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Geotechnical • Construction Materials • Environmental • Facilities

September 22, 2020

Mr. Kelli Jones
Sabak, Wilson & Lingo, Inc.
608 South Third Street
Louisville, Kentucky 40202

Reference: **Lyndon Green Subdivision – Subsurface Evaluation**
1900 Washington Boulevard
Louisville, Jefferson County, Kentucky 40228
ECS Project No. 61:2373

Dear Ms. Jones:

ECS Southeast, LLP (ECS) conducted a subsurface exploration for the referenced site in accordance with ECS Proposal No. 61:P2029, dated August 13, 2020. This exploration is an extension of the previously conducted ECS Project No. 61:2296, Preliminary Slope Evaluation – Lyndon Green Subdivision provided a report to Sabak, Wilson & Lingo, Inc., dated 04/29/2020.

Purpose

The purpose of the evaluation was to explore the materials along slopes greater than 30% that will be disturbed during construction, the depth to bedrock and the shear strength of the soils in these areas are required to be analyzed by a geotechnical engineer per the county development code (Section 4.7.4 of the Land Development Code).

Project Information

Refer to the attached ECS Project No. 61:2296, **Preliminary Slope Evaluation – Lyndon Green Subdivision**.

Geology

Refer to the attached ECS Project No. 61:2296, **Preliminary Slope Evaluation – Lyndon Green Subdivision**.

Soil Conservation Service Soil Survey

Refer to the attached ECS Project No. 61:2296, **Preliminary Slope Evaluation – Lyndon Green Subdivision**.

Site Reconnaissance

Refer to the attached ECS Project No. 61:2296, **Preliminary Slope Evaluation – Lyndon Green Subdivision**.

Subsurface Summary

Six (6) borings were drilled on August 25-31, 2020 Using a hand auger and Dynamic Cone Penetrometer (DCP). The approximate test pit locations were established with a consumer-grade GPS device. A drive rod was extended in each boring, below the encountered hand auger refusal, to determine the approximate refusal depth. Refusal was encountered approximately 2.3 to 3.9 feet below existing grades. Materials encountered at each location were logged. Brief descriptions are provided in the following **Boring Summary**. Refer to the **Boring Location Diagram** for the test pit locations, and the **Boring Records** for the depths of materials encountered at each location.

20-MSUB-0005

Boring Summary

APPROXIMATE DEPTH (FT)	STRATUM	DESCRIPTION	N-VALUES BLOWS PER FOOT (BPF)(2)
0.0 – 0.8	I	**TOPSOIL –** Approximately 6 to 10 inches of topsoil encountered at the surface materials in all borings.	NA
0.5 – 2.3	II	**CLAY (CL-CH) –** Orange brown to brown, moderate to high plasticity, soft to very stiff, moist, silty clay (CL-CH), with trace black oxide nodules and root fibers. Encountered below Stratum I in all borings.	3 - 26
1.1 – 3.7	III	**CLAY (CH) –** Orange and/or red orange, high plasticity, stiff to hard, moist, silty clay, (CH), with trace black oxide nodules and varying amounts of chert and weathered limestone fragments/cobbles. Encountered below Stratum II in all borings.	12 - 22
1.8 – 3.9	IV	**LIMESTONE –** A thin layer of yellow to light gray, completely to highly weathered limestone encountered above the termination depth in borings.	NA
REFUSAL	Refusal was encountered approximately 2.3 to 3.9 feet below existing grades.		
GROUNDWATER	Groundwater was not encountered at the time of drilling. However, groundwater seepage at the soil/rock interface and within the underlying limestone onsite is common and should be anticipated.		

Notes:

(1) This summary is generalized and does not describe the actual conditions in each boring. These zones also may not occur at each location. Depths are approximate. Detailed descriptions of the encountered materials are listed on the **Boring Records** in the **Appendix**.

(2) Number of blows to drive the dynamic cone penetrometer 1.75 inches has been empirically correlated to the Standard Penetration Test value "N" in blows per foot.

Laboratory Test Summary

STRATUM	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONFINED COMPRESSIVE STRENGTH (ksf)	UNDRAINED SHEAR STRENGTH (psf)	UNIFIED SOIL CLASSIFICATION
II	13.8 – 23.2	51	23	28	2.6 – 9.0	2,250 – 4,500	CL-CH
III	22.7 – 28.1	61	26	35	7.0 – 9.0	3,500 – 4,500	CH

Notes:

(1) A more detailed summary of the laboratory test results is included on the **Boring Records** and **Laboratory Reports** in the **Appendix.** Detailed descriptions of the laboratory test methods are listed in the **Laboratory Procedures** section of the **Appendix**.

Findings

The subsurface exploration did not reveal any additional instability concern as it pertains to Section 4.7.4 and 4.7.5 of the Land Development Code. See below for a revised summary of findings as presented in ECS report dated April 29, 2020.

Based on our review of the above reference observations and information, and on our past experience with site development for similar conditions in Jefferson County, the on-site slopes (excluding small, localized erosion features along swales and streams) in the observed areas were stable at the time of our reconnaissance. Evidence of minor instability was observed in an isolated area in the north and east portions of the site (Slope Area).

The current, on-site localized slope instability observed likely is related to the following factors:

- Relatively thin depths of soil in slope areas
- Cohesive (clayey) soil matrix
- Rocky soil texture
- Limestone bedrock
- Numerous trees and other vegetation
- Groundwater seepage from shallow bedrock

Based on the conditions observed, our opinion is that additional geotechnical exploration/analyses including soil/rock test borings/coring, shear strength tests of soils, etc. are not required for most of the evaluated on-site slopes, provided that the planned subdivision is designed and constructed utilizing the guidelines included in this report. The north portions of the site, as shown in the shaded ("contains slopes > 20%" area) where minor instability was observed should be further investigated during the construction phase of the project once the location and planned elevation of the proposed structures and related improvements are known.

The following guidelines should be used to help maintain the stability of the existing and planned slopes during the design and construction of the new subdivision, and over the life of the new homes. These guidelines include:

- ECS should be contacted to review and evaluate specific foundation and design plans prior to and during construction.
- All foundations should to bear entirely on competent rock (sound and continuous).
- Groundwater seepage should anticipated. Plan to install foundation and sub-floor drainage systems for structures bearing entirely on rock or near the soil/rock interface.
- Plan grading to minimize changes to existing topography along slopes.
- Minimize disturbance to slopes and vegetation outside new construction areas.
- Avoid significant transverse cuts along face or at the toe of existing slopes.
- Avoid significant embankments on the face, or along or at the crest of existing slopes.
- Maintain the following limits for new embankments without additional geotechnical exploration and analysis:
  - 3:1 (horizontal:vertical) or flatter slopes.
  - Properly strip all vegetation, topsoil, etc. where fill will be placed.
  - Construct embankments with controlled fill compacted to at least 98 percent of the Standard Proctor maximum dry density and within 2 percent of the optimum moisture content.
  - Maximum fill embankment height – 5 feet.
  - Horizontally bench new fill into existing slopes in maximum one-foot vertical steps.
- Maintain the following limits for new cuts in soil without additional geotechnical exploration and analysis:
  - 3:1 (horizontal:vertical) or flatter slopes.
  - Maximum cut height – 5 feet.
- Provide adequate erosion and surface water drainage control during construction and over the life of the subdivision.
- Establish permanent vegetative cover as soon as practical.

Closing

We appreciate the opportunity to serve as your geotechnical consultants for this project. We look forward to future association with you on this and other projects.

Respectfully submitted,
ECS Southeast, LLP

William "Grant" Hess
Project Manager

G.T. Vandevelde, P.E.
Principal Engineer
Kentucky License No. 14708

Attachments: Site Vicinity Map
Boring Location Diagram
Soil & Rock Classification
Boring Legend
Boring Records
Boring Composite
Field & Laboratory Procedures
ECS Project No. 61:2296, Preliminary Slope Evaluation – Lyndon Green Subdivision

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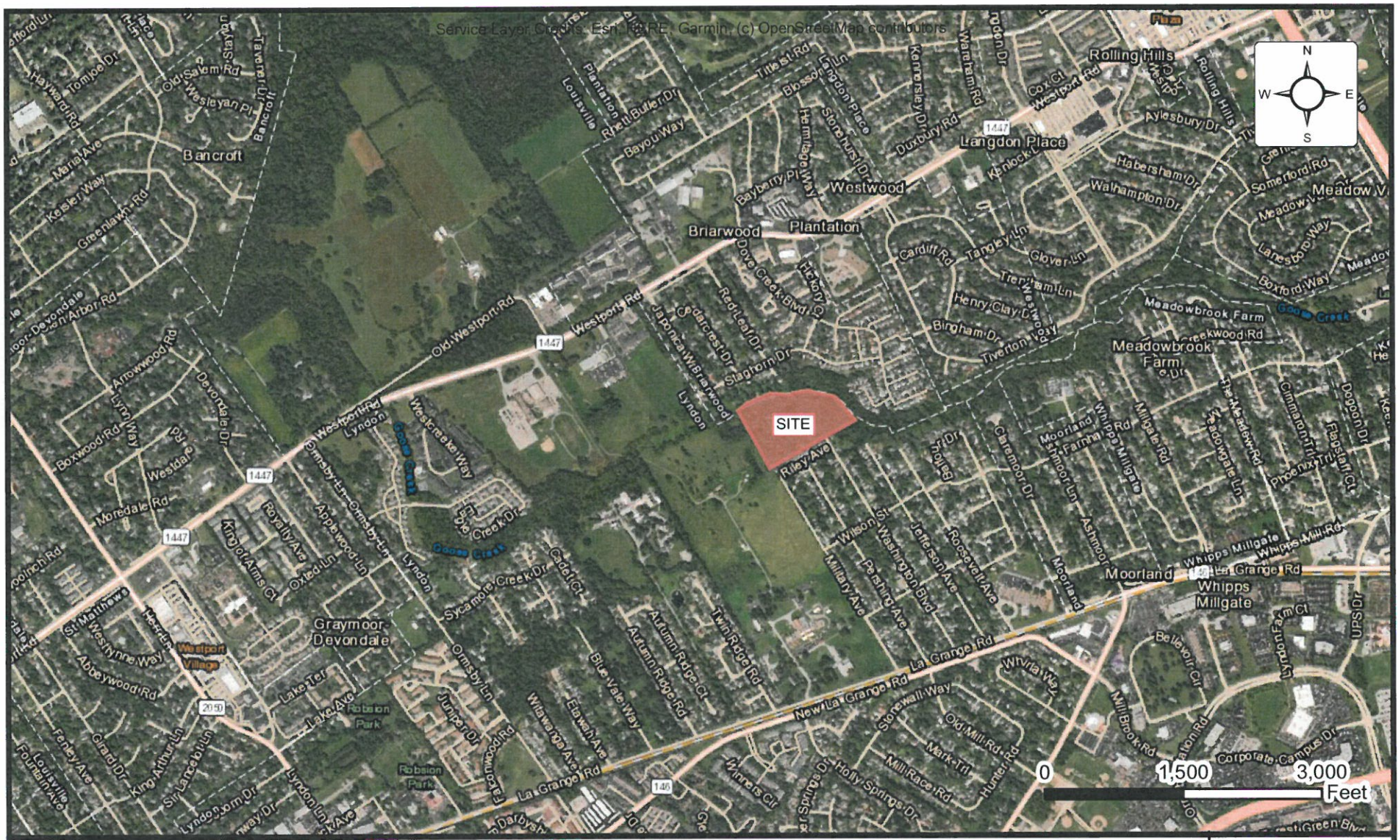
20-MSW3-0005



