



Soil & Environmental Consultants, PA

11010 Raven Ridge Road • Raleigh, North Carolina 27614 • Phone: (919) 846-5900 • Fax: (919) 846-9467
www.SandEC.com

January 24, 2006
Project #10046.S1

Spang Development Company
Attn: Bill Spang
111 Cloister Court
Chapel Hill, NC 27514

Re: Preliminary Soil/Site Evaluation on 62+/- Acre Site located at intersection of Mann's Chapel Road and Tobacco Road in Chatham County, NC

Dear Mr. Spang:

Soil & Environmental Consultants, PA (S&EC) performed a preliminary soil/site evaluation on the above referenced tract. This was performed at your request as part of the preliminary planning process in order to determine areas of soil that have potential for subsurface wastewater disposal. Fieldwork was performed in January of 2006.

S&EC traversed the property and observed landforms (slope, drainage patterns, past use, etc.) as well as soil conditions (depth, texture, structure, seasonal wetness, restrictive horizons, etc.) through the use of hand auger borings. The site was evaluated during dry soil conditions. From these observations, an evaluation of the site, relative to subsurface disposal of wastewater, was developed. The soil/site evaluation criteria used is that contained in 15 A NCAC 18A .1900 "Laws and Rules for Sewage Treatment and Disposal Systems".

FINDINGS

This site is located in the acid crystalline region of Chatham County. The upland soils on this tract are similar to the Wedowee, Louisburg and Vance soil series. The Wedowee and Vance soil series have a sandy loam surface material over clay subsoil. These soils are 24-30+ inches deep to prohibitive soil characteristics and are generally useable for conventional, modified conventional, ultra-shallow, arid/or LPP low pressure pipe septic systems, however there is an area denoted on the attached map showing an area of Vance soils with borderline soil structure due to its clay mineralogical properties, they may need further evaluation with back-hoe pits with the Chatham County Health Department after an individual improvement permit has been applied for. The Louisburg soils are shallow to rock parent material, and are therefore less than 24 inches deep to prohibitive soil characteristics (parent material) and are unsuitable for the type of subsurface septic systems mentioned above.

The accompanying GPS/AutoCAD map indicates the areas with potential use for subsurface wastewater disposal. **The "hatched" units indicate areas of soils that are at least 24 inches deep to prohibitive soil characteristics, and the approximate size of these areas is +/- 37 acres. The "solid green" unit represents areas of Vance soils with mixed mineralogy that results in decreased soil structure and slower permeability. Additional investigation of these areas may be warranted, and the Chatham County Health Department may request back-hoe pits to evaluate the structure of the soil as part of the permitting process.** Unit "UN" on the attached map indicates areas of soils that are less than 24 inches to prohibitive soil characteristics and are generally unsuitable for the type of systems mentioned above. Unit "NE"

Charlotte Office:
236 LePhillip Court, Suite C
Concord, NC 28025
Phone: (704) 720-9405
Fax: (704) 720-9406

Greensboro Office:
3817-E Lawndale Drive
Greensboro, NC 27455
Phone: (336) 540-8234
Fax: (336) 540-8235

on the attached map represents areas not evaluated within the natural gas line easement and in areas with existing structures, etc.

The site plan for each lot/site must ensure that adequate soil area for system and repair is unaffected by site elements (house placement, driveway, wells, patios, decks, etc.) on that or adjacent lots. The area ultimately designated by the health department on the site plan for the septic system and repair must remain undisturbed (no mechanical clearing, excavation, heavy traffic or other significant site disturbing activities) until authorized by the health department. A lot with initially adequate useable soil area may be rendered unusable as a result of improper site planning and/or disturbance.

