GEOTECHNICAL INVESTIGATION

FOR

APARTMENT COMMUNITY

SOUTH PARK ROAD

LOUISVILLE, KENTUCKY

FOR

LDG DEVELOPMENT, LLC

1473 SOUTH FOURTH STREET

LOUISVILLE, KY 40208

BY

GREENBAUM ASSOCIATES, INC.
994 LONGFIELD AVENUE
LOUISVILLE, KENTUCKY 40215
DECEMBER 26, 2019





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1.0 Introduction

LDG Development, LLC intends to build a new 312-unit apartment community on a ±18.64-acre tract located at 4011 South Park Road in Louisville, Kentucky. This property consists of two large residential tracts fronting on South Park Road and one parcel fronting on Blue Lick Road. The area is relatively level with the north central portion of the property being overgrown and partially wooded. The new development is to consist of thirteen three-story apartment buildings, a clubhouse, and a pool. A boring location plan is included in the appendix of this report that shows the approximate locations of the borings and the proposed construction. A site location plan is also included in the appendix.

It is our understanding that limestone has been mined from below the property via horizonal mineshafts that extend from the above-ground quarry present on the opposite side of South Park Road. Geotechnical study relating to mining activities below the property was not performed since that is beyond the scope of this investigation. A geophysical survey could be used to determine the presence of mineshafts with rock core borings used to determine the thickness of the overlying bedrock (roof). Such a study could determine the possibility of catastrophic collapse of the mineshaft roof.

No subsidence or erosion feature was observed on the property. Were such a feature present, it could be due to erosion into a karst feature or into a mineshaft.

We were contracted by LDG Development, LLC to carry out a geotechnical investigation directed at determining the foundation support characteristics of the materials upon which these buildings and associated pavement will be supported. Work was coordinated through Ms. Ramona Vasta of LDG Development, LLC.

2.0 General Geology

Soils at this site are shown by the Kentucky Geological Survey to be residuum, the residual product of weathering of the local bedrock. Bedrock is shown to be the New Albany Shale and Beechwood Limestone, undifferentiated. This property is near the contact with the underlying Louisville Limestone, so the bedrock below the eastern portion of the development is probably the Beechwood Limestone and the New Albany Shale may be present below the western portion of the development.

The Kentucky Geological Survey describes the New Albany Shale as:

Shale, silty, olive black to grayish black, weathers pale yellowish brown or very light gray; massive; dense where fresh, fissile in thin brittle chips where weathered. Pyrite abundant as veinlets or spherules that weather to stain outcrops with brown and yellow iron oxides and sulfates. Phosphate nodules as much as 2 inches in diameter in upper 10 feet; calcareous, clayey and sandy in lower part; quartz in dike like geodiferous fracture fillings in upper 10 to 20 feet. Fossils include conodonts, silicified wood, spores, fish remains, worm markings, and linguloid brachiopods.

The Kentucky Geological Survey describes the Beechwood Limestone as:

Limestone, light gray to light greenish gray, weathers moderate yellowish brown to dark yellowish orange; fossil fragmental, with coarse to very coarse fossil fragments and whole fossils in a very fine grained matrix; very thin to thin bedded, locally cross-bedded, stylolitic; weathers to rounded massive slabs on which slightly resistant dull white fossil remains stand out in sharp relief from brownish matrix. Remains of the crinoid commonly called Dolatocrinus are distinctive. Pyrite common at top and base. Basal contact marked by zone of fossil trash. Contact with underlying unit unconformable. Unit commonly poorly exposed owing to solution by recent weathering or cover by terrace deposits of Quaternary age.

3.0 Investigation

Thirty-six borings were carried out across the site by standard penetration procedures to auger refusal. Diedrich D-25 and GeoProbe 66DT track-mounted drill rigs were used to carry out the borings through the use of 2 ¼-inch inside diameter hollow stem augers and an automatic hammer. The boring locations were staked using a nylon tape from existing topography, so boring locations are only as accurate at this method allows.

The standard penetration procedure involves driving a standard 2-inch diameter split spoon in the formation at selected intervals using a 140-pound hammer falling through 30 inches. The blow counts for each 6 inches of drive, to a total of 18 inches, are recorded and the number of blows for the 12 inches after the first 6 inches is a standard measure of the condition of the soil. As the split spoon is removed from the ground, it retrieves a sample of the soil in a disturbed

condition. Nevertheless, this sample is suitable for certain classification tests and is representative of the soils at the depth tested.

Soil samples were returned to the laboratory where a program of testing was carried out. This testing included a grain size analysis, an Atterberg Limits' test and a number of natural moisture determinations.

Grain size determination arrives at a curve of grain size against that fraction of the soil that is finer than that particular grain size. It also allows the determination of the clay fraction, silt fraction, sand fraction, etc. in any particular soil sample. Based on this division of grain sizes, the field soils classifications are refined and the boring logs adjusted. In the case of fine grained soils, the soils are largely silt and clay; thus requiring that the soils be suspended in an aqueous medium and the rate at which the particles drop out is measured in order to arrive at the grain size distribution. Silt and clay grains are so fine that sieve analysis alone will not function in this range. The coarse fraction of this sample is separated from the fine and run through a nest of sieves in order to further detail the grain size distribution in the coarse range. In this case only the sieve analysis portion of the test was performed since little sand and silt was present in the soil samples selected for testing.

The natural moisture determination arrives at the in-situ moisture content of the soil and is useful for correlating the strength of various samples of like texture and in conjunction with the Atterberg limits, gives a strong measure of the strength range the soils are likely to be found in.

4.0 Findings

4.1 Boring Results

This site is covered by 6- to 8-inches of topsoil, for the most part, but one boring found 10 inches of topsoil. Below this soil is moist, soft to very stiff, brown or reddish brown, lean clay, sometimes containing ferromagnesian nodules and sometimes a trace of organics in the top three feet. Deeper soils, below 5- to 6-feet depth, frequently contain chert and/or weathered limestone. Soils are generally very stiff below 5- to 6-feet depth. Auger refusal on apparent bedrock was encountered between 5.5- and 14.8-feet depth.