ECS

RECEIVED
SEP 29 2020
PLANNING & DESIGN SERVICES

Site Vicinity Map
SUBGRADE EVALUATION
LYNDON GREEN SUBDIVISION

1900 WASHINGTON BOULEVARD
LOUISVILLE, JEFFERSON COUNTY, KENTUCKY 40228

ENGINEER	WGH
SCALE	1 " = 1500 '
PROJECT NO.	61:2373
SHEET	1 OF 1
DATE	9/17/2020

ECS Southeast, LLP

SOIL & ROCK CLASSIFICATION

SOIL CLASSIFICATION

MAJOR DIVISIONS			SYMBOLS	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS	Clean Gravels	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SAND AND SANDY SOILS	Clean Sands	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sand, little or no fines
		Sands with fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE	SILTS AND CLAYS	Liquid Limit less than 50	ML	Inorganic silts, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to moderate plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS	Liquid Limit greater Than 50	MH	Inorganic silts, micaeceous or diatomaceous fine sand or silty soils
			CH	Inorganic clays of high plasticity
			OH	Organic clays of moderate to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils with high organic contents

SOIL CONSISTENCY

SPT N: Standard Penetration Test N-Value N^1 – Manual Hammer (Rope & Pulley - 60% Efficiency) N^2 – Automatic Hammer (Free-Fall - 96% Efficiency)

COARSE GRAINED SOILS		
SPT N^1	SPT N^2	Relative Density
0-4	0-3	Very loose
4-10	3-6	Loose
10-30	6-19	Medium dense
30-50	19-31	Dense
> 50	> 31	Very dense

FINE GRAINED SOILS		
SPT N^1	SPT N^2	Field Identification
0-2	0-1	Very soft – Easily penetrated several inches by fist
3-4	2-3	Soft – Easily penetrated several inches by thumb
5-7	3-4	Firm – Can be penetrated several inches by thumb with moderate effort
8-15	5-9	Stiff – Readily indented by thumb but penetrated only with great effort
16-30	10-19	Very stiff – Readily indented by thumbnail
> 30	> 19	Hard – Indented with difficulty by thumbnail

SOIL PARTICLE SIZES

Description	Size Limits	Familiar Example
Boulder	12 inches or more	Larger than basketball
Cobble	3 - 12 inches	Orange to basketball
Coarse gravel	¾ - 3 inches	Grape to orange
Fine gravel	4.75 mm (No. 4 sieve) - ¾ inch	Pea to grape
Coarse sand	2-4.75 mm (No. 10 to 4 sieve)	Rock Salt
Medium sand	0.42-2 mm (No. 40 to 10 sieve)	Table Salt
Fine sand	0.075-0.42 mm (No. 200 to 40 sieve)	Powdered sugar
Silt/Clay/Fines	Less than 0.075 mm (No. 200)	Not visible to naked eye

RELATIVE PROPORTIONS

Description	Percent
Trace	1-5
Few	5-15
Little	15-30
Some	30-50
Mostly	50-100

ROCK CONTINUITY

Description	Core Recovery (%)
Incompetent	0-40
Competent	40-70
Fairly Continuous	70-90
Continuous	90-100

ROCK QUALITY DESIGNATION

Description	RQD (%)
Very Poor	0-25
Poor	25-50
Fair	50-75
Good	75-90
Excellent	90-100

ROCK BEDDING

Description	Thickness (in)
Parting	< 0.3
Band	0.3-2.5
Thin Bed	2.5-6.0
Medium bed	6.0-12.0
Thick bed	12.0-36.0
Massive	> 36.0

ROCK HARDNESS (Descriptions for rock core samples)

Description	Definition
Very soft	Can be broken with fingers
Soft	Can be scratched with fingernail; only edges can be broken with fingers
Moderately hard	Can be easily scratched with knife; cannot be scratched with fingernail
Hard	Difficult to scratch with knife; hard hammer blow to break specimen
Very hard	Cannot be scratched with knife; several hard hammer blows to break specimen

ROCK WEATHERING (Descriptions for rock core samples)

Description	Definition
Completely	Rock decomposed to soil; rock fabric and structure completely destroyed
Highly	Most minerals are decomposed; texture indistinct but fabric preserved; strength greatly reduced
Moderately	Discoloration throughout and weaker minerals decomposed; texture preserved but strength less than unweathered rock
Slightly	Discoloration around open fractures; strength preserved
Unweathered	No sign of decomposition

20-MSUB-0005

ECS Southeast, LLP
1762 Watterson Trail
Louisville, Kentucky

BORING RECORD LEGEND

Scale, ft.	Elevation, ft.	Soil Symbol	Material Description and Classification	Depth, ft.	Sample Type	Sample Depth, ft.	Recovery, %	DCP Penetration Test Blows	Ne Value	Water Content, %	Uc, tsf	Comments
1			TOPSOIL	0.5								
			Moderate to high plasticity silty clay, (CL-CH)	1.0								
			High plasticity silty clay, (CH)	1.5								
2			LIMESTONE, weathered	2.0								
3			Abbreviations ATD - At the Time of Test Pit DCP - Dynamic Cone Penetrometer Notes: Dashed lines indicate an estimated or gradual strata change. Solid lines indicate a more precise, measured depth value.									
4			Auger Sample			3.8 - 4.8						
5												

Scale - Proportional distance below the surface.

Elevation - Vertical distance above or below a benchmark.

Soil Symbol - Graphic representation of subsurface material.

Material Description - Account of encountered materials based on ASTM D-2488.

Depth - Distance below the surface to a strata as measured in the field.

Sample Type - Method for collecting soil or rock specimens.

Sample Depth - Collected specimen interval.

Recovery - Percentage of recovered sample material.

DCP Penetration Test Blows - Number of blows to drive a dynamic cone penetrometer three 1.75" increments with a 15-lb. hammer falling 20".

Ne Value - Number of blows to drive the dynamic cone penetrometer the final foot. These blow counts have been corrected for hammer efficiency or other applicable factors. The manual hammer, if used, has an estimated efficiency of 60%. The automatic hammer, if used, has an estimated efficiency of 96%.

Water Content - The weight of water divided by the weight of oven dried soil, expressed as a percentage.

Uc - Unconfined compressive strength.

Comments - Pertinent comments about the conditions encountered.

Remarks: Additional information about the surface, subsurface or other conditions that could impact the exploration results.

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Louisville, Kentucky

BORING RECORD

Project Name	**Lyndon Green Subdivision - Subsurface Evaluation**			Boring No.	B-01
Location	**Louisville, Kentucky**			Project No.	61:2373
Client	**Sabak, Wilson & Lingo, Inc.**			Elevation	597 (a)
Driller	Grant Hess	Rig Type	DCP	Started	8/25/2020
Drill Method	Hand Auger	Hammer Type	Manual	Completed	8/31/2020
Groundwater	Not Encountered ATD			Logged By	G. Hess
				Weather	80's Cloudy

Scale, ft.	Elevation, ft.	Soil Symbol	Material Description and Classification	Depth, ft.	Sample Type	Sample Depth, ft.	Recovery, %	DCP Penetration Test Blows	Ne Value	Water Content, %	Uc, tsf	Comments
			TOPSOIL (9 inches)									
						0.0 - 1.0	100	6-8-6	7			
				0.8								
1	596		CLAY, silty, orange brown, moderate to high plasticity, firm, moist, (CL-CH), with trace root fibers							19.9		
						1.0 - 1.8	100	4-6-7	6	23.2		
			- brown, with few chert fragments below 1.5 feet									
				1.8								
2	595		LIMESTONE, highly to completely weathered, yellow to light gray			1.8 - 2.1	100	5-22-27	24			Hand Auger Refusal encountered at appximately 1.8 feet below existing grades.
				2.3								
3	594		Boring Terminated at Drive Rod Refusal									
4	593											
5	592											

Remarks: (a) The ground surface elevations interpolated to ± 1 foot based on a drawing "3104-DDP Resubmital 2020 07 30", provided by Kelli Jones of Sabak, Wilson & Lingo, Inc. via email, dated August 13, 2020.

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ECS Southeast, LLP
1762 Watterson Trail
Louisville, Kentucky

BORING RECORD

Project Name	**Lyndon Green Subdivision - Subsurface Evaluation**			Boring No.	B-02
Location	**Louisville, Kentucky**			Project No.	61:2373
Client	**Sabak, Wilson & Lingo, Inc.**			Elevation	596 (a)
Driller	Grant Hess	Rig Type	DCP	Started	8/25/2020
Drill Method	Hand Auger	Hammer Type	Manual	Completed	8/31/2020
Groundwater	Not Encountered ATD			Logged By	G. Hess
				Weather	80's Cloudy

Scale, ft.	Elevation, ft.	Soil Symbol	Material Description and Classification	Depth, ft.	Sample Type	Sample Depth, ft.	Recovery, %	DCP Penetration Test Blows	Ne Value	Water Content, %	Uc, tsf	Comments
			TOPSOIL (7 inches)									
				0.6		0.0 - 1.0	100	11-9-9	9			
1	595		CLAY, silty, orange brown, moderate to high plasticity, stiff, moist, (CL-CH), with trace root fibers and chert fragments							18.0		
						1.0 - 2.0	100	9-9-8	8	19.2	2.3	Undisturbed sample obtained from approximately 1.1 to 1.5 feet below existing grades.
2	594											
				2.2								
			CLAY, silty, orange brown, high plasticity, stiff, moist, (CH), with trace chert fragments and black oxide nodules			2.0 - 3.0	100	11-12-13	12	23.9		Liquid Limit: 61 Plastic Limit: 26 Plasticity Index: 35
3	593		- red orange, very stiff, with few chert fragments below 2.8 feet									
				3.2		3.0 - 3.2	100	15-17-18	17	28.1		
			LIMESTONE, completely weathered, yellow gray									Hand Auger Refusal encountered at appximately 3.2 feet below existing grades.
				3.4								
4	592		Boring Terminated at Drive Rod Refusal									
5	591											

Remarks: (a) The ground surface elevations interpolated to ± 1 foot based on a drawing "3104-DDP Resubmital 2020 07 30", provided by Kelli Jones of Sabak, Wilson & Lingo, Inc. via email, dated August 13, 2020.

