

**GEOTECHNICAL ENGINEERING STUDY**

**CROSSINGS AT MILL CREEK  
1936 BLUEGRASS AVENUE  
LOUISVILLE, KENTUCKY**

**ASHER PROJECT NO. 20-114**

**Prepared For:**

**Mr. Jonathan Brannon, AIA  
WBCS Architecture+Design  
jonathan@wbcsarch.com**

**Prepared By:**

**Asher Engineering, Inc.  
1021 S. Floyd Street  
Louisville, Kentucky 40203**

**December 2, 2020**

**20-ZONE-0096**

# Asher Engineering, Inc.

---

*Environmental & Engineering Consulting*

December 2, 2020

Mr. Jonathan Brannon, AIA  
WBCS Architecture+Design  
jonathan@wbcsarch.com

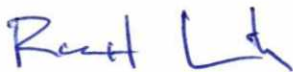
Re: Geotechnical Engineering Study  
Crossings at Mill Creek  
1936 Bluegrass Avenue  
Louisville, Kentucky

Dear Mr. Brannon,

Asher Engineering has completed a Geotechnical Engineering Study for the referenced project. This report contains the findings of our subsurface exploration, geotechnical recommendations to aid design of foundations, and pavements, and construction recommendations with regard to site work; fill placement, and foundation installation and inspection.

We appreciate the opportunity to be of service to you on this project. If we can be of further assistance, or if you have any questions regarding this report, please contact our office.

Sincerely,



Richard A. Linker, P. E.



# TABLE OF CONTENTS

<b>LETTER OF TRANSMITTAL</b> .....	i
<b>1.0 PROJECT INFORMATION</b> .....	1
<b>2.0 SUBSURFACE EXPLORATION</b> .....	1
<b>3.0 DESIGN RECOMMENDATIONS</b> .....	2
3.1 Site Development.....	2
3.2 Shallow Foundations .....	3
3.3 Floor Slabs .....	3
3.4 Below Grade Walls.....	3
3.5 Pavements .....	4
<b>4.0 CONSTRUCTION RECOMMENDATIONS</b> .....	5
4.1 Subgrade Preparation.....	5
4.2 Engineered Fill.....	5
4.3 Foundation Excavations.....	5
<b>5.0 QUALIFICATIONS</b> .....	6
<b>APPENDICES</b>	
Site Location Photograph	
Location of Test Borings	
Thickness of Old Fill	
Test Boring Logs	

## 1.0 PROJECT INFORMATION

The 10.2 acre site is located at the southeast corner of Bluegrass Ave. and Manslick Rd., in Louisville, Kentucky. The site topography changes dramatically from the west and center portion which is flat to the east side of the site which drops in elevation significantly forming a ridge that extends downward steeply to the east. The east portion of the site is heavily wooded with small and large trees and thick brush from the north to the south border. The center and west half of the site has some woods, but also some open areas at the northeast corner of the site, and the east side of the site. The southwest corner of the site also has some open spaces, and is the only portion of the site that is developed with a small Dr. Office building with driveway and parking lot.

Proposed for construction is an apartment complex with four 3-Story and three 3-Story slab on grade apartment buildings, with a Club House building and asphalt paved parking lots and access drives down the center of the site north to south.

## 2.0 SUBSURFACE EXPLORATION

The subsurface conditions were explored by conducting 12 test borings at the locations shown on the sketch in the Appendix. The boring logs (also included in the Appendix) describe the materials and conditions encountered at each location.

The flat to gently sloping portion of the site from the center to the west has been filled. This man-placed fill is what forms the ridge that runs north-south along the east portion of the site. The old fill material consists of clay soil, crushed stone, concrete, shale, cinders, asphalt, rock, brick, trace organics. The subsurface conditions east of the 'ridge' is stiff natural silty clay soil.

<b><u>Building (Borings)</u></b>	<b><u>Old Fill Thickness, ft.</u></b>
1 (B-7 and B-10)	2 to 6
2 (B-4 and B-7)	6 to 12
3 (B-4 and B-1)	14
4 (B-1 and B-2)	10 to 14
5 (B-6)	0
6 (B-9)	0
7 (B-12)	10
CH (B-5 and B-8)	6 to 12

## **2.0 SUBSURFACE EXPLORATION (CONT.)**

The borings were extended to 20 ft. and did not technically 'refuse' on bedrock. However, the sampling and drilling observations revealed that the borings encountered Shale bedrock about 18 to 20 ft. below existing grade.

## **3.0 DESIGN RECOMMENDATIONS**

The following design recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions.

### **3.1 Site Development**

The flat to gently sloping portion of the site from the center to the west has been filled forming a steep ridge that runs north-south along the east portion of the site.

