

December 5, 2021



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Albany, OH 45710
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John Smith
Countrytyme Land Specialist LTD
3451 Cincinnati-Zanesville Rd SW
Lancaster, Ohio 43130-9205

RE: Findings for a Site and Soil Evaluation for a Subsurface Treatment System for a New Home on Tract 6, Ridgeview Road, Blue Rock, Ohio.

Dear Mr. Smith:

In accordance with our proposal sent to you on September 13, 2021, Good Ground LLC has conducted a site and soil evaluation to assess feasibility, to support design and to provide necessary documents for permitting through the Muskingum County Health Department (MCHD) of a new on-site subsurface wastewater dispersal and treatment system (STS) for a new domicile located on Tract 6 of the Ridgeview Woods subdivision, Ridgeview Road, Blue Rock, Ohio. The new home is located on property that is currently owned by Countrytyme Land Specialist LTD (Muskingum County parcel 40010702007). This property comprises 5.137 acres and is located in the northwest quarter of the southwest quarter of Section 7, Meigs Township, Muskingum County, as approximately shown on Figure 1. The new domicile is assumed to be a three bedroom home with an estimated daily wastewater output of 360 of gallons per day (gpd).

On September 27, 2021, Good Ground LLC evaluated the site and collected soil data from multiple extractions using a 3” diameter soil auger to depths of up to 60 inches below the ground surface and a 60-inch pin probe. Soils were sampled in multiple locations. The collected soil data for four of these samples are attached to this letter report and identified as soil samples T6-1, T6-2, RV6-1, and RV6-3. RV6-2 was a bedrock depth check and not logged by strata. Soil sample points were flagged in the field and GPS-located using a Trimble GeoXH 6000 unit. GPS data were imported into an ArcGIS format for map depiction. Soil sample locations are illustrated on Figures 1 and 2.

The new home will be located on a northeast-facing hillcrest. The assessment area includes the hillslopes northeast of the driveway and the hill crest east of the new home location. There is approximately 80 feet of topographic relief within the assessment area. Slopes range from 5 to 50 percent. The northeastern corner of the property appears to be unmined natural terrain bounded by nearly vertical natural cliff 30 feet in height. The majority of current land use is a reclaimed coal strip mine with herbaceous and planted pine vegetation covering most of the site. The ODNR Mines of Ohio online GIS map

(<https://gis.ohiodnr.gov/MapViewer/?config=OhioMines>) shows that up to 80 percent of Tract 6 was mined and reclaimed by Ohio Power Company in 1979 under Permit C-0602. Site investigations are consistent with this finding. The ODNR mapped mined/reclaimed line has been adjusted west based on defining the line between mined and unmined land using the Trimble GeoXH GPS in the field.

Soils are formed in loess atop residuum and colluvium from sandstone and siltstone. Soils within the assessment area are mapped in the USDA Soil Survey of Muskingum County as Mwc3D - Morristown silty clay loam and LrE2- Lowell-Gilpin complex. Soils observed were similar to the mapped soil types. The Morristown soil is composed of mixed mine spoil and fragmented rock covered with 6 to 9 inches of silty topsoil substitute. Broken rock and open voids were encountered throughout the sampled profile. A shallow seasonal or apparent water table was not observed. There is minor post-reclamation carbon accumulation in the upper strata; however, there is no evidence of significant pedogenesis throughout the profile. This type of substrate fill material is unsuited for use as an infiltration medium for wastewater dispersal (ORC-3701-29-10-14 (O) 5(c)). The soils in the selected STS installation area are similar to the Gilpin loam.

Selection of the assessment area is based on site topography, soil conditions and other natural or man-made features observed on the site. Design of the on-site subsurface wastewater treatment system is based on the most restrictive soil infiltration and permeability characteristics observed in the selected sample for the installation area. Collected soil characteristics for soils at least 18 inches below the surface were used with the Tyler Table (Table 1) to estimate the infiltration loading capacity, minimum infiltration area and minimum trench length for a primary and a replacement infiltration trench field for the new three bedroom home. The design layer for this treatment system is silty clay loam, which has an infiltration loading rate of 0.6 gallons per day per square foot. Daily design flow is based on the domestic default volume of wastewater production of 120 gpd per bedroom, or 360 gpd for the proposed home.

