

GREENBAUM ASSOCIATES, INC.
GEOTECHNICAL & MATERIALS ENGINEERS

994 Longfield Avenue
Louisville, Kentucky 40215
502/361-8447
FAX 502/361-4793

January 20, 2022

Mr. Damon Garrett
Sunshine Industries, LLC
901 Lilly Creek Road, Suite 101
Louisville, KY, 40243

**Re: Slope Stability Survey
400 Shelby Station Drive
Louisville, Kentucky
Project Number 21-230G**

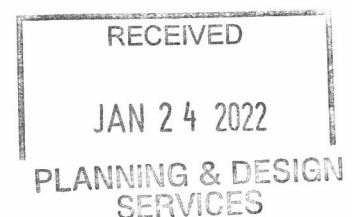
Dear Mr. Durrett:

On December 17, 2021, Luke Van Nevel, E.I.T., walked the above referenced property and viewed a number of slopes with a greater than 20-degree inclination. Included is a drawing showing the approximate locations of the slopes (indicated by yellow shading) as well as a drawing showing the geologic mapping taken from the Kentucky Geological Survey. Also included are photos of several of the slopes taken during a walkover of the site.

During the walkover, no evidence was found of slope movement or landslide. Photos taken of the slopes during the walkover are included at the end of this document.

Soils at this site are shown by the Kentucky Geological Survey to be residuum, the product of weathering of the local bedrock. The Geological Survey also shows this site to lie on contacts between three different geologic units which are the Laurel Dolomite, the Osgood and Brassfield Formations, and the Hitz Limestone Bed of the Drakes Formation. The Geological Survey describes the Laurel Dolomite as:

Dolomite and shale: Dolomite, medium light, light olive, or greenish gray, weathers yellowish gray or grayish orange; upper one third to one half of unit very fine grained, dense, and in even beds commonly 0.6 to 2.0 feet thick, fossils obscure; lower part fine grained, porous, thick to very thick bedded, bedding obscure, weathers massive. Shale is olive gray to greenish gray, weathers to yellowish gray or grayish yellow clay; dolomitic; in single bed 2 to 3 feet thick from 5 to 8 feet above base of unit. Unit poorly exposed; description mainly from quarry and roadcut exposures in Anchorage quadrangle adjacent to the northwest and Jeffersontown quadrangle adjacent to the west. Residuum generally 5 to 12 feet thick on uplands. Sinkholes common near upland rims.



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The Geological Survey describes the underlying Osgood Formation as:

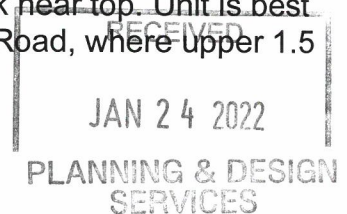
Shale, dolomitic mudstone, and dolomite: Shale is light olive gray to greenish gray, with streaks of grayish red to dark reddish brown 5 to 9 feet above base; weathers same to grayish yellow. Interbedded with dolomitic mudstone and dolomite in uppermost and lowermost parts of unit. Dolomitic mudstone and dolomite are medium gray to greenish gray, weather same to dusky yellow and yellowish gray, locally reddish brown, mottled in part. Contact with underlying Brassfield Formation appears conformable but may be erosional where unit rests on Saluda Dolomite Member of Drakes Formation. Exposures sparse; description mainly from exposure at inter-change of Jefferson Freeway and Ky. Highway 155, about half a mile west of quadrangle.