The subsurface conditions east of the ridge consist of stiff natural silty clay soil.

The old fill material was not placed under engineering control, and is not suitable for support of the new buildings. The old fill was relatively 'clean' with no trash or debris, and minimal topsoil and organics. We recommend undercutting Bldgs 1, 2, 3, 4, 7, and the ClubHouse down to firm natural soil. (Buildings 5 and 6 are in an area with little or no old fill, and can be completed by typical building pad and footing construction.)

The undercut area should be extended 5 ft. outside the bldg footprint. The old fill material that was removed would then be placed back into the undercut excavation, compacted in about 1 ft. loose lifts. Any pieces of old fill larger than 1 ft. should not be used back in the new engineered fill. Floor slabs should be poured on a stone subbase of at least 12 in. of Ky DGA crushed limestone.

The old fill can remain in place under new pavement areas provided they are inspected by proofroll with a loaded dump truck. Any soft areas identified by the proofroll would be undercut and stabilized with crushed stone

With this construction, there will be no slope issues regarding the new structures.

All structures will bear either on firm natural soil (Bldgs 5 and 6), or engineered fill that is placed and compacted on firm natural soil.

### **3.2 Shallow Foundations**

Footings can be proportioned using a net allowable bearing capacity of 3000 psf for continuous wall and isolated footings. Site Classification C should be used for seismic design. Wall footings must be at least 16 in. wide and column footings must be at least 24 in. wide to provide an adequate factor of safety for bearing capacity. All exterior footings and footings in unheated areas must bear at least 30 in. below final exterior grade for frost protection. Interior footings in heated areas can bear at nominal depths below the floor (at least 12 inches).

### **3.3 Floor Slabs**

The geotechnical engineer should inspect the subgrade with a proofroll prior to the placement of fill or the crushed stone base. Some undercutting and stabilization with crushed stone may be necessary to stabilize the slab area, especially during wet periods of the year. Upon approval of the subgrade, we recommend that the slab be supported on a 4-in. layer of KY DGA crushed stone compacted to 100 percent of the standard Proctor.

### **3.4 Below Grade Walls**

Below grade walls and retaining walls should be designed to provide sufficient drainage to relieve hydrostatic pressure. A clean, free draining granular fill such as KY No. 57 stone should be used to backfill against below grade walls. The backfill zone should be drained using a perforated pipe placed at the base of the wall. An Equivalent Hydrostatic Pressure of 50 pcf can be used to design below grade walls. A unit weight of 130 pcf should be used for the granular backfill. The granular fill should be capped at the ground surface with about 2 ft. of clayey soil to inhibit infiltration of surface water behind the below grade walls. Care should be taken and equipment size limited when compacting next to the walls.

### 3.5 Pavements

The subgrade in all new pavement areas should be proofrolled to identify any soft areas that may require undercutting and stabilization. Assuming proper subgrade preparation and drainage, a California Bearing Ratio (CBR) value of 5 is recommended.

The following pavement sections are recommended.

#### **Automobile and Light Truck Areas**

1.5 in. asphalt concrete surface  
2.0 in. asphalt concrete base  
4.0 in. KY DGA  
4.0 in. 4 to 6 in. Minus crushed stone

#### **Heavy Truck Areas**

1.5 in. asphalt concrete surface  
3.0 in. asphalt concrete base  
4.0 in. KY DGA  
4.0 in. 4 to 6 in. Minus crushed stone

## **4.0 CONSTRUCTION RECOMMENDATIONS**

Variations in subsurface conditions must be expected during construction. It is therefore recommended that the geotechnical engineer be retained to review the soils-related phases of the project and to correlate the subsurface data with the soil conditions that are encountered during construction.

### **4.1 Subgrade Preparation**

Prior to construction or the placement of new engineered fill, the exposed subgrade should be evaluated by the project geotechnical engineer. The evaluation should include proofrolling of the exposed subgrade with a loaded dump truck. If unsuitable material were disclosed, the geotechnical engineer would recommend an appropriate remedial measure at that time. The silty clay soils encountered just beneath the pavement surface will be sensitive to moisture and heavy construction equipment, and may require aeration and re-compaction or undercutting to reach firm subgrade. The severity of this potential problem depends on the weather conditions prevailing during construction.

The contractor should exercise discretion when selecting equipment sizes and also control surface water while the subgrade soils are exposed. It may be necessary to undercut and stabilize the proposed pavement areas with crushed stone, or use a geotextile fabric to improve the subgrade, especially if the sitework is done during wet weather conditions.