Table 1: Tyler Data for Calculation for Absorption Area and Dispersal Trench Length - Simple Infiltration Trench System												
Soil Sample Number	Texture	Structure		Infiltration Loading Rate > 30 mg/l BOD (gal/day /ft ²)	Loading Rate Conditions		Hydraulic Linear Loading Rate (gal/day/lf)			Infiltration Area (SF)	Infiltration Component Length (ft)	Total Trench Length (LF)
		Shape	Grade		Slope %	Infiltration Distance (inches)	Infiltration Distance Factor	Design Flow (gpd)	SF/LF 24" Trench			
RV6-1	SIL	BK	3	0.6	6	24-48	4.0	360	2	600	90	300
RV6-3	SIL	BK	3	0.6	6	24-48	4.0	360	2	600	90	300

In addition to the minimum absorption area and minimum trench lengths derived through use of the Tyler Table, Ohio Health Department regulations require a “resting” area component. The resting area must be a minimum of 25% addition to the Tyler Table-derived design figures. The use of gravelless chambers, instead of gravel-filled trenches, allows reduction of the total length of trenches required, while continuing to accommodate the required resting trench area. Tables 2A and 2B (attached) present the calculations for both a gravel infiltration trench system and for gravelless system, with the resting area burden added.

Given the findings presented in Tables 1 and 2, the use of a gravelless chamber-based subsurface treatment system for wastewater dispersal would be both feasible and recommended for a new gravity-driven STS

at the approximate location shown on Figure 2. The minimum septic system components for the new home would include:

- A 1500 gallon septic tank,
- Approximately 140 linear feet of 4-inch sewer pipe with joints and clean-out ports to connect the home to the septic tank and the septic tank to the distribution box,
- An accessible 4-port parallel distribution box with shut-off valves meeting the specifications of OAC Appendix A rules 3701-29-15.1 (F),
- Three 116-foot long by 24-inch wide Quick-4 EQ36 Equalizer Chambers (or equivalent) with end caps and inspection ports,
- Approximately 100 linear feet of 4-inch pipe to connect individually from the distribution box to each trench inlet.

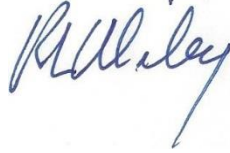
All materials and equipment used for STS construction must meet the requirements of OAC 3701-29. A layout of the STS is shown on Figure 2 using the gravelless chamber trenches. The replacement system for the new home would be constructed south of the primary system, as also shown on Figure 2. Trenches for the replacement system as shown would be the same length as the primary trench field.

All trenches would be excavated along the contour to a maximum depth of 18 inches at a maximum inter-trench spacing of 6 feet. Take care during construction to preserve soil infiltration capacity by not grading deeply or working when the soil is saturated. Should there be trees within the infiltration trench field area, do not grub. Cut them to the ground and excavate through the root system. The location selected for STS Field 1 as shown on Figure 2 appears to be the most practical option given the home location, the site topography, and the soil conditions.

The next step is identification of the STS system materials that considers actual system components and comparative system costs. These are choices that you the homeowner will make in consultation with your selected Ohio Environmental Protection Agency (OEPA) certified STS installer and ACHD. All materials and equipment used for STS construction must meet the requirements of OAC 3701-29.

A final specification of materials, a field layout and a final field sketch may be needed to obtain a permit to install the septic system in Athens County. It is likely that your chosen Ohio EPA-certified system installer can provide specifications, a list of materials and costs. The county health department sanitarian will most likely inspect the field layout prior to installation permit issuance. As result, the location of the new STS trench field, septic tank and distribution box will need to be finally marked on the ground by your selected installer. The MCHD can provide further guidance on system final documents, application forms that are needed, certified STS installers, and the names of septic system design engineers that could be needed for more complex systems.