The Geological Survey describes the underlying Brassfield Formation as:

Limestone and dolomite: Dominant limestone is grayish orange to pale yellowish brown, weathers yellowish gray to dark yellowish orange; coarsely crystalline, possibly recrystallized; contains whole and broken fossils and scattered thin lenses of porcelaneous chert. Less abundant limestone is light gray with greenish gray and pale reddish brown mottling, weathers same to dark yellowish orange; very finely crystalline; dolomitic; grades to dolosiltite of similar colors. Limestone types interbedded and intergraded; stylolitic; bedding is generally irregular, rubbly, and obscure; locally cross-bedded; bed thickness ranges from 0.1 to 2.5 feet. Glauconite locally abundant in topmost bed; bed near base contains pyrite and pellets, and clasts of limestone and dolomite from underlying unit. Fossils, locally silicified, include zaphrentid solitary corals, favositid and halysitid colonial corals, bryozoans, brachiopods, stromatoporoids, pelmatozoans, and laminated algal mat remains. Mapped with overlying Osgood Formation. On some flat topped ridges the Brassfield is represented entirely by cherty red clay residue as much as 4 feet thick; absent locally due to non-deposition or pre Osgood erosion. Erosional unconformity at base on which relief is as much as 1.5 feet in cuts along Interstate Highway 64 west of English Station Road.

And the Geological Survey describes the underlying Hitz Limestone Bed of the Drakes Formation which underlies the Brassfield Formation as:

Limestone, dolomite, and shale: Limestone and dolomite are dark gray to olive gray, weather light gray to grayish orange, locally with reddish brown cast; very fine to medium grained, silty, laminated in part; hackly to blocky fracture; interbedded and inter-tongued. Limestone and dolomite occur in at least four distinct alternating layers 0.2 to 0.4 foot thick with limestone at base. Fossils include burrows, thin shelled brachiopods, cephalopods, gastropods, bryozoans, small pelmatozoan stem plates, and ostracodes. Pink calcite locally fills large fossil cavities. Shale is grayish black to dusky brown, carbonaceous, calcareous, strongly fissile; commonly in two beds, one about 0.5 foot thick near base and one 0.2 foot thick near top. Unit is best exposed along Interstate Highway 64 west of English Station Road, where upper 1.5

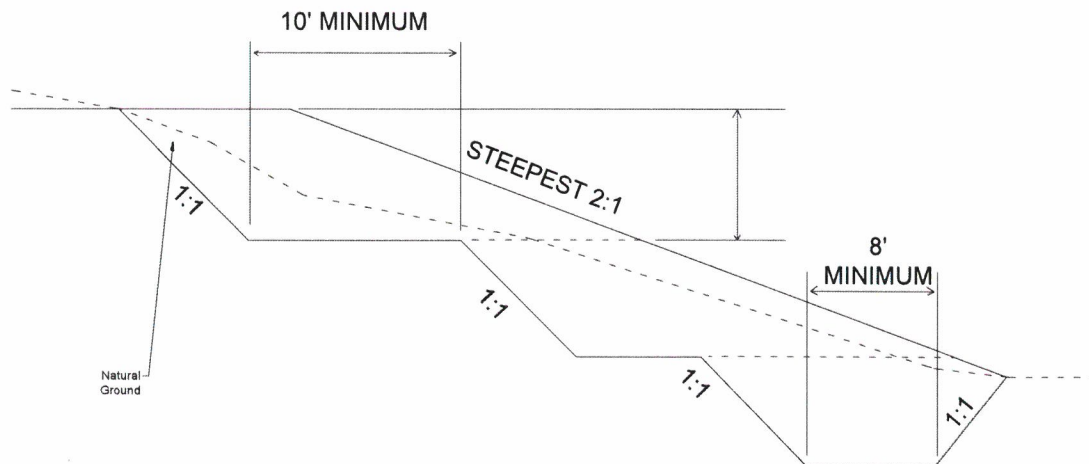


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feet of dolomite is locally missing due to pre Brassfield erosion. Called the Hitz Limestone Member of the Whitewater Formation by other; rank is herein reduced to the Hitz Limestone Bed of the Saluda Dolomite Member of Drakes Formation.

When fill is to be placed on the slopes across this site, the existing slopes must be benched as shown in the diagram below to prevent the formation of a plane of weakness along which a slope failure can develop. Benching will have to be adjusted as necessary, in consultation with this office, where limestone bedrock is encountered that prevents benching as shown from being achieved.