### **4.2 Engineered Fill**

Engineered fill should be placed on a prepared subgrade that has been evaluated by the geotechnical engineer. Engineered fill placed in the building pad should be compacted to at least 98 percent of the standard Proctor maximum dry density (ASTM D-698). Fill placed in paved areas may be compacted to 95 percent. The geotechnical engineer or his representative should monitor engineered fill placement and compaction operations. Field density tests should be performed on each lift as necessary to insure that the specified compaction is being achieved.

### **4.3 Foundation Excavations**

All foundation excavations should be evaluated by the geotechnical engineer or his representative to insure adequate foundation support. All concrete for foundations should be poured the same day the excavation is made.



## 5.0 QUALIFICATIONS

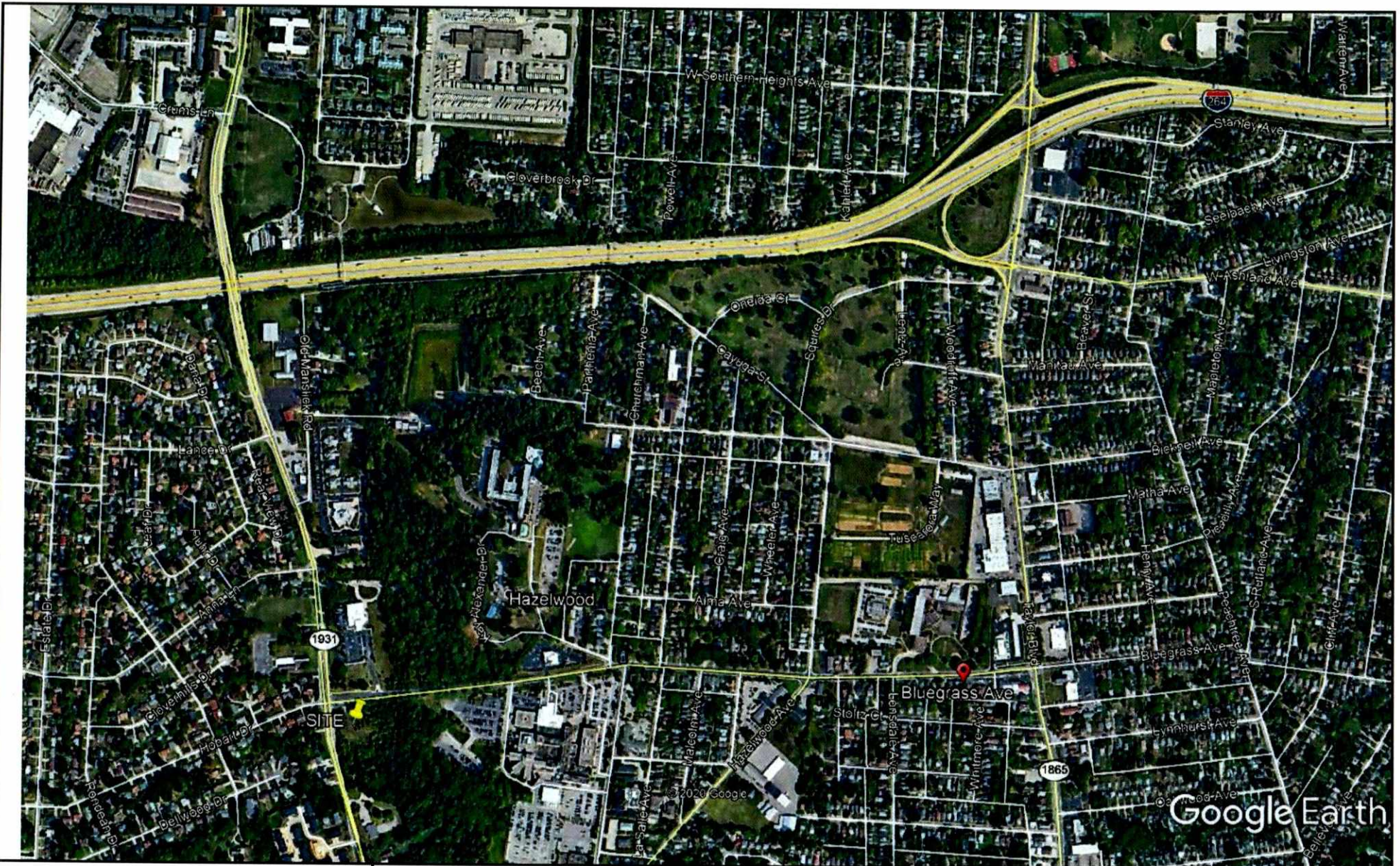
Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either express or implied. Asher, Inc. is not responsible for the independent conclusion, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

The nature and extent of variation and change in the subsurface conditions at the site may not become evident until the course of construction. Construction monitoring by the geotechnical engineer or his representative is therefore considered necessary to verify the subsurface conditions and to check that the soil connected construction phases are properly carried out. If significant variations or changes are in evidence, it may then be necessary to reevaluate the recommendations of this report.