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1762 Watterson Trail
Louisville, Kentucky

BORING RECORD

Project Name	**Lyndon Green Subdivision - Subsurface Evaluation**			Boring No.	B-03
Location	**Louisville, Kentucky**			Project No.	61:2373
Client	**Sabak, Wilson & Lingo, Inc.**			Elevation	597 (a)
Driller	Grant Hess	Rig Type	DCP	Started	8/25/2020
Drill Method	Hand Auger	Hammer Type	Manual	Completed	8/31/2020
Groundwater	Not Encountered ATD			Logged By	G. Hess
				Weather	80's Cloudy

Scale, ft.	Elevation, ft.	Soil Symbol	Material Description and Classification	Depth, ft.	Sample Type	Sample Depth, ft.	Recovery, %	DCP Penetration Test Blows	Ne Value	Water Content, %	Uc, tsf	Comments
			TOPSOIL (10 inches)									
						0.0 - 1.0	100	6-8-9	8			
				0.8								
1	596		CLAY, silty, orange brown, moderate to high plasticity, stiff to very stiff, moist, (CL-CH), with trace root fibers	1.1						14.3		
			CLAY, silty, red orange brown, high plasticity, very stiff, moist, (CH), with trace chert fragments and black oxide nodules			1.0 - 1.7	100	13-14-16	15	22.7		
2	595		- very stiff to hard, with few chert fragments below 1.8 feet			1.7 - 1.9	100	25-50/1	50/1			
				2.5								
			LIMESTONE, completely weathered, yellow gray	2.7								Hand Auger Refusal encountered at appximately 2.5 feet below existing grades.
3	594		Boring Terminated at Drive Rod Refusal									
4	593											
5	592											

Remarks: (a) The ground surface elevations interpolated to ± 1 foot based on a drawing "3104-DDP Resubmital 2020 07 30", provided by Kelli Jones of Sabak, Wilson & Lingo, Inc. via email, dated August 13, 2020.

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1762 Watterson Trail
Louisville, Kentucky

BORING RECORD

Project Name	**Lyndon Green Subdivision - Subsurface Evaluation**
Location	**Louisville, Kentucky**
Client	**Sabak, Wilson & Lingo, Inc.**
Driller	Grant Hess — Rig Type: DCP
Drill Method	Hand Auger — Hammer Type: Manual
Groundwater	Not Encountered ATD

Boring No.	B-04
Project No.	61:2373
Elevation	597 (a)
Started	8/25/2020
Completed	8/31/2020
Logged By	G. Hess
Weather	80's Cloudy

Scale, ft.	Elevation, ft.	Material Description and Classification	Depth, ft.	Sample Type	Sample Depth, ft.	Recovery, %	DCP Penetration Test Blows	Ne Value	Water Content, %	Uc, tsf	Comments
		TOPSOIL (7 inches)									
			0.6		0.0 - 1.0	100	10-8-10	9			
1	596	CLAY, silty, orange brown, moderate to high plasticity, stiff, moist, (CL-CH), with trace root fibers and chert fragments							17.3		Liquid Limit: 51 Plastic Limit: 23 Plasticity Index: 28
					1.0 - 2.0	100	12-13-12	12	21.7	2.3	Undisturbed sample obtained from approximately 1.5 to 1.9 feet below existing grades.
2	595									4.5	Undisturbed sample obtained from approximately 1.9 to 2.3 feet below existing grades.
			2.3								
		CLAY, silty, red orange, high plasticity, very stiff to hard, moist, (CH), with black oxide nodules and weathered limestone cobbles			2.0 - 3.0	100	15-17-16	16	23.7		
3	594		3.0								
		LIMESTONE, completely weathered, yellow gray			3.0 - 3.2	100	22-50/1	50/1			Hand Auger Refusal encountered at appximately 3.2 feet below existing grades.
			3.4								
		Boring Terminated at Drive Rod Refusal									
4	593										
5	592										

Remarks: (a) The ground surface elevations interpolated to ± 1 foot based on a drawing "3104-DDP Resubmital 2020 07 30", provided by Kelli Jones of Sabak, Wilson & Lingo, Inc. via email, dated August 13, 2020.

20-MSUB-0005

ECS Southeast, LLP
1762 Watterson Trail
Louisville, Kentucky

BORING RECORD

Project Name	**Lyndon Green Subdivision - Subsurface Evaluation**			Boring No.	B-05
Location	**Louisville, Kentucky**			Project No.	61:2373
Client	**Sabak, Wilson & Lingo, Inc.**			Elevation	596 (a)
Driller	Grant Hess	Rig Type	DCP	Started	8/25/2020
Drill Method	Hand Auger	Hammer Type	Manual	Completed	8/31/2020
Groundwater	Not Encountered ATD			Logged By	G. Hess
				Weather	80's Cloudy

Scale, ft.	Elevation, ft.	Soil Symbol	Material Description and Classification	Depth, ft.	Sample Type	Sample Depth, ft.	Recovery, %	DCP Penetration Test Blows	Ne Value	Water Content, %	Uc, tsf	Comments
			TOPSOIL (6 inches)									
				0.5		0.0 - 1.0	100	3-3-3	3			
1	595		CLAY, silty, orange brown, moderate to high plasticity, soft moist, (CL-CH), with trace root fibers and chert fragments							20.1		
			- stiff, with few weathered limestone cobbles below 1.2 feet	1.4							4.5	Undisturbed sample obtained from approximately 1.2 to 1.6 feet below existing grades.
2	594		CLAY, silty, red orange, high plasticity, stiff to very stiff, moist, (CH), with trace chert fragments and black oxide nodules			1.0 - 2.0	100	12-11-13	12	21.3		
			- with some weathered limestone cobbles below 1.9 feet			2.0 - 2.1	100	50/1	50/1	21.5	3.5	Undisturbed sample obtained from approximately 1.7 to 2.0 feet below existing grades.
3	593											Hand Auger Refusal encountered at appximately 2.1 feet below existing grades.
				3.7								
4	592		LIMESTONE, completely weathered, yellow gray	3.9								
			Boring Terminated at Drive Rod Refusal									
5	591											

Remarks: (a) The ground surface elevations interpolated to ± 1 foot based on a drawing "3104-DDP Resubmital 2020 07 30", provided by Kelli Jones of Sabak, Wilson & Lingo, Inc. via email, dated August 13, 2020.

20-MSW-0005

ECS Southeast, LLP
1762 Watterson Trail
Louisville, Kentucky

BORING RECORD

Project Name	**Lyndon Green Subdivision - Subsurface Evaluation**			Boring No.	B-06
Location	**Louisville, Kentucky**			Project No.	61:2373
Client	**Sabak, Wilson & Lingo, Inc.**			Elevation	595 (a)
Driller	Grant Hess	Rig Type	DCP	Started	8/25/2020
Drill Method	Hand Auger	Hammer Type	Manual	Completed	8/31/2020
Groundwater	Not Encountered ATD			Logged By	G. Hess
				Weather	80's Cloudy

Scale, ft.	Elevation, ft.	Soil Symbol	Material Description and Classification	Depth, ft.	Sample Type	Sample Depth, ft.	Recovery, %	DCP Penetration Test Blows	Ne Value	Water Content, %	Uc, tsf	Comments
			TOPSOIL (6 inches)									
				0.5								
1	594		CLAY, silty, orange brown, moderate to high plasticity, stiff to very stiff, moist, (CL-CH), with trace root fibers, chert fragments, and black oxide nodules			0.0 - 1.0	100	5-10-11	10	14.2		
2	593					1.0 - 2.0	100	21-24-28	26	13.8		Liquid Limit: 51 Plastic Limit: 23 Plasticity Index: 28
				2.3								
3	592		CLAY, silty, red orange, high plasticity, very stiff, moist,(CH), with trace chert fragments and black oxide nodules - with some weathered limestone cobbles below 2.8 feet			2.0 - 2.8	100	18-22-23	22	24.6		
						2.8 - 3.1	100	18-18-21	19			
				3.1								
4	591		LIMESTONE, completely weathered, yellow gray									Hand Auger Refusal encountered at appximately 3.1 feet below existing grades.
				3.7								
5	590		Boring Terminated at Drive Rod Refusal									

Remarks: (a) The ground surface elevations interpolated to ± 1 foot based on a drawing "3104-DDP Resubmital 2020 07 30", provided by Kelli Jones of Sabak, Wilson & Lingo, Inc. via email, dated August 13, 2020.

20-MSUB0005

ECS Southeast, LLP

1762 Watterson Trail
Louisville, Kentucky

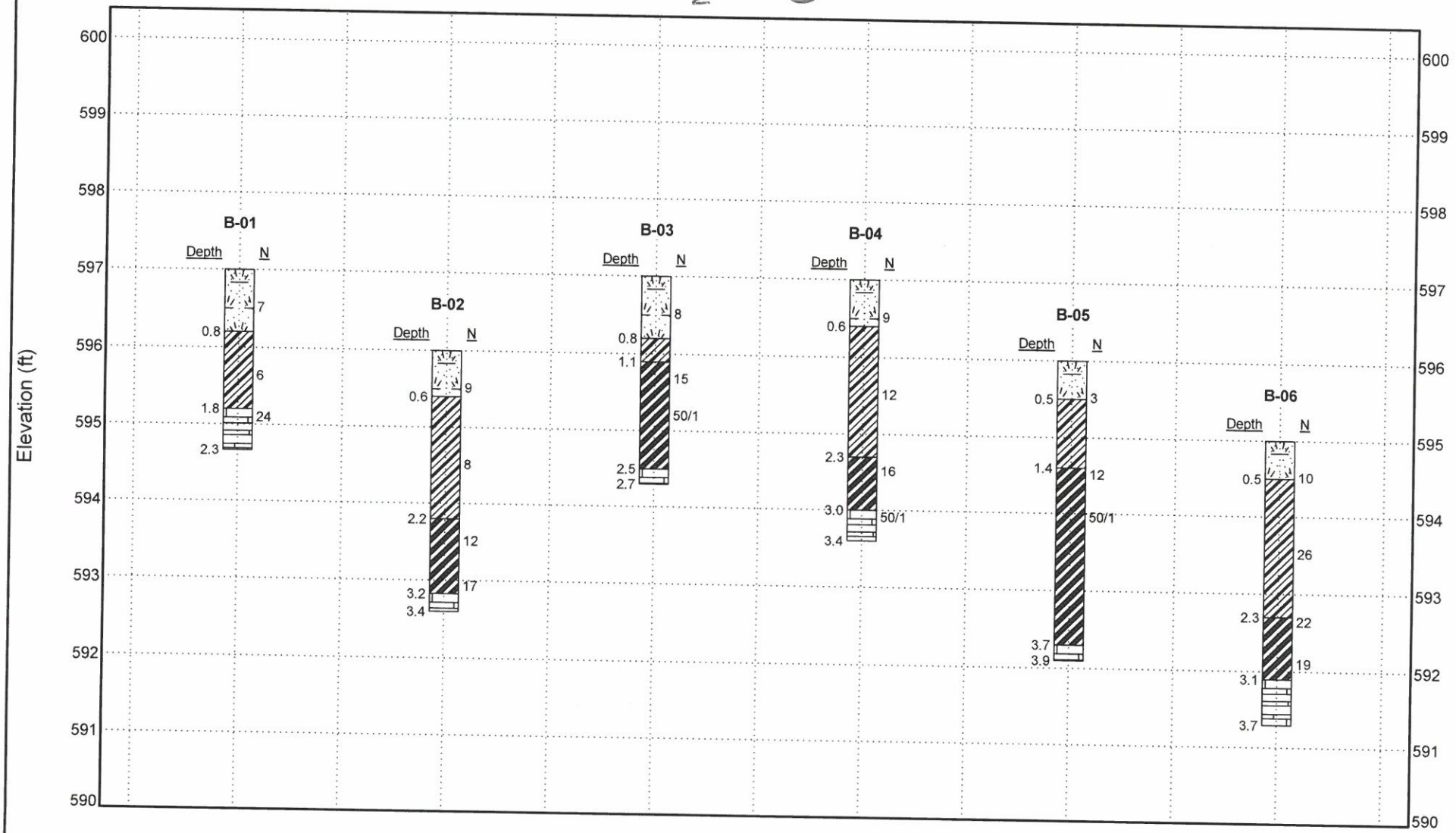
CLIENT Sabak, Wilson & Lingo, Inc.

