



Soil & Environmental Consultants, PA

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

October 20, 2005

Project #9939.s1

Oak City Homes
Attn: Beau Harrison
PO Box 6127
Raleigh, NC 27628

Re: Soil/Site Evaluation on Ballard Woods Lot 34 and 73 on Ruth Circle Road – Harnett County, NC

Dear Mr. Harrison:

Soil & Environmental Consultants, PA (S&EC) performed a preliminary soil and site evaluation on the above referenced lots. 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 on October 15, 2005.

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 moist soil conditions. From these observations, an evaluation of the site, relative to subsurface disposal of wastewater, was developed. Soil areas were estimated in the field. 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 Upper Coastal Plain region of Harnett County. The upland soils on this tract are similar to the Norfolk soil series. The Norfolk soil series has a sandy loam surface material over a sandy clay loam subsoil. These soils are at least 24 inches deep to prohibitive soil characteristics and are generally useable for subsurface septic systems. Refer to the attached soil/site evaluation form for additional information.

The accompanying sketch map indicates the estimated areas with potential use for subsurface wastewater disposal. The areas of useable soil are at least 24 inches deep to prohibitive soil characteristics and have potential for a conventional septic system, a modified conventional (shallow placed lines with no fill required over the disposal area) or a low pressure pipe system (LPP) and/or ultra-shallow conventional (shallow placed lines with fill required over the disposal field) system.

The site plan for each lot 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. Since an easement area is being proposed on Lot 73 to accommodate the repair field for Lot 34, a field layout of the proposed septic systems may be required on Lot 73 as part of the

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

Greensboro Office:
1817-E Lawdale Drive
Greensboro, NC 27455
Phone: (336) 540-8234
Fax: (336) 540-8235

individual lot development process. However, even with the area lost due to the easement, it appears that there is adequate useable soil area on Lot 73 to serve both system and repair for a three bedroom home.

It is important to note that any preliminary certification that a subdivision plan meets does not represent approval or a permit for any site work, nor does it guarantee issuance of an improvement permit for any lot. Final site approval for issuance of improvements is based on regulations in force at the time of permitting and is dependent on satisfactory completion of individual site evaluations following application for an improvement permit detailing a specific use and siting.

GENERAL WASTEWATER CONSIDERATIONS

Once potentially useable areas are 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 is 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 (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). A typical area needed for a 3-bedroom residence is approximately 10,000 to 12,000 ft² (could be more depending on site features) or 600 to 720 linear feet of conventional line (system and repair) or 1440 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 0.3 gpd/ft² for conventional septic systems (.1955), a LTAR of 0.3 gpd/ft² for modified conventional (.1956) and 0.1 gpd/ft² for LPP septic systems (.1957a). The health department will determine the ultimate LTAR after their lot evaluation. S&EC will be glad to assist in any system layout or sizing calculations, if requested.

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 permit will be required for each 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,



Ricky Postello
NC Licensed Soil Scientist

Mark Allen
Soil Scientist-in-Training

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 | 10 feet |
| (i) upslope | 15 feet |
| (ii) sideslope | 25 feet |
| (iii) downslope | 25 feet |
| (B) Groundwater lowering ditches and devices | 15 feet |
| (16) any swimming pool | 20 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.

BALLARD WOODS LOT 34

Project No.9939.S1

October 14, 2005

LAYOUT FOR 3 BEDROOM HOME

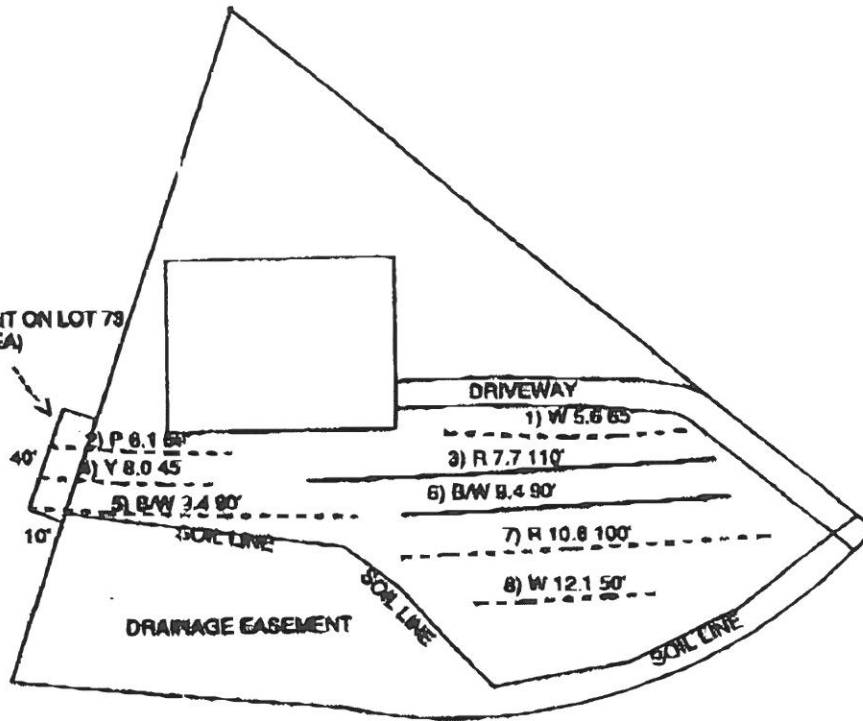
LINE #	FLAG COLOR	BS	HI	FS	ELEVATION	FLAGGED LINE LENGTH	DESIGN LINE LENGTH
TBM					100.00		
INSTR. 1			100.00				
1	WHITE			5.60	94.40	65	65
2	PINK			6.10	93.90	50	50
3*	RED			7.70	92.30	110	110
4	YELLOW			8.00	92.00	45	45
5	BLUE/WHITE			9.40	90.60	190	90
6*	BLUE/WHITE			9.40	90.60	same as line 5**	90
7*	RED			10.80	89.20	100	100
8	WHITE			12.10	87.90	50	50
Total						610	600