Furthermore, if the project characteristics are altered significantly from those discussed in this report, if the project information contained in this report is incorrect, or if additional information becomes available, a review must be made to determine if any modification in the recommendations will be required.

**APPENDIX**

**Site Location Photograph  
Location of Test Borings  
Thickness of Old Fill  
Test Boring Logs**



**Marian Development**

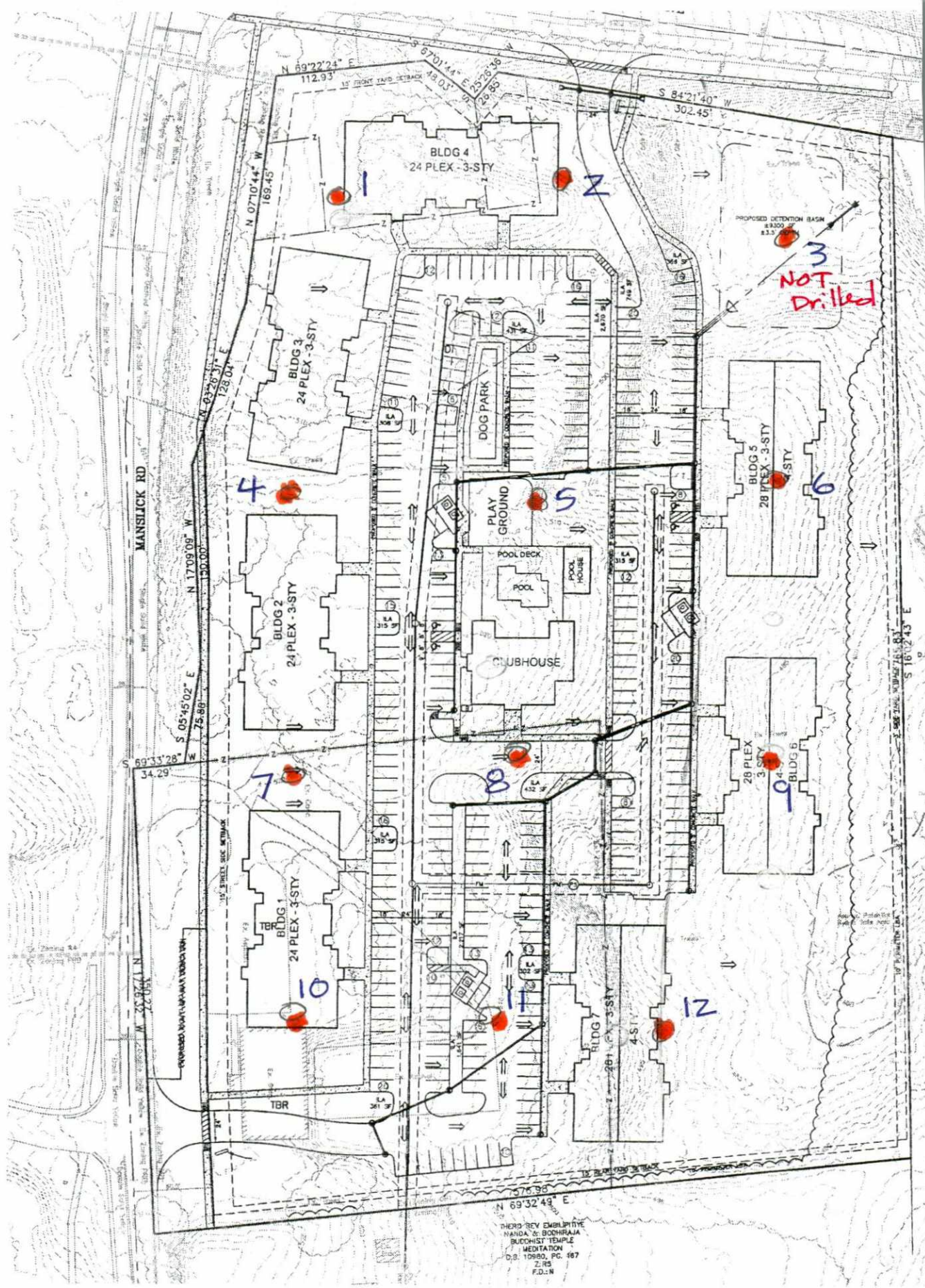
**Site Location  
Bluegrass Avenue At Manslick Road  
Louisville, KY**