PROJECT NUMBER 61:2373

BORING COMPOSITE

PROJECT NAME Lyndon Green Subdivision - Subsurface Evaluation

PROJECT LOCATION Louisville, Kentucky



20-MSub-0

Field Procedures

General

ECS conducts field sampling and testing procedures in general accordance with methods of the American Society for Testing Materials (ASTM) and widely accepted geotechnical engineering standards. A brief description of the procedures we utilize is provided in the following paragraphs.

Boring Locations and Elevations

Boring locations typically are selected by our project manager. The project manager establishes the boring locations in the field by pacing or measuring distances, and estimating angles relative to existing site landmarks. When topographic plans of the site are provided, the project manager estimates the surface elevation of the boring locations using available information. Surveying to determine the locations and elevations of the borings is beyond the scope of typical geotechnical studies; therefore, the boring locations and elevations should be considered approximate.

Dynamic Cone Penetrometer Tests (ASTM STP-399)

The Dynamic Cone Penetrometer (DCP) uses a 15 lb (6.8 kg) steel mass falling 20 in (50.8 cm) that strikes an anvil to cause penetration of a 1.5 in (3.8 cm) diameter cone (45° vertex angle) that has been seated in the bottom of a hand augered hole. The blows required to drive the embedded cone a depth of 1-3/4 in have been correlated to N values derived from the Standard Penetration Test (SPT). Experience has shown that the DCP can be used effectively in augered holes to depths of 15 to 20 ft. (4.6 to 6.1 m).

Boring Records

Our interpretation of the conditions encountered at each location is indicated on the Boring Records, which are prepared from the observations of the GEM field engineer or geologist during drilling or excavation, our engineering review of the soil samples obtained, the results of laboratory testing on selected samples, and our experience with similar subsurface conditions. Soil descriptions are made using the Unified Soil Classification System and/or ASTM D-2488 as guides. The depths designating strata changes are estimations and only representative of depths at that specific boring location. In many geologic settings, the transition between strata is gradual. A Boring Legend, which defines the symbols and other pertinent information presented on the Boring Records, is provided with this report. The subsurface conditions indicated on our Boring Records represent only the conditions encountered at the specific boring location at the time of our exploration. The groundwater observations were made at the time of drilling and may vary with changes in the season and weather.

Refusal

Refusal is the term applied to material that cannot be penetrated with augers or has a standard penetration resistance exceeding 50 blows per 6-inch increment. Refusal may be encountered on continuous bedrock, discontinuous floaters, cemented soil, weathered rock, debris, buried structures, or other hard subsurface materials. Refusal materials can be evaluated only by obtaining a core of the material. This limitation must be considered when evaluating refusal depths where coring is not conducted.

Laboratory Procedures

General

Laboratory tests are generally conducted to satisfy one or more of the following objectives: (1) confirmation of visual-manual soil identification; (2) determination of index values used to estimate soil engineering properties (i.e., strength, compressibility and permeability); or (3) direct measurement of specific soil properties. The tests selected for a given project are dependent on the subsurface conditions encountered, as well as specific project requirements, such as structural loads and planned grade changes. The results of all laboratory tests conducted for this project are listed on the Boring Records, Laboratory Test Data Summary, or laboratory data curves in the Appendix. Brief descriptions of the test procedures are provided below.

Description and Identification of Soils (Visual-Manual Procedure) (ASTM D 2488)

The Visual-Manual Procedure provides a general guide to the engineering properties of soils and enables the engineer to apply past experience to current situations. Samples obtained during the field exploration are examined and visually described and identified by a geotechnical engineer or geologist. The soils are typically identified according to predominant particle size (clay, silt, sand, etc.), consistency (based on apparent stiffness and the number of blows from standard penetration tests), color, moisture and group symbol (CL, CH, SP, SC, etc.). Unless otherwise indicated, the soil descriptions in this report are based on the Visual-Manual Procedure.

Classification of Soils for Engineering Purposes (Unified Soil Classification System) (ASTM D 2487)

The Visual-Manual Procedure described above is primarily qualitative. The Unified Soil Classification System (USCS) is used when precise soil classification is required. The USCS is based on laboratory determination of particle-size characteristics, liquid limit, and plasticity index. Using these test results, the soil can be classified according to the Unified Classification System, which provides an index for estimating soil behavior.

Water (Moisture) Content of Soil (ASTM D 2216)

Moisture content is one of the most important index properties used in establishing a correlation between soil behavior and soil properties such as strength and compressibility. The moisture content, along with the liquid and plastic limits, are used to express the relative consistency or liquidity index of a soil. Increasing moisture contents typically reflect lower strengths for a given soil. The soil moisture content is the ratio, expressed as a percentage, of the mass of "pore" or "free" water in a given mass of soil to the mass of the solid soil. Moisture content samples are taken from the sealed container obtained during the field exploration phase of a project. Each sample is weighed, and then placed in an oven set to 110oC + 5o. Each sample remains in the oven until the free moisture evaporates. Each dried sample is removed from the oven, allowed to cool, and then weighed. The moisture content is computed by dividing the weight of evaporated water by the weight of the dry sample.

Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D 4318)

Depending upon the relative moisture content, a fine-grained soil may occur in a liquid, plastic, or solid state. In current usage, the liquid limit (LL) and plastic limit (PL) of a soil are referred to as the "Atterberg Limits", which establish the approximate moisture contents at which the soil changes state. This test method is an integral part of several engineering classification systems to characterize the fine grained fractions of soils. It is also used with other soil properties to correlate with engineering behavior such as compressibility, permeability, compactability, shrink-swell, and shear strength. The liquid limit is the moisture content at which a soil becomes sufficiently "wet" to behave as a heavy viscous fluid (i.e., transition from plastic to liquid state). It is defined as the moisture content at which the soil, when placed in a standard brass bowl, makes a 1/2-inch closure

in a groove cut through the soil after the bowl is dropped 25 times at a specified height and rate. The plastic limit is the moisture content at which the soil begins to lose its plasticity (i.e., transition from plastic to semi-solid state). It is defined as the lowest moisture content at which the soil can be rolled into 1/8-inch diameter threads without crumbling. The plasticity index (PI) is the difference between the liquid limit and the plastic limit, and is the range of moisture content over which a soil deforms as a plastic material.

Pocket Penetrometer

The pocket penetrometer is a hand-held, spring-loaded rod that measures the penetration resistance of soil. It is used to gauge the approximate unconfined compressive strength of cohesive soils. The strength is measured by applying pressure to the end of the penetrometer thereby pushing the rod tip a prescribed distance into the soil. The unconfined compressive strength is read directly from a scale or gauge on the device.

ECS SOUTHEAST, LLP
"Setting the Standard for Service"
Geotechnical • Construction Materials • Environmental • Facilities

April 29, 2020

Mr. Kelli Jones
Sabak, Wilson & Lingo, Inc.
608 South Third Street
Louisville, Kentucky 40202

Reference: **Preliminary Slope Evaluation – Lyndon Green Subdivision**
1900 Washington Boulevard
Louisville, Jefferson County, Kentucky 40228
ECS Project No. 61:2296

Dear Ms. Jones:

ECS Southeast, LLP (ECS) conducted a preliminary slope evaluation and karst survey for the referenced site in accordance with ECS Proposal No. 61:P1877R1, dated April 01, 2020. A separate Karst Survey Report was issued by ECS on April 20, 2020. The slope survey included the following elements: a review of provided drawings; a review of soil survey information; a review of geologic maps; a review of topographic maps; conduct a visual reconnaissance of indicated steeper slope areas that would be disturbed by new construction; and evaluate the reviewed information and prepare a report of our findings and recommendation.

Project Information

The proposed development on-site includes 38 single-family residential lots and associated roadways. There is approximately 50 feet of fall across the entire site, with up to approximately 22 feet of fall across a single proposed residential development lot. The site included approximately 14.11 acres of a relatively flat open field surrounded by densely wooded areas. Residential buildings (house, barn, and shed) were present at the 1900 Washington Boulevard site in Louisville, Jefferson County, Kentucky. The site slopes down steeply toward Goose Creek along the north and east boundaries of the site.

The "3104-DDP DRAFT 2020 02 27.pdf" provided by Kelli Jones of Sabak, Wilson & Lingo, Inc. via email, dated March 26, 2020 identified existing 20-30% slopes and >30% slopes on the property. A reduced copy of this drawing is attached.

The current Metro Louisville Land Development Code (LDC) 4.7.5 includes requirements for land disturbing activities on slopes greater than 20%. Item B.3 of 4.7.5 states "Land disturbing activities on slopes greater than 20% and less than 30% shall be required to prepare a geotechnical survey report if the staff of the USDA Natural Resources Conservation Service (NRCS) determines such a study is warranted, given the site's soil and geologic characteristics. A geotechnical survey report shall be submitted for land disturbing activities on slopes greater than 30%."

