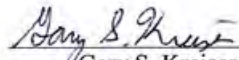


Soil and Site Evaluation For
Sewage Treatment and Disposal Systems
Near 810 Highway 43
Macon, NC
(APN: H8 6)
May 23, 2023


Gary S. Kreiser



Findings: Based on the soil and site evaluation, there is a high degree of certainty that there is enough space for conventional septic systems for two 3-bedroom houses, and the lot could be used for residential development.

No opinions are made regarding the following:

- Applicable zoning requirements;
- House location;
- Specific septic system layout/components;
- Septic location to meet all horizontal setback requirements; and
- Riparian buffers

INTRODUCTION

Soil & Septic Solutions performed an on-site subsurface wastewater system investigation on approximately 5.04 acres (APN: H8 6) located on Highway 43 in Warren County, North Carolina on May 13, 2023. The property was evaluated in accordance with North Carolina statutes for waste disposal ("Laws and Rules for Sewage Treatment and Disposal Systems", Sections .1940 through .1944). The purpose of this investigation was to locate suitable areas on both sides of Highway 43 for two conventional on-site wastewater systems. For this report the property is divided into a northern and southern portion.

At the time of the survey, the review area was wooded. In the southern portion of the property a hand dug/bored well approximately 30 to 40 feet deep was located. This well is located along the western property line, but it is unclear if the well is on the property.

INVESTIGATION METHODOLOGY

Soil borings were made with a hand-turned auger in the study area. Observations of the landscape (slope, drainage patterns, past use, etc.) as well as soil properties (depth, texture, structure, seasonal wetness, restrictive horizons, etc.) to a depth \geq 48 inches when possible were recorded. Soil color was determined with a Munsell Soil Color Chart. From these observations, potentially suitable areas for wastewater disposal were identified.

A handheld global positioning system (GPS) with sub-meter accuracy was used to locate each soil boring as well as other pertinent site features.

FINDINGS

On the day of the field investigation, twelve (12) hand auger borings were made on the property, logged, and their locations are shown in the Soil Boring Location Exhibits. Soil Boring logs are attached.

Depth to saprolite and wetness were the limiting factors for the site. Borings 1, 2, 4, 5, 9 and 12 indicated that the depth to saprolite or wetness was at least 36 inches. There are three areas that had at least 36 inches of suitable soil as depicted on the Soil Boring Location Exhibits. Two suitable areas on the northern portion were approximately 12,000 ft² and 8,600 ft². In the southern portion, an area of approximately 13,000 ft² that had at least 36 inches of suitable soil was located. These areas include the required 10 foot property line setback requirement.

Of the unsuitable areas, approximately 58,000 ft² was unsuitable due to being in the floodplain.

The well, if located on the property, will need to be properly abandoned to avoid having the required 50 foot setback from a well.

Based on soil and site evaluation the site can be classified as **provisionally suitable to suitable** and may be utilized for septic systems consistent with the Rules.

CRITERIA FOR CONVENTIONAL SEPTIC SYSTEMS

A foot separation is required from the bottom of the trench and saprolite or other restrictive horizons.

Based on the soil texture and depth to restrictive horizons a long-term acceptance rate (LTAR) of 0.28 to 0.3 gpd/ft² is recommended. Depending on the location of the system a trench bottom of 24 to 36 inches is recommended.

For a 3-bedroom system, the design flow is 360 gallons per day (gpd). When the design flow is divided by the LTAR (using 0.28), the area of trench bottom can be calculated, which is 1285 ft². The total length of trenches can be calculated by dividing the trench bottom area by 3 feet (which is the maximum trench width). Using these calculations, a 3-bedroom home would need 428 linear feet of trench.

Septic lines are laid on contour 9 feet apart from the center. The minimum area needed is 3,900 ft². This area assumes even linear slope with parallel septic lines. Additionally, septic systems need a designated repair area. At a minimum there needs to be approximately 7,800 ft² for both the initial and repair area. This area can be reduced by using approved systems that allow for a 25% reduction in trench length.

Other required horizontal setbacks (wells etc.,) were not considered in the soil that could be used for a conventional system. These setbacks will affect the overall area that can be used.

CONCLUSIONS

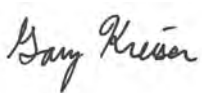
Depth to saprolite and wetness were the limiting factors at this site. Two areas of approximately 12,000 ft² and 8,600 ft² were determined to have at least 36 inches of soil in the northern portion of the property. An area of approximately 13,000 ft² of suitable soil was found in the southern portion of the property. The site can be classified as provisionally suitable to suitable for a conventional septic system.