**Asher Engineering, Inc.  
Project No.: 20-114  
Photo Date September 2019**

**20-ZONE-0096**



CONTAINING HAZARDOUS MATERIALS SHALL BE LOCATED AWAY FROM STREAMS, CATCH BASINS, STOCKPILES SHALL BE ADEQUATELY CONTAINED BY FENCE. ALL EXCAVATION ACTIVITIES MUST UTILIZE LOW-WATER TABLE PER MSD STANDARD DRAWING. LAND DISTURBANCE ACTIVITY WILL BE LIMITED TO ANY PORTION OF A SITE. EROSION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED THROUGHOUT THE ACTIVITY HAS CEASED. SEDIMENT TRAPPING DEVICES SHALL BE INSTALLED DURING OTHER EXCAVATION ACTIVITIES PRIOR TO A STREAM, POND, SWALE OR

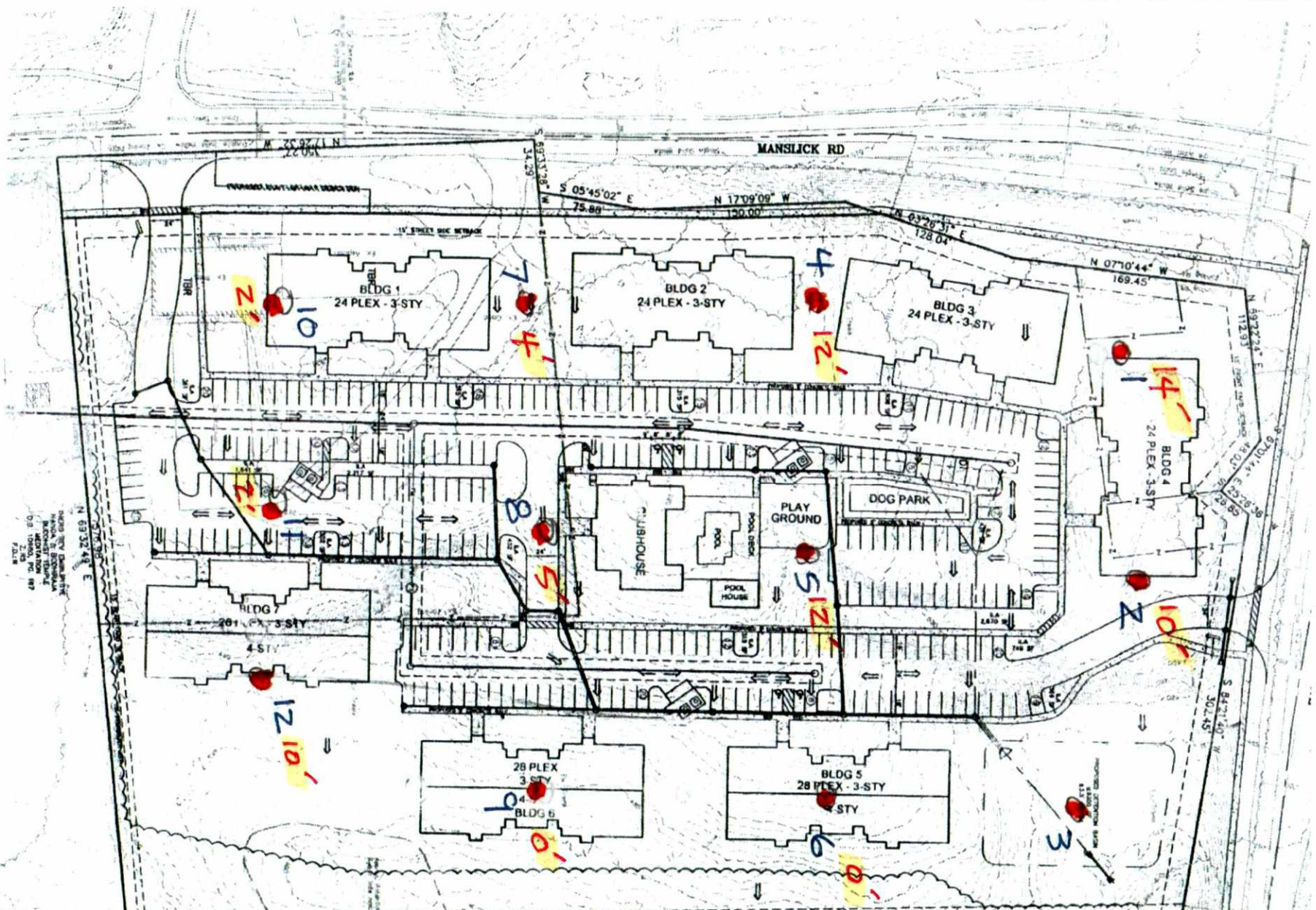


LOCATION OF TEST BORINGS

20-ZONE-0096

TO MINIMIZE THE TRACKING OF  
 DUST AND OTHER PARTICULATES  
 FROM THE ROADWAY SHALL BE  
 LOCATED AWAY FROM STREAMS,  
 TRENCHES, STORMWATER  
 COLLECTION SYSTEMS,  
 AND ADEQUATELY CONTAINED  
 FENCE.

