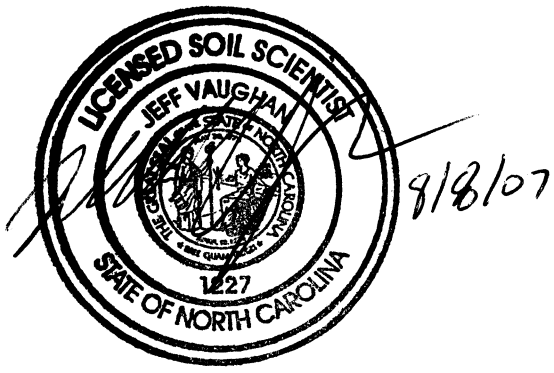
Agri-Waste Technology, Inc.

5400 Etta Burke Court
Raleigh, North Carolina 27606
Phone: (919) 859-0669
Fax: (919) 233-1970
Email: awt@agriwaste.com



9/8/07

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

Harvest, Pea Ridge Road
New Hill, NC 27562
Chatham County

Prepared for: Mr. Nathan Wieler, Harvest Community, LLC

Prepared By: Jeff Vaughan, Ph.D., L.S.S.
Senior Agronomist/Soil Scientist

Enrique Cachafeiro
Soils/GIS Specialist

Chris McGee
Assistant Agronomist/Soil Scientist

Sloan Griffin
Soils Technician

Report Date: August 8, 2007

TABLE OF CONTENTS

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PREPARED FOR: Mr. Nathan Wieler, Harvest Community, LLC

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Chris McGee
Sloan Griffin

DATE: August 8, 2007

Soil suitability for domestic sewage treatment and disposal systems was evaluated on 5/11/07, 5/16/07, 5/17/07, and 5/24/07 for property located on Pea Ridge Road in New Hill, NC (Chatham County) currently owned by Paul and Barbara McCoy and under contract by Harvest Community, LLC. This report is written as a separate yet complimentary information source in the proposed development sketch plan submittal application. The results of our field evaluation are summarized along with other relevant information for the use of on-site septic systems in relationship to the proposed design.

At the time this field work was completed the most up-to-date information available for identifying the property boundary was the Chatham County GIS map as Northarrow had not yet finished the on-site boundary survey. It was discovered as a result of the survey work that the southern most boundary of the property is actually parallel to the county waterline shown on the GIS map. Therefore, this report does not include additional borings or mapped soil lines for that small rectangular addition to the site. This does not compromise the viability of the development plan in relationship to the potential for sufficient on-site treatment. As further field work commences for the project additional soil testing will be conducted on that area of the property.

Jeff Vaughan, Enrique Cachafeiro, Chris McGee, Sloan Griffin, and Julie Peele of Agri-Waste Technology, Inc. (AWT) conducted the soil evaluation. The field investigation conducted followed the rules and regulations (Article 11, Chapter 130A of NCGS 15A NCAC 18A .1900 *et seq.*) for North Carolina. 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 according to NC rules and regulations can be found in Attachment 1.

The total property area is approximately 214 acres. The majority of the property is dominated by agricultural fields and wooded areas. The maps in Attachment 2 show several drainage features, perennial streams, and other water features throughout the property and also include a map of the isolated wetlands delineated on site.

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

In addition to the approximate property boundaries, drainage features and topographic information the maps included in Attachment 2 detail the soil boring locations, soil types, and provisionally suitable soil areas for septic systems. Soil borings were flagged in the field with blue ribbon (24" or more of provisionally suitable soil), blue/red ribbon (18 - 23" of provisionally suitable soil), red ribbon (12 - 17" of provisionally suitable soil), yellow ribbon (less than 12" of provisionally suitable soil), and blue/yellow ribbon (auger refusal due to rock). Approximately 166 soil boring locations were advanced within the property. The majority of the soil borings exhibited soil characteristics and soil depths (24" or greater) that are provisionally suitable for conventional or shallow conventional trench septic systems. In addition, several soil borings exhibited soil characteristics and soil depths (less than 24") that are provisionally suitable for more sophisticated septic systems like subsurface drip and/or pre-treatment septic systems. Therefore, some areas mapped as unsuitable could possibly be used for more sophisticated alternative septic systems.

