Engineers and Soil Scientists

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

April 8, 2018

Memo:
To: Lynn Richardson, Chatham County Planning Department
Thomas Boyce, R.S., L.S.S., Chatham County Health Department

From: Karl Shaffer, L.S.S.
Agri-Waste Technology, Inc.

Subject: Soils report and maps
Major Subdivision- Bonterra (David Lazzo)
Manns Chapel Road- Parcels 2532 and 2533
Chatham County, NC

Lynn and Thomas:

Please find attached a revised and sealed subdivision plan for the Bonterra Subdivision. The developer has made minor adjustments in lot design since my previous report of February, 2018. This letter serves to advise that there are no revisions to the previously filed soils reports- all lots as proposed have suitable soils for conventional style septic systems (includes shallow, at-grade, and pump to conventional or at-grade). This statement is based upon using accepted septic system technology with a 25% area reduction as specified in the State of N.C. Section 1900 Health Code rules for on-site wastewater systems and subsequent approvals.

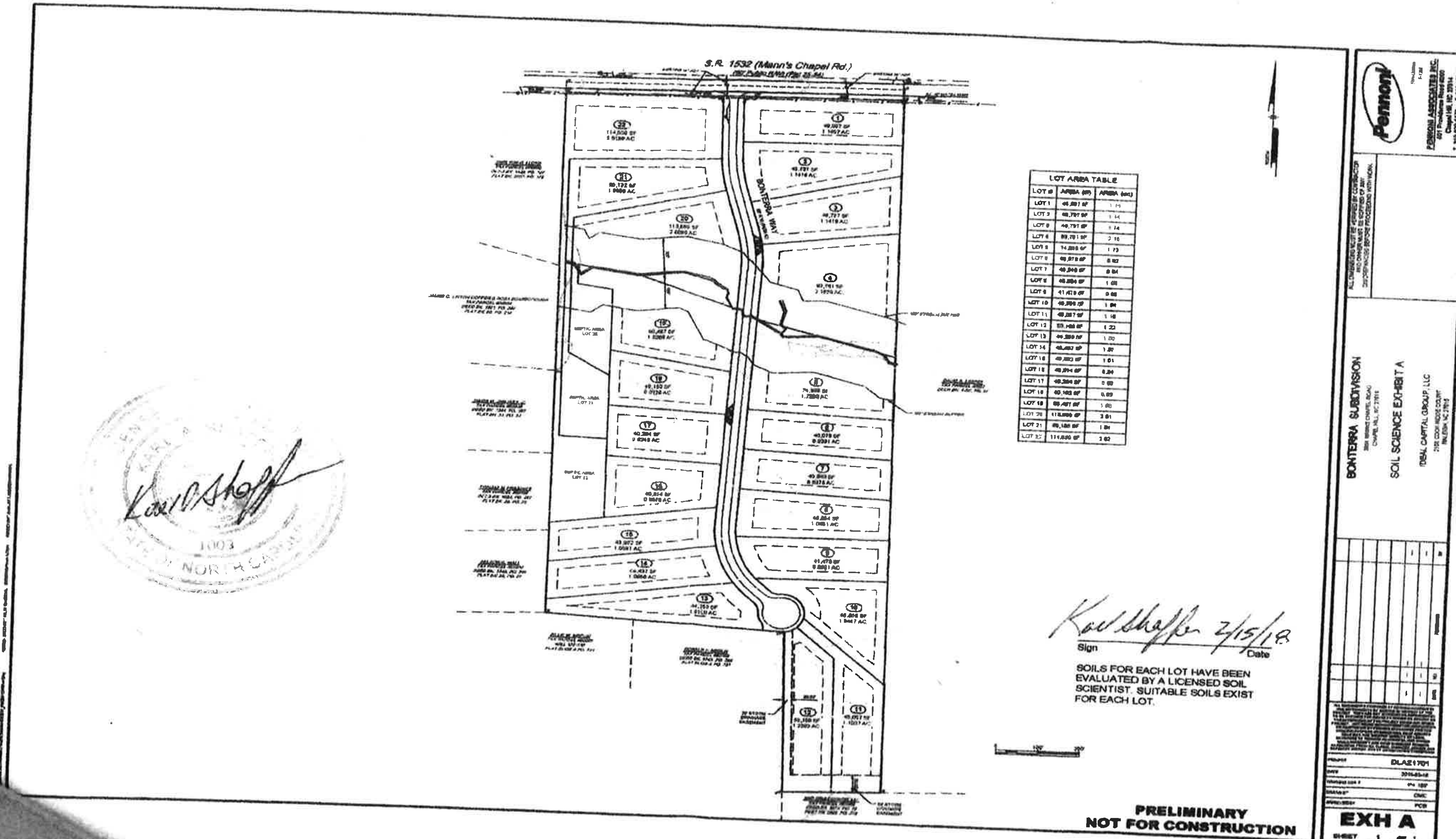
Please contact me as soon as possible if any questions arise. My cell phone is 919-244-1984. Thank you.

Sincerely,

Karl Shaffer

Karl Shaffer, LSS

Cc: Pete Bellantoni, P.E.- Pennoni and Associates
David Lazzo- Angier Development
Kathy Morris, R.S. – AWT, Inc.


S.R. 1532 (Mann's Chapel Rd.)
BONTERRA WAY
LOT AREA TABLE
Sign
Date
SOILS FOR EACH LOT HAVE BEEN EVALUATED BY A LICENSED SOIL SCIENTIST. SUITABLE SOILS EXIST FOR EACH LOT.
PRELIMINARY
NOT FOR CONSTRUCTION
Pennoni
BONTERRA SUBDIVISION
SOIL SCIENCE EXHIBIT A
IDEAL CAPITAL GROUP, LLC
DLAZ1701
EXH A
2/15/18
1003
NORTH CAROLINA

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Soils & Site Evaluation Report – On-site Wastewater Systems

David Lazzo- Angier Development, LLC
Bonterra Subdivision
Manns Chapel Road
Parcels 2532 and 2533
Chatham County, NC

PREPARED FOR: David Lazzo

PREPARED BY: Karl Shaffer, LSS
Senior Soil Scientist

DATE: February 14, 2018

The subject parcels were evaluated for suitability for development originally by Shaffer Soil Services, Inc. A copy of this evaluation and site maps (2) are attached here as Attachment 1. The report was designed for general assessment and overall site suitability.

Subsequent to this work, Agri-Waste Technology, Inc. (AWT) was contracted to complete the soils work for the proposed development plan. This subdivision proposes 22 lots and is called Bonterra. Attachment 2 shows the site plan prepared by Pennoni and Associates. AWT has reviewed the previous soil work and provided additional detail to support the lot design concept.

Generally, the soils over the majority of the tract are in the Appling and Wedowee soil series. These soils have a sandy loam topsoil with a sandy clay to clay subsoil. Underlying saprolite is formed from weathered acid crystalline rock, mainly granite. Soil depth ranges from 25 to 40 inches to saprolite. Topography is gently rolling uplands with slopes from 2 to 8 percent, and sideslopes ranging up to 20 percent. The clay subsoil is firm and non-expansive. In several areas, soil with seasonal wetness less than 24 inches occur. These soils are not proposed for septic systems.

South of the major drainageway there are numerous loose boulders. In some areas there are concentrated areas of boulders. The boulders do **not** reflect bedrock contact, and soil borings with depths consistent to other areas were performed. In the concentrated boulder areas, no septic systems are proposed. Lesser concentrated areas are proposed for septic systems as soil depths are consistently deeper than 24 inches and the boulders are remnant floaters.