The soils are softest in the portion of the property that appears as a panhandle extending westward from the main property to Blue Lick Road, This

area is planned for the clubhouse, pool and one apartment building. Elsewhere, shallow soils at the probable foundation bearing level were found to be soft only in borings B-15 and B-33, though there were areas where soils are soft above 2.5 feet depth, possibly the foundation bearing level if these areas are to be filled. However, the vertical extent of these softer soils is limited allowing these soils to be removed and replaced by means of undercut and refill where encountered in foundation bearing surfaces. The more extensive soft soils in borings B-01 through B-05 will limit bearing capacity in this area.

The table below, and continued at the top of the following page, provides a tabulation of N-values as measured by the standard penetration test and corrected for the energy of the automatic hammer. Depth to auger refusal is also provided.

Depth	B-01	B-02	B-03	B-04	B-05	B-06	B-07	B-08	B-09
1 – 2.5 feet	4	5	3	4	. 5	2	5	7	7
3 – 4.5 feet	7	7	9	7	8	17	27	14	12
6 – 7.5 ft	10	21	17	21	18	17	29	18	29
8.5 – 10 ft	50/2"	8	gain mail prayer may paragraphic dispraign and a magest.	13	50/2"	50/3"	50/3"		25
Refusal	9.8'	10.3'	8.5'	10.5'	8.6'	9.8'	9.8'	8.0'	11.3'

Depth	B-10 B-11 B-12 B-13 B-14 B-15 B-16 B-17 B-18
1 - 2.5 feet	40 13 10 17 9 7
2 - 3.5 feet	7 18 18
3 – 4.5 feet	16 36 20 21 12 17
5 – 6.5 feet	9 26 25
6 - 7.5 feet	16
Refusal	6.6' 8.4' 9.3' 7.2' 8.4' 5.5' 7.7' 7.8' 8.0'

Depth	B-19 B-20 B-21 B-22 B-23 B-24 B-25 B-26 B-27
1 – 2.5 feet	4 5 7 7 4
2 – 3.5 feet	14 21 23 20
3 – 4.5 feet	20 10 27 18 13
5 – 6.5 feet	16 27 29 26
6 - 7.5 feet	21 20 17 22 50/4"
8.5 - 10 feet	5 15 13 22
Refusal	11.0' 14.8' 10.8' 11.0' 7.5' 7.7' 6.8' 6.9' 8.1'

Depth	B-28	B-29	B-30	B-31	B-32	B-33	B-34	B-35	B-36
1 - 2.5 feet	20	13	area wealth result of part	13	18	4	7	5	
2 – 3.5 feet			12						21
3 – 4.5 feet	46	31		30	20	8	17	13	
5 – 6.5 feet			9						48
6 – 7.5 feet						23	27	26	
8.5 - 10 feet						14	25		
10 – 11.5 ft.			9						
Refusal	8.0'	7.5'	13.1'	7.8'	6.6'	10.5'	10.3'	8.5'	7.9'

No groundwater was encountered in any of the borings, but water is known to have flooded the mineshafts present below the property.

4.2 Laboratory Results

A sample of soil from shallow depth was tested and classified and was found to be lean clay. The result of this testing is summarized in the table below with more detailed results provided in the appendix of this report. Moisture content is shown graphically on the boring logs.

	Grain S	Size Distr	ibution	Atte	rberg Li	Soil Classification			
Soil Sample	Percent Sand	Percent Silt	Percent Clay	Liquid Limit	Plastic Limit	Plasticity Index	Unified	AASHTO	
B-24 @ 2' - 3,5'	10	45	45	37	19	18	CL	A-6	

4.3 Historic Aerial Photographs

Aerial photographs, available on Google Earth, dating back to 1993 are available. The portion of the property that is overgrown was relatively clear through 2006, at which point it was allowed to become overgrown. There was a house or barn on the east side of the property near its north-south center through 2017, but that structure is not present in the most recement image.

4.4 Seismicity

By the 2018 edition of the Kentucky/2015 International Building Code, this is a Very Dense Soil and Soft Rock Profile, Site Class C. The Spectral Response Acceleration Coefficients, for this area, as provided by U.S.G.S., FEMA Design Parameters are:

 $S_s = 0.204 g$

 $S_{MS} = 0.245 g$

 $S_{DS} = 0.164 g$

 $S_1 = 0.106 g$

 $S_{M1} = 0.180 g$

 $S_{D1} = 0.120 g$

5.0 Recommendations

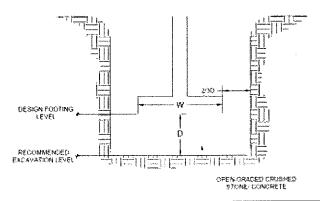
5.1 Foundations

Soil conditions vary across the site, so foundations for these buildings are discussed in two subsections to cover these varying soil conditions.

5.1.1 Panhandle with frontage on Blue Lick Road (Boring B-01 to B-05)

The proposed buildings in this area may be supported on spread footings bearing on shallow soil or structural fill placed in accordance with section 5.3 of this report. These foundations may be designed based on an allowable net bearing capacity of up to 2,000 pounds per square foot.

Undercut and refill below foundations should be under the direction of a Geotechnical Engineer and should be refilled with Kentucky Number 57 stone in a manner as illustrated in the diagram below. Depth of undercut, D, should be 2 feet unless the Geotechnical Engineer determines that greater depth of undercut is necessary.



Soil bearing foundations exposed to weather must bear at least 30 inches below finished grade in order to insulate the bearing strata from freezing. Interior foundations protected from freezing are exempt from this requirement. Continuous footings must be at least 16 inches wide and isolated footings must be at least 24 inches wide.

Settlement of foundations designed based on the above criteria should be below that which is considered acceptable for this type of construction; that is total settlement should be less than one inch and differential settlement should be less than three quarters of an inch.

For shallow foundations, friction along the base of the footing can be used to resist lateral forces. A friction coefficient of 0.35 may be used, which assumes that the footing concrete is placed directly against the natural cut faces. The coefficient of friction value recommended is an ultimate value and a minimum factor of safety of 1.5 must be applied when determining the allowable sliding resistance.

5.1.2 Main Body of Property

Theses proposed apartment buildings may be supported on spread footings bearing on shallow soil or structural fill placed in accordance with section 5.3 of this report. These foundations may be designed based on an allowable net bearing capacity of up to 2,500 pounds per square foot.