Based on the LTAR it is estimated that the required area for a 3-bedroom home would be approximately 7,800 ft². The use of an accepted system would reduce the area by 25% and would require approximately 5,800 ft². The exact location of the systems and potential layouts as well as house locations and horizontal setbacks, except for property line, were not calculated or defined.

The findings presented herein represent Soil and Septic Solutions' site and soils evaluation and knowledge of the current laws and regulations governing on-site wastewater systems in North Carolina (Section .1900 of the North Carolina Administrative Code).

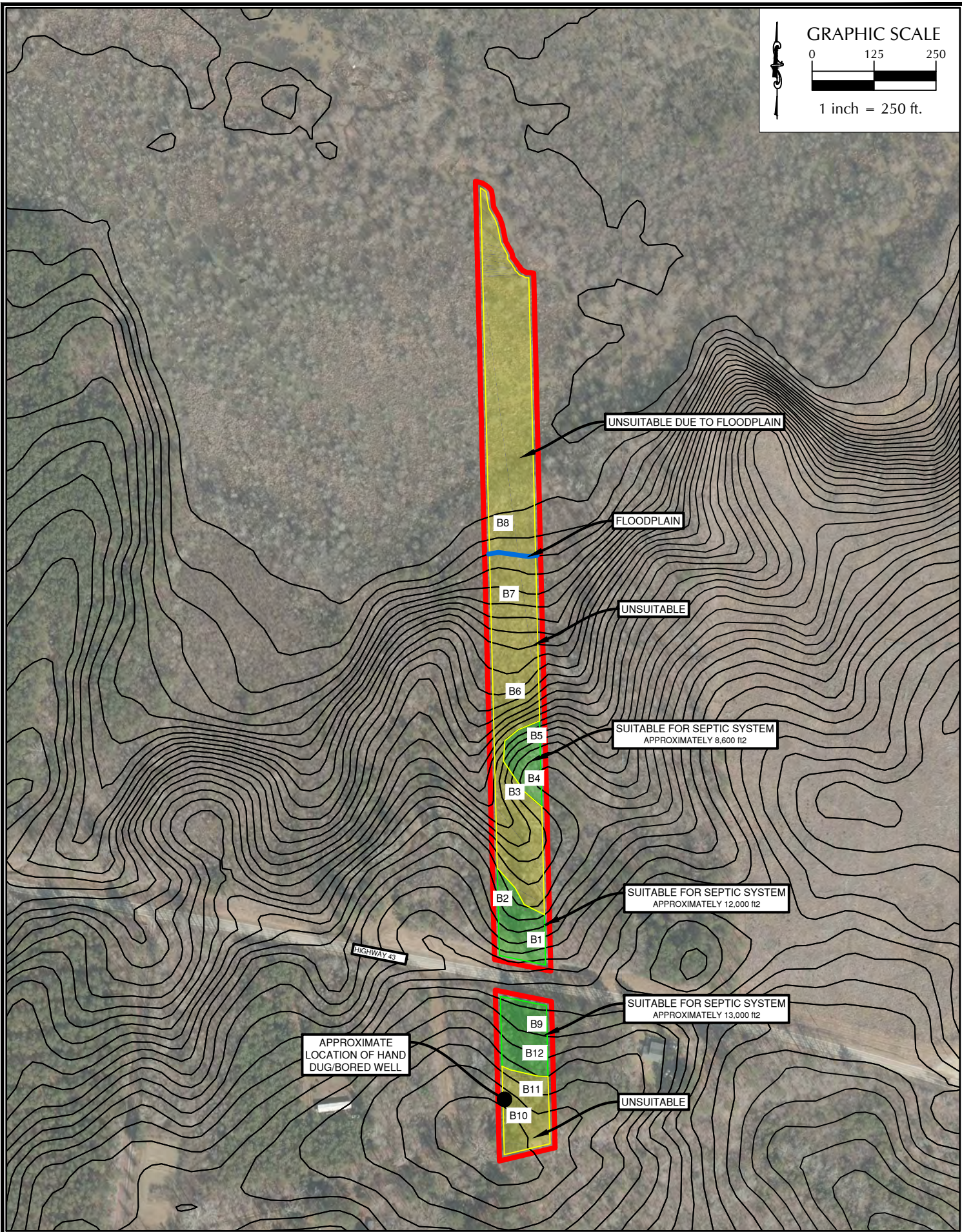
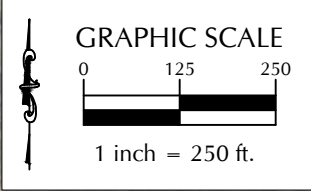
It is Soil & Septic Solutions' professional opinion that this lot can be used for residential development and has enough suitable soil for a septic system on the northern and southern portions of the property. Any concurrence with the findings of this report would be made during the County's site evaluation. Additionally, do not clear or grub any land until the County has granted the appropriate approvals.