This report is for the sole and only use of John Smith, Countrytyme Land Specialist LTD, or the owners of record of the subject property in support of obtaining a permit to install a subsurface septic treatment and dispersal system from the MCHD and shall not be used or relied upon by any other person, firm, corporation, or other entity. Please contact me if you have any additional questions. Thank you for allowing Good Ground LLC to assist you with this project.

A handwritten signature in blue ink, appearing to read "R. Wiley".

Robert L. Wiley, President,
Good Ground LLC

Attachments: Figure 1, Figure 2
Tables 2A and 2B
4 Soil Data Forms

TABLE 2A Infiltration Trench Length Calculations - Primary

Parcel	40010702007
Owner/Client:	John Smith

Calculation of the Trench Bottom Area and Trench Length Required for Shallow Leaching Gravel Infiltration Trenches

Design Parameters	Value	Comment
Wastewater Source:	Existing Domicile	Manual Input
Condition:	Replacement	Manual Input
Daily WW Volume (gal/day):	360	Manual Input
Soil		
Texture	SIL	Soil data sheet input
Shape	BK	Soil data sheet input
Grade	3	Soil data sheet input
Sample	RV6-1	Tyler Table input
Tyler Table Data		
Loading Rate (gpd/sf)	0.6	Tyler Table input
Slope (%)	6	Soil data sheet input
Infiltration Distance (inches)	24-48	Soil data sheet input
Tyler Calculations		
Infiltration Area (sf)	600	Daily WW volume/Loading Rate in gpd/sf
Hydraulic Loading Rate (gpd/lf)	4	Tyler Table input
Minimum Trench Length (ft)	90	Infiltration area/min trench length for 24" trench
Proposed Trench Width (ft):	2	Manual input
Number of Minimum Length Trenches Needed	3.33	Total Trenches needed at minimum length
On-Site Feasible Trench Length (ft)	100	Manual input length needed for 3 equal trenches
Number of Feasible-length Trenches	3	Infiltration area/feasible trench length
Resting Trenches (min 25% addition)	1	Additional resting trenches
Total Number of Trenches Needed at on-site feasible Length:	4	Number of trenches needed for Shallow Gravel Infiltration System
Absorption Base Width:	7	HLLR/soil infiltration rate

The required minimum bottom area for a Gravelless trench (chamber) shall be no less than 75% of a shallow gravel infiltration trench

Calculation of the Trench Bottom Area and Trench Length Required for Gravelless (chamber) Infiltration Trenches

Total Infiltration area using chambers (sf)	450	Total infiltration area X 0.75
Minimum Trench Length (ft)	90	Infiltration area/min trench length for 24" trench
Number of Minimum Length Trenches Needed	2.5	Total Trenches needed at minimum length
On-Site Feasible Trench Length (ft)	113	Manual input length needed for 3 equal trenches
Round to Number of Uncut 4' Sections	116	Total actual trench length for uncut sections
Minimum Infiltration Trenches Needed	2	Actual trench length/minimum number of chambers needed
Resting Trenches (min 25% addition)	1	Additional resting trench
Total Number of Trenches Needed at On-site Feasible Length:	3	Number of trenches needed for a Gravelless chamber infiltration system

TABLE 2B Infiltration Trench Length Calculations - Replacement

Parcel	40010702007
Owner/Client:	John Smith

Calculation of the Trench Bottom Area and Trench Length Required for Shallow Leaching Gravel Infiltration Trenches