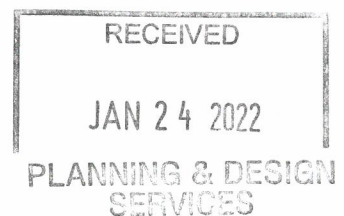


To prevent shallow slips of these slopes downward in elevation, preventative measures must be taken prior to construction. These are: 1) trimming; 2) embedment of geotextile; or 3) emplacement of deep rooting woody vegetation.

Trimming requires that the fill be placed 18 inches beyond the final fill point. Once fill is complete the top 18 inches of soil must be bladed-off the slope to be removed for use as fill elsewhere.

Embedment of geotextiles requires that a woven-geotextile of uniaxial geogrid be placed vertically every two feet along the outer edge of the fill. This slope reinforcement must extend at least five feet in from the outer edge of the slope.

Soil fill must be no steeper than 2 horizontal to 1 vertical in order that it remain stable. Where there is a sharp angle in the slope, such as near the corner of a building or pavement corner, the slope must be no steeper than 2.5 to 1. If the slope is to be mowed with normal lawncare equipment, it should be no steeper than 3 to 1.



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Provided these measures are adhered to, the proposed disturbance and/or construction can be carried out in a manner that will not adversely impact foundation stability on the subject property and surrounding properties or cause instability of slopes.

Stable foundations can be constructed on the site provided foundations are constructed in accordance with good engineering practice. However, during construction, foundation bearing surfaces must be viewed by an Engineering Technician of Geotechnical Engineer from this office to ensure adequate bearing capacity is provided by the soils at that location or if remedial work is required to achieve that bearing capacity.

Erosion and sediment control measures must comply with those set forth by the Jefferson County Erosion and Sediment Control Ordinance

This survey is intended to address existing slopes at this site. This is not a geotechnical investigation and does not include any boring, laboratory testing nor modeling of slope stability to determine factor of safety against sliding.

If you have any questions regarding this study, please call.

Sincerely,

GREENBAUM ASSOCIATES, INC.

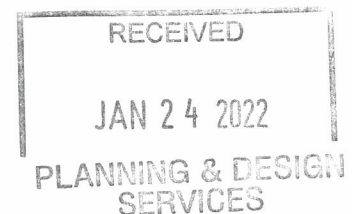


Luke Van Nevel, E.I.T.
Geotechnical Engineer

Sandor R.
Greenbaum

Sandy Greenbaum, P.E.
Principal Engineer

Digitally signed by
Sandor R. Greenbaum
Date: 2022.01.20
15:04:54 -05'00'



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Google Earth

SITE

Site Location Plan
17.394± Acre Parcel
400 Shelby Station Drive, Louisville, KY
Greenbaum Project Number: 21-230G