All lots are proposed for 4 bedroom septic systems of conventional or shallow conventional design with a gravelless system (accepted). Trench depth would range from 12 inches to 18 inches. Most of the areas would support a LTAR of up to 0.30 GPD/Ft^2, however for planning purposes we have set enough area on each lot for LTAR of 0.25 to 0.275 GPD/Ft^2. In the event that some of the edge areas on some lots approach 24 inches in depth or slightly shallower, a low profile chamber or large diameter pipe system may be employed. These areas will be reserved for the repair areas for each lot.

Three lots are proposed for satellite systems. These are lots 20, 21, and 22. The soils in these areas will not support conventional or shallow conventional septic systems, thus the developer wishes to use suitable soils south of the creek to serve as the septic areas for these lots. These will be done with lot layout design, and not use septic easements.

As shown on the map by Pennoni dated 2/16/2018 and signed and sealed by Karl Shaffer, L.S.S., all lots are capable of supporting on-site septic systems as described above.

Conclusions

All proposed lots have potential to be served by conventional or shallow conventional types of septic systems for primary and repair areas. Area is adequate with the proposed LTAR to support a 4-bedroom home septic system in each case. There may be a few sites requiring another repair system option other than conventional or shallow conventional. For purpose of this report, shallow conventional also refers to the system type often referred to as "at-grade".

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

Sincerely,

Karl Shaffer

Karl Shaffer, LSS

Summary of Attachments

Attachment 1: Original Soil Report
Attachment 2: Typical Soil Profile Description

Attachment 1

SHAFFER SOIL SERVICES
685 SANFORD ROAD
PITTSBORO, N.C. 27312
919-542-5803

March 15, 2004

Mr. Christoffel Verwoerdt
P.O. Box 5151
Chapel Hill, NC 27514-5002

Subject: Soil and site evaluation
Webster Property
Manns Chapel Road
Chatham County, NC

Dear Chris:
At your request, I performed a site evaluation on the above named parcel of land. This parcel is a combination of 2 tracts, one of 10.3 acres and one of 21.2 acres which are contiguous. They lie on the south side of Mann's Chapel Road, approximately 1 mile west of U.S. 15-501.

The purpose of the evaluation was to prepare a soil and land feature map to document the soil and drainage resources on the property, ultimately to assist with an assessment of the property's suitability for on-site wastewater (septic) systems to serve proposed residences on the property. The evaluation was conducted by advancing hand auger borings to a depth of approximately 40 inches, or to a depth which defines a limiting or restrictive horizon according to county and state health department rules for subsurface wastewater treatment systems. The soil borings were then grouped into *soil map units*, in which all soils in a given map unit exhibit similar characteristics and are similar in use and management. Each map unit is defined and the extent of the map unit on the property shown (both as a percentage of the total tract and in acreage units).

Typically, to site an on-site wastewater (septic) field, 10,000 square feet of suitable or provisionally suitable soil area is required for a 3-bedroom home, and up to 13,000 square feet is required for a 4-bedroom home. However, when referencing the acreages shown for the given map units, other siting factors must be taken into consideration before making assumptions as to how many homesites will be possibly available. Other factors include setbacks from property lines, homesites and improvements, and wells that will be developed, as well as topographic considerations. Therefore, these acreage estimates as shown on the attachment are a general guide in planning and site development. Of course, the local zoning will affect the density of development as well. Further, if you wish to site multi-family or community type of development, proposed improvements for those structures will need to be addressed as they relate to the location of the septic drainfield area.

Approximately one hundred soil borings were performed across the tract to assess the soil resources. Landscape, slope, and drainage features were also noted, as these features combine with the soil characteristics to determine utility of a site for various uses. The attached aerial photograph based map of the property shows the map units which have been defined for the property. In the attachment to this report, each map unit is defined and its utility for various land

uses summarized. Soil map unit 4 constitutes the drainageways and adjacent wet soils. At the time of this preliminary evaluation, detailed land use plans were not available, therefore a definitive boundary denoting jurisdictional wetlands was not flagged. It is likely that some of the area within map unit 4 will exhibit wetland characteristics, and therefore will require avoidance of impacts. Minimal impacts such as driveway or utility crossings will be allowed.

The soils are formed from felsic igneous rock. This bedrock type typically develops into soils with a clay type of subsoil. Soils across the tract range from moderately deep to deep to bedrock or partially weathered bedrock. Most of the tract has soils that are well drained, but areas associated with the drainageways have drainage problems as indicated in the attached soil map unit description summary. Most of the area south of the major drainageway through the tract has numerous surface boulders and several isolated rock outcroppings. The soils throughout the area however, are moderately deep to deep with very few exceptions. There are some minor areas where rock volume is extensive enough to warrant avoidance for purpose of septic system siting, but the vast majority of the area has surface rocks and boulders covering up to 15% of the surface, and these are easily moved or avoided for future development purposes.

You have indicated that you may be interested in development potential for commercial purposes with wastewater flows exceeding 3,000 gallons per day. Permitting of these systems requires both local county health department evaluation and State of North Carolina Division of Environmental Health evaluation. Attached to this report is a copy of the permitting procedures and requirements for large (over 3,000 gallons per day) septic systems. As this site has soils suitable to entertain such a system, an engineering design will be required. A typical system type to handle large wastewater flows on good soils such as this site possesses is the pressure manifold type of system. This will be a decision that is to be made between you, the engineering firm, and the permitting agency.

This evaluation and report are a tool which can assist in estimating property values and in property development. This report does not constitute any guarantee that wastewater permits will be issued on any particular portion of the tract, that any particular type or size of wastewater system will be allowed, and further does not constitute any guarantee that the systems, once installed, will function properly for any given length of time. These systems must be permitted by the staff of the Chatham County Health Department and/or the state Division of Environmental Health. Proper system functioning is dependent on proper installation techniques and owner maintenance. Large wastewater systems also require periodic maintenance inspections and operation by a state-licensed subsurface wastewater system operator.

If you have any questions concerning this report or require further assistance, please do not hesitate to contact me. Thank you for the opportunity to perform this service for you.

Sincerely,

Karl A. Shaffer

Karl A. Shaffer
NC Licensed Soil Scientist
Certificate Number 1009

enclosures: maps (2)
soil map unit descriptions
invoice

SOIL MAP UNIT DESCRIPTIONS

The following breakdown of soil map units gives a brief description of each map unit, the soils and topography of the area, and limitations for development types of uses. The limitations terms used are:

SLIGHT: the proposed activity can be done with very few or no special considerations, and there should not be any unexpected excessive costs associated with the activity proposed.

MODERATE: the proposed activity can be done, but some special considerations , either in design and/or implementation, will be required. These special design and construction requirements will result in additional costs associated with the activity. Examples include: a homesite on a soil with drainage problems will need surface water diversions and foundation drainage. An alternative type of septic system needed for soils with limitations will cost more than a conventional type of system.

SEVERE: the proposed activity is not likely to succeed, or there will be significant effort in design and/or construction to overcome the limitations on the site. These limitations result in significant expense in overcoming the limitations. For purposes of on-site wastewater systems, severe means that there are few or no acceptable alternatives that meet county and state rules, and permits can only be granted for wastewater systems that are classified as alternative or innovative- requiring specialized design and operational criteria. These types of systems range from $15,000 to over $30,000 per single family home.

NOTE: Even though a site is not acceptable for an individual wastewater system, such measures as shared or community systems can be utilized to accommodate sites with suitable areas mixed with unsuitable areas.

For purposes of on-site wastewater (septic) systems, slight limitations indicate that the soils are suitable for a conventional or typically used modification of a conventional type of septic tank system. These systems generally range in cost from $3,500 to $5,000. A moderate limitation indicates that a shallow placement, pump system, or pressure distribution (LPP, pressure manifold) type of septic system is required. These systems require much more involved design, and are significantly more expensive ($7,000 up to $15,000) than a conventional system. A severe limitation indicates that the site is not suited for a septic system, or with special considerations, design, and operational agreements, an alternative or innovative system may be allowed. These systems range from $15,000 to over $30,000. No cost estimates are given for community systems, as these depend largely on the wastewater flow and the specific design requirements.