Once foundation bearing surfaces are exposed, an engineer or senior engineering technician from this office should be present to view all bearing surfaces to determine the presence of soft soils. Where soft soils are encountered, undercut will need to extend to firm material or to a level determined to be acceptable by the geotechnical engineer and should be refilled with either lean concrete (fc' = 2,000 psi) or open-graded stone such as Number 57 stone.

Where the building was present on the east side of the property, any foundations that remain must be removed entirely to a level at least two feet below foundation bearing surfaces. Any basements or cellars must be filled with engineered fill as discussed in section 5.3 of this report. If the basement slab is below the foundation bearing level, it may be left in place if perforated with two-inch or larger perforations on four-foot centers.

Soil bearing foundations exposed to weather must bear at least 30 inches below finished grade in order to insulate the bearing strata from freezing. Interior foundations protected from freezing are exempt from this requirement. Continuous

footings must be at least 16 inches wide and isolated footings must be at least 24 inches wide.

Settlement of foundations designed based on the above criteria should be below that which is considered acceptable for this type of construction; that is total settlement should be less than one inch and differential settlement should be less than three quarters of an inch. Settlement of rock bearing foundations will be negligible.

For shallow foundations, friction along the base of the footing can be used to resist lateral forces. A friction coefficient of 0.35 may be used, which assumes that the footing concrete is placed directly against the natural cut faces. The coefficient of friction value recommended is an ultimate value and a minimum factor of safety of 1.5 must be applied when determining the allowable sliding resistance.

5.2 Slab-On-Grade

Prior to placement of the fill in the slab area, the subgrade must be proofrolled and carefully examined by a geotechnical engineer for areas of soft or loose soil. If soft or loose soils are encountered, they must be undercut and refilled in accordance with instructions given by the geotechnical engineer's on-site representative. Undercut and refill in soft areas consists of excavating to a depth up to two feet below subgrade elevation and refill should be with "Surge Rock", 6-inch minus or Number 3 stone. Large rock should not be used in areas where trenching will be required to install piping or conduit.

Some of the soils at this site are relatively silty, so if construction is to take place other than during mid-June to mid-September, shallow soils are likely to be soft. Undercut and refill can be kept to a minimum if construction vehicles traveling over the building pad is kept to a minimum, perhaps delineating areas where construction traffic is acceptable and areas where it is not. Control of construction traffic can prove difficult but has been found to work in some cases.

A slab-on-grade that is structurally separated from the walls, columns and foundations is preferable, though thickened slab may be used. Separation of slab-on-grade from foundations will minimize the stress caused by possible differential settlement between the slabs and the foundations and between adjacent slabs. A vapor barrier must be incorporated into the design and at least four inches of Dense Graded Aggregate (DGA) should underlie the slab. The floor slab may be designed based on a Modulus of Subgrade Reaction of 75 pounds per cubic inch

in the area of borings B-01 through B-06 and 100 pounds per cubic inch over the rest of the site.

5.3 Site Preparation and Earthwork

Prior to fill placement all vegetation and topsoil (soil containing more than 4 percent organic content) must be removed from below the area to be filled. Where trees or bushes have been present, the entire rootball should be removed and the resulting excavation should be refilled with soil compacted as described in this section of the report. Then, prior to placement of fill, the exposed subgrade should be proofrolled by a fully loaded tri-axle truck to delineate any yielding or rutting areas that may require treatment such as undercut and refill or drying.

All fill should be placed in lifts not exceeding 8 inches in uncompacted thickness and must be compacted to at least 98 percent of the soils maximum dry density as determined by the Standard Proctor (ASTM D-698). Soil moisture content should be within 2 percent of optimum as determined from the Standard Proctor.

Soil from any off-site borrow sources should be tested and approved by this office prior to being used on the site. Satisfactory borrow materials are those falling in one of the following classifications: GC, SM, SC, ML, or CL. Soil types MH, CH and OH soils and peat are unsatisfactory borrow materials.

The site should be maintained in a well-drained condition both during and after construction. Site grading should provide for drainage of surface run-off away from proposed buildings and pavement.

The placement of compacted fill should be carried out by an experienced excavator with the proper materials. The excavator must be prepared to adapt his procedures, equipment and materials to the type of project, to weather conditions, and the structural requirements of the engineer. Methods and materials used in summer may not be applicable in winter; soil used in proposed fill may require wetting or drying for proper placement and compaction. Conditions may also vary during the course of a project or in different areas of this site. These needs should be addressed in the project drawings and specifications.

During freezing conditions, the fill must **not** be frozen when delivered to the site. It also must not be allowed to freeze during or after compaction. Since the ability to work the soil while keeping it from freezing depends in part on the soil type, the specifications should require the contractor to submit a sample of his proposed fill before construction starts, for laboratory testing. If the soil engineer

determines that it is not suitable, it should be rejected. In general, silty sand, clayey sand, and cohesive/semi-cohesive soils should not be used as fill under freezing conditions. All frozen soil of any type should be rejected for use as compacted fill.

It is important that compacted fill be protected from freezing after it is placed. The excavator should be required to submit a plan for protecting the soil. The plan should include details on the type and amount of material (straw, blankets, extra loose fill, topsoil, etc.) proposed for use as frost protection. The need to protect the soil from freezing is ongoing throughout construction and applies both before **and** after concrete is placed, until backfilling for final frost protection is completed. Foundations placed on frozen soil can experience heaving and significant settlement, rotation, or other movement as the soil thaws. Such movement can also occur if the soil is allowed to freeze **after** the concrete is placed and then allowed to thaw. The higher the percentage of fines (clay and silt) in the fill, the more critical is the need for protection from freezing.

The contractor should be required to adjust the moisture content of the soil to within a narrow range near the optimum moisture content (as defined by the applicable Proctor or AASHTO Test). In general, fill should be placed within 2% of optimum moisture. The need for moisture control is more critical as the percentage of fines increases. Naturally occurring cohesive/semi-cohesive soil are often much wetter than the optimum. Placing and attempting to compact such soils to the specified density may be difficult. Even if compacted to the specified density, excessively wet soils may not be suitable as pavement subgrades due to pumping under applied load. This is especially true when wet cohesive/semi-cohesive soil is used as backfill in utility trenches and like situations. Excessively wet soil in thick fill sections may cause post-construction settlement beyond that estimated for fill placed at or near (±2%) the optimum moisture content.