The borings identified as "Auger Refusal" are typically a result of a gravelly subsurface soil horizon. A minimum of 3 and a maximum of 6 attempts were made to advance a soil boring within these rocky areas before labeling the location with auger refusal. Some of these rocky areas may warrant examination with excavated soil pits to determine specific acceptable locations for septic systems as the project submittal process moves ahead. Areas of the property containing drainage features and/or low-lying topography are considered unsuitable for septic systems. The larger drainage features and low areas were mapped as unsuitable for septic systems, however smaller drainage features (not mapped as unsuitable) may need further field assessment to accurately determine if septic systems can be located within these locations.

This evaluation provides a preliminary review to determine what potential this land might have for domestic sewage treatment and disposal systems. The specific types of septic systems, exact locations of future drainfields and repair areas, buffers, and building foundations will be examined more extensively as the submittal process and planning proceed. It is likely that additional more specific soil evaluations will be required once final lot and housing layouts are considered.

Soil Characterization

Typical profile descriptions of the provisionally suitable and unsuitable soil for this property are in Attachment 3. Three distinct soil profiles were observed in the soil borings on the property; either a deep red clay subsoil (with and without a tillage pan) with indications of saprolite beginning at 25-27", or a yellowish-brown clay subsoil with indications of saprolite beginning at approximately 28". Tillage pans were encountered in some soil borings (within crop fields) beginning at about 3-6", but the pan discontinued at about 12-15".

The provisionally suitable soil borings had the following characteristics. Soil texture was provisionally suitable and was estimated to be silt loam to loam near the soil surface (A horizons) and clay loam to 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). A densely compacted plow pan layer (massive structure) was noted at 5-13" in some of the borings in the crop fields. These borings exhibited massive type structure due to the compacted clay, although they appeared to have no drainage or wetness issues. Clay mineralogy was provisionally 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 many soil borings, but were not dominant until greater than 24 inches in most profiles.

The major soil types on this property are Chewacla and Wehadkee soils (map symbol: ChA), Mattaponi sandy loam (map symbol: MaB), Peawick sandy loam (map symbol: PeB), Riverview silt loam (map symbol: RvA), and State sandy loam (map symbol: StB). The Chatham County Soil Survey addresses these soil types as detailed in Attachment 4.

Septic System Calculations

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	~12,960	~9,720
4 bedrooms	0.1 – 0.4	9,000 – 43,200	5,850 – 28,080
4 bedrooms	0.25	~17,280	~12,960
5 bedrooms	0.1 – 0.4	11,250 – 54,000	7,313 – 35,100
5 bedrooms	0.25	~21,600	~16,200

Conclusions Regarding Soils Evaluation for Septic System Suitability

The result of this evaluation indicates that a substantial area of the property would support installation of conventional or shallow conventional septic systems. Further more detailed assessments will help to identify exact locations and alternative designs to employ.

Wetlands Evaluation

A wetland evaluation was conducted on July 3, 2007, for the Harvest site located on Pea Ridge Road near New Hill, NC. Julie Peele, Enrique Cachafeiro, and Jeff Vaughan of Agri-Waste Technology, Inc. (AWT) conducted the wetland evaluation. Fourteen areas were evaluated as detailed on the attached map. These fourteen areas corresponded to possible locations of proposed road crossings on the property.

Wetlands were not found within most of the evaluated areas on the property. Wetlands were found within Areas A and B as noted on the map in Attachment 2. Approximately 4,400 ft^2 of wetlands were found in Area A and 540 ft^2 of wetlands were found in Area B. A narrow creek is also located within the east central portion of the property as noted on the attached map. The creek ranged from approximately 4 – 6 feet wide and 0 – 12 inches deep.

wieler-harvest

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.