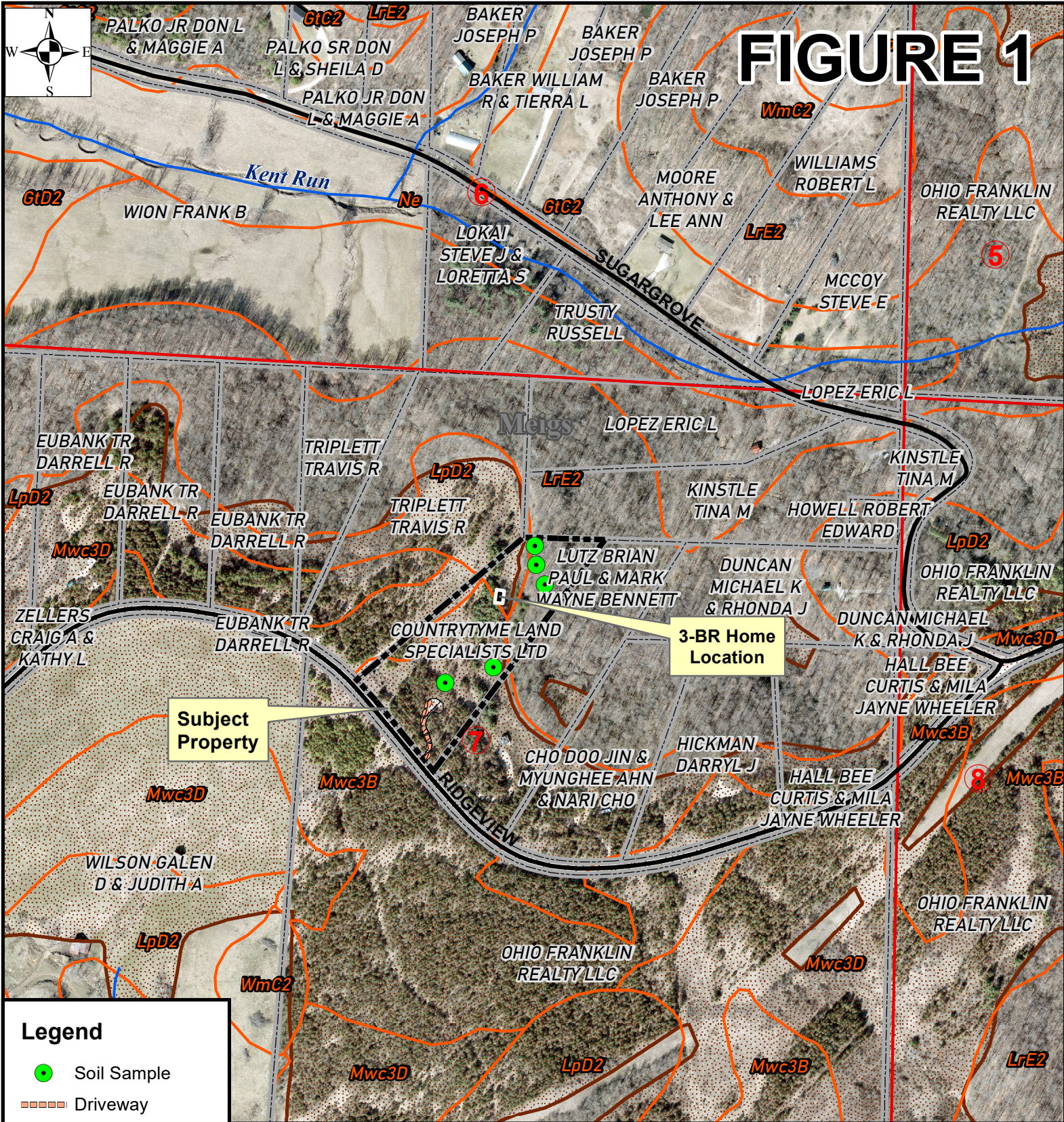
Design Parameters	Value	Comment
Wastewater Source:	Existing Domicile	Manual Input
Condition:	Replacement	Manual Input
Daily WW Volume (gal/day):	360	Manual Input
Soil		
Texture	SIL	Soil data sheet input
Shape	BK	Soil data sheet input
Grade	3	Soil data sheet input
Sample	RV6-3	Tyler Table input
Tyler Table Data		
Loading Rate (gpd/sf)	0.6	Tyler Table input
Slope (%)	6	Soil data sheet input
Infiltration Distance (inches)	24-48	Soil data sheet input
Tyler Calculations		
Infiltration Area (sf)	600	Daily WW volume/Loading Rate in gpd/sf
Hydraulic Loading Rate (gpd/lf)	4	Tyler Table input
Minimum Trench Length (ft)	90	Infiltration area/min trench length for 24" trench
Proposed Trench Width (ft):	2	Manual input
Number of Minimum Length Trenches Needed	3.33	Total Trenches needed at minimum length
On-Site Feasible Trench Length (ft)	100	Manual input length needed for 3 equal trenches
Number of Feasible-length Trenches	3	Infiltration area/feasible trench length
Resting Trenches (min 25% addition)	1	Additional resting trenches
Total Number of Trenches Needed at on-site feasible Length:	4	Number of trenches needed for Shallow Gravel Infiltration System
Absorbtion Base Width:	7	HLLR/soil infiltration rate