5.4 Earth Pressures

Any retaining walls should be constructed with a drainage blanket of sand or a synthetic drainage material. Synthetic drainage media should be available from suppliers of geotextile. The wall should be drained at its base by a perforated PVC underdrain or weepholes at a spacing of not more than 10 feet. Where a relatively thin drainage blanket is used, the retaining wall should be designed based on a coefficient of active earth pressure (K_a) of 0.36 and a soil unit weight (γ_w) of 130 pounds per cubic foot. This results in an equivalent fluid pressure of 47 pounds per cubic foot. Where granular backfill completely fills the area defined by a plane extending upward from the base of the wall at a 45-degree angle, the retaining wall may be designed based on a coefficient of active earth pressure (K_a)

of 0.27 and a soil unit weight (γ_w) of 130 pounds per cubic foot. This results in an equivalent fluid pressure of 35 pounds per cubic foot.

However, where the wall is restrained from movement, as in the case of building basement walls bearing against the basement slab or building frame, the wall must be designed based on the "at rest" earth pressure. The coefficient of "at rest" earth pressure (K_0) is 0.47 with a soil unit weight (γ_w) of 130 pounds per cubic foot in the case of a thin drainage blanket behind the wall, resulting in an equivalent fluid of 61 pounds per cubic foot unit weight. Where granular backfill completely fills the area defined by a plane extending upward from the base of the wall at a 45 degree angle, the retaining wall may be designed based on a coefficient of "at rest" earth pressure (K_0) of 0.43 and a soil unit weight (γ_w) of 130 pounds per cubic foot. This results in an equivalent fluid pressure of 56 pounds per cubic foot.

The table below summarizes the design earth pressures.

	Active Earth Pressure Coefficient (K _a)	Passive Earth Pressure Coefficient (K _p)	Coefficient of Earth Pressure at Rest (Ko)	Equivalent Fluid Pressure on Cantilever Walls	Equivalent Fluid Pressure on Braced Walls
Fill Material/Local Soils	0.36	2.77	0.47	47 pcf	61 pcf
Granular Backfill	0.27	3,69	0.43	35 pcf	56 pcf

Surcharge above the wall will add additional load. A uniform surcharge must be multiplied by the appropriate coefficient of earth pressure to determine the additional load applied to the wall.

Any retaining wall design must use appropriate factors of safety. It is critical that drainage be provided as mentioned earlier in this section in order to avoid hydrostatic pressure. Hydrostatic pressure would increase pressure against the wall substantially.

5.5 Light- and Heavy-Duty Pavement

Pavement subgrade should be examined and proofrolled as described under "Floor Slabs". If soft areas are encountered, the soft soils will need to be undercut and refilled in accordance with the instructions of the geotechnical engineer's on-site representative. Subgrade stabilization was discussed in section

5.2 for slab-on-grade. The same approach should be taken for pavement subgrade, but the requirement for a stable, non-yielding subgrade is even more important in the case of asphalt pavement.

The soils at this site are very silty, making the soils very sensitive to moisture. It is very likely that extensive undercut and refill or chemical stabilization of the building and pavement subgrades will be required. If earthwork and paving is preformed during the normally dry, warm months of mid-June through mid-September, the need for soil stabilization may be minimized. However, budgeting should take into account the need for either extensive undercut and refill with stone or cement stabilization. These soils are too silty for lime stabilization to be effective.

A pavement analysis was conducted using a life cycle of 20 years and a cumulative 18-kip equivalent single axle load of 20,000 for light traffic loads and 160,000 for moderate traffic loads. Recommendations are provided for both flexible and rigid pavement systems. However, rigid pavement should be used in special truck traffic areas, such as those areas which receive frequent traffic by garbage trucks. The concrete pavement should extend throughout the areas that require extensive turning and maneuvering of garbage trucks or other heavy trucks. Heavily loaded pavement areas that are not designed to accommodate these conditions often experience localized pavement failures, particularly if flexible pavement sections are used.

The minimum recommended thickness for both hot mixed asphalt concrete (HMAC) and reinforced Portland cement concrete (PCC) pavement sections are presented in the table below for the described light, moderate and special traffic condition.

	a Releading	andra fravan	ichikschildi		
	Li	ght	Mod	Special	
Component	Rigid	Flexible	Rigid	Flexible	Rigid
Reinforced Portland Cement Concrete (PCC)	5 inches		6 inches	(a.	7 inches
Hot Mixed Asphalt Concrete (HMAC)		3 inches		4 inches	
Crushed Limestone Base (Dense Graded Aggregate)	4 inches	8 inches	4 inches	8 inches	4 inches
Prepared Subgrade	6 inches	6 inches	6 inches	6 inches	6 inches

The Portland cement concrete should be air-entrained and conform to ASTM C-94 (Standard Specifications for Ready-Mixed Concrete) and have a minimum compressive strength of 4,000 pounds per square inch. Reinforcing should meet the requirements of ACI.

Hot mix asphalt concrete and Dense Graded Aggregate should meet the requirements of the Kentucky Transportation Cabinet. The top inch of asphalt should be a surface mix, the remainder being a base mix.

5.6 Temporary Earth Slopes or Cuts

Temporary earth cuts necessary to construct foundations or utility lines should be no deeper than 4 feet without benching or sloping. Cuts deeper than this should be sloped no steeper than one horizontal to one vertical or should have benches every 2 feet of height equating to this slope. If vertical faces deeper than 4 feet are used, bracing designed for short term loads may be used. Excavations should comply with OSHA regulations.