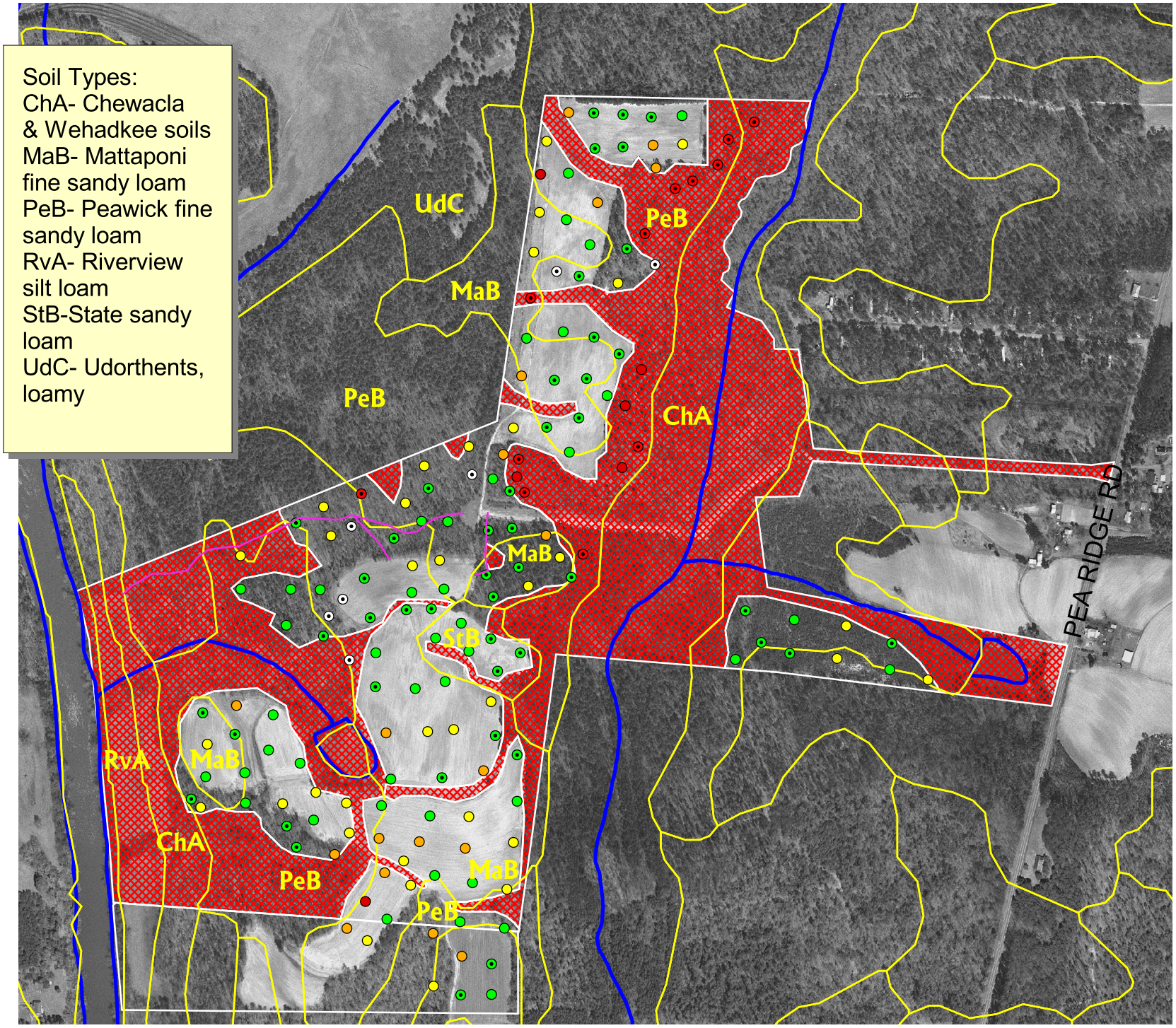
ATTACHMENT 2: Property Maps Detailing Soil Suitability for Septic Systems, Wetlands, Topography, Soil Types, and Other Features