The required minimum bottom area for a Gravelless trench (chamber) shall be no less than 75% of a shallow gravel infiltration trench

Calculation of the Trench Bottom Area and Trench Length Required for Gravelless (chamber) Infiltration Trenches

Total Infiltration area using chambers (sf)	450	Total infiltration area X 0.75
Minimum Trench Length (ft)	90	Infiltration area/min trench length for 24" trench
Number of Minimum Length Trenches Needed	2.5	Total Trenches needed at minimum length
On-Site Feasible Trench Length (ft)	113	Manual input length needed for 3 equal trenches
Round to Number of Uncut 4' Sections	116	Total actual trench length for uncut sections
Minimum Infiltration Trenches Needed	2	Actual trench length/minimum number of chambers needed
Resting Trenches (min 25% addition)	1	Additional resting trench
Total Number of Trenches Needed at On-site Feasible Length:	3	Number of trenches needed for a Gravelless chamber infiltration system

FIGURE 1



Legend

- Soil Sample
- Driveway
- County_Road
- Tract_6
- Stream
- Section
- Township
- Adjacent Parcels
- USDA Soils
- Reclaimed Land

SITE FEATURES AND LOCATION

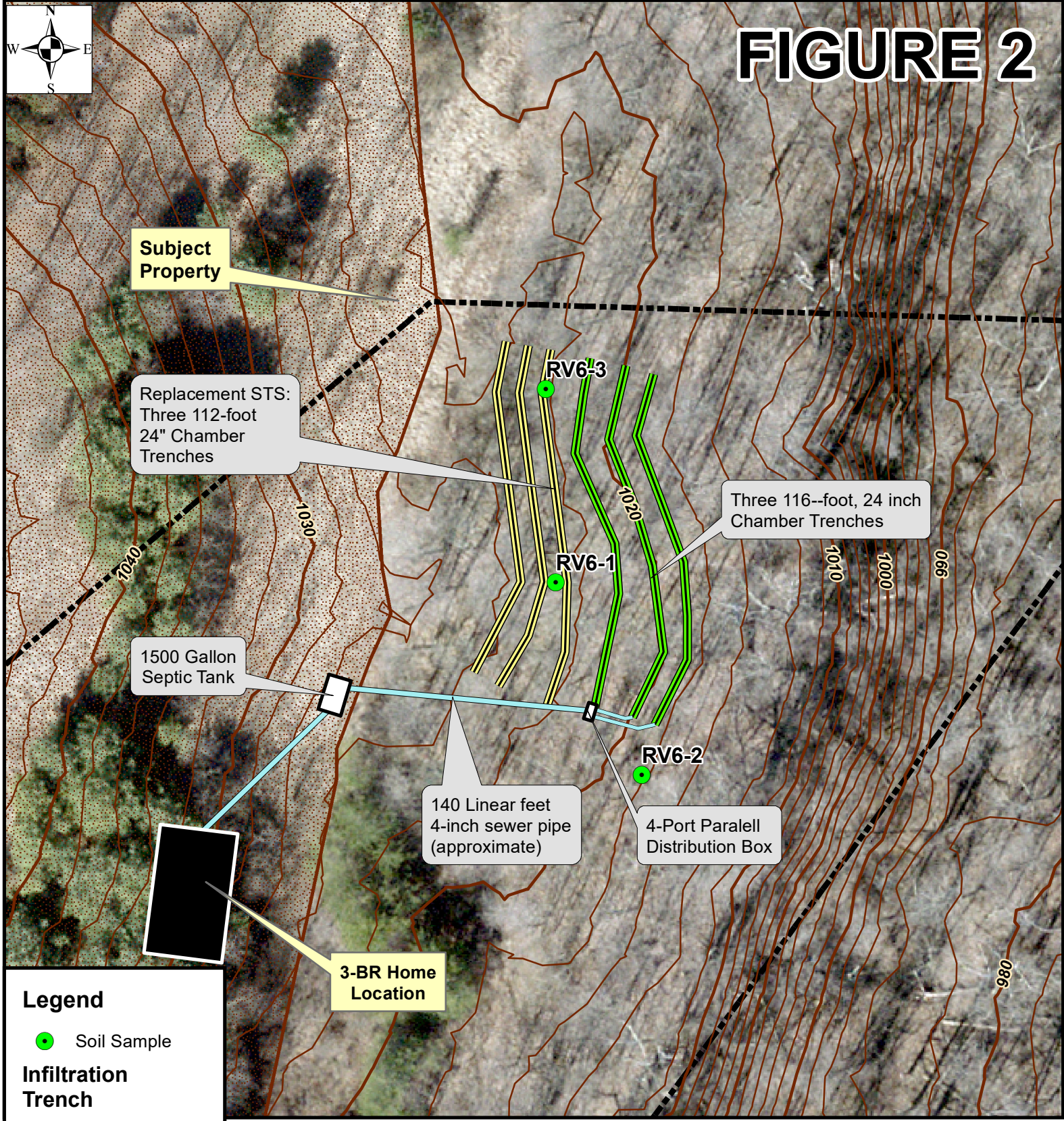
Tract 6 - Countrytyme L.S. LTD
The Woods at Ridgeview, Blue Rock
Section 2, Meigs Township