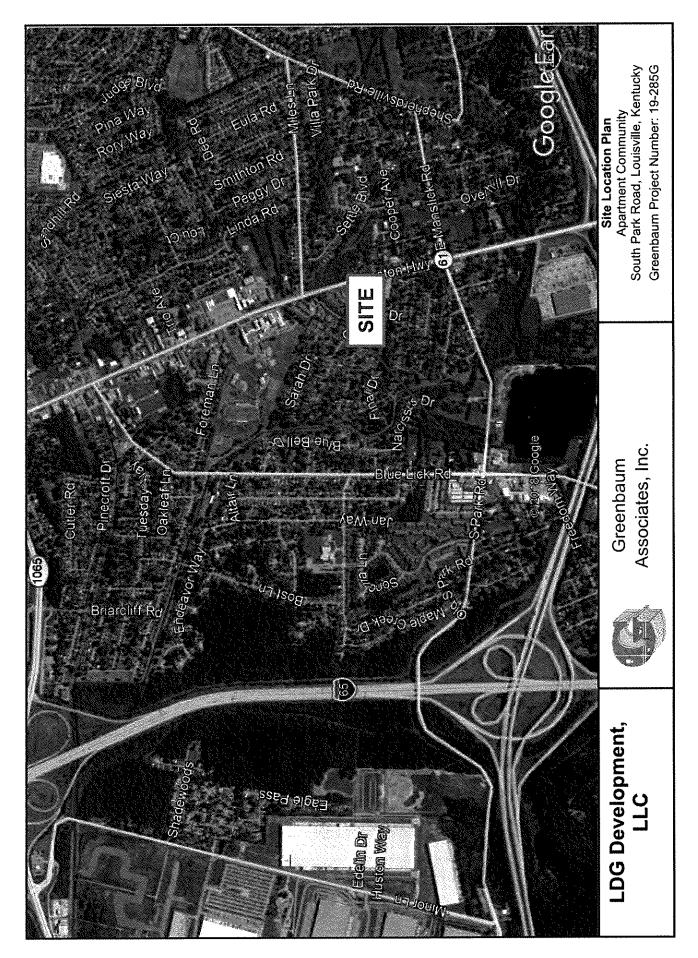
5.7 Limitations

We strongly recommend that bearing surfaces and compaction be monitored by Greenbaum Associates, Inc. Our technicians will be available to further assist you in providing these and other normally specified quality control services. The report is preliminary until such time as these examinations are completed to confirm conditions consistent with those discovered in the investigation.

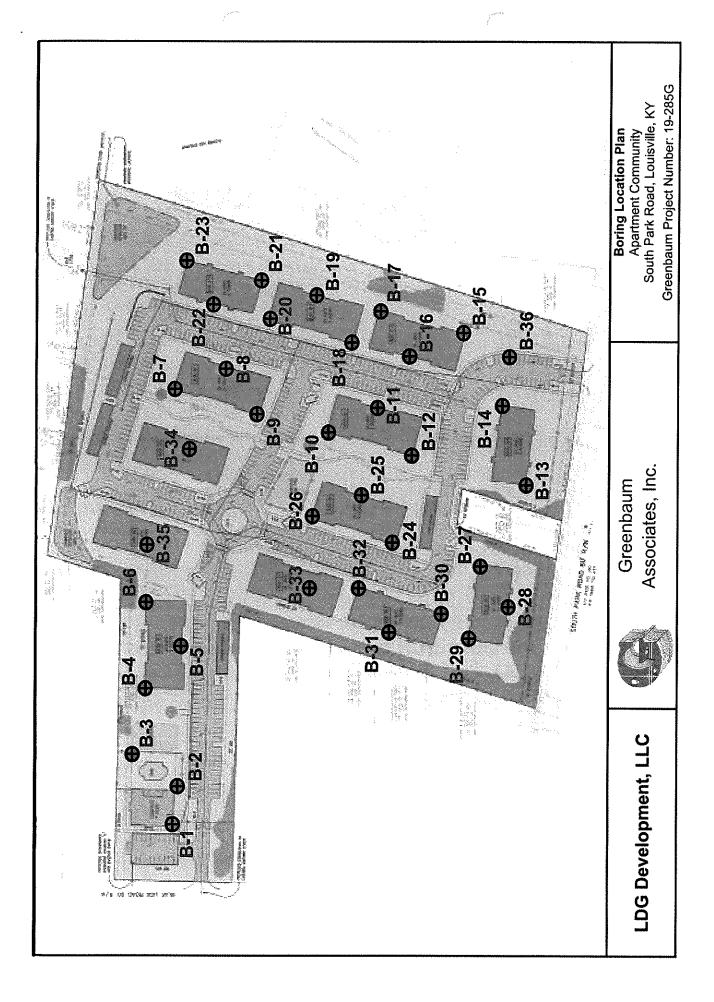
The conclusions and recommendations offered in this report are based on the subsurface conditions encountered in the borings. No warranties can be made regarding the continuity of conditions between or beyond borings. If, during construction, soil conditions are encountered that differ from those indicated in this report, a representative of Greenbaum Associates, Inc. should inspect the site to determining if design modification is required.

This study was directed at specific buildings and associated pavement at this location to be constructed within a reasonably short period after this study. Use for any other location, structures or substantial changes in construction period may invalidate the recommendations. The geotechnical engineer should be consulted relative to any substantial change in these.

This study is directed at mechanical properties of the soils and includes no sampling, testing or evaluation for environmental considerations.



19 - ZONE - 0086



19 - ZONE - 0086

SOIL DESCRIPTION TERMINOLOGY

Soils are identified and classified in this report according the the Unified Classification System with the following modifiers:

RELATIVE DENSITY OF GRANULAR SOILS

CONSISTENCY OF COHESIVE SOILS

Description	Blows/Foot	<u>Description</u>	N-value	<u>q. (tsf)</u>
Very Loose	0 to 4	Very Soft	0 to 2	0 to 0.25
Loose	4 to 10	Soft	3 to 4	0.26 to 0.50
Medium Dense	10 to 30	Medium Stiff	5 to 8	0.51 to 1.0
Dense	30 to 50	Stiff	9 to 15	1.1 to 2.0
Very Dense	50 to 80	Very Stiff	16 to 30	2.1 to 4.0
Extremely Dense	80+	Hard	>30	4.1 to 8.0
		Very Hard		8.1+