AWT
Land Development Division
5400 Etta Burke Court
Raleigh, NC 27606
Ph: 919-859-0669
Fax: 919-233-1970
www.awtlanddevelopment.com

Harvest Subdivision
Harvest Community, LLC
Chatham Co, NC

Soils Map

Soil Types:
ChA- Chewacla & Wehadkee soils
MaB- Mattaponi fine sandy loam
PeB- Peawick fine sandy loam
RvA- Riverview silt loam
StB-State sandy loam
UdC- Udorthents, loamy



Legend

Depth of Prov Suitable Soil
- < 12"
- 12" - 17"
- 18" - 23"
- 24" - 29"
- 30" - 35"
- > 36"
- Auger Refusal
- Paths

Property
- Prov Suitable Area
- Unsuitable Area
- Soil Types
- Surface Waters

Drawn By:
Enrique Cachafeiro
Reviewed By:
Jeff Vaughan
Date:
05/28/2007

1000 0 1000 2000 Feet

Scale: 1:8000

AWT
Land Development Division

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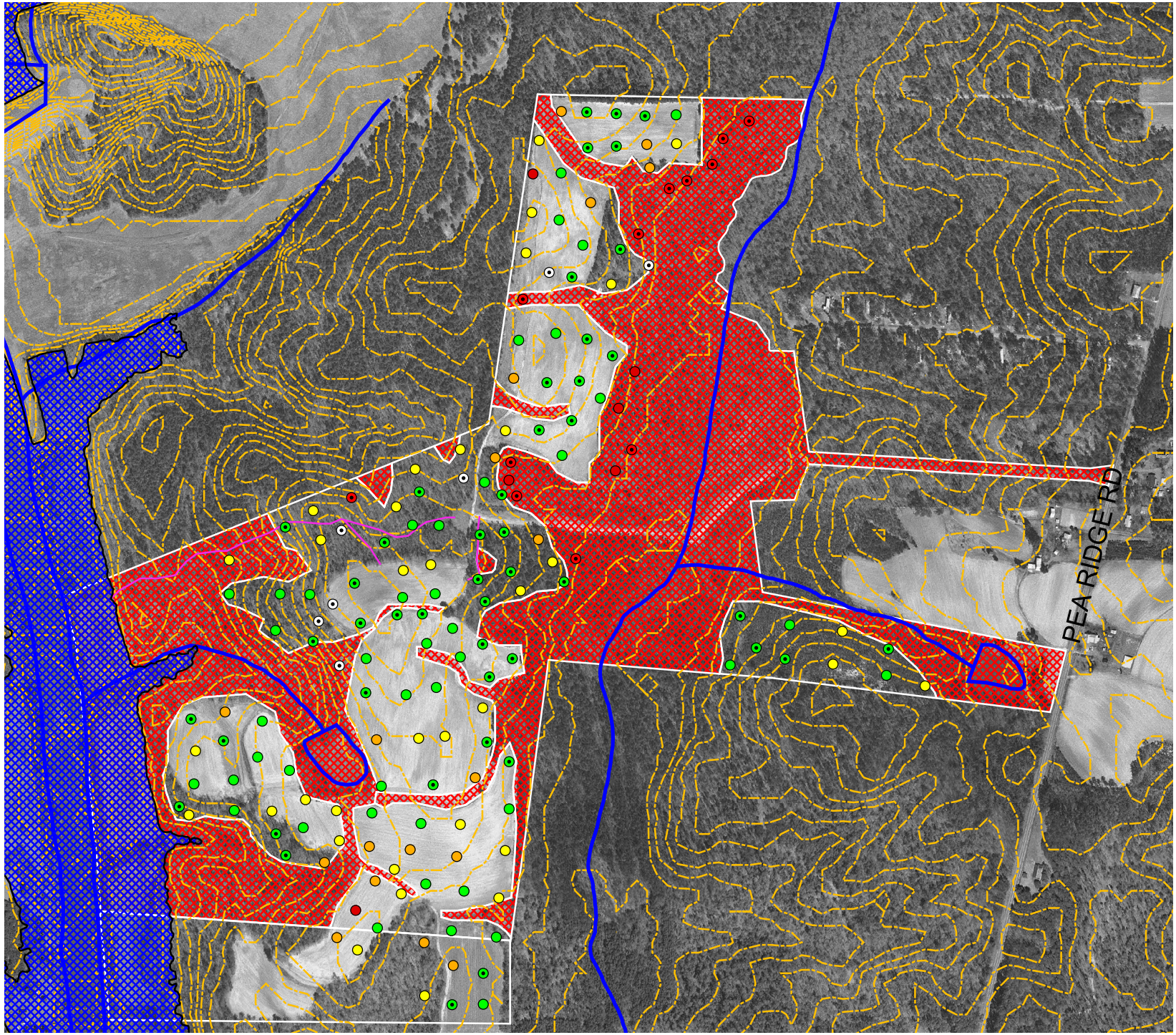
N
W E
S