We understand that at present the NRCS is not making the determination of the need for a geotechnical survey report. Accordingly, ECS Southeast, LLP (ECS) was retained to conduct an initial slope evaluation of the site and to determine if additional geotechnical exploration/analyses would be required. Our evaluation consisted of the following tasks:

- Review the Plan
- Review USGS Geologic Quadrangle Map information
- Review USDA NRCS Soil Survey information
- Conduct a visual reconnaissance of indicated steeper slope areas that would be disturbed by new construction
- Evaluate the reviewed information and prepare a report of our findings and recommendations

Geology

The following geologic information is based on the review of: the Anchorage, 24K Quadrangle, Geologic Map, Kentucky, published by the United States Geological Survey (USGS); information (aerial photos, geologic maps, and topographic maps, etc.) obtained from the Kentucky Geological Survey (KGS) Geologic Information Service website; and Google Earth Satellite Imaging.

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The Kentucky Geologic Map Information Service website indicated that majority of the proposed development area (roughly above ~EL 600 to ~EL 610) was underlain by the Sellersburg and Jeffersonville Limestones. The majority of steep slopes were underlain by Louisville Limestone (roughly ~EL 575 to ~EL 610), with the remainder of the site underlain by Laurel Dolomite (roughly below ~EL 575 to ~EL 580).

Above	~EL 600 – 610	Sellersburg and Jeffersonville Limestones
	~EL 575 – 580 to EL 600 – 610	Louisville Limestone
Below	~EL 575 – 580	Alluvium

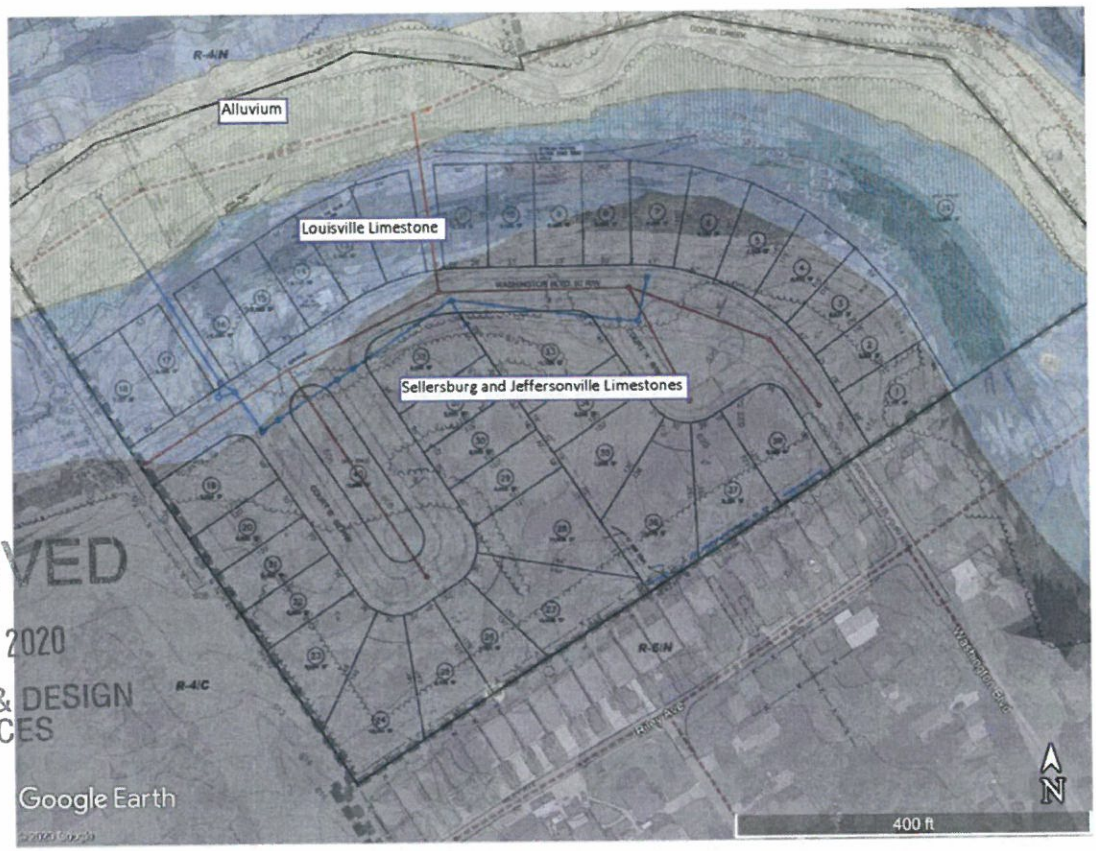

Figure 1: Reported Site Geology

Alluvium (Goose Creek Depositional Plain)

Total Reported Thickness: 0 – 20 feet
Karst Potential: Non-Karst
Primary Lithology: Silt and clay.

Silt and clay; silt, clay along tributary streams may include sand and gravel of locally derived rocks as well. Maximum thickness along Ohio River valley in northwest corner and Harrods Creek where deposits veneer older alluvium. Generally less than 10 feet thick in most tributary valleys; some small areas of bedrock exposure not shown on map.

Louisville Limestone (Slope Areas)

Total Reported Thickness: ± 40 – 80 feet
Karst Potential: Medium
Primary Lithology: Dolomite and Limestone.

Dolomitic limestone and dolomite, yellowish gray to light olive gray, in quarry exposures lower half of unit has brownish cast; finely crystalline; argillaceous in zone above base; pyritic; thin to very thin bedded in upper part, thick bedded near base; bedding defined by stylolites; irregular rubbly bedding common; chert in discontinuous layers in uppermost few feet. Unit thins irregularly northward from between 70 and 80 feet thick along south edge of quadrangle, to between 40 and 45 feet along north edge. Sinks develop in unit on uplands.

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Sellersburg and Jeffersonville Limestones (Uplands, Most of Site)

Total Reported Thickness: ± 23 – 42 feet
Karst Potential: High
Primary Lithology: Limestone.
Members: Beechwood Limestone Member; Silver Creek Limestone Member; and Jeffersonville Limestone.

Beechwood Limestone Member

Limestone, light gray to greenish gray, weathers moderate yellowish brown to light olive gray; coarse to very coarse fossil fragments and whole fossils in matrix of silt sized lime mud or very finely crystalline calcite; and locally cherty. Weathers to porcelaneous residue with well-preserved silicified fossils common. Complete exposures of unit lacking in quadrangle owing to near surface weathering; "trashy" phosphatic zone at base conformity with underlying unit with which it was mapped.

Silver Creek Limestone Member

Limestone, dolomitic, argillaceous, olive gray to light greenish gray; weathers light yellowish gray; crypto-grained to micro-grained; bedding laminated to cross-laminated, marked by faint mottling and scattered thin lenses of very fine to medium fossil fragments. Unconformable on underlying unit with which it was mapped; basal beds pyritic and contain less conspicuous "trashy" layers. Maximum thickness of 7 feet measured along U.S. Highway 42 about 1 mile south of Harrods Creek.

Jeffersonville Limestone

Limestone, olive gray, brownish gray, or medium to light gray; weathers pale yellowish brown to light yellowish gray; fine to very coarse fossil fragments and larger whole fossils abound in matrix of silt to clay sized lime mud, or crystalline calcite; locally dolomitic; pyritic. Some occurrences represented by scattered thin irregular limestone slabs exposed in basement excavations for widespread residential subdivision development. Unit lies unconformably on Louisville Limestone; otherwise obscure contact commonly marked by abrupt transition.

Karst Potential

According to the KGS Karst Potential Classification definitions, formations designated with a "High" karst potential are where the development of karst features in this category is likely and the occurrence of karst features may be influenced by physiographic setting, unit thickness, and lithology. Formations designated with a "Medium" karst potential are where the development of karst features in this category is variable and dependent on site-specific conditions. Formations designated with a "Non-Karst" karst potential are described as "Consolidated or unconsolidated siliclastic units. Karst features rare or absent."

Soil Conservation Service Soil Survey

The USDA Natural Resources Conservation Service "Web Soil Survey" website indicated 7 general soil types at the site as shown in Figure 2. Descriptions of these soil types are summarized below.

CaD2	Description:	Caneyville silt loam, 12 to 25 percent slopes, eroded, very rocky
	Parent material:	Clayey residuum weathered from limestone.
	Typical Profile:	0 to 2 inches: silt loam
		2 to 30 inches: silty clay
		30 to 40 inches: unweathered bedrock
CcF2	Description:	Caneyville-Rock outcrop complex, 12 to 60 percent slopes, eroded
	Parent material:	Clayey residuum weathered from limestone.
	Typical Profile:	0 to 2 inches: silt loam
		2 to 30 inches: silty clay
		30 to 40 inches: unweathered bedrock
CrB	Description:	Crider silt loam, 2 to 6 percent slopes
	Parent material:	Fine-silty non-calcareous loess over clayey residuum weathered from limestone
	Typical Profile:	0 to 9 inches: silt loam
		9 to 39 inches: silty clay loam
		39 to 79 inches: silty clay

CrC	Description:	Crider silt loam, 6 to 12 percent slopes
	Parent material:	Fine-silty non-calcareous loess over clayey residuum weathered from limestone
	Typical Profile:	0 to 9 inches: silt loam
		9 to 39 inches: silty clay loam
		39 to 79 inches: silty clay
Ld	Description:	Lindside silt loam, 0 to 2 percent slopes, occasionally flooded
	Parent material:	Mixed fine-silty alluvium.
	Typical Profile:	0 to 7 inches: silt loam
		7 to 27 inches: silty loam
		27 to 80 inches: silty clay loam
UahC	Description:	Urban land – Udorthents complex, 0 to 12 percent slopes
	Parent material:	None specified.
	Typical Profile:	None specified.
UmC	Description:	Urban land – Alfic Udarents-Crider complex, 0 to 12 percent slopes
	Parent material:	Thin fine-silty loess over clayey residuum weathered from limestone and dolomite
	Typical Profile:	0 to 24 inches: silt loam
		24 to 100 inches: weathered bedrock