PARTICAL SIZES

SOIL MOISTURE

Compone	<u>nts</u>	Size or Sieve No.		Descriptive Term
Boulders		over 12 inches	Dry	Dry of Standard Proctor Optimum
Cobbles		3 to 12 inches	Damp	Moist (sand only)
Gravel -	Coarse	3/4 to 3 inches	Moist	Near Standard Proctor Optimum
	Fine	No. 4 to ³ / ₄ inch	Wet	Wet of Standard Proctor Optimum
Sand -	Coarse	No. 10 to No. 4	Saturated	Free Water in Sample
	Medium	No. 40 to No. 10		
	Fine	No. 200 to No. 40		
Fines (silt	and clay)	Finer than No. 200		

ROCK DESCRIPTION TERMINOLOGY

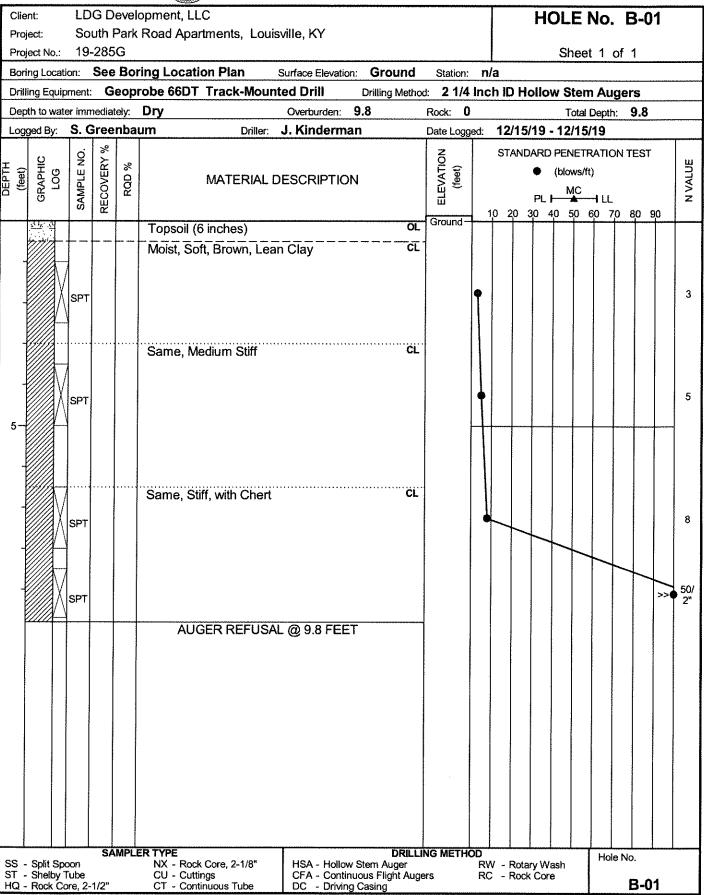
The Rock Quality Determination (Deere et. Al., 1969) method of determining rock quality as reported here was obtained by summing up the total length of core recovered in each run, counting only those pieces of core which are four inches (10 cm.) in length or longer and which are hard and sound. The sum is then represented as a percentage over the length of the run. If the core is broken by handling or by the drilling process, the fresh broken pieces are fitted together and counted as one piece provided that they the requisite length of four inches (10 cm.). RQD is reported as a percentage.

RELATIONSHIP BETWEEN RQD AND ROCK QUALITY

RQD (%)	<u>Description</u>	of Rock Quality
0 to 25	Ve	ry Poor
26 to 50		Poor
51 to 75 76 to 90		Fair Good
91 to 100		ccellent



OG WITH WELL AND SPT GRAPH 19-285.GPJ 08-053.GPJ 12/26/19





Clie	nt:		LD	G De	evel	opment, LL	С								НО	LE	No). I	B-02	2	
Proj	ect:					Road Apar	tments, Louis	ville, KY													
	ect No			285									<u> </u>			She	et 1	of	1		
	_					ring Locati		Surface Elevation	****		Station:	n/			11	. 04.					
				···			Track-Mount		Drilling Meth		2 1/4 Rock: 0	inc	n ID	МО	llow				rs 10.3		
			-			Dry	Driller:	Overburden: J. Kinderma	10.3 n		ate Logge	~d·	12/	1151	10 _		5/19		10.3		
Logg	ged By	<i>r</i> .		%	IIDa	<u>um</u>	Diller.	J. Miluerila				3U.	***************************************						TEST		
E _	₽,	'n	SAMPLE NO.	Σ	%	**************************************					ELEVATION (feet)		317	~1YD/		blows		ION	1001		Ħ,
DEPTH (feet)	GRAPHIC	ŏ	JPL.	RECOVERY	RQD %		MATERIAL D	ESCRIPTION	RIPTION (Legat)							MC	:			Ì	N VALUE
	ျ		SAI	REC								. 1	0 2		PL I- 0 40				80 9	90	den.
	<u> 24.7</u>		····			Topsoil (1	10 inches)		O)L	Ground -										
_	7711	<u> </u>			<u> </u>	Moist Me	dium Stiff, Bro	wn. Lean Cla	iv c	<u>.</u>											
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_		1	SPT									•	-			ľ	ŀ				4

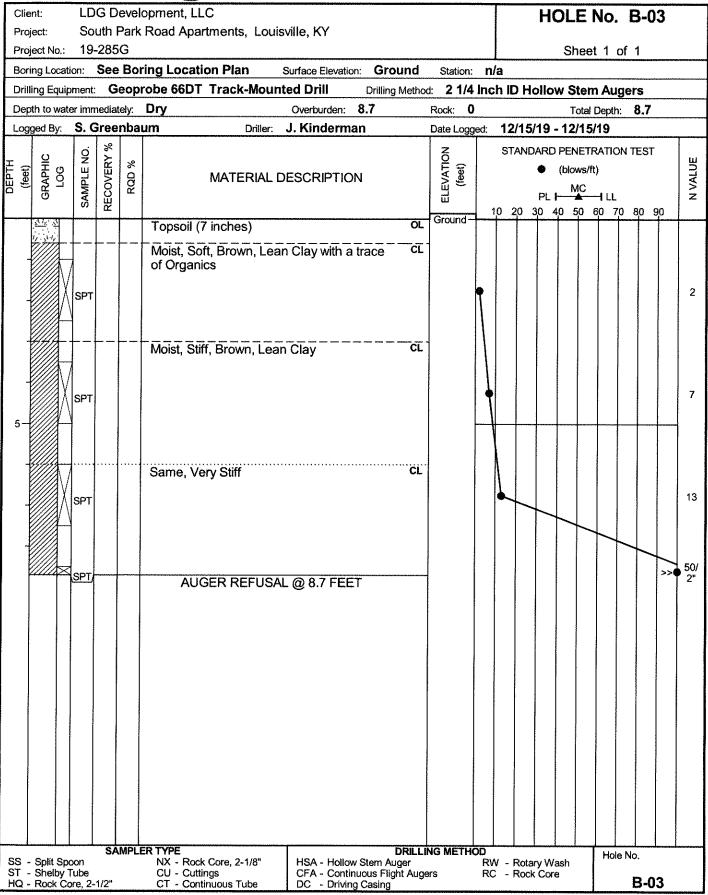
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		}\/				Same St	iff, with Chert		c	H			I			ł					10
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		1/	SPT			V. A. C.						Ī									ď
10-						***************************************							 	 		+		╫		\vdash	
	- Andread - Andread	1				AUG	SER REFUSAL	_ @ 10.3 FEE	=												
SS ST HQ		*				WINDS AND															
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						TOTAL PROPERTY OF THE PROPERTY					,							***************************************			
						OAAAA PARANTA												V			