Harvest Subdivision
Harvest Community, LLC
Chatham Co, NC

Topo Map



Legend

- 100 YR Flood Zone
- 5ft Contours

Depth of Prov Suitable Soil

- < 12"
- 12" - 17"
- 18" - 23"
- 24" - 29"
- 30" - 35"
- > 36"
- Auger Refusal
- Paths

Property

- Prov Suitable Area
- Unsuitable Area
- Surface Waters

Drawn By:
Enrique Cachafeiro
Reviewed By:
Jeff Vaughan
Date:
06/15/2007

1000 0 1000 2000 Feet

Scale: 1:8000

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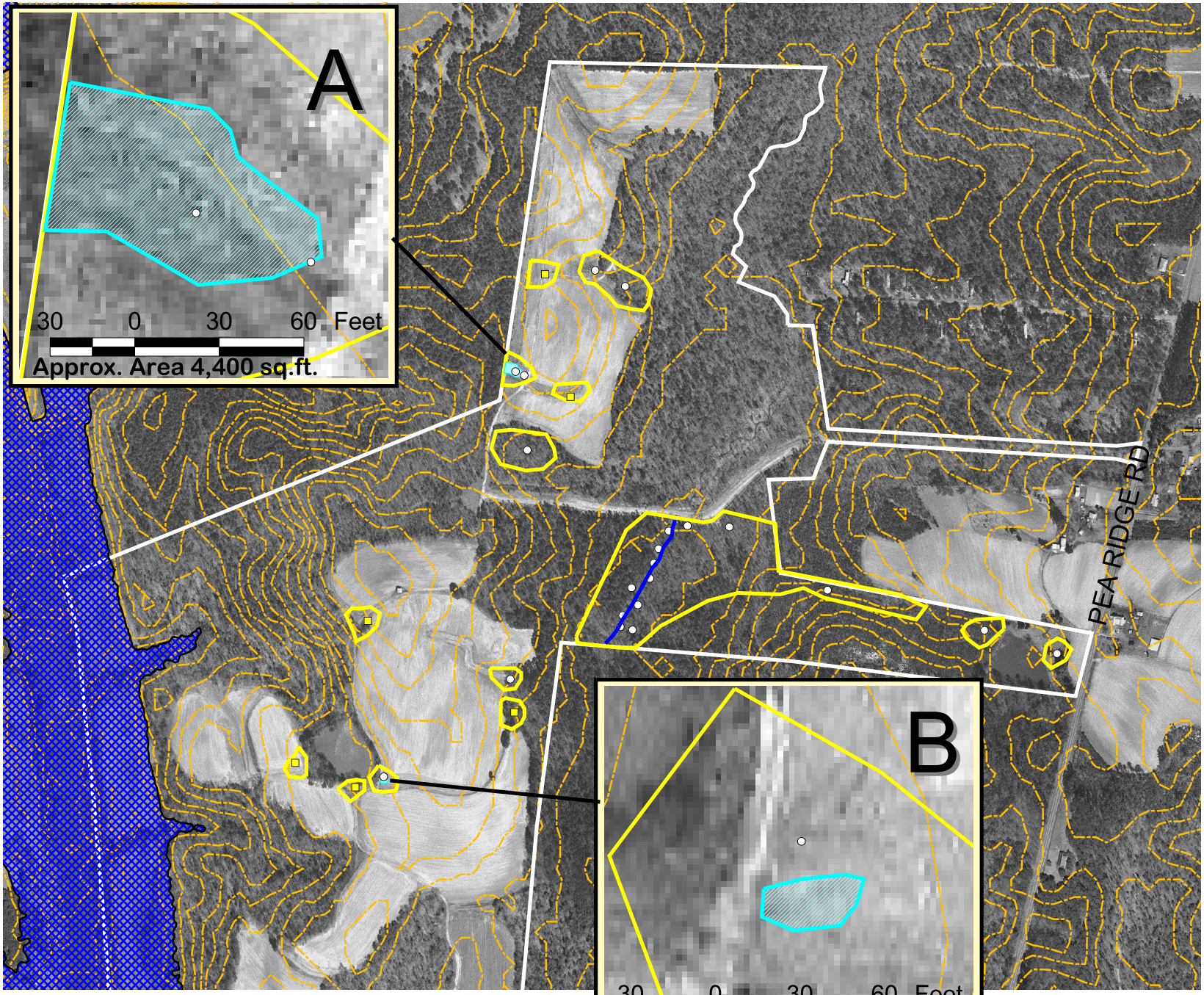
Wetlands Map



Legend

- 5ft Contours
- Areas Examined for Wetlands
- Confirmed Wetlands

GPS Points

- Soil Boring
- No Wetland Plants
- Creek
- Property Boundary

Drawn By:
Enrique Cachafeiro
Reviewed By:
Julie Peele
Date:
07/05/2007

Scale: 1:8000

ATTACHMENT 3: Typical Profile Description of Provisionally Suitable Soil

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

SOIL/SITE EVALUATION
FOR
ON-SITE WASTEWATER SYSTEM

Applicant: Harvest Community, LLC
Address: 3246 Hanks Chapel Road
Pittsboro, NC 27312

Owner: X Agent:__ Phone: (919)225-6344
Date Evaluated: 5/11/07, 5/16/07, 5/17/07, 5/24/07
Proposed Facility: Residential
Property Size: 205 acres

Location Site: Pea Ridge Road (approx. ½ mile north of U.S. 1 interchange), New Hill, NC 27562
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 0-5"	**10YR 4/4**	**NA**	**NA**	**SiL - L**	**GR**	**SEXP**	**NS, NP**	**VFr**
Bt1 5-25"	**2.5YR 4/8**	**NA**	**NA**	**C**	**SBK**	**SEXP**	**S, P**	**Fi**
Bt2 25-36"	**2.5YR 4/8**	**2.5YR 6/8; 10YR 8/1**	**2,m,D**	**C**	**SBK**	**SEXP**	**S, P**	**Fi**
		10R 3/6						

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

Comments: Some chroma 2 due to parent material and some due to wetness. Difficult to distinguish. Cobbles in some profiles.