5. MUST UTILIZE LOW-WATER  
 PERMS STANDARD DRAWING  
 LAND DISTURBANCE ACTIVITY WILL  
 BE LIMITED TO ANY PORTION OF A SITE  
 THAT IS NOT NEARER THAN 14  
 FEET TO A STREAM, POND, SWALE OR  
 OTHER EXCAVATION ACTIVITIES  
 SHALL BE LIMITED TO A STREAM, POND, SWALE OR  
 OTHER EXCAVATION ACTIVITIES  
 PRIOR TO A STREAM, POND, SWALE OR  
 OTHER EXCAVATION ACTIVITIES



Thickness of old fill

XX'

20-ZONE-0096

# BORING LOG

**Asher Engineering**  
 1021 South Floyd St.  
 Louisville, KY 40203  
 (502) 589-0073

Boring No.: 1

ELEV.: \_\_\_\_\_

Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 12, 2020

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	2-3-7	10		<b>FILL</b> - 3" of Topsoil; moist to v. moist; firm; brown silty clay soil with rock, crushed stone, concrete and trace of shale, cinders and asphalt  Same - v. moist; med. firm to firm; brown with blue and dark gray silty clay with rock, crushed stone, and concrete  Same - v. moist (wet); med. firm (softer); dark gray, blue gray, and olive brown very silty clay with trace shale fragments and crushed stone  <b>SILTY CLAY (CL)</b> - moist; stiff; olive gray; silty; with trace organic debris (original ground line)  <i>Ground water near 18 ft.</i> Same - moist; v. stiff; red brown; with trace rock and shale fragments  <b>Terminated at 20 ft.</b>
		2	6-17-8	25		
		3	2-2-2	4		
	5					
		4	3-4-4	8		
		5	2-2-2	4		
	10					
		6	4-6-7	13		
	15					
		7	8-9-13	22		
	20					
	25					

**Notes:** 3" of topsoil, approximately 12 ft. to 13 ft. of old fill; groundwater noted near 18 ft.

# TEST PIT LOG

Asher Engineering

1021 South Floyd St.  
Louisville, KY 40203  
(502) 589-0073

Test Pit No.: 2

ELEV.: \_\_\_\_\_

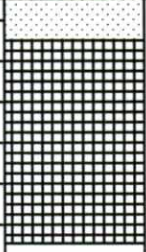
Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 13, 2020

Elev (feet)	Depth (feet)	Soil Profile	Percent Moisture	Description of Material
	5			<p><b>Fill</b> - 3" topsoil; moist to very moist; medium firm; brown and gray silty clay soil with organics, rock, concrete (slabs); asphalt</p> <p>Same - moist to v. moist; med. firm; olive gray silty clay with asphalt and trace organics</p> <p>Same - moist; med. firm; brown and olive gray silty clay with trace asphalt</p>
	10			<p><b>Terminated at 10 ft.</b></p>
	15			
	20			
	25			

**Notes:** Test pit performed at Boring #2 location



# BORING LOG

**Asher Engineering**

1021 South Floyd St.

Louisville, KY 40203

(502) 589-0073

Boring No.: 3

ELEV.: \_\_\_\_\_

Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 12, 2020

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	5					Not Drilled. Not Accessible.
	10					
	15					
	20	7	3-4-5	9		Same - v. moist; stiff; olive brown and gray; very silty
	25					<b>Terminated at 20 ft.</b>

**Notes:** 4" of topsoil, approximately 10 ft. to 13 ft. of old fill; perched water near 8.5 ft.

# BORING LOG

**Asher Engineering**

1021 South Floyd St.  
Louisville, KY 40203  
(502) 589-0073

Boring No.: 4

ELEV.: \_\_\_\_\_

Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 12, 2020

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	1-1-2	3		<b>FILL</b> - 4" of Topsoil; moist to v. moist; soft to med. firm; gray and brown with trace red silty clay soil with rock and concrete  Same - moist ; med. firm to firm; olive gray and dark gray very silty clay with cinders and asphalt  Same - v. moist (wet); med. firm (softer); olive gray and brown very silty clay with asphalt  <b>SILTY CLAY (CL)</b> - moist; stiff; olive gray and brown with gray; with trace organic debris (original ground line)  <i>Ground water near 17 ft.</i>  Same - v. moist; stiff; red brown with tan; with trace rock fragments  <b>Terminated at 20 ft.</b>
		2	2-2-2	4		
	5	3	2-18-6	24		
		4	4-4-2	6		
	10	5	4-2-2	4		
	15	6	3-4-7	11		
	20	7	3-4-5	9		
	25					

