly suited
Management concerns: Georgeville=steepness of slope and low strength; Badin=steepness of slope, low strength, and shrink-swell potential
Management measures and considerations:
Incorporating sand and gravel, compacting roadbeds, and designing roads to conform to the natural slope helps to improve soil strength.
Using a geotextile fabric filter cloth between the roadbed and the soil surface helps to minimize the loss of stone into the soil.
Constructing roads on the contour and providing adequate water-control structures, such as culverts, help to maintain road stability.
Vegetating cut and fill slopes as soon as possible after construction helps to stabilize the soil and prevent excessive soil erosion.

Recreational Development

Camp areas

Suitability: Poorly suited
Management concerns: Steepness of slope and erodibility
Management measures and considerations:
Designing roads and trails on the contour and locating camping facilities in the less sloping areas helps to overcome the slope limitation.
Providing a level pad that has a gravel surface helps to improve the suitability of these soils for tents and other facilities.
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Picnic areas
Suitability: Poorly suited
Management concerns: Steepness of slope, erodibility
Management measures and considerations:
Designing roads and trails on the contour and locating picnic facilities in the less sloping areas help to overcome the slope limitation.
Providing a level pad that has a gravel surface for picnic tables and other facilities helps to improve soil performance.
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Playgrounds
Suitability: Unsuited
Management concerns: steepness of slope,
Management measures and considerations:
This map unit is severely limited for playgrounds because of steepness of slope. A site on better suited soils should be selected.
Cutting, filling, or grading only areas requiring excavation improves soil stability and reduces equipment limitations caused by the slope.
Extensive grading, including cutting and filling slopes, will be required.
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.

Paths and trails
Suitability: Poorly suited
Management concerns: Steepness of slope and erodibility
Management measures and considerations:
Designing paths and trails on the contour and providing adequate water-control structures, such as culverts, help to maintain the stability of trails.

Interpretive Groups

Land capability classification: Georgeville=VIe; Badin=VIe
Woodland ordination symbol: Georgeville=8R for loblolly pine; Badin=8R for loblolly pine

205C=Georgeville silt loam, 6 to 10 percent slopes

Setting

Landscape: Piedmont uplands in the Carolina Slate Belt, mainly in the central and western part of the county
Landform: Ridges, hills and side slopes
Shape of areas: Long and narrow, rounded or irregular
Size of areas: 5 to 150 acres

Composition

Georgeville and similar soils: 95 percent
Dissimilar soils: 5 percent

Typical Profile

Surface layer:
0 to 7 inches=brown silt loam
Subsoil:
7 to 10 inches=yellowish red silty clay loam
10 to 36 inches=red clay
36 to 44 inches=red clay that has strong brown mottles
44 to 53 inches=red silty clay loam that has yellow and brown mottles
Underlying material:
53 to 62 inches=red, yellow and brown saprolite that has white mottles

Soil Properties and Qualities

Depth class: Very deep
Agricultural drainage class: Well drained
Permeability: Moderate
Available water capacity: High or very high
Depth to seasonal high water table; kind: More than 60 inches
Shrink-swell potential: Low
Hazard of flooding: None
Surface runoff: Low
Hazard of water erosion: Severe
Parent material: Residuum weathered from fine-grained metavolcanic rocks of the Carolina Slate Belt
Depth to bedrock: More than 60 inches

Minor Components

Dissimilar:
Random areas of Tarrus and Nanford soils that have depth to soft bedrock 40 to 60 inches
Moderately well drained and somewhat poorly drained Lignum soils that have depth to soft bedrock 40 to 60 inches along drainageways and heads of drainageways.
Random areas of moderately eroded Georgeville soils with silty clay loam or clay loam surface layers

Random areas of surface stones and boulders shown with special symbols
Badin soils that have depth to soft bedrock 20 to 40 inches on small knolls, nose slopes, and on the outer edge of map units

Similar:
Random areas of Georgeville soils that have loam, or fine sandy loam surface layers
Random areas of very deep soils that have clayey subsoil layers less than 24 inches thick or that extend to less than 30 inches in depth.
Random areas of Herndon soils that have yellowish red or yellower subsoils
Random areas of Georgeville soils with gravelly or cobbly surface layers

Land Use

Dominant uses: woodland, pasture and hayland, and cropland
Other uses: Urban development

Agriculture

Cropland
Suitability: Moderately suited
Commonly grown crops: Corn, soybeans, small grain and tobacco
Management concerns: Erodibility and soil fertility
Management measures and considerations:
Resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, and sod-based rotations help to control soil erosion and surface runoff and maximize the infiltration of water.
Applying lime and fertilizer according to recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Pasture and hayland
Suitability: Well suited for pasture; moderately suited for hayland
Commonly grown crops: Tall fescue, orchardgrass and clover
Management concerns: Erodibility
Management measures and considerations:
Preparing seedbeds on the contour or across the slope helps to control soil erosion and increase germination.
Fencing livestock away from creeks and streams helps to prevent streambank erosion and sedimentation.
Planting adapted species helps to ensure the production of high-quality forage and minimize soil erosion.
The timely removal of livestock from pastures so that forage plants can recover before winter dormancy helps to maintain pasture and increase productivity.
Rotational grazing and a well planned clipping and harvesting schedule help to maintain pasture and increase productivity.
When establishing, maintaining, or renovating hay and pasture, applying lime and fertilizer according to recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland
Suitability: Well suited
Productivity class: Moderately high for loblolly pine

Management concerns: No significant limitations affect woodland management.
Management measures and considerations:
Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and improve aquatic habitat by providing shade for the water surface.
Planting the appropriate species, as recommended by a forester, helps to achieve maximum productivity and ensure planting success.