Sincerely,



Attachments:

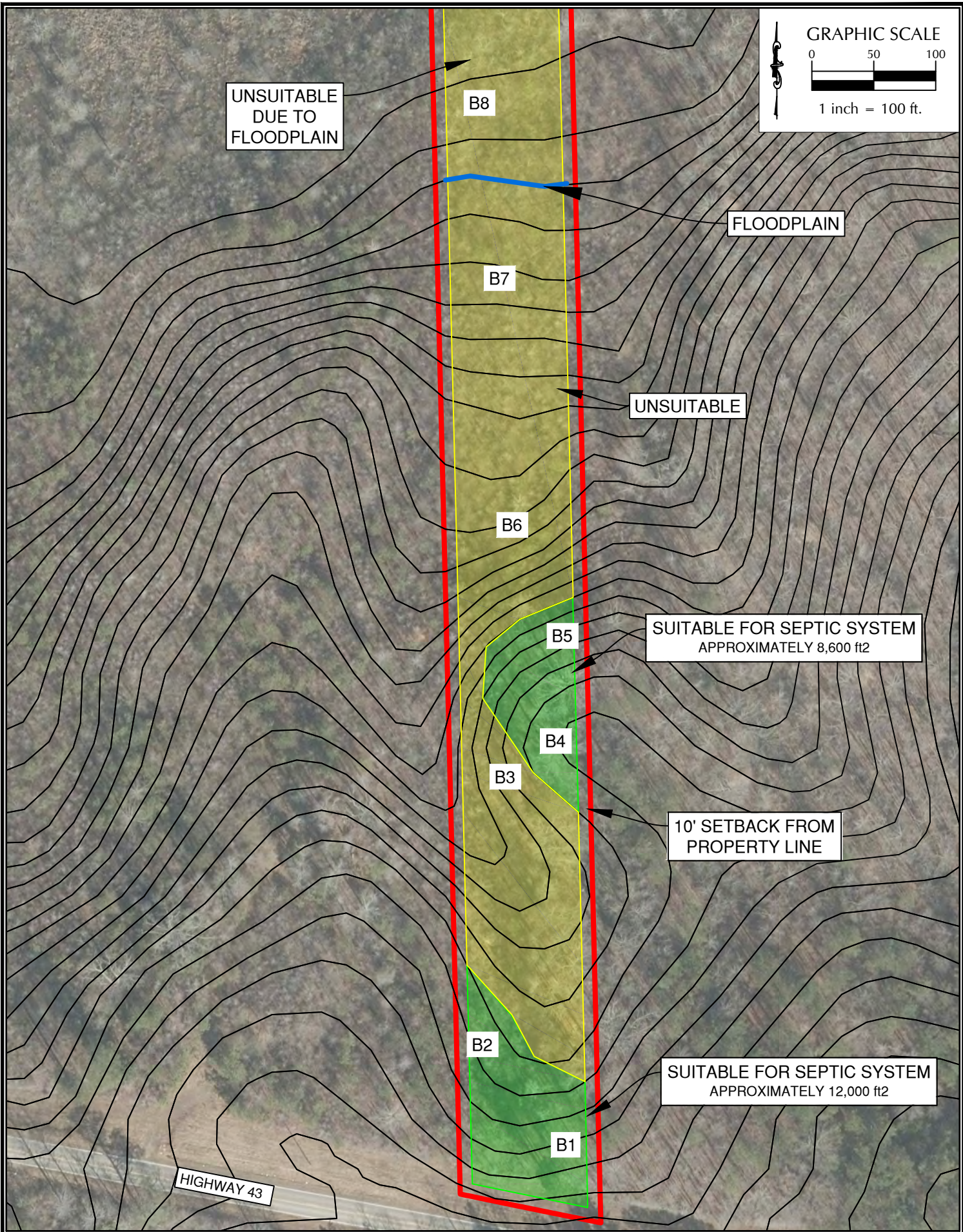
1. Soil boring Location Exhibits
2. Soil Boring Logs



HIGHWAY 43

OVERALL SOIL BORING LOCATIONS

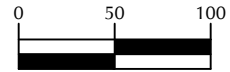
SOIL & SEPTIC SOLUTIONS



UNSUITABLE
DUE TO
FLOODPLAIN

B8

GRAPHIC SCALE



1 inch = 100 ft.