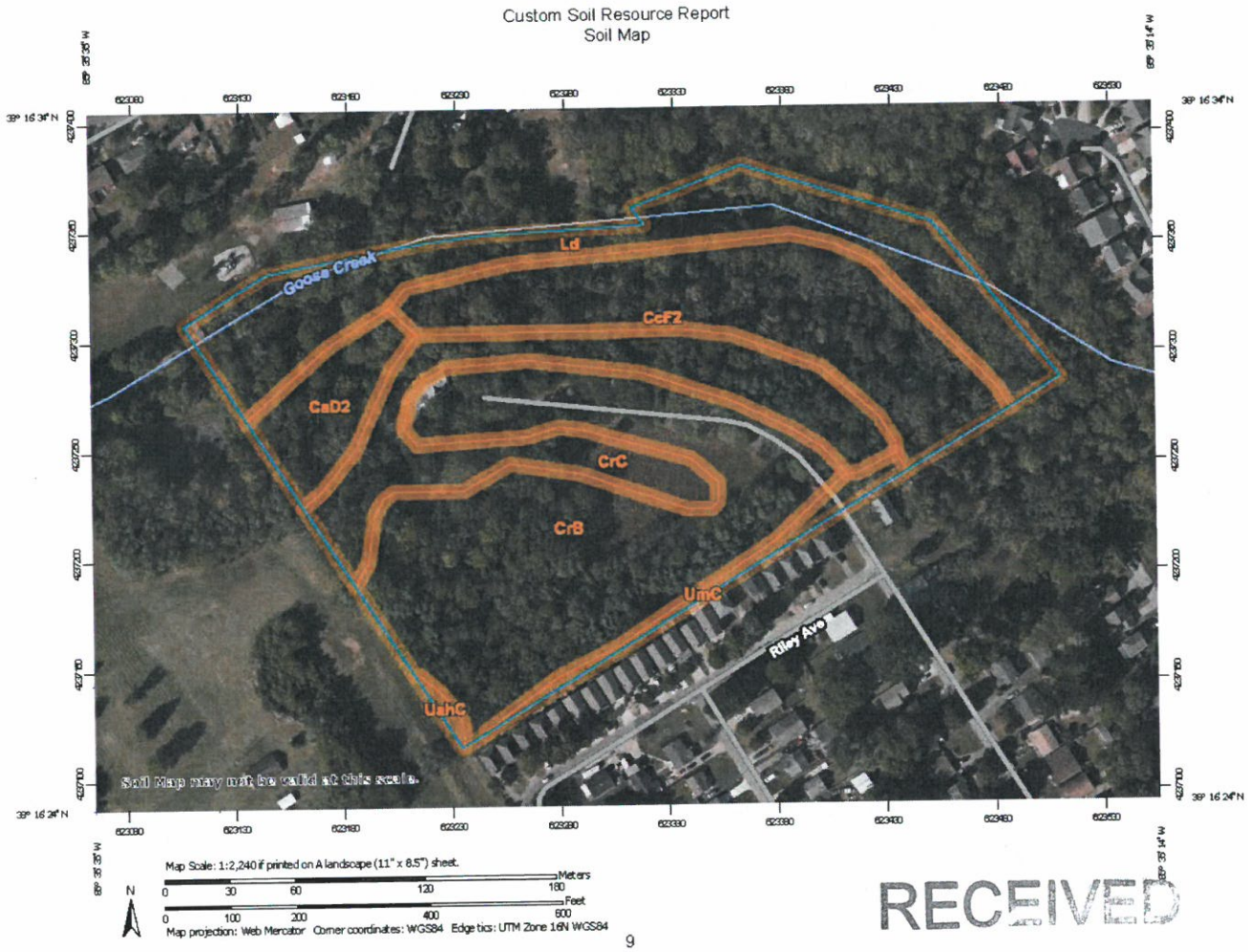

Figure 2: Reported Soil Data

Site Reconnaissance

Based on our review of the provided drawing, the north and east portions of the site included either 20-30% slopes or >30% slopes that may be disturbed during development. A site reconnaissance was conducted on April 9, 2020 by Grant Hess of ECS. Refer to the attached **Slope Reconnaissance Plan** for the approximate locations.

Steep slopes with numerous rock outcroppings were observed along the northern and eastern portions of the site, and generally extended to the relatively flat depositional plain along Goose Creek. Surface drainage generally was directed to the north and east portions of the site by topography and small swales. A large drainage swale approximately 300 feet long and 10 to 40 feet wide was observed in the northwest portion of the site that extended to Goose Creek. Indications of erosion were observed primarily along the swales including occasional patches of bare soil and small gullies.

Some visual indications of minor slope instability and evidence of creep were observed in the north and east portions including: displaced cobbles and boulders; unusual tilting, bowed, and fallen trees; minor eroded soil; and mounding of the eroded soil at the slope base. No indications of large, wide-scale or deep seated slope movements were noted. For the remainder of the site (upland portion), the slopes appeared to be stable. In particular, none of the following were noted in the remaining areas: unusual tilting or fallen trees, tension cracks, scarps, displaced soil, or mounds of soil in areas south and west of the steep slopes.


View of Slope Area (Eastern Portion).


View of tilted trees (Eastern Portion).


View of outcropping (Eastern Portion).


View of displaced boulders and soil mounding (Eastern Portion).

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View of displaced boulders (Eastern Portion).


View of outcropping (Northeastern Portion).


View of slope head (Northeastern Portion).


View of Slope Area (Northern Portion).


View of depositional plain (Northern Portion).


View of soil mounding (Northern Portion).

Based on our review of the above reference observations and information, and on our past experience with site development for similar conditions in Jefferson County, our opinion is that the on-site slopes (excluding small, localized erosion features along swales and streams) in the observed areas were generally stable at the time of our reconnaissance. Evidence of minor instability was observed in an isolated area in the north and east portions of the site (Slope Area).

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The current, on-site localized slope instability observed likely is related to the following factors:

- Relatively thin depths of soil in slope areas
- Cohesive (clayey) soil matrix
- Rocky soil texture
- Limestone bedrock
- Numerous trees and other vegetation

Based on the conditions observed, our opinion is that additional geotechnical exploration/analyses including soil/rock test borings/coring, shear strength tests of soils, etc. are not required for most of the evaluated on-site slopes, provided that the planned subdivision is designed and constructed utilizing the guidelines included in this report. The north and east portions of the site, as shown in the shaded ("contains slopes > 20%" area) where minor instability was observed should be further investigated during the construction phase of the project once the location and planned elevation of the proposed structures and related improvements are known.

The following guidelines should be used to help maintain the stability of the existing and planned slopes during the design and construction of the new subdivision, and over the life of the new homes. These guidelines include:

- Plan grading to minimize changes to existing topography along slopes.
- Minimize disturbance to slopes and vegetation outside new construction areas.
- Avoid significant transverse cuts along face or at the toe of existing slopes.
- Avoid significant embankments on the face, or along or at the crest of existing slopes.
- Maintain the following limits for new embankments without additional geotechnical exploration and analysis:
  - 3:1 (horizontal:vertical) or flatter slopes.
  - Properly strip all vegetation, topsoil, etc. where fill will be placed.
  - Construct embankments with controlled fill compacted to at least 98 percent of the Standard Proctor maximum dry density and within 2 percent of the optimum moisture content.
  - Maximum fill embankment height – 5 feet.
  - Horizontally bench new fill into existing slopes in maximum one-foot vertical steps.
- Maintain the following limits for new cuts in soil without additional geotechnical exploration and analysis:
  - 3:1 (horizontal:vertical) or flatter slopes.
  - Maximum cut height – 5 feet.
- Provide adequate erosion and surface water drainage control during construction and over the life of the subdivision.
- Establish permanent vegetative cover as soon as practical.

Closing

We appreciate the opportunity to serve as your geotechnical consultants for this project. We look forward to future association with you on this and other projects.

Respectfully submitted,
ECS Southeast, LLP

William "Grant" Hess
Project Manager

G.T. Vandevelde, P.E.
Principal Engineer
Kentucky License No. 14708

Attachments: Site Vicinity Map
Slope Reconnaissance Plan
3104-DDP DRAFT 2020 02 27.pdf

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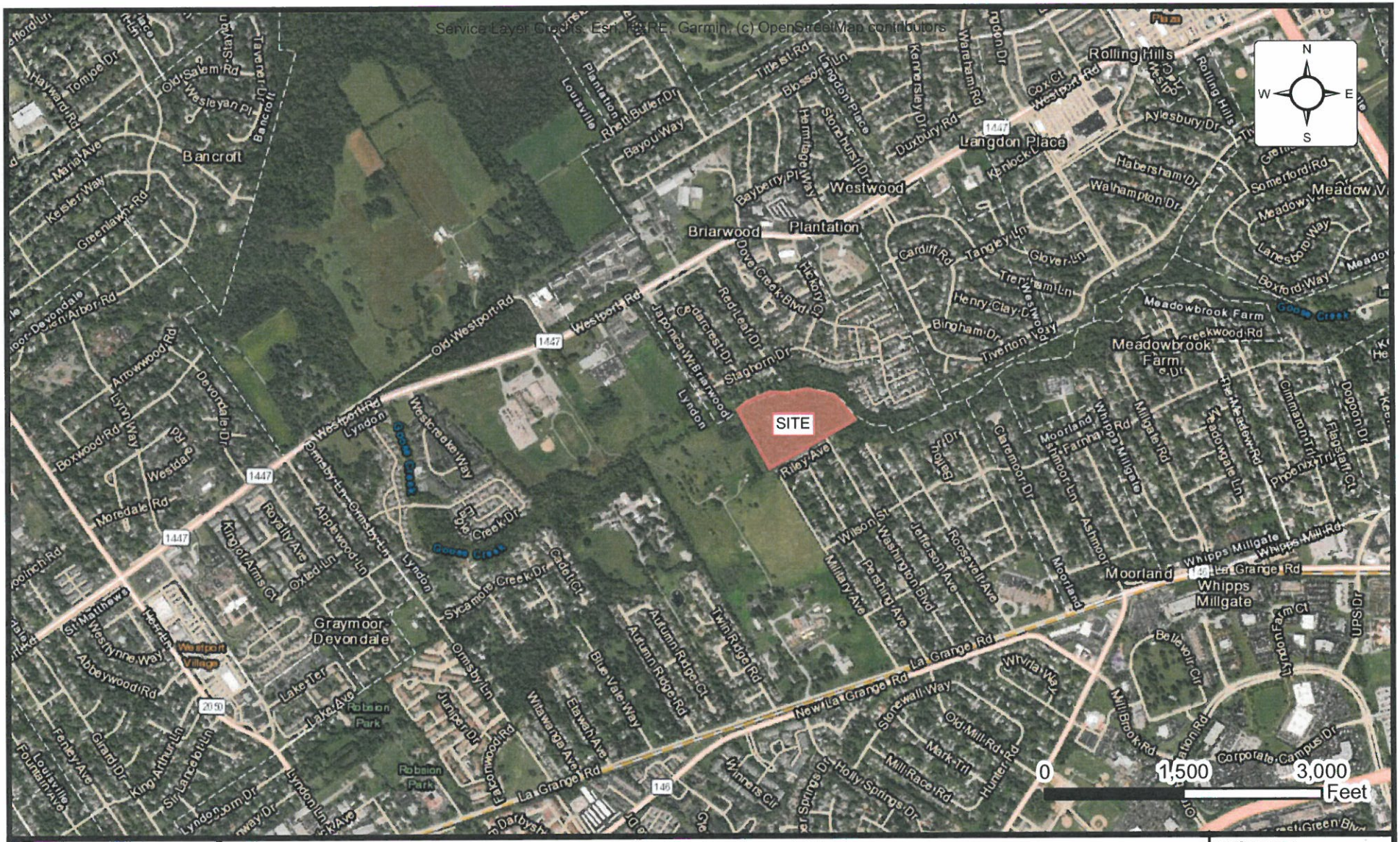