GENERAL WASTEWATER CONSIDERATIONS

Once potentially useable areas were located through vertical borings, the next consideration is the horizontal extent of those areas. The size and configuration of the useable soil area dictate the utility of that area. The size of a subsurface disposal field was determined by: 1) the design flow from the source (120 gallons/bedroom/day in residences), and 2) the long term acceptance rate (LTAR) of the soil (based on the hydraulic conductivity of the soil, a function of the soil's texture, mineralogy, structure, porosity, etc.). The configuration must be such that an efficient layout of disposal lines (on contour) is possible. An additional consideration is the required setbacks for the system from various elements such as wells (50', 100'), streams and ponds (50') or more (depending on watershed regulations), property lines (10'), top of embankment (15'), watershed buffers, etc. (see Attachment 1).

The utility of a potential useable soil area for a subsurface system is most accurately determined by an on-ground layout of the proposed system. The total area needed for system and repair areas will depend upon the system type, the layout of that system and the total design flow (factors mentioned above).

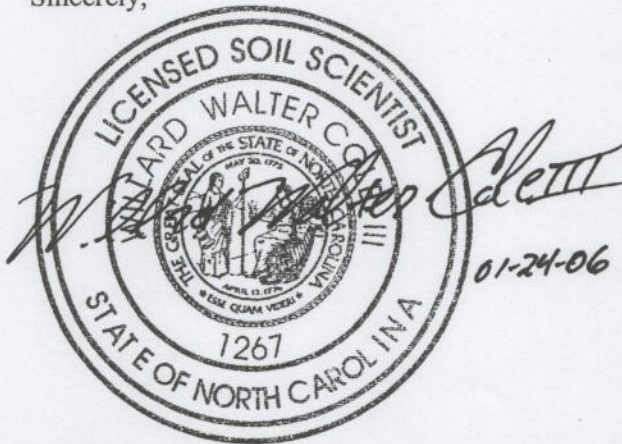
The total area needed for system and repair areas will depend upon the system type, the long term acceptance rate, and the total design flow (factors mentioned above). A typical area needed for a five bedroom residence is approximately 20,000 to 22,000 ft² (could be more depending on site features) or 1200 to 1600 linear feet of conventional line (system and repair) or 2400 linear feet of LPP line (system and repair). These estimates reference Laws and Rules for Sewage Treatment and Disposal Systems for North Carolina and use a LTAR of 0.25gpd/ft² for conventional septic systems (.1955), a LTAR of 0.25gpd/ft² for modified conventional (.1956) and 0.1gpd/ft² for LPP septic systems (.1957a). The Chatham County health department will determine the ultimate LTAR after their lot evaluation.

This report discusses the general location of potentially useable soils for on-site subsurface wastewater disposal and, of course, does not constitute or imply any approval or permit as needed by the client from the local health department. S&EC is a professional consulting firm that specializes in the delineation of soil areas for wastewater disposal and the layout and design of wastewater treatment systems. As a professional consulting firm, S&EC is hired for its professional opinion in these matters. The rules governing wastewater treatment (interpreted and governed by local and state agencies) are evolving constantly, and in many cases, affected by the opinions of individuals employed by these governing agencies. Because of this, S&EC cannot guarantee that areas delineated and/or systems designed will be permitted by the governing agencies. As always, S&EC recommends that anyone making financial commitments on a tract be fully aware of individual permit requirements on that tract prior to final action.

An individual septic system improvements permit will be required for this lot prior to obtaining a building permit. This will involve a detailed evaluation by the local health department to determine, among other things, system size and layout, well, drive and house location. Only after developing this information can a final determination be made concerning specifics of system design and site utilization.

Soil & Environmental Consultants, PA is pleased to be of service in this matter and we look forward to assisting in any site analysis needs you may have in the future. Please feel free to call with any questions or comments.