FLOODPLAIN

B7

UNSUITABLE

B6

SUITABLE FOR SEPTIC SYSTEM
APPROXIMATELY 8,600 ft²

B5

B4

10' SETBACK FROM
PROPERTY LINE

B3

B2

SUITABLE FOR SEPTIC SYSTEM
APPROXIMATELY 12,000 ft²

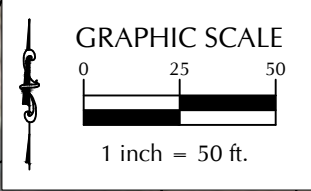
B1

HIGHWAY 43

HIGHWAY 43

SOIL BORING LOCATIONS (NORTHERN)

SOIL & SEPTIC SOLUTIONS



HIGHWAY 43

SUITABLE FOR SEPTIC SYSTEM
APPROXIMATELY 13,000 ft²

B9

10' SETBACK FROM
PROPERTY LINE

B12

APPROXIMATE LOCATION
OF HAND DUG/BORED WELL

B11

UNSUITABLE

B10

HIGHWAY 43

SOIL BORING LOCATIONS (SOUTHERN)

SOIL & SEPTIC SOLUTIONS

SOIL/SITE EVALUATION
for ON-SITE WASTEWATER SYSTEM
 (Complete all fields in full)

OWNER: _____ APPLICATION DATE: _____
 ADDRESS: Highway 43 (APN: H8 6) DATE EVALUATED: 5/13/23
 PROPOSED FACILITY: 3 BDR PROPOSED DESIGN FLOW (.1949): 360 PROPERTY SIZE: 5.04
 LOCATION OF SITE: _____ PROPERTY RECORDED: _____
 WATER SUPPLY: Private Public Well Spring Other _____
 EVALUATION METHOD: Auger Boring Pit Cut TYPE OF WASTEWATER: Sewage Industrial Process Mixed

P R O F I L E #	.1940 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY (.1941)		OTHER PROFILE FACTORS				PROFILE CLASS & LTAR
			.1941 STRUCTURE/ TEXTURE	.1941 CONSISTENCE/ MINERALOGY	.1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	
1	L 2%	0-16	SBK/SCL	FR/SS/SP/SEXP	10YR 4/4 5YR 5/8	PS	UN	-	PS 0.28-0.3
		16-36	SBK/C	FI/SS/SP/SEXP					
		36+	M/SCL	FR/SS/SP/SEXP					
2	L 2-5%	0-10	SBK/SCL	FR/SS/SP/SEXP	10YR 4/4 5YR 5/8	PS	UN	-	PS 0.28-0.3
		10-42	SBK/C	FI/SS/SP/SEXP					
		42+	M/SCL	FR/SS/SP/SEXP					
3	L 3%	0-20	SBK/CL	FI/SS/SP/SEXP	10YR 5/8 AUGER REFUSAL @ 20"	UN	UN	-	UN
		20	AR						
4	L 2%	0-36	SBK/C	FI/SS/SP/SEXP	2.5YR 4/8	PS	UN	-	PS 0.28-0.3
		36+	M/SCL	FR/SS/SP/SEXP					

DESCRIPTION	INITIAL SYSTEM	REPAIR SYSTEM	OTHER FACTORS (.1946): _____
Available Space (.1945)	YES	YES	SITE CLASSIFICATION (.1948): _____
System Type(s)	CONVENTIONAL/ACCEPTED		EVALUATED BY: <u>GARY KREISER</u>
Site LTAR	0.28-0.30	0.28-0.3	OTHER(S) PRESENT: _____