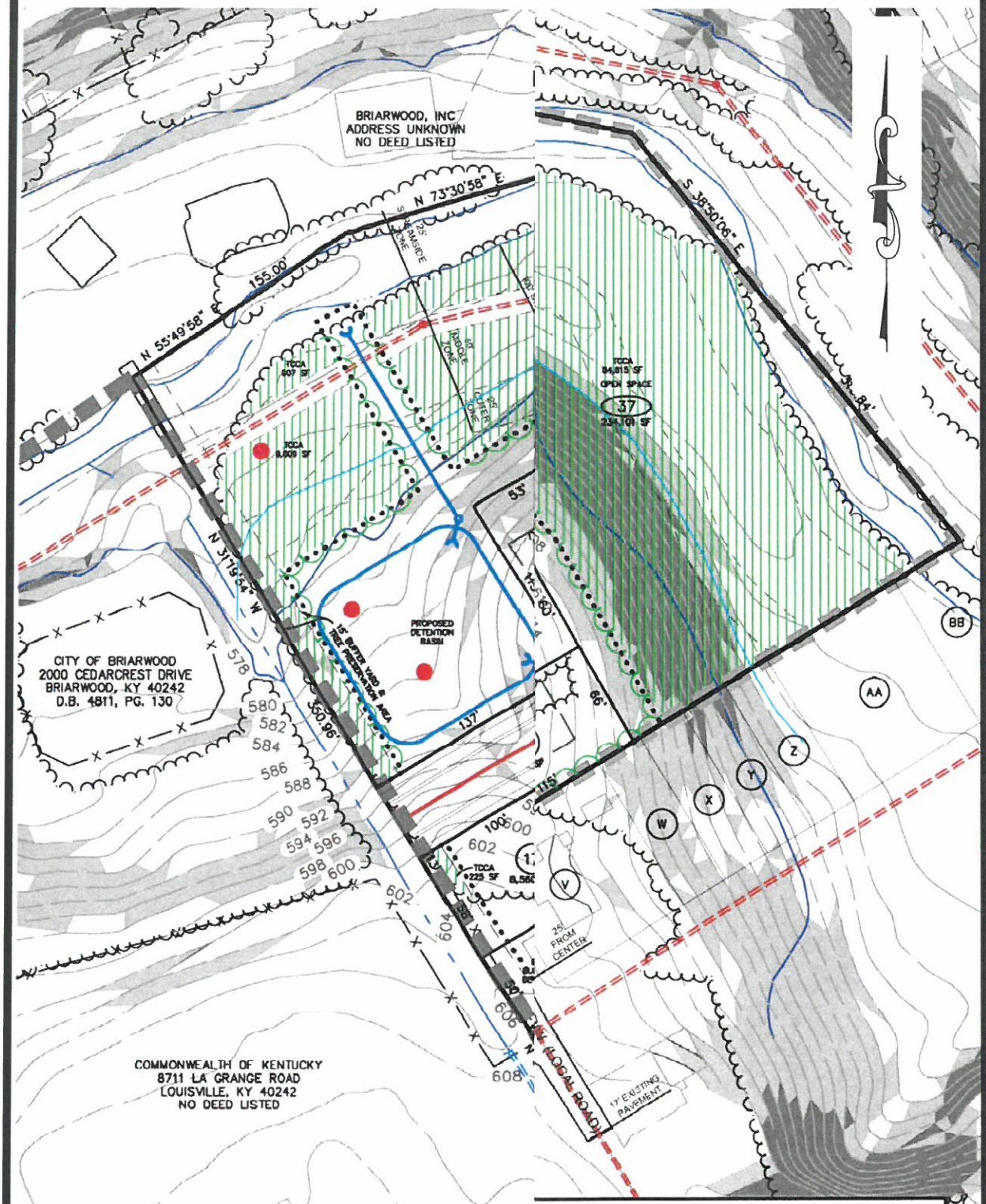
ECS

Site Vicinity Map
PRELIMINARY SLOPE EVALUATION
LYNDON GREEN SUBDIVISION

1900 WASHINGTON BOULEVARD

LOUISVILLE, JEFFERSON COUNTY, KENTUCKY 40228

ENGINEER	WGH
SCALE	1 " = 1500 '
PROJECT NO.	61:2296
SHEET	1 OF 1
DATE	4/24/2020



LEGEND

- Previously Observed Closed Depressions
- Boring Locations.
- Slopes > 20 %
- Slopes ≥ 30 %

tions are approximate.

Based on a drawing "3104-DDP Resubmitta
provided by Kelli Jones of Sabak, Wilson &
via email, dated August 13, 2020.

RECEIVED
SEP 29 2020
PLANNING & DESIGN SERVICES

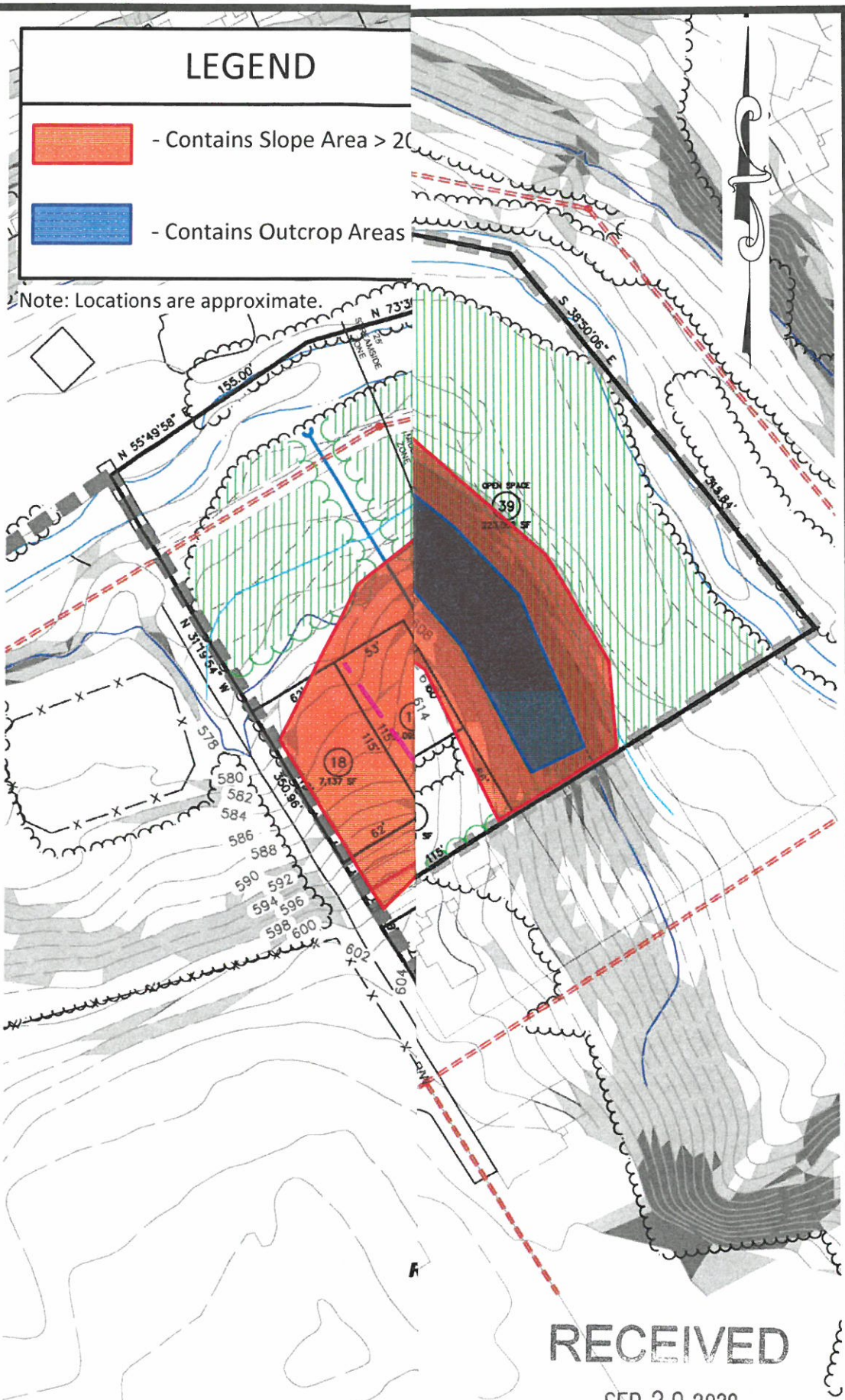
Boring Location Diagram
Lyndon Green Subdivision
Subsurface Evaluation
1900 Washington Boulevard
Louisville, Jefferson County, Kentucky 40228

Drawn By: WGH | Checked By: GTV | Scale: As Shown

Project No.: 61:2373 | Drawing No.: 2373 BLP | Date: 09/17/2020

ECS Southeast, LLP
1762 Watterson Trail
Louisville, Kentucky 40299
Tel. (502) 493-7100

20-MSUB-000



Based on a DRAFT drawing "3104-DDP DRA
provided by Kelli Jones of Sabak, Wilson & L
dated March 26, 2020.

RECEIVED
SEP 29 2020
PLANNING & DESIGN SERVICES

Slope Reconnaissance Plan
Preliminary Slope Survey – Lyndon Green Subdivision
1900 Washington Boulevard
Louisville, Jefferson County, Kentucky 40228

Drawn By: WGH	Checked By: GTV	Scale: As Shown
Project No.: 61:2296	Drawing No.: 2296	Date: 04/24/2020

ECS Southeast, LLP
1762 Watterson Trail
Louisville, Kentucky 40299
Tel. (502) 493-7100

20-MSUB-0005

GENERAL NOTES

1. CONSTRUCTION PLANS AND DOCUMENTS SHALL COMPLY WITH LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT'S DESIGN MANUAL AND STANDARD SPECIFICATIONS AND OTHER LOCAL, STATE AND FEDERAL ORDINANCES.
2. WASTEWATER: SANITARY SEWER WILL CONNECT TO THE MORRIS FORMAN WASTEWATER TREATMENT PLANT BY LATERAL EXTENSION AGREEMENT, SUBJECT TO FEES. SANITARY SEWER PATTERN DEPICTED FOR CONCEPTUAL PURPOSES ONLY. FINAL CONFIGURATION AND SIZE OF SEWER PIPES SHALL BE DETERMINED DURING THE CONSTRUCTION PLAN DESIGN PROCESS. SANITARY SEWER FACILITIES SHALL CONFORM TO MSD REQUIREMENTS.
3. THE DEVELOPMENT LIES IN THE ST MATTHEWS FIRE DISTRICT.
4. A PORTION OF THE SUBJECT PROPERTY LIES WITHIN A FLOOD HAZARD AREA PER FEMA MAP, (21111C0031E DATED DECEMBER 5, 2006).
5. THE DEVELOPMENT SHALL BE IN ACCORDANCE WITH THE APPROVED PRELIMINARY PLAN. NO FURTHER SUBDIVISION OF LAND INTO A GREATER NUMBER OF LOTS THAN ORIGINALLY APPROVED SHALL OCCUR, WITHOUT THE APPROVAL OF THE PLANNING COMMISSION.
6. COMPATIBLE UTILITY LINES ELECTRIC, PHONE, CABLE) SHALL BE PLACED IN A COMMON TRENCH UNLESS OTHERWISE REQUIRED BY APPROPRIATE AGENCIES.
7. STREET TREES SHALL BE PLANTED IN A MANNER THAT DOES NOT EFFECT PUBLIC SAFETY OR HAMPER SIGHT DISTANCE.
8. ALL STREETS AND RIGHTS OF WAY SHALL MEET THE REQUIREMENTS OF CHAPTER 6 OF THE LAND DEVELOPMENT CODE.
9. MITIGATION MEASURES FOR DUST CONTROL SHALL BE IN PLACE DURING CONSTRUCTION TO PREVENT FUGITIVE PARTICULATE EMISSIONS FROM REACHING EXISTING ROADS AND NEIGHBORING PROPERTIES.
10. THE FINAL DESIGN OF THIS PROJECT MUST MEET ALL MS4 WATER QUALITY REGULATIONS ESTABLISHED BY MSD. SITE LAYOUT MAY CHANGE AT THE DESIGN PHASE DUE TO PROPER SIZING OF GREEN BEST MGMT. PRACTICES.
11. A KARST SURVEY WAS PERFORMED BY KELLI JONES ON ________ AND ______ KARST FEATURES WERE OBSERVED.
12. REGIONAL FACILITY FEE REQUIRED IN LIEU OF ON-SITE DETENTION.