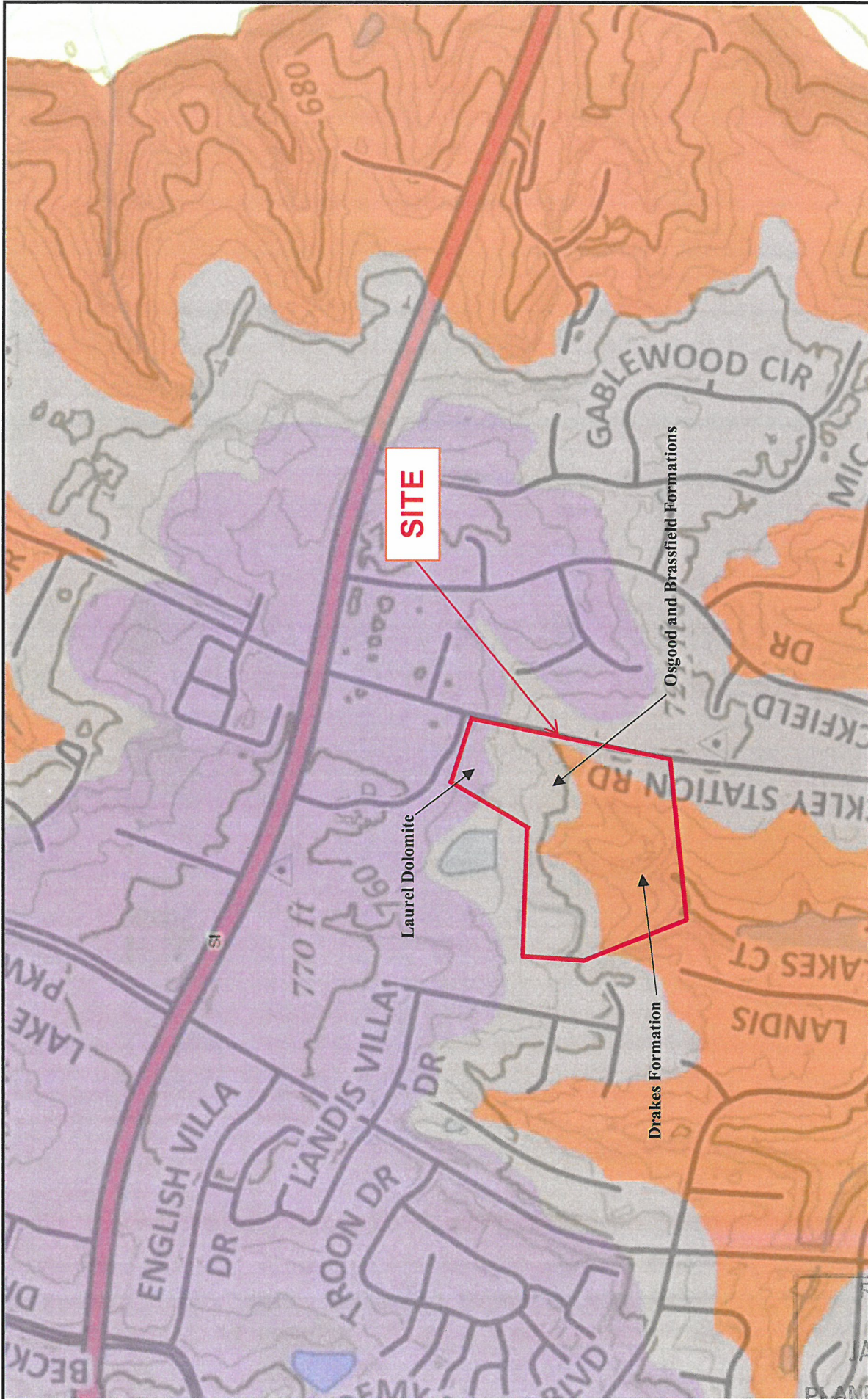
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Site Geology
 Proposed Residential Development
 400 Shelby Station Drive, Louisville, KY
 Greenbaum Project Number: 21-230G

Greenbaum Associates, Inc.



Sunshine Industries LLC

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View of slope in roadway north of recreational open space
(N 38.236384° W 085.490898°)



View of slope in roadway north of recreational open space
(N 38.236236° W 085.491196°)

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View of slope between building 2 and proposed dog park
(N 38.236332° W 085.491837°)



View of slope in proposed footprint of building 3
(N 38.236029° W 085.492600°)

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View of slope east of proposed building 3 footprint
(N 38.235760° W 085.492397°)



View of slope in creek in southwest corner of site
(N 38.234432° W 085.491904°)

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View of slope at southern end of designated open space '1003'
(N 38.234555° W 085.491455°)



View of slope south of southeast corner of
building 4 (N 38.234884° W 085.491442°)

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View of slope south of existing pond
(N 38.234989° W 085.491362°)

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