	LINE LENGTH	LTAR PERCENT	SYSTEM TYPE	SOIL LTAR PERCENT	INNOVATIVE SYSTEM	DISTRIBUTION SERIAL
* System	300'	0.30	INNOV.	0.30	EZ-Flow	DISTRIBUTION SERIAL
Repair	300'	0.30	Innov.	0.30	EZ-Flow	DISTRIBUTION SERIAL

Notes:

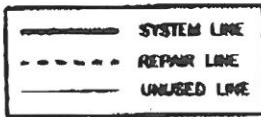
- **TBM is assumed to be 100'.
- **All measures in feet.
- **Nitrification lines are demonstrated on contour via colored pin flags.
- **BS, HI, and FS indicate rod readings.
- **In the field, Line 5 and 6 are flagged as the same line; for installation, it should be split as indicated with 10' of separation between lines

SEPTIC SYSTEM EASEMENT ON LOT 73
(REPAIR AREA)

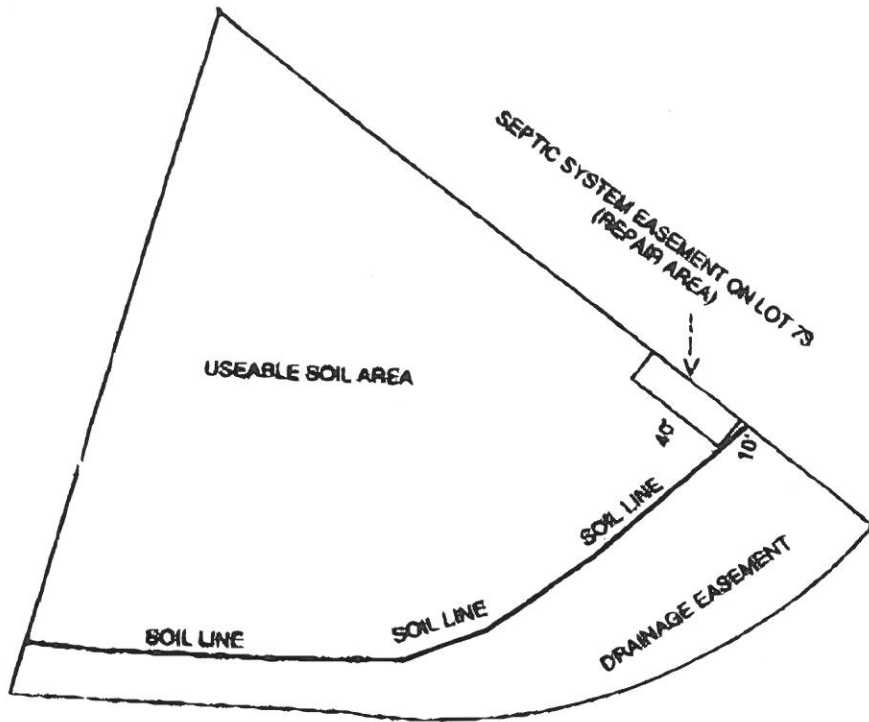


3-BEDROOM INNOV. SERIAL DISTRIBUTION SYSTEM
LINES 3,5, 3 LTAR EZ-FLOW
3-BEDROOM INNOV. SERIAL DISTRIBUTION REPAIR
LINES 1,2,4,6,7, 3 LTAR W-EZFLOW

FOUNDATION DRAINS ALLOWED
LOT 34



PROJECT NO. 220153	SCALE 1" = 60'	DRAWN BY MJA	 <p>Soil & Environmental Consultants, PA 11016 Bevan Ridge Road • Raleigh, North Carolina 27614 • Phone: (919) 846-1500 • Fax: (919) 846-3467 www.SoilEC.com</p>
PROJECT AREA RTP	FIELD WORK MJA	DATE OCTOBER 2009	
<p>PROJECT TITLE: LOT 34 SEPTIC SYSTEM LAYOUT</p>		<p>PROJECT NAME: BALLARD WOODS CITY OF RICHMOND VALE COUNTY, NORTH CAROLINA OCTOBER 2009</p>	



LOT 73



PROJECT NO. 000151	SCALE 1" = 50'	SHEET TITLE LOT 73 SOIL EVALUATION
PROJECT ADDR. 000	FIELD WORK NA	PROJECT NAME BALLARD WOODS OUR CITY HOUSE
DRAWN BY USA		VALE COUNTY, NORTH CAROLINA 05/20/03 BSB
WORKSHEET 04/03		



Soil & Environmental Consultants, PA
 11018 Raven Ridge Road • Raleigh, North Carolina 27614 • Phone: (919) 844-8000 • Fax: (919) 844-8067
www.SandE.com