Sincerely,



Walter Cole
NC Licensed Soil Scientist #1267
Registered Sanitarian #1510

Encl: Attachment 1
Soil Suitability Map

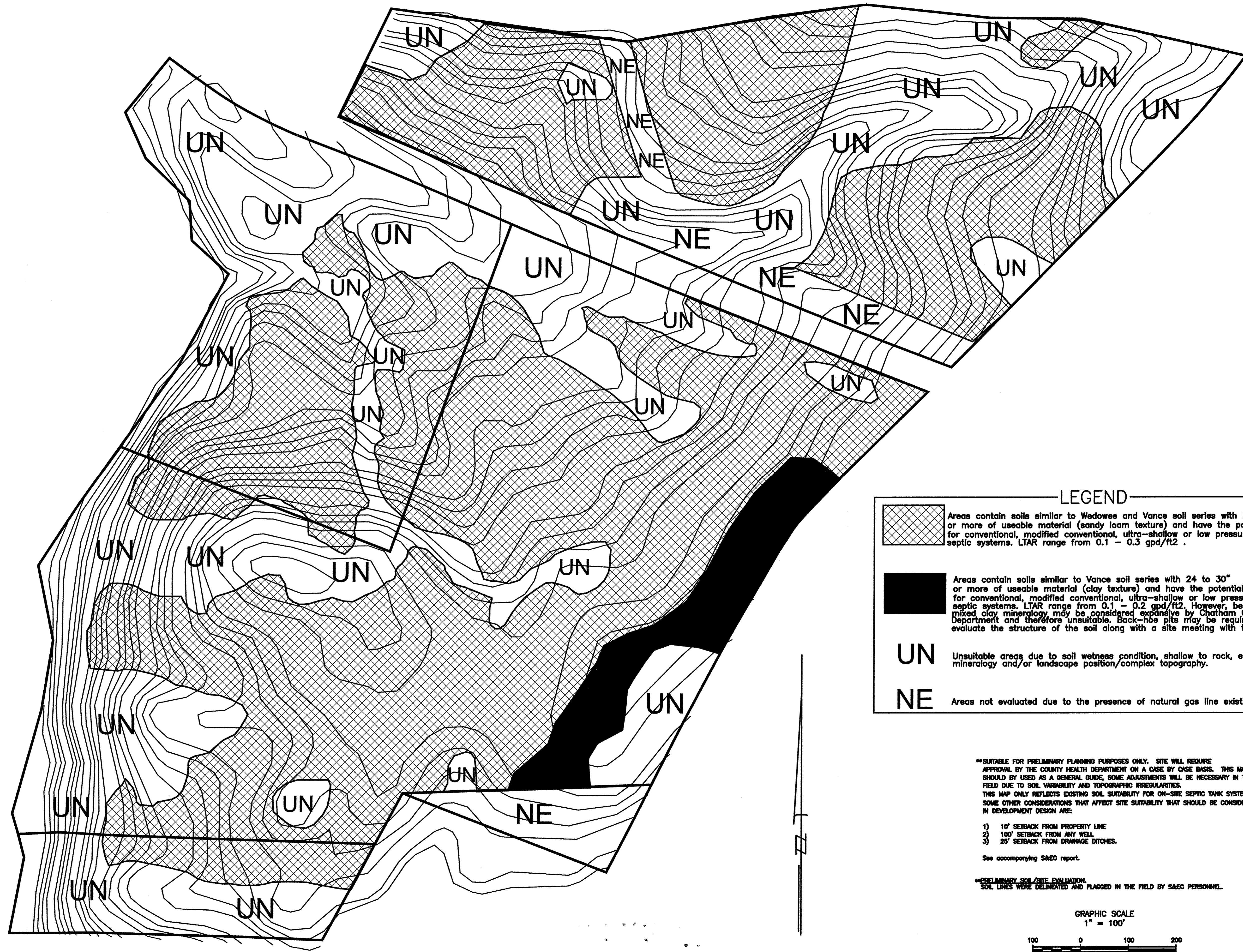
Attachment 1

.1950 Location of Sanitary Sewage Systems

(c) Every sanitary sewage treatment and disposal system shall be located at least the minimum horizontal distance from the following:

- | | |
|--|-------------------------------------|
| (1) any private water supply source including a well or spring | 100 feet |
| (2) any public water supply source | 100 feet |
| (3) streams classified as WS-I | 100 feet |
| (4) water classified as S.A. | 100 feet from mean high water mark |
| (5) Other coastal waters | 50 feet from mean high water mark |
| (6) any other stream, canal, marsh, or other surface waters | 50 feet |
| (7) any Class I or Class II reservoir | 100 feet from normal pool elevation |
| (8) any permanent storm water retention pond | 50 feet from flood pool elevation |
| (9) any other lake or pond | 50 feet from normal pool elevation |
| (10) any building foundation | 5 feet |
| (11) any basement | 15 feet |
| (12) any property line | 10 feet |
| (13) top of slope of embankments or cuts of 2 feet or more vertical height | 15 feet |
| (14) any water line | 10 feet |
| (15) drainage systems: | |
| (A) Interceptor drains, foundation drains and storm water diversions | |
| (i) upslope | 10 feet |
| (ii) sideslope | 15 feet |
| (iii) downslope | 25 feet |
| (B) Groundwater lowering ditched and devices | 25 feet |
| (16) any swimming pool | 15 feet |
| (17) any other nitrification field (except repair area) | 20 feet |
| (b) Ground absorption, sewage treatment and disposal systems may be located closer than 100 feet from a private well supply, except springs and uncased wells located downslope and used as a source of drinking water, repairs, space limitations and other site-planning considerations but shall be located the maximum feasible distance and, in no case, less than 50 feet. | |
| (c) Nitrification fields and repair areas shall not be located under paved areas or areas subject to vehicular traffic. If effluent is to be conveyed under areas subject to vehicular traffic, ductile iron or its equivalent pipe shall be used. However, pipe specified in Rule .1955 (e) may be used if a minimum of 30 inches of compacted cover is provided over the pipe. | |

Note: Systems over 3000 GPD or an individual nitrification fields with a capacity of 1500 GPD or more have more restrictive setback requirements, see .1950 (a) (17) (d) for specifics.



LEGEND

Areas contain soils similar to Wedowee and Vance soil series with 24 to 30" or more of useable material (sandy loam texture) and have the potential for conventional, modified conventional, ultra-shallow or low pressure pipe septic systems. LTAR range from 0.1 - 0.3 gpd/ft2 .

Areas contain soils similar to Vance soil series with 24 to 30" or more of useable material (clay texture) and have the potential for conventional, modified conventional, ultra-shallow or low pressure pipe septic systems. LTAR range from 0.1 - 0.2 gpd/ft2. However, because of mixed clay mineralogy may be considered expansive by Chatham County Health Department and therefore unsuitable. Back-hoe pits may be required in order to evaluate the structure of the soil along with a site meeting with the health dept.

UN Unsuitable areas due to soil wetness condition, shallow to rock, expansive clay mineralogy and/or landscape position/complex topography.

NE Areas not evaluated due to the presence of natural gas line existing house etc..

****SUITABLE FOR PRELIMINARY PLANNING PURPOSES ONLY. SITE WILL REQUIRE APPROVAL BY THE COUNTY HEALTH DEPARTMENT ON A CASE BY CASE BASIS. THIS MAP SHOULD BE USED AS A GENERAL GUIDE. SOME ADJUSTMENTS WILL BE NECESSARY IN THE FIELD DUE TO SOIL VARIABILITY AND TOPOGRAPHIC IRREGULARITIES. THIS MAP ONLY REFLECTS EXISTING SOIL SUITABILITY FOR ON-SITE SEPTIC TANK SYSTEMS. SOME OTHER CONSIDERATIONS THAT AFFECT SITE SUITABILITY THAT SHOULD BE CONSIDERED IN DEVELOPMENT DESIGN ARE:**

- 1) 10' SETBACK FROM PROPERTY LINE
- 2) 100' SETBACK FROM ANY WELL
- 3) 25' SETBACK FROM DRAINAGE DITCHES.

See accompanying S&EC report.

****PRELIMINARY SOIL/SITE EVALUATION. SOIL LINES WERE DELINEATED AND FLAGGED IN THE FIELD BY S&EC PERSONNEL.**