MAP UNIT 1:

This area consists of Appling soils and a few minor variants. These soils are deep and well drained, with a reddish brown to strong brown clayey subsoil. The surface texture is sandy loam. Topography is ridgetops and associated sidelopes, with slope ranging from 3 and 22 percent. There is little or no surface disturbance (gullies) that would impact the use of these areas. The soil permeability is moderate. These soils are provisionally suitable for septic tank absorption fields. Typically these soils warrant a LTAR of 0.25 gallons per day per square foot for the septic tank drain field loading rate.

Limitations for use of this soil for:

Homesite:	**Slight to moderate (moderate due to boulders on site)**
Septic System:	**Slight- acceptable for conventional or shallow conventional system***
Roads/driveway:	**Slight**
Landscaping:	**Slight to moderate (moderate due to boulders on site)**
Area extent:	**54.9% of the area, or 17.29 acres**

*The system design will be determined with consultation of the design engineer and the reviewing permitting agencies. Similar projects utilize a pressure manifold system with conventional trench design.

MAP UNIT 2:

This area consists of Appling, Wedowee, and Helena soils. These soils are deep to moderately deep, well drained to moderately well drained, and have a clayey subsoil. Slopes in these areas are mainly 3 to 8 percent, which is gently to moderately sloping. These soils have either saprolite (soft weathered bedrock) or seasonal wetness conditions from 24 to 32 inches below the soil surface. As the soil depth to these limitations is less than those in map unit 1, this area will require shallow placement trench design, likely with additional soil backfill to meet all required separations.

Homesite:	**Moderate- soil depth, possibly soil wetness in a few areas**
Septic System:	**Moderate - soil depth and wetness**
Roads/driveway:	**Moderate- soil depth and wetness**
Landscaping:	**Moderate- slight**
Area extent:	**12.0% of the area, or 3.79 acres**

MAP UNIT 3:

This map unit is the soil series Helena and minor other related variants. It is somewhat poorly drained to moderately well drained, with seasonal high water table ranging from 12 to 24 inches from the soil surface. These soils are characterized by a light yellowish brown and gray to mottled clay subsoil. It occurs along low slopes and smooth upland concave to nearly level positions. It can also occur along gentle ridgetops and sideslopes.

Limitations for use of this soil for:

Homesite:	**Severe- wetness and possibly very firm clay- need special consideration for drainage for building foundations**
Septic System:	**Severe- seasonal high water table, possibly very firm clay****
Roads, driveways:	**Moderate- seasonal wetness**
Landscaping:	**Severe- wetness, clay and plastic subsoil in certain areas**
Area extent:	**6.6 % of the area, or 2.08 acres**

** There are alternative system types that can accommodate soils with

limitations in the 12-24 inch depth range. They are classified as innovative systems and require sewage pretreatment and additional, extensive design factors. With the substantial area of better soils available for use, it is recommended that this area be avoided for the septic site.

MAP UNIT 4:

This soil is typical of the Helena and Chewacla soil series. It is somewhat poorly to poorly drained, with seasonal high water table at or very near the soil surface during wet periods of the year. The soil is characterized by a gray to mottled clay or sandy clay subsoil. It occurs along the drainageways that traverse the property, as well as low interstream divides with little slope.

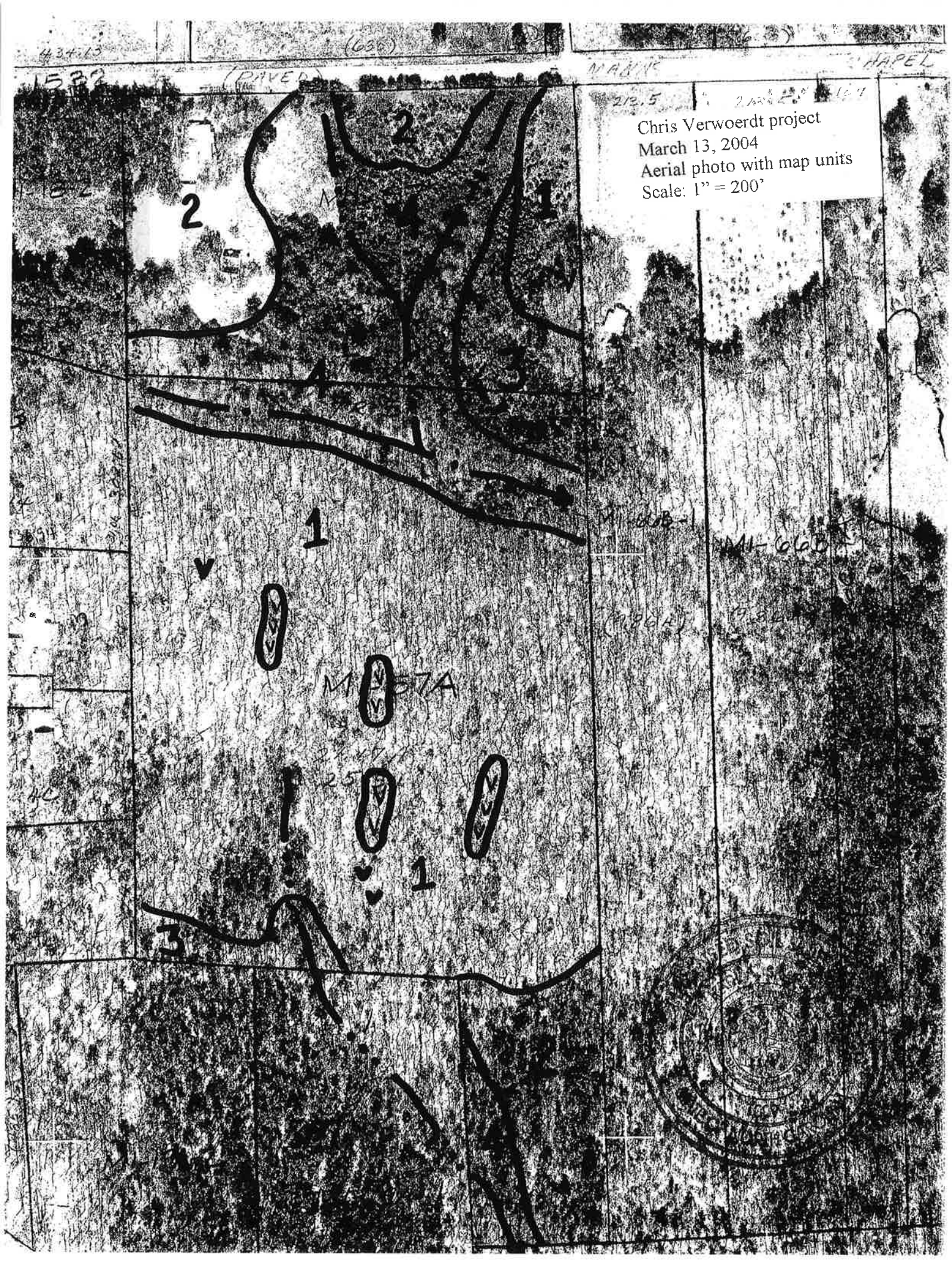
Limitations for use of this soil for:

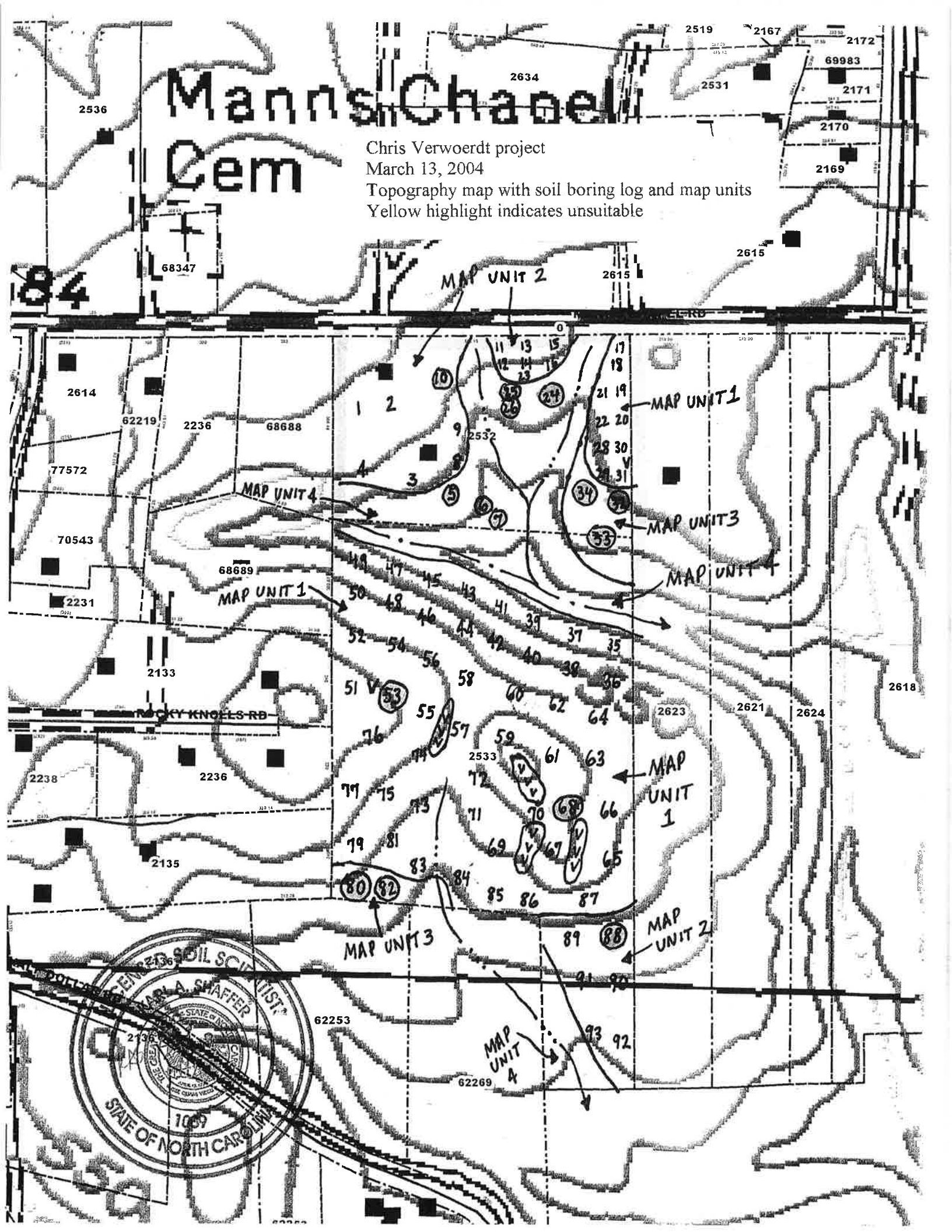
Homesite:	**Severe- wetness, flooding**
Septic System:	**Severe- seasonal high water table, ponding, flooding-totally unsuitable**
Roads, driveways:	**Severe- wetness, ponding, flooding**
Landscaping:	**Severe- wetness, ponding, flooding**
Area extent:	**24.6% of the area, or 7.68 acres**

NOTE: The difference between map units 3 and 4 is that the soils in map unit 4 are along the drainageways, are generally wetter, and some portions may be classified as jurisdictional wetlands. While there are some limited alternatives for septic systems for Unit 3, there are no alternatives for Unit 4. Also note that the flooding hazard only relates to the narrow strip of the property along the largest stream traversing the property which runs from west to east. The majority of map unit 4 has no flood hazard. Disturbance such as utility constructions or road crossings can be done with proper drainage and engineering design.

ROCK OUTCROP MAP UNIT:

Approximately 0.65 acres of area exists in rock outcropping or boulder piles considered too extensive to disturb for purpose of wastewater system siting. Soil borings throughout the tract, and even adjacent to these areas, show moderately deep and deep soils. When it comes time to design and lay out the wastewater system, I recommend total avoidance of these minor areas.


Chris Verwoerdt project
March 13, 2004
Aerial photo with map units
Scale: 1" = 200'


Mann's Chapel
Cem
Chris Verwoerdt project
March 13, 2004
Topography map with soil boring log and map units
Yellow highlight indicates unsuitable
MAP UNIT 1
MAP UNIT 2
MAP UNIT 3
MAP UNIT 4
ROCKY KNOLLS RD
STATE OF NORTH CAROLINA

Attachment 2

Typical Soil Description- Septic System Area
Lazzo Project- Parcels 2532 and 2533

Wedowee Soil Series

Ap 0-7 inches; grayish brown (10 YR 4/3) sandy loam, moderate fine granular structure; very friable; nonsticky, nonplastic; common fine and medium roots; 2-5% gravels; clear smooth boundary.

BA 7-12 inches: light brown (7.5 YR 5/4) sandy clay loam; moderate fine subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; clear smooth boundary.

Bt1 12-26 inches: strong brown (7.5 YR 5/6) clay; moderate medium subangular blocky structure; firm, slightly sticky, nonplastic; gradual wavy boundary

Bt2 26 -32 inches: strong brown (7.5 YR 5/6) clay; common fine distinct red (2.5 YR 4/8) concentrations, common fine distinct light yellowish brown (10YR 6/4) depletions; moderate medium subangular blocky structure; firm; slightly sticky, nonplastic; gradual wavy boundary

BC 32-38 inches: strong brown (7.5 YR 5/6) clay with sandy clay loam saprolite pockets; common to many splotches of light yellowish brown, reddish brown, and grayish brown parent material colors from weathered granitic rock; weak medium subangular blocky structure; friable to firm; slightly sticky, nonplastic; gradual wavy boundary

C 38-46 inches: mottled light yellowish brown, strong brown, and grayish brown saprolite that crushes to sandy loam and sandy clay loam lenses; massive, friable to very friable; nonsticky, nonplastic.

CHATHAM COUNTY
NORTH CAROLINA

WATERSHED PROTECTION DIVISION
Environmental Quality Department

P.O. Box 548
Pittsboro, NC 27312
PHONE: (919) 545-8394

Fax: (919) 542-2698 ● E-mail: drew.blake@chathamnc.org ● Website: www.chathamnc.org

October 13, 2017

Soil & Environmental Consultants, PA
Mr. Steven Ball
8412 Falls of Neuse Road, Suite 104
Raleigh, NC 27615

Project Name:	Bellatoni Subdivision (Parcels 2532 & 2533)
Chatham County Planning Application #:	20171556
Location:	3954 Manns Chapel Road, Chatham County
Subject Feature(s):	One (1) ephemeral segment, one (1) intermittent segment, one (1) perennial segment, and one (1) potential wetland
Date of Determination:	October 13, 2017

Explanation: The site visit was completed on October 13, 2017 by Drew Blake with Chatham County Environmental Quality and Dan McCauley of Soil & Environmental Consultants, PA, (S&EC) on two (2) properties identified as Chatham County Parcel numbers 2532 & 2533 which are located within the Jordan Lake watershed. S&EC personnel completed a previous site visit which resulted in the identification of two (2) potential ephemeral stream segments, one (1) potential intermittent stream segment, one (1) potential perennial stream segment, and one (1) potential wetland. S&EC submitted a request to Chatham County to complete a formal review to determine if the aforementioned features would be subject to riparian buffers according to Section 304 of the Chatham County Watershed Protection Ordinance. All points of origin and stream type transitions were reviewed and agreed to in the field. One (1) of the potential ephemeral stream segments (SF5 between SO1 & SO2) identified by S&EC scored 9.5 points on the NC DWQ Stream Identification Form Version 4.11 and therefore does not meet the definition of an ephemeral stream according to Section 304 of the Chatham County Watershed Protection Ordinance.