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<u> </u>										بلِ											
ss	- Split			S	AMPL		k Core, 2-1/8"	HSA - Hollov	v Stem Auger		IG METH	R			ry Wa		'	loie l	No.		
ST HQ	- She - Roc	lby k Co	Tube ore, 2	-1/2"		CU - Cuti CT - Con	tings itinuous Tube	CFA - Contir DC - Drivin	nuous Flight A g Casing	uger	rs	R	C -	Rock	Core)			B-0	2	



AND SPT GRAPH 19-285.GPJ 08-053.GPJ 12/26/19

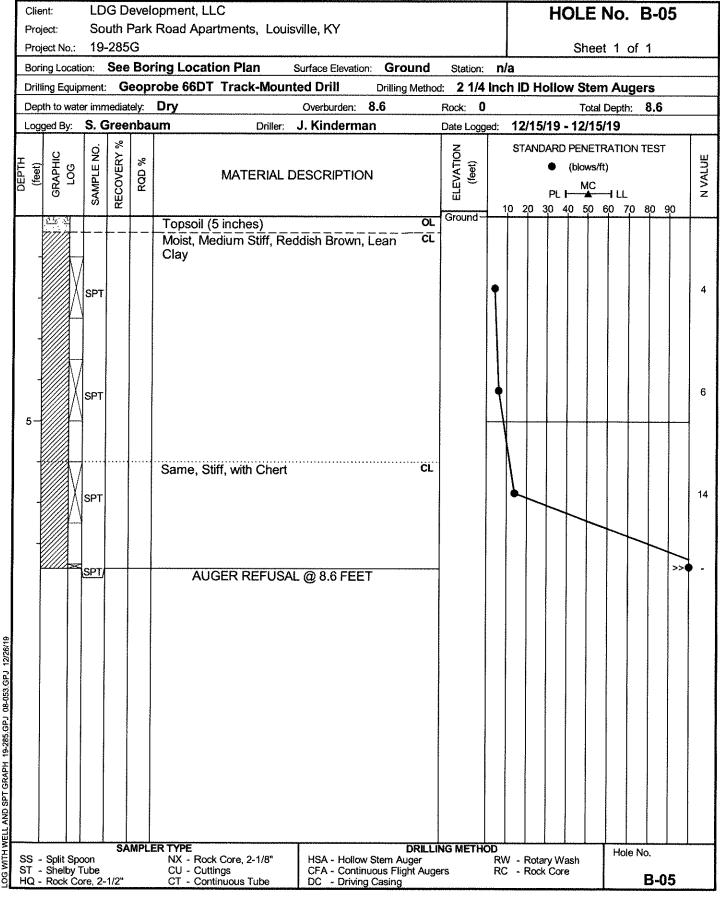




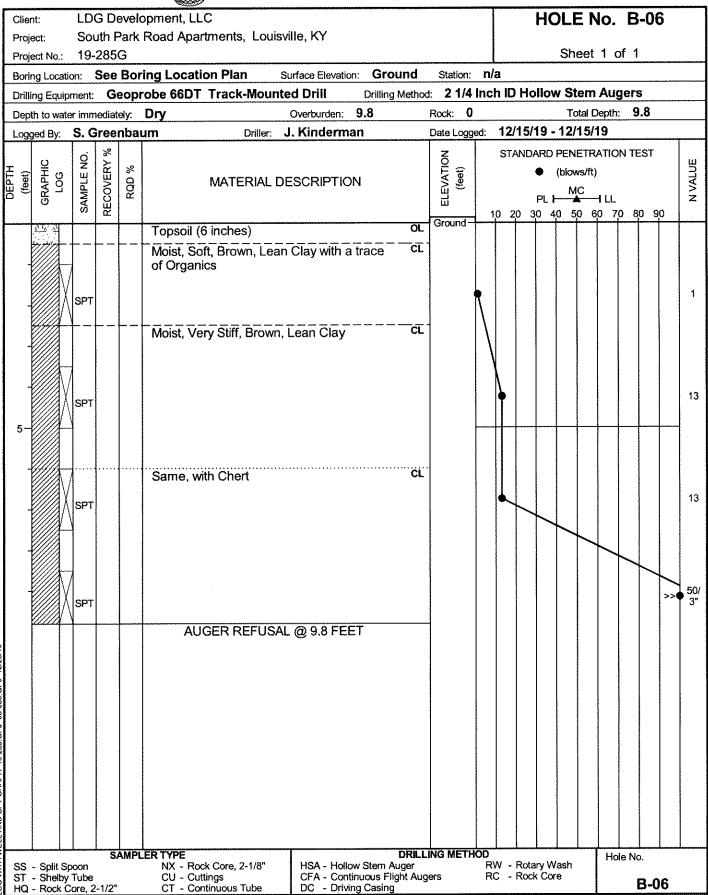
						Louisville, Ki	.02.0 700-	7								
Clier						opment, LLC					HOL	E N	io.	B-0	4	
Proje						Road Apartments, Louisville, KY					C		44	: 4		
-	ect No			285	_						3	neet	1 of			
	ng Loc					ring Location Plan Surface Elev			n/a							
						robe 66DT Track-Mounted Drill	Drilling Method		ich IL) но						
						Dry Overburde		Rock: 0	40					10.5	· · · · · · · · · · · · · · · · · · ·	····
Logg	ed By	<u>':</u>	S. G		nba	um Driller: J. Kinder	man	Date Logged:			9 - 12				ī	
_	ပ		Š	RECOVERY %				<u>S</u> _	ST	ANDA	RD PE			ITEST		щ
DEPTH (feet)	GRAPHIC	3	SAMPLE NO.	VER	RQD %	MATERIAL DESCRIPT	ION	ELEVATION (feet)				ows/ft)				N VALUE
E F	GRV	!	AMF	000	8						PL I	MC A	I LL			ź
			S	R				Ground	10 2	20 3	0 40	50 6	0 70	80 9	90	
	<u> </u>		L			Topsoil (6 inches)	OL]								
						Moist, Soft, Brown, Lean Clay	CL									
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		1	SPT					•	,		-					3
-		$I \setminus I$	011													
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-		1			ļ	Same, Medium Stiff	CL	1 1								
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		Λ	SPT											***************************************		Ŭ
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		$\Lambda/$				Same, Very Stiff, with Chert	ÇE.									
		1	SPT						1					-		16
		$V \setminus$							-11							
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									$\parallel \parallel$		-					
		1/			1	Same, Stiff	CL	1	-							
-			CDT						1		***************************************					10
		$1/\backslash$	SPT													
10-						- Control of the Cont				+		+				
SST HQ		1-				AUGER REFUSAL @ 10.5	FEET	-								
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					***************************************	1								***************************************		
					***************************************									***************************************		
					***************************************									Nessay Water Street		