COMMENTS: _____

LEGEND

use the following standard abbreviations

LANDSCAPE POSITION	GROUP	SOIL	CONVENTIONAL	LPP	MINERALOGY/	STRUCTURE
		TEXTURE	.1955 LTAR*	.1957 LTAR*	CONSISTENCE	
CC (Concave Slope)	I	S (Sand)	1.2 - 0.8	0.6 - 0.4	SEXP (Slightly Expansive)	G (Single Grain)
CV (Convex Slope)		LS (Loamy Sand)			EXP (Expansive)	M (Massive)
D (Drainage Way)	II	SL (Sandy Loam)	0.8 - 0.6	0.4 - 0.3		CR (Crumb)
DS (Debris Slump)		L (Loam)				GR (Granular)
FP (Flood Plain)	III	Si (Silt)	0.6 - 0.3	0.3 - 0.15		SBK (Subangular Blocky)
FS (Foot Slope)		SiCL (Silty Clay Loam)				ABK (Angular Blocky)
H (Head Slope)		CL (Clay Loam)				PL (Platy)
L (Linear Slope)		SCL (Sandy Clay Loam)				PR (Prismatic)
N (Nose Slope)		SiL (Silt Loam)				
R (Ridge)	IV	SC (Sandy Clay)	0.4 - 0.1	0.2 - 0.05	MOIST	WET
S (Shoulder Slope)		SiC (Silty Clay)			VFR (Very Friable)	NS (Non-sticky)
T (Terrace)		C (Clay)			FR (Friable)	SS (Slightly Sticky)
		O (Organic)			FI (Firm)	S (Sticky)
			None	None	VFI (Very Firm v. Very Sticky)	VS (Very Sticky)
					EFI (Extremely Firm)	NP (Non-plastic)
						SP (Slightly Plastic)
						P (Plastic)
						VP (Very Plastic)

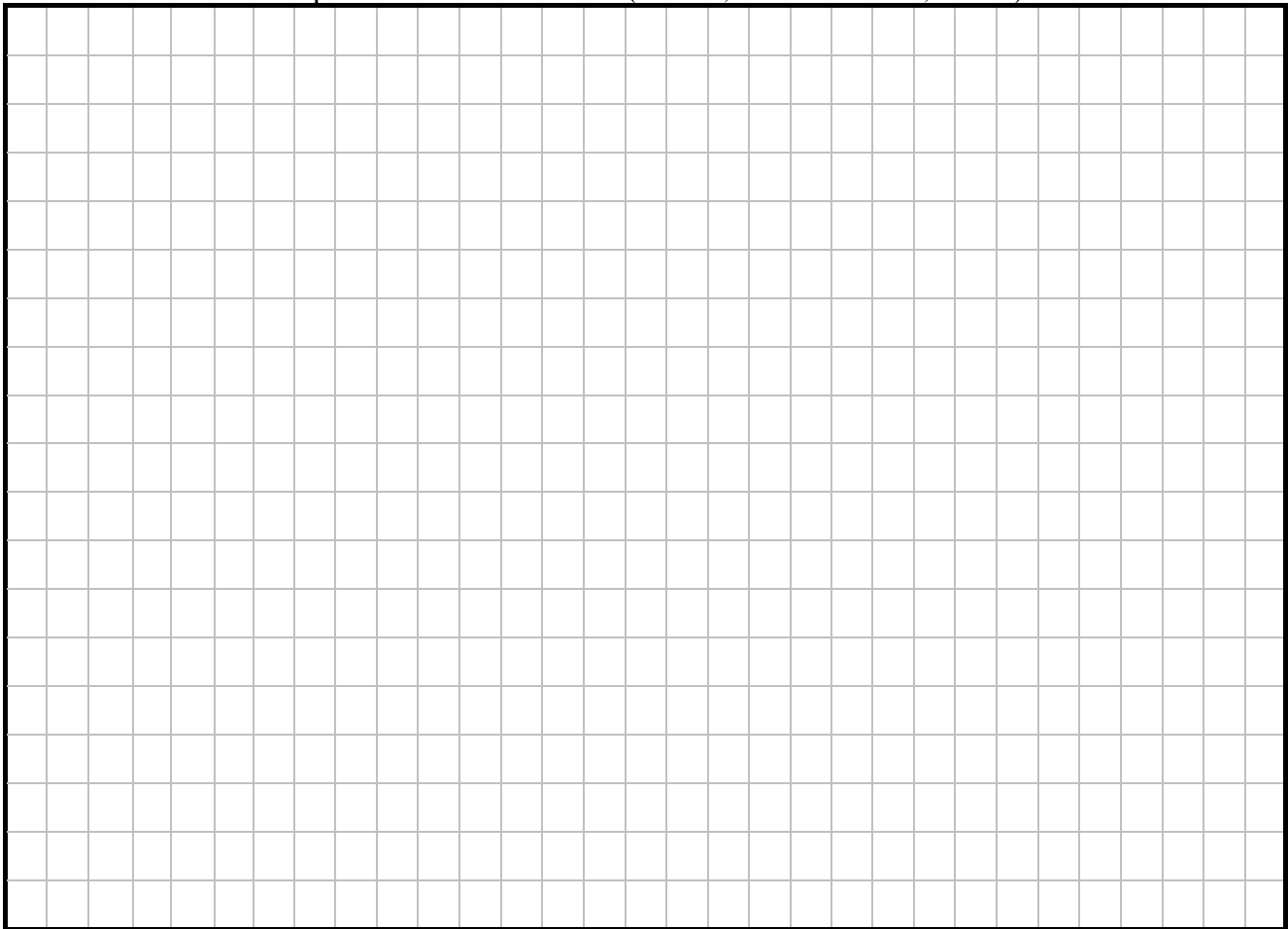
*Adjust LTAR due to depth, consistence, structure, soil wetness, landscape, position, wastewater flow and quality.