Required Riparian Buffers

Chatham County and S&EC staff agreed to a point of origin and stream type for the remaining features: (SF1-SF4). SF1, upstream of SO3, was confirmed as a perennial stream segment and will require a 100-ft riparian buffer on both sides. SF2, from SO3 to SO4, was confirmed as an ephemeral stream segment and will require a 30-ft riparian buffer on both sides; however, this feature will most likely be within the 100-ft perennial buffers of SF1 and SF3. SF3, from SO4 to the eastern property boundary, was confirmed to be a perennial stream segment and will require a 100-ft riparian buffer on both sides. SF4, downstream of SO1, was confirmed to be an intermittent stream segment and will require a 50-ft riparian buffer on both sides. SF5, between SO1 & SO2, does not meet the definition of an ephemeral stream and will not require riparian buffers.

CHATHAM COUNTY
NORTH CAROLINA

WATERSHED PROTECTION DIVISION
Environmental Quality Department

P.O. Box 548
Pittsboro, NC 27312
PHONE: (919) 545-8394

Fax: (919) 542-2698 ● E-mail: drew.blake@chathamnc.org ● Website: www.chathamnc.org

The wetland boundaries flagged in the field by S&EC must be reviewed and confirmed by the US Army Corps of Engineers (USACE). A 50-ft buffer will be required beginning at the flagged boundary and proceeding landward of any flagged wetlands determined jurisdictional by the USACE. Should a USACE review result in revisions to any features reviewed by Chatham County staff on October 13, 2017, additional reviews and consultation may be required. Please provide any revised maps, sketches, and documentation to Drew Blake following the USACE site visit for inclusion in our records.

This on-site determination shall expire five (5) years from the date of this letter. Landowners or affected parties that dispute a determination made by Chatham County, on parcels outside of the Jordan Lake watershed, may submit a request for appeal in writing to the Watershed Review Board. A request for a determination by the Watershed Review Board shall be made in accordance with Section 304 of the Chatham County Watershed Protection Ordinance. Landowners or affected parties that dispute a determination made by Chatham County, on parcels inside the Jordan Lake watershed, shall submit a request for appeal in writing to NC DWR, 401 & Buffer Permitting Unit, 1650 Mail Service Center, Raleigh, NC 27669-1650 attention of the Director of the NC Division of Water Quality.

Should this project result in any direct impacts to surface water features (i.e., crossing and/or filling streams or wetlands) additional reviews may be necessary. Additionally, a Section 404/401 Permit may be required. Any inquiries regarding Section 404/401 permitting should be directed to the Division of Water Resources (Central Office) at (919)-807-6364 and the US Army Corp of Engineers (Raleigh Regulatory Field Office) at (919)-554-4884.

Respectfully,

Drew Blake

Drew Blake
Watershed Specialist

Enclosures: Chatham County Riparian Buffer Application Packet (submitted September 19, 2017)

cc: Rachael Thorn, Chatham County Watershed Protection Supervisor
Brian Burkhart, Chatham County Director of Environmental Quality
Lynn Richardson, Chatham County Subdivision Administrator
Kimberly Tyson, Chatham County Land Use Administrator
Jason Sullivan, Chatham County Director of Planning

Watershed Protection Division
Environmental Quality Department
Phone: (919) 545-8394
Website: www.chathamnc.org

Riparian Buffer Review Application
Surface Water Identification Request for
Major Subdivisions

Application Date: 9/19/17 Planning Application Number (Office Use Only): 20171556

Tract Information

Parcel #: 2532 ; 2533 Watershed District (and name of creek if known): Cape Fear (Pokeberr Creek)

Property Owner: Cobeana LLC

Location/Physical Address of Tract: 3954 Manns Chapel Rd., Chapel Hill, NC 27516

Driving Directions from Pittsboro: Hwy 501 north to Manns Chapel Rd., turn left. Property is on the left.

Subdivision Name (if applicable): _____

Owner's/Agent Contact Information (Agent: Consultant, Real Estate Agent, Surveyor, Other) Circle one

Name: Soil + Environmental Consutants, PA

Contact Phone Numbers: (h) _____ (w) 919-846-5900 (c) _____

E-mail: sb@sandec.com

Mailing Address: 8412 Falls of Neuse Rd, Suite 104, Raleigh, NC 27615

Do you wish to be contacted prior to Chatham County staff visiting the property? ☑ Yes ☐ No

How much notice is required prior to arrival onsite? ASAP

How would you like to receive the completed review letter? (Please check one of the following)
☐ I would like to pick up the completed Riparian Buffer Review at the County Office
☐ I would like the completed Riparian Buffer Review mailed to me
☑ I would like the completed Riparian Buffer Review e-mailed to me

Please include the following items with this request
☑ Completed consultant findings report including the following:
- ☑ GIS generated or hand drawn sketch of surface water features found onsite (Buffer Plan Sheet) No smaller than 1"=60' and paper size 11"x17" or larger
- ☑ NCDWQ Stream Identification Forms, Version 4.11, Wetland Determination Data Form – Eastern Mountains and Piedmont Region, digital photographs, notes, sketches, etc.

Land & Water Resources Division
Environmental Quality Department
Phone: (919) 545-8394
Website: www.chathamnc.org

Riparian Buffer Review Application
Surface Water Identification Request

- [x] NRCS map with property boundary depicted
- [x] USGS map with property boundary depicted
- [x] Statement of Credentials (Training Certificate for NCDWQ/NC State University Surface Waters Classification course, 2 years of jurisdictional wetland delineation according to the Eastern Mountains and Piedmont Regional Supplement to the 1987 US Corps of Engineers Wetland Delineation Manual)
- [x] Signed Right to Enter Property Form
- [x] Signed Owner's Agent Designation Form
- [x] Fee (make checks payable to Chatham County) **$100 per feature confirmed onsite**

Feature *is defined as any surface water that is subject to Chatham County Riparian Buffers (streams, wetlands, ponds)*

Total Number of Features: 6 Total Paid: $ 600

I have read and understand the regulations of the Watershed Protection Ordinance, Section 304, and I agree to adhere to these associated policies and guidelines herein.

Owner/Agent Signature: _____ Date: 9/19/17

Applications can be submitted by mail to: Environmental Quality Department, P.O. Box 548, Pittsboro, NC 27312 or by electronic mail to drew.blake@chathamnc.org

For Questions, please contact:
Drew Blake, Watershed Specialist, at (919)-545-8394 or drew.blake@chathamnc.org
Rachael Thorn, Watershed Protection Supervisor, at (919) 545-8343 or rachael.thorn@chathamnc.org

CHATHAM COUNTY
NORTH CAROLINA

LAND & WATER RESOURCES DIVISION
Environmental Quality Department
PHONE: (919) 545-8204
Website: www.chathamnc.org

AUTHORIZED AGENT FOR LEGAL REPRESENTATION FORM

PROPERTY LEGAL DESCRIPTION: 9766-62-6623

LOT NO. _____ PARCEL ID (PIN) 9766-61-6728 PARCEL SIZE ±30 ac.