320 160 0 320 Feet

1 inch = 400 feet
 Contour Interval: 2 Feet

Prepared by Good Ground LLC. 120321
 Planimetrics: Muskingum County Auditors DB & 2014/2020 OGRIP:
<http://gis5.oit.ohio.gov/geodatadownload/>
 Coordinate System: NAD 1983, Ohio State Plane, Feet.
 Parcel Data based on "Parcels 0820"
 Soil code key found in Muskingum County Soil Survey. USDA, ODNR, 1985.

FIGURE 2



Legend

- Soil Sample
- Infiltration Trench**
 - Field 1
 - Field 2
- Contour Interval**
 - 2 Feet
 - 10 Feet
- Tract_6
- Reclaimed Land


SEPTIC SYSTEM DESIGN LAYOUT

Tract 6 - Countrytyme L.S. LTD
The Woods at Ridgeview, Blue Rock
Section 2, Meigs Township

30 15 0 30 Feet


1 inch = 40 feet
Contour Interval: 2 Feet

Prepared by Good Ground LLC. 120321
Planimetrics: Muskingum County Auditors DB & 2014/2020 OGRIP:
<http://gis5.oit.ohio.gov/geodatadownload/>
Coordinate System: NAD 1983, Ohio State Plane, Feet.
Parcel Data based on "Parcels 0820"
Soil code key found in Muskingum County Soil Survey. USDA, ODNR, 1985.

Site and Soil Evaluation for Sewage Treatment and Dispersal						TH#	T6-1
County:	Muskingum			Landuse/ Vegetation:	Reclaimed Strip Mine		
TWP./Section:	Meigs Township, Section 17			Landform:	Upland		
Property Address/Location:	Tract 6, Ridgeview Road Blue Rock, Ohio 43720			Position on Landform:	Hillslope		
Applicant Name:	John Smith			Percent Slope:	10-15%		
Applicant Address:	3451 Cincinnati-Zanesville Road			Slope Shape:	Convex	Cert. Stamp or Cert. #:	
Applicant Address:	Lancaster, Ohio 43130			Date:	September 27, 2021		ODH Certified April, 2016
Phone #:	614-540-8998			Evaluator:	Robert L. Wiley		
Lot #:	40010702007			3050 Glennfinnan Drive			Signature:
Test Hole #:	T6-1			Albany, OH 45710			
Lat./Long; ddms	39.8309792	81.79436287		Mapped soil type(s):			
Method (circle):	Pit	Auger	Probe	All	Mwc3D—Morristown silty clay loam		740-698-9100