**Notes:** 4" of topsoil, approximately 10 ft. to 12 ft. of old fill; groundwater noted near 17 ft.

# BORING LOG

**Asher Engineering**  
 1021 South Floyd St.  
 Louisville, KY 40203  
 (502) 589-0073

Boring No.: 5

ELEV.: \_\_\_\_\_

Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 12, 2020

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	3-4-7	11		<b>FILL</b> - 4" of Topsoil; v. moist (wet); med. firm; brown with trace gray silty clay soil with rock, stone, and concrete  Same - moist ; firm; brown silty clay soil with trace rock, concrete, and organics <i>Perched water near 8.5 ft.</i> Same - v. moist; firm; dark gray and olive brown; with trace rock and organics  <b>SILTY CLAY (CL)</b> - moist; stiff; brown with gray; silty; with trace organics (original ground line)  Same - v. moist; stiff; olive brown and gray; very silty  <b>Terminated at 20 ft.</b>
		2	2-2-3	5		
		3	2-3-20	23		
	5					
		4	3-3-4	7		
		5	3-5-5	10		
	10					
		6	3-5-6	11		
	15					
		7	3-4-5	9		
	20					
	25					

**Notes:** 4" of topsoil, approximately 10 ft. to 13 ft. of old fill; perched water near 8.5 ft.

# TEST PIT LOG

**Asher Engineering**

1021 South Floyd St.

Louisville, KY 40203

(502) 589-0073

Test Pit No.: 6

ELEV.: \_\_\_\_\_

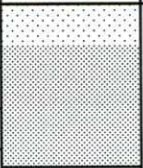
Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 13, 2020

Elev (feet)	Depth (feet)	Soil Profile	Percent Moisture	Description of Material
				<b>Topsoil - 4" thick</b>
	5			<b>SILTY CLAY (CL)</b> - moist to v. moist; med. firm; brown and olive gray; very silty
	10			<b>Terminated at 10 ft.</b>
	15			
	20			
	25			

Notes: Test pit performed at Boring #6 location

# BORING LOG

**Asher Engineering**  
 1021 South Floyd St.  
 Louisville, KY 40203  
 (502) 589-0073

Boring No.: 7

ELEV.: \_\_\_\_\_

Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 12, 2020

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	2-4-4	8		<b>FILL</b> - 4" of Topsoil; moist; firm to med. firm; brown and dark brown silty clay soil; with trace brick; very silty
		2	2-2-3	5		
		3	2-2-3	5		
	5					<b>SILTY CLAY (CL)</b> - v. moist; med. stiff; brown; silty; (possible fill to 6 ft.)
		4	4-5-5	10		Same - moist; stiff to v. stiff; brown and red with olive gray and trace tan; becoming weather shale soil
	10	5	4-6-8	14		
		6	17-22-50/5"	n/a		Weathered Shale - dry; hard; olive gray and tan; silty; layered
	15					Same
	20					<b>Terminated at 20 ft.</b>
	25					

**Notes:** 4" of topsoil, approximately 4 ft. to 6 ft. of old fill  
 Sounded down to 20 ft.; slow drilling; no refusal encountered

# BORING LOG

**Asher Engineering**

1021 South Floyd St.

Louisville, KY 40203

(502) 589-0073

Boring No.: 8

ELEV.: \_\_\_\_\_

Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 12, 2020

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	4-12-5	17		<b>FILL</b> - 5" of Topsoil; v. moist; med. firm; brown silty clay soil; with crushed stone, concrete, and trace brick fragments
		2	2-4-8	12		
		3	4-4-4	8		
	5					Same - moist; firm; brown very silty clay soil
		4	3-2-3	5		<b>ORGANIC CLAY (OL)</b> - v. moist; med. firm to soft; gray; with trace old soil fill; low recovery
		5	3-3-6	9		<b>SILTY CLAY (CL)</b> - v. moist; med. stiff to stiff; olive gray; very silty; trace organic odor
	10					
		6	5-7-9	16		Same - moist; stiff to v. stiff; red with tan; with very silty layers and trace rock fragments
	15					
	20					<b>Terminated at 20 ft.</b>
	25					