UTILITY NOTES

ALL UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE. INDIVIDUAL SERVICE LINES ARE NOT SHOWN. THE CONTRACTOR OR SUBCONTRACTOR SHALL NOTIFY KENTUCKY 811 (PHONE 811, WWW.KENTUCKY811.COM) FORTY EIGHT HOURS IN ADVANCE OF ANY CONSTRUCTION ON THIS PROJECT. THIS NUMBER WAS ESTABLISHED TO PROVIDE ACCURATE LOCATIONS OF EXISTING BELOW GROUND UTILITIES (I.E. CABLES, ELECTRIC WIRES, GAS, AND WATERLINES). WHEN CONTACTING KENTUCKY 811 CALL CENTER, PLEASE STATE THAT THE WORK TO BE DONE IS FOR A PROPOSED MSD SEWER OR DRAINAGE FACILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BECOMING FAMILIAR WITH ALL UTILITY REQUIREMENTS SET FORTH ON THE PLANS IN THE TECHNICAL SPECIFICATIONS AND SPECIAL PROVISIONS.

SWPPP NOTES

THE APPROVED EROSION PREVENTION AND SEDIMENT CONTROL (EPSC) PLAN SHALL BE IMPLEMENTED PRIOR TO ANY LAND-DISTURBING ACTIVITY ON THE CONSTRUCTION SITE. ANY MODIFICATIONS TO THE APPROVED EPSC PLAN MUST BE REVIEWED AND APPROVED BY MSD'S PRIVATE DEVELOPMENT REVIEW OFFICE. EPSC BMP'S SHALL BE INSTALLED PER THE PLAN AND MSD STANDARDS.

DETENTION BASINS, IF APPLICABLE, SHALL BE CONSTRUCTED FIRST AND SHALL PERFORM AS SEDIMENT BASINS DURING CONSTRUCTION UNTIL THE CONTRIBUTING DRAINAGE AREAS ARE SEEDED AND STABILIZED. ACTIONS MUST BE TAKEN TO MINIMIZE THE TRACKING OF MUD AND SOIL FROM CONSTRUCTION AREAS ONTO PUBLIC ROADWAYS. SOILS TRACKED ONTO THE ROADWAY SHALL BE REMOVED DAILY.

SOIL STOCKPILES SHALL BE LOCATED AWAY FROM STREAMS, PONDS, SWALES, AND CATCH BASINS. STOCKPILES SHALL BE SEEDED, MULCHED, AND ADEQUATELY CONTAINED THROUGH THE USE OF SILT FENCING. ALL STREAM CROSSINGS MUST UTILIZE LOW-WATER CROSSING STRUCTURES PER MSD STANDARD DRAWING ER-02.

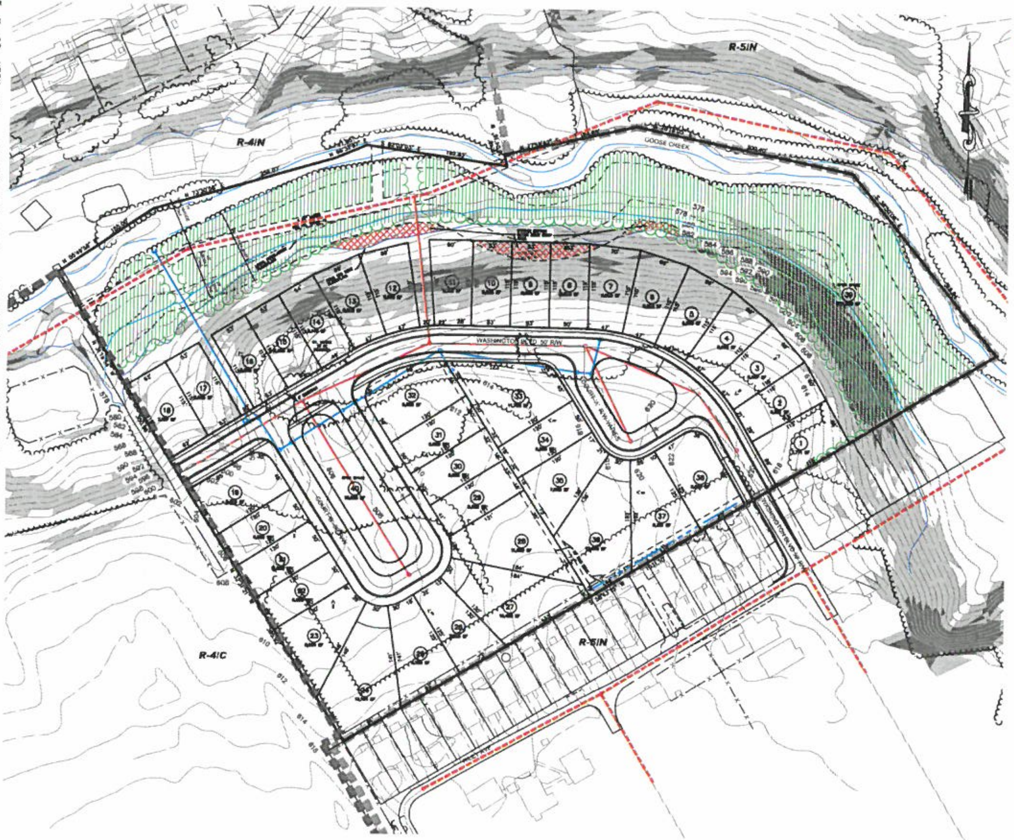
WHERE CONSTRUCTION OR LAND DISTURBANCE ACTIVITY WILL OR HAS TEMPORARILY CEASED ON ANY PORTION OF A SITE, TEMPORARY SITE STABILIZATION MEASURES SHALL BE REQUIRED AS SOON AS PRACTICABLE, BUT NO LATER THAN 14 CALENDAR DAYS AFTER THE ACTIVITY HAS CEASED.

SEDIMENT-LADEN GROUNDWATER ENCOUNTERED DURING TRENCHING, BORING OR OTHER EXCAVATION ACTIVITIES SHALL BE PUMPED TO A SEDIMENT TRAPPING DEVICE PRIOR TO BEING DISCHARGE INTO A STREAM, POND, SWALE OR CATCH BASIN.

BENCHMARK (NAVD 88 DATUM)

B.M. TPIN - THE EXTENSION OF WASHINGTON BOULEVARD STRAIGHT AHEAD FROM THE END OF PAVEMENT 38 FEET AND LEFT 90 FEET TO A PIN WITH A RED CAP. ELEV. 822.63

B.M. BP PIN - THE EXTENSION OF WASHINGTON BOULEVARD STRAIGHT AHEAD FROM THE END OF PAVEMENT 80 FEET AND RIGHT 9 FEET TO A PIN WITH A RED CAP. ELEV. 821.46



DRAFT

GRAPHIC SCALE
0 30 60 120

LOCATION MAP
NOT TO SCALE

SITE DATA

FORM DISTRICT:	NEIGHBORHOOD
EXISTING ZONING:	R-4
SURROUNDING ZONING:	R-5
EXISTING USE:	SINGLE FAMILY RESIDENTIAL
PROPOSED USE:	SINGLE FAMILY RESIDENTIAL
GROSS SITE AREA:	14.11 ACS
AREA IN ROW:	2.10 ACS
NET SITE AREA:	12.01 ACS
BUILDABLE LOTS:	38 LOTS
OPEN SPACE LOTS:	2 LOTS
GROSS DENSITY:	2.69 DU/AC
NET DENSITY:	3.16 DU/AC
MAXIMUM DENSITY:	7.26 DU/AC

YARD REQUIREMENTS

FRONT YARD:	25'
STREET SIDE YARD:	25'
MIN. SIDE YARD:	6'
REAR YARD:	25'
MAX. BUILDING HEIGHT:	35'

TREE CANOPY CALCULATIONS

TOTAL SITE AREA:	614,668 SF
EXISTING TREE CANOPY:	4.5%
EXISTING TREE CANOPY TO REMAIN:	119,536 SF (100%)
ADDITIONAL TREE CANOPY REQUIRED:	0 SF (0%)

LEGEND

- EX. MAJOR CONTOUR
- EX. MINOR CONTOUR
- 20-30% SLOPE
- 30%+ SLOPE
- EX. FENCE
- EX. SANITARY SEWER
- PROP. SANITARY SEWER
- PROP. STORM SEWER
- DRAINAGE FLOW ARROW
- EXISTING TREE LINE
- PROPOSED TREE LINE
- TREE CANOPY CREDIT AREA (TCCA)
- EXISTING ZONING
- EXISTING FORM DISTRICT

CASE # ________

SABAK, WILSON & LINGO, INC
ENGINEERS, LANDSCAPE ARCHITECTS & PLANNERS
THE HENRY CLAY 608 S. THIRD STREET, LOUISVILLE, KENTUCKY 40202 (502) 584-6271

SHEET TITLE: MAJOR PRELIMINARY SUBDIVISION PLAN & DETAILED DISTRICT DEVELOPMENT PLAN

PROJECT TITLE: WASHINGTON GREEN

DEVELOPER: GDB HOLDINGS, LLC

JOB NO.	3104
SCALE:	1"=60'
DATE:	02/27/20

DRAWING NO: DDP

SHEET 1 OF 1

K:\JOBS\DDP\3104-DDP, 24x36, Kelli Jones, 2/27/2020