Soil Profile		Estimating Soil Saturation			Estimating Soil Permeability							Other Soil Features
Horizon	Depth (inches)	Matrix Color	Munsell Color		Texture			Structure			Consistence	
			Active Redox Features	Concretions	Depletions	Class	Approx. % Clay	Approx. % Fragments	Grade	Size		
A	0-6	10YR4/4	NONE	NONE	sil	15	<1	2	f	sbk	fr	
Ud1	6-22	10YR5/3	NONE	NONE	sil	20	5-10	2	f	sbk	l	Mixed spoil
Ud2	22-26	10YR5/2	NONE	NONE	sicl	15	10-15	2	f	abk	l	Coal fragments

Limiting Conditions	Depth to (inches)	Descriptive Notes	Remarks/ Risk Factors:
Perched Seasonal Water Table	Not Encountered		
Apparent Water Table	Not Encountered		
Highly Permeable Material	Not Encountered		
Bedrock	Not Encountered		
Mine spoil	6		reclaimed strip mine

Site and Soil Evaluation for Sewage Treatment and Dispersal						TH#	T6-2
County:	Muskingum			Landuse/ Vegetation:	Reclaimed Strip Mine		
TWP./Section:	Meigs Township, Section 17			Landform:	Upland		
Property Address/Location:	Tract 6, Ridgeview Road Blue Rock, Ohio 43720			Position on Landform:	Hillslope		
Applicant Name:	John Smith			Percent Slope:	10-15%		
Applicant Address:	3451 Cincinnati-Zanesville Road			Slope Shape:	Convex	Cert. Stamp or Cert. #:	
Applicant Address:	Lancaster, Ohio 43130			Date:	September 27, 2021		ODH Certified April, 2016
Phone #:	614-540-8998			Evaluator:	Robert L. Wiley		
Lot #:	40010702007			3050 Glennfinnan Drive			Signature: 
Test Hole #:	T6-2			Albany, OH 45710			
Lat./Long; ddms	39.83110167	81.79383943		Mapped soil type(s):	Mwc3D—Morristown silty clay loam		
Method (circle):	Pit	Auger	Probe	All	740-698-9100		


Soil Profile		Estimating Soil Saturation			Estimating Soil Permeability							Other Soil Features
		Munsell Color			Texture			Structure			Consistence	
Horizon	Depth (inches)	Matrix Color	Active Redox Features		Class	Approx. % Clay	Approx. % Fragments	Grade	Size	Type (shape)		
A	0-9	10YR4/4	NONE	NONE	sil	15	<1	2	f	sbk		fr
Ud1	9-24	10YR5/3	NONE	NONE	sic1	15	10-15	2	f	sbk	l	Mixed spoil

Limiting Conditions	Depth to (inches)	Descriptive Notes	Remarks/ Risk Factors:
Perched Seasonal Water Table	Not Encountered		
Apparent Water Table	Not Encountered		
Highly Permeable Material	Not Encountered		
Bedrock	Not Encountered		
Restrictive Layer	9	Mine spoil	Reclaimed strip mine

Site and Soil Evaluation for Sewage Treatment and Dispersal					TH#	RV6-1
County:	Muskingum				Landuse/ Vegetation:	Successional forest
TWP./Section:	Meigs Township, Section 17				Landform:	Upland
Property Address/Location:	Tract 6, Ridgeview Road Blue Rock, Ohio 43720				Position on Landform:	Hillslope/ hill crest
Applicant Name:	John Smith				Percent Slope:	5-9%
Applicant Address:	3451 Cincinnati-Zanesville Road				Slope Shape:	Linear
Applicant Address:	Lancaster, Ohio 43130				Date:	December 1, 2021
Phone #:	614-540-8998				Evaluator:	Robert L. Wiley
Lot #:	40010702007				3050 Glennfinnan Drive	
Test Hole #:	RV6-1				Albany, OH 45710	
Lat./Long; ddms	39.83196455		-81.79335517		Mapped soil type(s):	
Method (circle):	Pit	Auger	Probe	All	LrE2—Lowell-Gilpin complex	
					740-698-9100	
					Cert. Stamp or Cert. #: ODH Certified April, 2016 Signature: 	