STREET ADDRESS: 3954 Manns Chapel Rd, Chapel Hill, NC

Please print:
Property Owner: COBEANA, LLC (Chris Verwoerdt)

Property Owner: _____

The undersigned, owner(s) of the above described property, do hereby authorize

Steven Ball, of S&EC
(Contractor/Agent) (Name of consulting firm if applicable)

to act on my/our behalf and take all actions, I/we could have taken if present, necessary for the processing, issuance and acceptance of reviews, inspections, or permits and any and all standard and special conditions attached to these approvals. The activities authorized include the following (**initial all that apply**):

____Building Permit
____Zoning Compliance Permits
____Floodplain Determination
____Soil Erosion and Sedimentation Control Permit
____Permits to install, repair, evaluate, or expand onsite wastewater system(s)
____Evaluation/inspection/permitting of a private drinking water well(s)
SR Riparian Buffer Review pursuant to §304 of the Chatham County Watershed Protection Ordinance
____Other: _____

Property Owner's Address (if different than property above):
1893 Henderson Tanyard Rd, Pittsboro, NC 27312

Owner Telephone: 919-360-0977 Email: chris@starpointusa.com

We hereby certify the above information submitted in this application is true and accurate to the best of our knowledge.

Owner Authorized Signature

Date: 9/19/17

Agent Authorized Signature

Date: 9/19/17

Applications can be mailed to: Planning Dept., PO Box 54, Pittsboro, NC 27312
For Questions, please contact: Lynn Richardson at 919-542-8207
Revised 3/2014

CHATHAM COUNTY
NORTH CAROLINA

LAND & WATER RESOURCES DIVISION
Environmental Quality Department
PHONE: (919) 545-8394

Website: www.chathamnc.org

Authorization to Enter Property Form

Date: 9/19/17

PARCEL No. (AKPAR) _____

I, (print name) Chris Verwoerdt, as owner of the property described above, or as a representative of the owner(s) do hereby convey permission to Chatham County staff to enter the property at their convenience to conduct a surface water identification (SWID) necessary to determine whether or not water features on my property are subject to the riparian buffer regulations described in Section 304 of the Chatham County Watershed Protection Ordinance. The SWID will be public record and on file at the Planning and Environmental Quality Departments, and may be requested in the future for review by interested parties.

I understand that stream delineations for the property listed above will be made by County staff only once and that if future subdivisions are proposed within this property boundary, it will require a surface water identification by a private consultant at the property owner's expense.

Chris Verwoerdt		9/19/17
(Print Owner's Name)	(Signature of Owner)	(Date)
Steven Ball		9/19/17
(Print Authorized Agent Name)	(Signature of Authorized Agent)	(Date)

SF1 Located above S03

NC DWQ Stream Identification Form Version 4.11

Date: 9/11/17	Project/Site: Victorian Hills	Latitude: 35.844548
Evaluator: SB + DM	County: Chatham	Longitude: -79.112712
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 33.5	Stream Determination (circle one) Ephemeral Intermittent (Perennial)	Other *e.g. Quad Name:* Farrington

A. Geomorphology (Subtotal = 16.5)

	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	(2)	3
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	0	1	(2)	3
7. Recent alluvial deposits	0	1	(2)	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = (0)		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 10)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = (3)	

C. Biology (Subtotal = 7)

18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	0	(0.5)	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = (0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

Located in between S02 & S01

SF5

NC DWQ Stream Identification Form Version 4.11

Date: 9/11/17	Project/Site: Victorian Hills	Latitude: 35.844754
Evaluator: SB + DM	County: Chatham	Longitude: -79.112205
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 9.5	Stream Determination (circle one) (Ephemera) Intermittent Perennial	Other *e.g. Quad Name:* Farrington

A. Geomorphology (Subtotal = 7.5)

	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	(2)	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	(0)	1	2	3
5. Active/relict floodplain	(0)	1	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	(0)	1	2	3
8. Headcuts	(0) →	(1)	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	(0.5)	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 1)

12. Presence of Baseflow	(0)	1	2	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	1	(0.5)	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 1)

18. Fibrous roots in streambed	3	2	1	(0)
19. Rooted upland plants in streambed	3	2	(1)	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = (0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

Located below S01

SF4

NC DWQ Stream Identification Form Version 4.11

Date: 9/11/17	Project/Site: Victorian Hills	Latitude: 35.844361
Evaluator: SB + DM	County: Chatham	Longitude: -79.112134
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 22	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other *e.g. Quad Name:* Farrington

A. Geomorphology (Subtotal = 12)

	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	(2)	3
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	(0)	1	2	3
6. Depositional bars or benches	0	1	(2)	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	(1)	2	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	(0.5)	1	1.5
11. Second or greater order channel	No = (0)		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 5.5)

12. Presence of Baseflow	(0)	1	2	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = (3)	

C. Biology (Subtotal = 4.5)

18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	3	(2)	1	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = (0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

Located below S04

SF3

NC DWQ Stream Identification Form Version 4.11

Date: 9/11/17	Project/Site: Victorian Hills	Latitude: 35.844309
Evaluator: SB + DM	County: Chatham	Longitude: -79.112324
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 36.5	Stream Determination (circle one) Ephemeral Intermittent (Perennial)	Other *e.g. Quad Name:* Farrington

A. Geomorphology (Subtotal = 21)

	Absent	Weak	Moderate	Strong
1[a] Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	0	1	(2)	3
7. Recent alluvial deposits	0	1	(2)	3
8. Headcuts	0	(1)	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = (3)	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9)

12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = (3)	

C. Biology (Subtotal = 6.5)

18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	0	(0.5)	1	1.5
23. Crayfish	0	(0.5)	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = (0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

Located in between S03 & S04

SF2

NC DWQ Stream Identification Form Version 4.11

Date: 9/11/17	Project/Site: Victorian Hills	Latitude: 35.844412
Evaluator: SB + DM	County: Chatham	Longitude: -79.112514
Total Points: 16.5 *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30**	Stream Determination (circle one) (Ephemeral) Intermittent Perennial	Other *e.g. Quad Name:* Farrington

A. Geomorphology (Subtotal = 8)

	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	(1)	2	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	(0)	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = (0)		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 4)

12. Presence of Baseflow	(0)	1	2	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	1	(0.5)	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	(0)	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = (3)	