NOTES

- HORIZON DEPTH** In inches below natural soil surface
- DEPTH OF FILL** In inches from land surface
- RESTRICTIVE HORIZON** Thickness and depth from land surface
- SAPROLITE** S(suitable) or U(unsuitable)
- SOIL WETNESS** Inches from land surface to free water or inches from land surface to soil colors with chroma 2 or less - record Munsell color chip designation
- CLASSIFICATION** S (Suitable), PS (Provisionally Suitable), or U (Unsuitable)

Evaluation of saprolite shall be by pits.
 Long-term Acceptance Rate (LTAR): gal/day/ft²

Show profile locations and other site features (dimensions, reference or benchmark, and North).



SOIL/SITE EVALUATION
(Continuation Sheet-Complete all field in full)

PROPERTY ID #: _____
DATE OF EVALUATION: 5/13/23
COUNTY: Warren

P R O F I L E #	.1940 LANDSCAPE POSITION/ SLOPE %	HORIZ ON DEPTH (IN.)	SOIL MORPHOLOGY (.1941)		OTHER PROFILE FACTORS				PROFILE CLASS & LTAR
			.1941 STRUCTURE/ TEXTURE	.1941 CONSISTENCE/ MINERALOGY	.1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	
5	L 3%	0-16	SBK/SCL	FR/SS/SP/SEXP	10YR 4/4	PS	UN	-	PS 0.28-0.3
		16-36	SBK/C	FI/SS/SP/SEXP	5YR 4/8				
		36+	M/SCL	FR/SS/SP/SEXP					
6	FS 3%	0-18	SBK/SCL	FR/SS/SP/SEXP	2.5Y 6/6	-	-	-	UN
					10YR 5/2 DELEPTIONS 5YR 4/6 CONC @18"				
7	L 2%	0-26	SBK/SCL	FR/SS/SP/SEXP	5YR 5/8 10YR 5/2 @ 26"	-	-	-	UN
8	L <2%				SHWT 12"	-	-	-	UN
9	L 2%	0-15	SBK/SCL	FR/SS/SP/SEXP	10YR 4/4	S	-	-	S 0.28-0.3
		15-48	SBK/C	FI/SS/SP/SEXP	5YR 4/6				

COMMENTS: BORING 8 LOATED IN FEMA FLOODPLAIN

SOIL/SITE EVALUATION
(Continuation Sheet-Complete all field in full)

PROPERTY ID #: _____
DATE OF EVALUATION: 5/13/23
COUNTY: Warren

P R O F I L E #	.1940 LANDSCAPE POSITION/ SLOPE %	HORIZ ON DEPTH (IN.)	SOIL MORPHOLOGY (.1941)		OTHER PROFILE FACTORS				PROFILE CLASS & LTAR
			.1941 STRUCTURE/ TEXTURE	.1941 CONSISTENCE/ MINERALOGY	.1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	
10	L 2%	0-16	SBK/SCL	FR/SS/SP/SEXP	AUGER REFUSAL @ 16"		-	-	UN
		16 AR							
11	L 2%	0-24	SBK/CL	FI/SS/SP/SEXP	AUGER REFUSAL @ 24"		-	-	UN
		24 AR							
12	L 3-5%	0-10	SBK/SCL	FR/SS/SP/SEXP	10YR 4/4	AT LEAST 36"	-	-	PS 0.28-0.3
		10-36+	SBK/C	FI/SS/SP/SEXP	5YR 4/6				

COMMENTS: BORINGS 10 AND 11 SMALL AMOUNT OF SURFACE TRASH PRESENT- RUSTED METAL - ROCKS - COULDN'T ADVANCE AUGER