**Notes:** 5" of topsoil, approximately 4 ft. to 6 ft. of old fill over very silty dark gray organic soil to near 8 ft.  
Sounded down to 20 ft.; no refusal encountered

# TEST PIT LOG


**Asher Engineering**  
 1021 South Floyd St.  
 Louisville, KY 40203  
 (502) 589-0073

Test Pit No.: 9

ELEV.: \_\_\_\_\_  
 Project: Crossings at Mill Creek  
 Location: Bluegrass Ave., Louisville, KY  
 Client: Marian Development

Project No.: 20-114

Date: November 13, 2020

Elev (feet)	Depth (feet)	Soil Profile	Percent Moisture	Description of Material
				<b>Topsoil - 12" thick</b> <b>SILTY CLAY (CL)</b> - moist to v. moist; med. firm; brown and olive gray; very silty Same
	5			<b>Terminated at 4 ft.</b>
	10			
	15			
	20			
	25			

**Notes:** Test pit performed at Boring #9 location

# BORING LOG

**Asher Engineering**  
 1021 South Floyd St.  
 Louisville, KY 40203  
 (502) 589-0073

Boring No.: 10

ELEV.: \_\_\_\_\_

Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 12, 2020

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	1-2-3	5		<b>FILL</b> - 5" of Topsoil; v. moist; med. firm; red brown silty clay soil; with trace organics
		2	3-5-6	11		
	5	3	5-6-11	17		<b>SILTY CLAY (CL)</b> - moist; stiff to v. stiff; red brown and tan
		4	9-11-15	26		Same - moist to dry; v. stiff; tan with trace dark brown shale fragments; silty
	10	5	7-8-12	20		Same - moist; v. stiff; tan with gray and trace red
	15	6	22-50/5"	n/a		Weathered Shale - dry; hard; olive gray with some dark brown; silty; layered
	20					<b>Terminated at 20 ft.</b>
	25					

**Notes:** 5" of topsoil, approximately 2 ft. of old fill  
 Sounded down to 20 ft.; slow drilling; no refusal encountered



# BORING LOG

**Asher Engineering**  
 1021 South Floyd St.  
 Louisville, KY 40203  
 (502) 589-0073

**Boring No.:** 11

**ELEV.:** \_\_\_\_\_

**Project:** Crossings at Mill Creek

**Project No.:** 20-114

**Location:** Bluegrass Ave., Louisville, KY

**Client:** Marian Development

**Date:** November 12, 2020

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	1-2-3	5		<b>FILL</b> - 4" of Topsoil; moist; med. firm; brown silty clay soil; very silty
		2	2-2-3	5		
	5	3	2-3-3	6		<b>SILTY CLAY (CL)</b> - v. moist to moist; med. stiff; brown; very silty; (possible fill)
		4	2-3-4	7		
	10	5	6-7-11	18		Same - moist; v. stiff; brown with tan, gray, and red
		6	9-11-9	20		
	15					Same - moist; v. moist; brown and tan; with oxidation; becoming tan and gray shale
	20					<b>Refusal at 19 ft.</b>
	25					

**Notes:** 4" of topsoil, approximately 2 ft. to 5 ft. of old fill  
 Sounded down to 19 ft.; refusal

# BORING LOG

**Asher Engineering**

1021 South Floyd St.

Louisville, KY 40203

(502) 589-0073

Boring No.: 12

ELEV.: \_\_\_\_\_

Project: Crossings at Mill Creek

Project No.: 20-114

Location: Bluegrass Ave., Louisville, KY

Client: Marian Development

Date: November 12, 2020

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	2-2-3	5		<b>FILL</b> - 7" of Topsoil; v. moist to moist; med. firm; brown and dark brown with olive gray and red silty clay soil; with trace rock, concrete, and organics  Same - moist; med. firm; brown and olive gray very silty clay soil  <b>ORGANIC CLAY (OL)</b> - v. moist; med. firm to soft; dark brown and gray with some black; with trace organics  <b>SILTY CLAY (CL)</b> - v. moist to moist; stiff; red brown with tan  <i>Groundwater at 19 ft.</i> Same - moist with wet zones; stiff to v. stiff; red and tan; with trace rock and shale  <b>Terminated at 20.5 ft.</b>
		2	2-7-7	14		
		3	2-3-3	6		
	5	4	2-3-3	6		
		5	2-2-2	4		
	10	6	3-4-4	8		
		7	6-7-18	25		
	15					
	20					
	25					

**Notes:** 7" of topsoil, approximately 8 ft. to 10 ft. of old fill over a layer of organic soil to near 11 ft. Sounded down to 20 ft.; no refusal encountered