Soil Profile		Estimating Soil Saturation			Estimating Soil Permeability							Other Soil Features
Horizon	Depth (inches)	Matrix Color	Munsell Color		Texture			Structure			Consistence	
			Concretions	Depletions	Class	Approx. % Clay	Approx. % Fragments	Grade	Size	Type (shape)		
A	0-6	7.5YR4/6	NA	NA	1	15	<1	2	f	sbk	fr	
B1	6-23	7.5YR5/6	NA	NA	1	25	<1	2	f	sbk	fr	
B2	23-38	7.5YR5/6	NA	NA	1	20	<1	3	m	sbk	fr	
B3	38-43	7.5YR4/6	NA	10YR6/2	1	25	<1	3	l	gr	fr	<5%, mixed parent
C	43-60	7.5YR4/6	NA	10YR6/2	sil	10	<1	3	l	abk	fi	>5% mixed parent

Limiting Conditions	Depth to (inches)	Descriptive Notes	Remarks/ Risk Factors:
Perched Seasonal Water Table	Not Encountered		This is a relic unmined fringe downhill from a reclaimed stripmine
Apparent Water Table	Not Encountered		
Highly Permeable Material	Not Encountered		
Bedrock	Not Encountered		
Restrictive Layer	Not Encountered		

Site and Soil Evaluation for Sewage Treatment and Dispersal					TH#	RV6-3
County:	Muskingum				Landuse/ Vegetation:	Successional forest
TWP./Section:	Meigs Township, Section 17				Landform:	Upland
Property Address/Location:	Tract 6, Ridgeview Road Blue Rock, Ohio 43720				Position on Landform:	Hillslope/ hill crest
Applicant Name:	John Smith				Percent Slope:	5-9%
Applicant Address:	3451 Cincinnati-Zanesville Road				Slope Shape:	Linear
Applicant Address:	Lancaster, Ohio 43130				Date:	December 1, 2021
Phone #:	614-540-8998				Evaluator:	Robert L. Wiley
Lot #:	40010702007				3050 Glennfinnan Drive	
Test Hole #:	RV6-3				Albany, OH 45710	
Lat./Long; ddms	39.83212801		-81.79336444		Mapped soil type(s):	
Method (circle):	Pit	Auger	Probe	All	LrE2—Lowell-Gilpin complex	
					740-698-9100	
					Cert. Stamp or Cert. #: ODH Certified April, 2016 Signature: 	

Soil Profile		Estimating Soil Saturation			Estimating Soil Permeability							Other Soil Features
		Munsell Color			Texture			Structure				
Horizon	Depth (inches)	Matrix Color	Active Redox Features		Class	Approx. % Clay	Approx. % Fragments	Grade	Size	Type (shape)	Consistence	
A	0-14	7.5YR4/6	NA	NA	l	10	<1	2	f	sbk	fr	
B1	14-29	7.5YR5/6	NA	NA	l	25	<1	2	f	sbk	fr	
B2	29-42	7.5YR5/6	NA	NA	l	25	<1	3	m	sbk	fr	
B3	42-48	7.5YR4/6	NA	NA	l	20	<1	3	l	gr	fr	
C	48-60	7.5YR4/6	NA	10YR6/2	sil	15	<1	3	l	abk	fi	>5% mixed parent

Limiting Conditions	Depth to (inches)	Descriptive Notes	Remarks/ Risk Factors:
Perched Seasonal Water Table	Not Encountered		This is a relic unmined fringe downhill from a reclaimed stripmine
Apparent Water Table	Not Encountered		
Highly Permeable Material	Not Encountered		
Bedrock	Not Encountered		
Restrictive Layer	Not Encountered		