TYPICAL PROFILE –

Horizon/ Depth (IN)	Matrix	Mottles	Mottle Abundance/ Contrast	(a)(1) Texture	(a)(2) Structure	(a)(3) Minerology	Consistence Wet	Consistence Moist
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Bt2 13-27"	**2.5YR 4/8**	**NA**	**NA**	**C**	**SBK**	**SEXP**	**S, P**	**Fi**
Bt3 27-36"	**2.5YR 4/8**	**10YR 6/8, 10YR 8/1, 10R 3/6**	**2,m,D**	**C**	**SBK**	**SEXP**	**S, P**	**Fi**

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Comments: Bt1 is the result of a plow pan. Some chroma 2 due to parent material and some due to wetness. Difficult to distinguish. Cobbles in some profiles.

EVALUATED BY: Jeff Vaughan, Enrique Cachafiero, Sloan Griffin, and Chris McGee
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
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VP - Very Plastic

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EVALUATED BY: Jeff Vaughan, Enrique Cachafeiro, Sloan Griffin, and Chris McGee
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VP - Very Plastic

ATTACHMENT 4: Soil Survey Information

Chewacla and Wehadkee soils

Pasture and Hayland
Suitability: Poorly suited
Commonly grown crops: Tall fescue, and orchardgrass
Management concerns: Flooding and wetness
Management measures and considerations:
Flooding may pose a hazard to livestock.
Although most flooding occurs during winter, livestock production and hay crops may be damaged any time of the year.
Preventing overgrazing or preventing grazing when the soil is too wet helps to avoid soil compaction, decreased productivity, and a rough soil surface.

Woodland
Suitability: Suited
Productivity: Moderately high
Management concerns: Chewacla=equipment use, windthrow hazard, and competition from undesirable plants; Wehadkee=equipment use, seedling survival, windthrow hazard, and competition from undesirable plants
Measures to be considered:
Harvesting timber during the summer months helps to reduce the risk of damage from flooding.
Productivity may be increased by periodic harvesting of windthrown trees caused by high winds and limited rooting depth of the soil.
Using site preparation practices such as chopping, prescribed burning, and herbicide application helps to reduce competition from unwanted plants.
Bedding the soil prior to planting helps to establish seedlings and increases their survival.

Urban Development

Dwellings
Suitability: Unsuited
Management concerns: Flooding
Management measures and considerations:
This map unit is severely limited for urban development because of frequent flooding. A site on better suited soils should be selected.

Septic tank absorption fields
Suitability: Unsuited
Management concerns: Flooding and wetness
Management measures and considerations:
This map unit is severely limited for septic tank absorption fields because of frequent flooding. The Chatham County Health Department should be contacted for guidance.

Local roads and streets
Suitability: Poorly suited

325B=Mattaponi fine sandy loam 2 to 8 percent slopes

Constructing dwellings on raised, well-compacted fill material helps to reduce the risk of damage from wetness.
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: Moderate
Management concerns: Wetness and restricted permeability
Management measures and considerations:
The Chatham County Health Department should be contacted for guidance on sanitary facilities.
Using suitable fill material to raise the filter field a sufficient distance above the seasonal high water table helps to improve the performance of septic systems.
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.
Increasing the size of septic tank absorption fields and installing distribution lines on the contour helps to improve performance.

Local roads and streets
Suitability: Well suited
Management concerns: No significant limitations affect roads and streets.
Management measures and considerations:
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: No significant limitations affect camp areas.

Picnic areas
Suitability: Well suited
Management concerns: No significant limitations affect picnic areas.

Playgrounds
Suitability: Well suited
Management concerns: Slope
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.

Paths and trails
Suitability: Well suited
Management concerns: No significant limitations affect paths and trails.