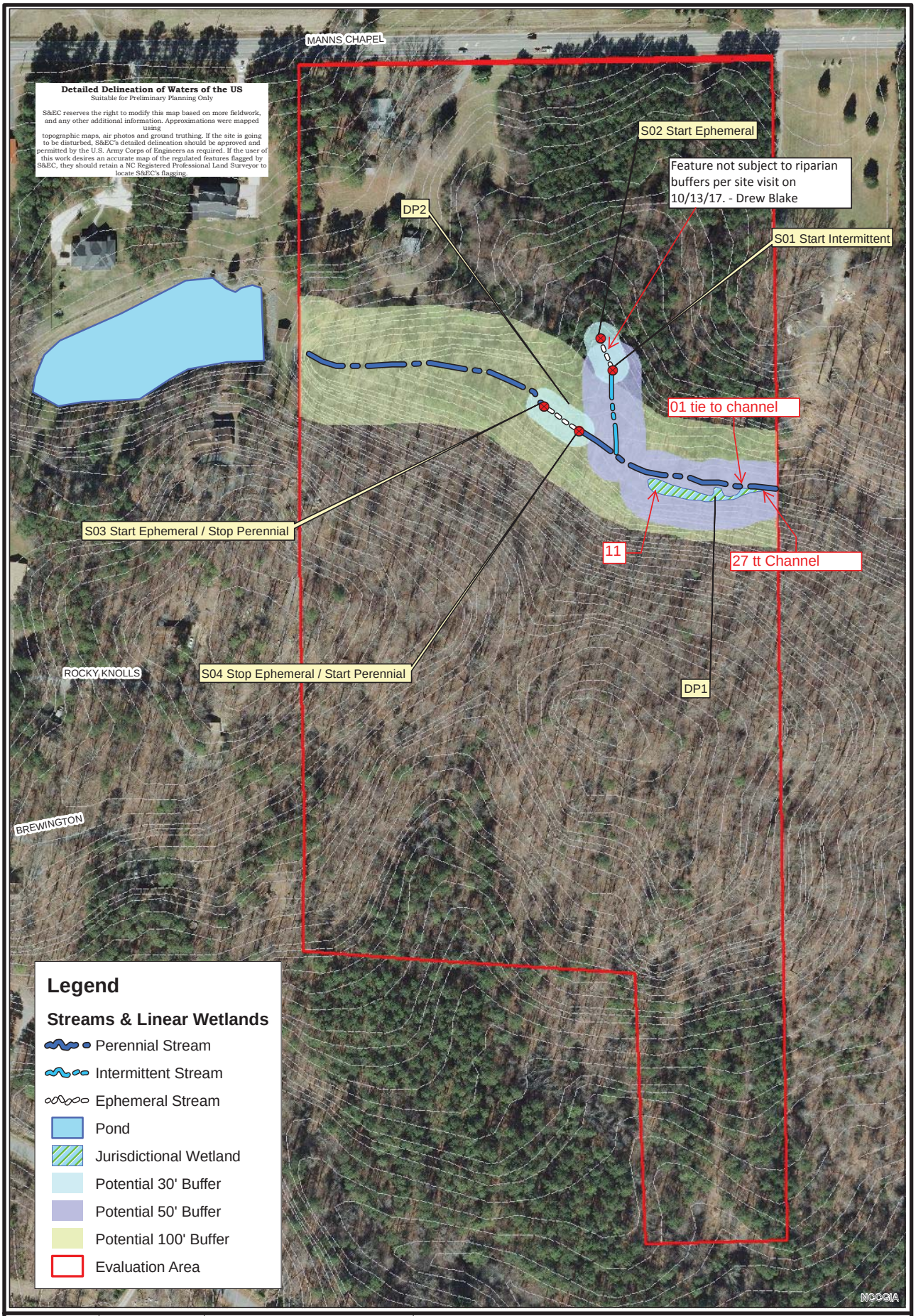
C. Biology (Subtotal = 4.5)

18. Fibrous roots in streambed	3	2	(1)	0
19. Rooted upland plants in streambed	3	(2)	1	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; (OBL) = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:



Project No. 12185.W1	**Scale:** 1" = 150'	**Figure 3 - Sketch Map** Victorian Hills Chatham County GIS
Project Mgr.: SB	**9/11/17**	**Prepared by:** JM

0 75 150 300 Feet

N

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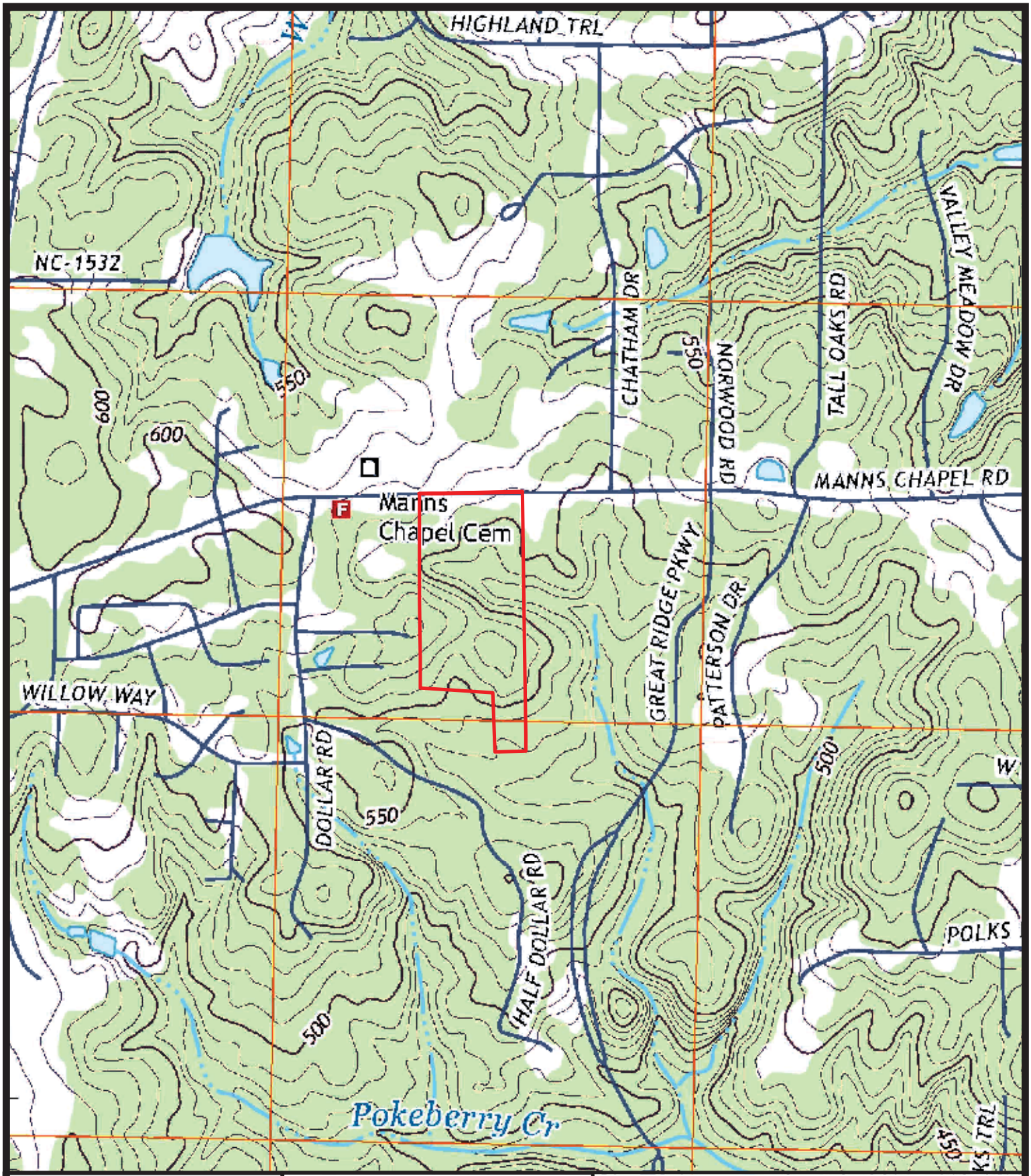

Project Number:	12185.W1
Project Manager:	SB
Scale:	1" = 1000'
Date:	9/11/17

Map Title:

Figure 1 - USGS Map

Victorian Hills Property
Chatham County, NC

Source: NC USGS Farrington Quadrangle

0 1,000 2,000
Feet

N

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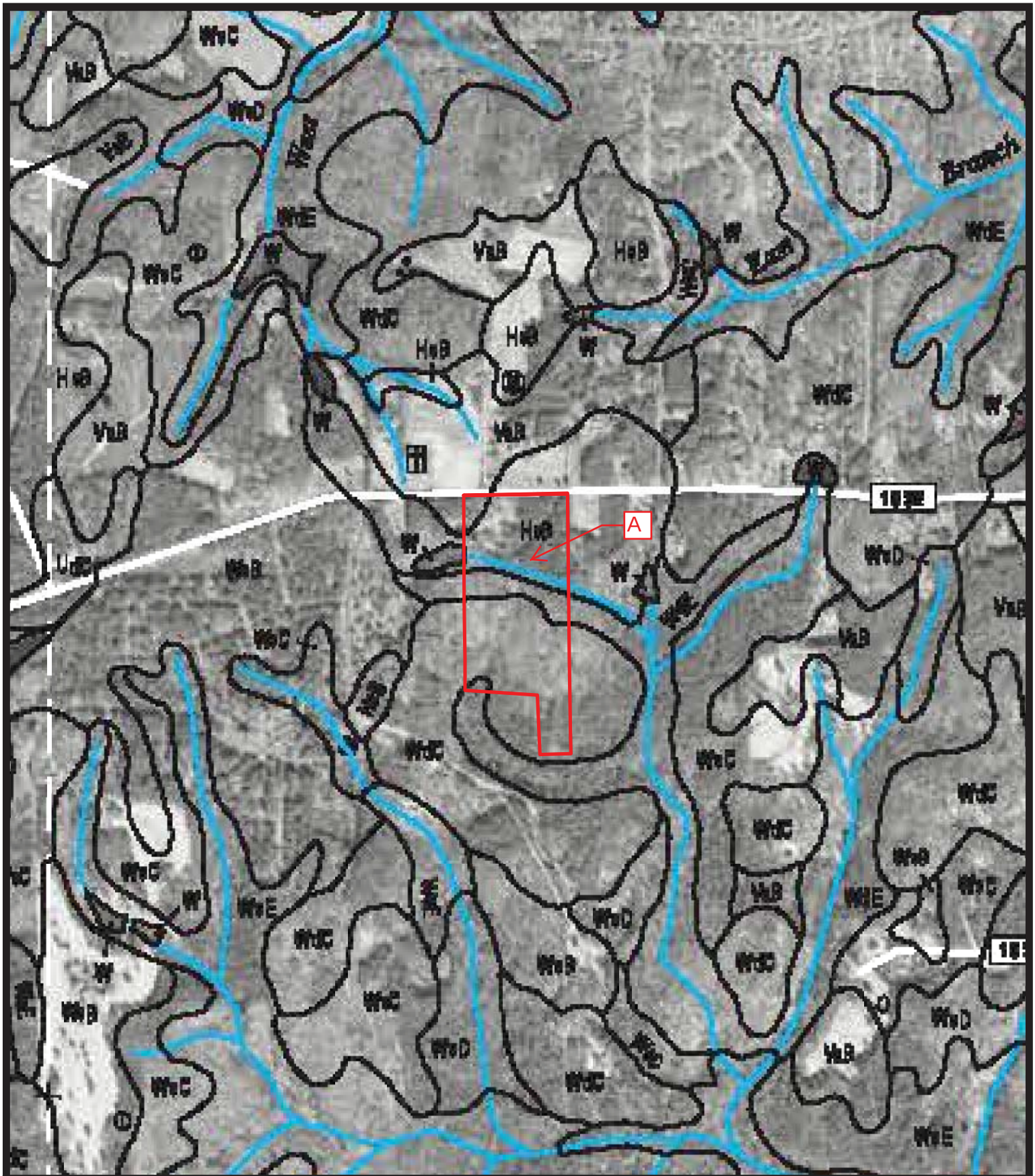

Project Number:	12185.W1
Project Manager:	SB
Scale:	1" = 1000'
Date:	9/11/17

Map Title:

Figure 2 - Soil Survey Map

Victorian Hills Property
Chatham County, NC

Source: Chatham County Soil Sheet 5

0 1,000 2,000
Feet

N

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NC STATE UNIVERSITY

DEPARTMENT of FORESTRY and ENVIRONMENTAL RESOURCES
NC STATE UNIVERSITY

NCDENR

DIVISION OF WATER QUALITY

Department of Forestry and Environmental Resources
North Carolina State University

Stormwater and Wetlands Unit
North Carolina Division of Water Quality

Certificate of Training

This certifies that

Steven Ball

has successfully completed training in

Intermittent and Perennial Stream Identification
For Riparian Buffer Rules

October 3 - 6, 2005
Raleigh and New Bern, NC

Training was provided on: (1) the science of stream networks, hydrologic functions of streams and riparian zones, stream maps, and stream characteristics for identification of stream types, (2) State of North Carolina Administrative Rules for Stream Definitions and the Protection and Maintenance of Vegetated Riparian Buffers, and (3) the North Carolina Division of Water Quality field methods for identification of the origins of intermittent and perennial streams and modified streams that are subject to the North Carolina riparian buffer rules.

James D. Gregory

Dr. James D. Gregory, CPSS, PWS, PhD, Professor, Course Director

North Carolina State University is a land-grant university and a constituent institution of the University of North Carolina

Forestry and Environmental Outreach Program

NC STATE UNIVERSITY

DEPARTMENT of FORESTRY and ENVIRONMENTAL RESOURCES
NC STATE UNIVERSITY

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September 7, 2010

Steven Ball
Soil & Environmental Consultants, PA
11010 Raven Ridge Rd
Raleigh, NC 27614

Dear Steven Ball,

This letter will serve as verification of your completion of the one day (6-hour) refresher course offered on Thursday, July 8, 2010 in Raleigh, NC. I can confirm your presence at the workshop based on a review of the sign-in sheets wherein your signature was listed next to your name.

The training session, "Surface Water Identification and Training Class (SWITC) version 4.0" was a 6-hour program that included classroom instruction and field exercise. It was provided by the North Carolina Division of Water Quality's (NCDWQ).

Please keep a copy of this memo for your records. If you have any questions about the training session content, please contact Amanda Mueller at (919)715-6830, NCDWQ. NC State University's Forestry and Environmental Resources Program (FEOP) retains records on this training program for 6 years.

Regards,

Kelley D. McCarter
Program Coordinator

North Carolina

Department of Environmental Quality

Division of Water Resources

Surface Water Identification Training

and Certification Program

Water Resources
ENVIRONMENTAL QUALITY

Division of Water Resources

Certificate of Training

Dan McCauley

Has successfully demonstrated capability and proficiency to determine the presence of surface waters that require the application of rules adopted by the N.C. Environmental Management Commission for the protection of riparian buffers as determined by 15A NCAC 02B.0200.

S. Jay Zimmerman, Director
Division of Water Resources

November 30, 2016
Date

933T-1116
Certification Number

Detailed Delineation of Waters of the US
Suitable for Preliminary Planning Only

S&EC reserves the right to modify this map based on more fieldwork, and any other additional information. Approximations were mapped using topographic maps, air photos and ground truthing. If the site is going to be disturbed, S&EC's detailed delineation should be approved and permitted by the U.S. Army Corps of Engineers as required. If the user of this work desires an accurate map of the regulated features flagged by S&EC, they should retain a NC Registered Professional Land Surveyor to locate S&EC's flagging.

Drew Blake with Chatham County confirmed stream buffers on 10/13/17 and Andy Williams of the USACE on 10/26/17

MANNS CHAPEL

Previous S02 Flag removed (determined not to meet ephemeral criteria)

USACE continues stream through this segment; no break

S01 Start Intermittent

DP2

Confirmed start points by Chatham Co and USACE

SF 4

B

01 TT CH

27 TT CH

SF 1

A

S03 Start Ephemeral / Stop Perennial

SF 2

11

W1

DP1

S04 Stop Ephemeral / Start Perennial

SF 3

ROCKY KNOLLS

BREWINGTON

Legend

- Evaluation Area
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Pond
- Jurisdictional Wetland
- 30' Buffer
- 50' Buffer
- 100' Buffer

NCCGIA

Project No. 12185.W1	**Scale:** 1" = 150'	**Figure 3 - Sketch Map** Victorian Hills Chatham County GIS
Project Mgr.: SB	**10/26/17**	**Prepared by:** DM

0 100 200 400 Feet

N

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