Urban Development

Dwellings
Suitability: Moderately suited
Management concerns: Steepness of slope
Management measures and considerations:
Designing structures that conform to the natural slope helps to improve soil performance.
Grading or shaping land prior to construction helps to reduce damage from surface water and prevent soil erosion.
Vegetating disturbed areas and providing erosion-control structures, such as sediment fences and catch basins helps to keep eroding soil on site.

Septic tank absorption fields
Suitability: Moderately suited
Management concerns: Restricted permeability, and steepness of slope
Management measures and considerations:
The Chatham County Health Department should be contacted for guidance on sanitary facilities.
Increasing the size of septic tank absorption field helps to improve performance.
Installing septic system distribution lines only during dry periods helps to reduce smearing and sealing of trench walls.
Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets
Suitability: Moderately suited
Management concerns: Low strength, steepness of slope and erodibility
Management measures and considerations:
Incorporating sand and gravel with the soil material, compacting roadbeds, and designing roads that conform to the natural slope help to improve soil strength.
Vegetating cut and fill slopes as soon as possible after construction helps to stabilize the soil and prevent excessive soil erosion.

Recreational Development

Camp areas
Suitability: Well suited
Management concerns: Steepness of slope
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.
Providing a level pad that has a gravel surface helps to improve the suitability of these soils for tents and other facilities.

Designing roads and trails on the contour and locating camping facilities in the less sloping areas helps to overcome the slope limitation.

Picnic areas
Suitability: Well suited
Management concerns: Steepness of slope
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.
Providing a level pad that has a gravel surface for picnic tables and other facilities helps to improve soil performance.
Designing roads and trails on the contour and locating picnic facilities in the less sloping areas help to overcome the slope limitation.

Playgrounds
Suitability: Moderately suited
Management concerns: Steepness of slope and small stones
Management measures and considerations:
Vegetating cleared and graded areas as soon as possible helps to maintain soil stability and prevent erosion.
Leaving a buffer zone of grass, trees, and shrubs adjacent to streams and drainageways helps to reduce siltation and provides shade.
Cutting, filling, or grading only areas requiring excavation improves soil stability and reduces equipment limitations caused by the slope.
Rake playground areas to remove small stones

Paths and trails
Suitability: Poorly suited
Management concerns: Erodibility, and steepness of slope
Management measures and considerations:
Designing paths and trails on the contour and providing adequate water-control structures, such as culverts, help to maintain the stability of trails.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 8A for loblolly pine

ATTACHMENT 5: Septic System Area Computation Spreadsheets

Conventional Septic System Area Computation

Created by: JV
Created on: 6/20/2001
Updated on: 4/16/2005

Client Name:	*Wrenn Brothers*	
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):	7020	(35% reduction from above)
Total Field Area Required (ft^2)(1):	27000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)(1):	17550	(35% reduction from above)
Total Field Area Required (ft^2)(1):	32400	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)(1):	21060	(35% reduction from above)

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

Client Name:	*Wrenn Brothers*	
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):	1755	(35% reduction from above)
Total Field Area Required (ft^2)(1):	6750	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)(1):	4387.5	(35% reduction from above)
Total Field Area Required (ft^2)(1):	8100	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)(1):	5265	(35% reduction from above)

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

Client Name:	*Wrenn Brothers*	
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):	2808	(35% reduction from above)
Total Field Area Required (ft^2)(1):	10800	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)(1):	7020	(35% reduction from above)
Total Field Area Required (ft^2)(1):	12960	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)(1):	8424	(35% 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: 4/16/2005

Client Name:	*Wrenn Brothers*	
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):	9360	(35% reduction from above)
Total Field Area Required (ft^2)(1):	36000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)(1):	23400	(35% reduction from above)
Total Field Area Required (ft^2)(1):	43200	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)(1):	28080	(35% reduction from above)

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

Client Name:	*Wrenn Brothers*	
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):	2340	(35% reduction from above)
Total Field Area Required (ft^2)(1):	9000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)(1):	5850	(35% reduction from above)
Total Field Area Required (ft^2)(1):	10800	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)(1):	7020	(35% reduction from above)

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

Client Name:	*Wrenn Brothers*	
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):	3744	(35% reduction from above)
Total Field Area Required (ft^2)(1):	14400	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)(1):	9360	(35% reduction from above)
Total Field Area Required (ft^2)(1):	17280	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)(1):	11232	(35% 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:	4/16/2005

Client Name:	*Wrenn Brothers*	
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):	11700	(35% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	45000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	29250	(35% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	54000	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	35100	(35% reduction from above)

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

Client Name:	*Wrenn Brothers*	
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):	2925	(35% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	11250	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	7312.5	(35% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	13500	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	8775	(35% reduction from above)

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

Client Name:	*Wrenn Brothers*	
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):	4680	(35% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	18000	(Minimum field area*2.5)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	11700	(35% reduction from above)
Total Field Area Required (ft^2)$^{(1)}$:	21600	(Minimum field area*3)
Total Field Area Required (Innovative) (ft^2)$^{(1)}$:	14040	(35% reduction from above)

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