55B=Peawick fine sandy loam 2 to 8 percent slopes

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: Poorly suited
Management concerns: Without basements=shrink-swell; with basements= wetness, and shrink-swell
Management measures and considerations:
Constructing dwellings on raised, well-compacted fill material helps to reduce the risk of damage from wetness.
Artificial drainage systems or diversions help to remove excess surface water.
Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and prevent damage caused by shrinking and swelling.
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: Wetness and restricted permeability
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.
Using suitable fill material to raise the filter field a sufficient distance above the seasonal high water table helps to improve the performance of septic systems.
Installing septic system distribution lines only during dry periods helps to reduce smearing and sealing of trench walls.
Increasing the size of septic tank absorption fields and installing distribution lines on the contour helps to improve performance.

Local roads and streets
Suitability: Poorly suited
Management concerns: Shrink-swell, and low strength
Management measures and considerations:
Installing geotextile fabric under the base aggregate and the final surface of the road helps to improve performance.
Incorporating sand and gravel with the soil material and compacting roadbeds helps 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: Poorly suited

13A=Riverview silt loam, 0 to 3 percent slopes, frequently flooded

Management measures and considerations:
This map unit is severely limited for urban development because of frequent flooding. A site on better suited soils should be selected.

Septic tank absorption fields
Suitability: Unsuited
Management concerns: Flooding and wetness
Management measures and considerations:
This map unit is severely limited for septic tank absorption fields because of frequent flooding. The Chatham County Health Department should be contacted for guidance.

Local roads and streets
Suitability: Poorly suited
Management concerns: Flooding
Management measures and considerations:
This map unit is severely limited for roads and streets because of frequent flooding. A site on better suited soils should be selected.
Using well-compacted fill material as a road base may help to elevate roads above the level of flooding.

Recreational Development

Camp areas
Suitability: Poorly suited
Management concerns: Flooding
Management measures and considerations:
This map unit is severely limited for camp areas because of frequent flooding. A site on better suited soils should be selected.
Camping should be avoided during periods of heavy rainfall when flooding is likely.

Picnic areas
Suitability: Moderately suited
Management concerns: Flooding
Management measures and considerations:
Restricting use after heavy rains, when flooding is a hazard, may be necessary.

Playgrounds
Suitability: Poorly suited
Management concerns: Flooding
Management measures and considerations:
Restricting use after heavy rains, when flooding is a hazard may be necessary.

Paths and trails
Suitability: Moderately suited
Management concerns: Flooding
Management measures and considerations:
Restricting use after heavy rains, when flooding is a hazard may be necessary.

328B=State sandy loam 2 to 6 percent slopes

Management concerns: Wetness
Management measures and considerations:
Building structures in the highest areas and installing artificial drainage systems help to reduce the risk of damage from wetness.
Constructing dwellings on raised, well-compacted fill material helps to reduce the risk of damage from wetness.
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: Moderate
Management concerns: Wetness
Management measures and considerations:
The Chatham County Health Department should be contacted for guidance on sanitary facilities.
Using suitable fill material to raise the filter field a sufficient distance above the seasonal high water table helps to improve the performance of septic systems.

Local roads and streets
Suitability: Well suited
Management concerns: No significant limitations affect roads and streets.
Management measures and considerations:
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: No significant limitations affect camp areas.
Management measures and considerations:

Picnic areas
Suitability: Well suited
Management concerns: No significant limitations affect picnic areas.
Management measures and considerations:

Playgrounds
Suitability: Well suited
Management concerns: Slope
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.

Paths and trails
Suitability: Well suited

ATTACHMENT 5: Septic System Area Computation Spreadsheets

Conventional Septic System Area Computation

Created by: JV
Created on: 6/20/2001
Updated on: 8/3/2007

Client Name:	*Harvest Community, LLC*	
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:	*Harvest Community, LLC*	
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:	*Harvest Community, LLC*	
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: 8/3/2007

Client Name:	*Harvest Community, LLC*	
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:	*Harvest Community, LLC*	
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:	*Harvest Community, LLC*	
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: 8/3/2007

Client Name:	*Harvest Community, LLC*	
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:	*Harvest Community, LLC*	
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:	*Harvest Community, LLC*	
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.