;																
SS	- Split	Sp	001	S	AMPI	LER TYPE NX - Rock Core, 2-1/8" HSA - H	lollow Stem Auger		RW -		ry Wash	1	Hole	No.		
ST	- She - Roc	lby '	Tube	_1/ 2 "		CU - Cuttings CFA - C	Continuous Flight Aug Priving Casing		RC -					B-6)4	
1300	- 17400		.n G, Z	· 114		Un - Constitution a ratio	ig Jaoning									



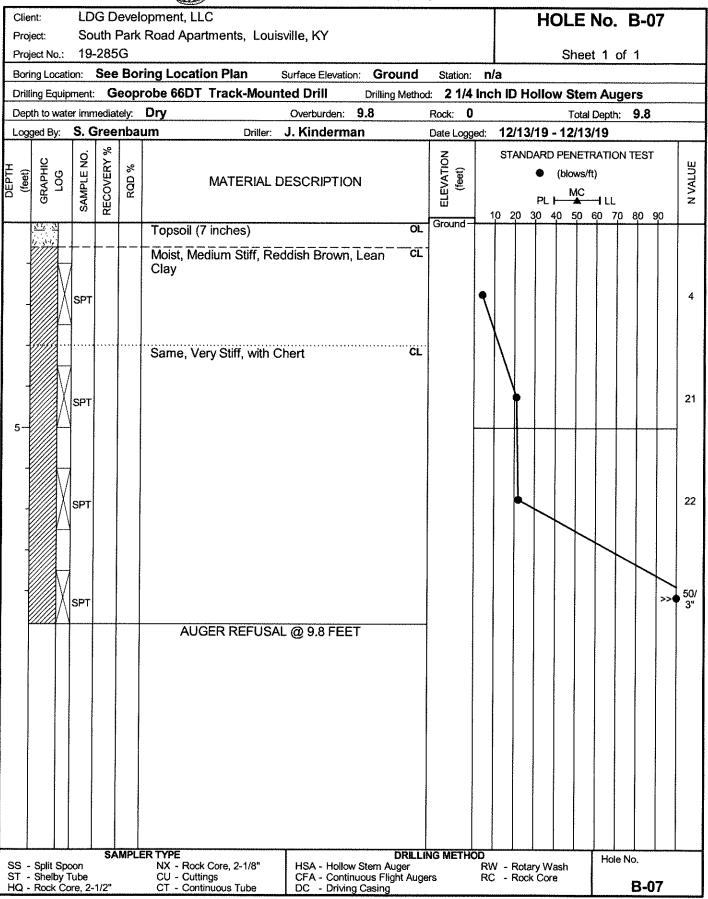








AND SPT GRAPH 19-285.GPJ 08-053.GPJ 12/26/19





Client: Project:			elopment, LI		evilla KV					HOI	ΕN	lo.	B-08	3	
Project No.:		285G	k Noad Apa	ranonio, coak	, i (i					5	Sheet	1 of	1		
Boring Location	n: S	See Bo	oring Locat	ion Plan	Surface Elevation:		Station:								_
Drilling Equipr	ment:	Geo	probe 66DT	Track-Moun		Drilling Metho			ID H						_
Depth to water					Overburden:	~~~	Rock: 0				Total C		8.0		
Logged By:		1	aum T	Driller:	J. Kinderma	n	Date Logg							Т.	-
DEPTH (feet) GRAPHIC LOG	SAMPLE NO.	RECOVERY %			DESCRIPTION		GLEVATION (feet)				MC	-I LL			NVA
7/1 N. 7/1			Topsoil (6 inches)		OL.	` [
	SPT			edium Stiff, Bro f Organics	own, Lean Cla	y with CL);;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	WATER TO THE	and the second s				1000 AAALAMAMAMAMAMAMAAAAAAAAAAAAAAAAAAAA	ξ
5-	SPT		Moist, St	iff, Brown, Lea	n Clay with Ch	nert CL		***************************************							1
	SPT		Same, V	ery Stiff		ĊL.			Bitter and the property of the second		A L HUNDRING MINIMA MARKET PARTY.			- I - I - O-O-O-O-O-O-O-O-O-O-O-O-O-O-O-	1
			AL	GER REFUSA	AL @ 8.0 FEE	Τ									
Y	<u> </u>	SAMI	PLER TYPE	*************************************	······································		LING METH					Hole	No.		•
SS - Split Sp ST - Shelby	Tube		NX - Ro CU - Cu		HSA - Hollow CFA - Contin	uous Flight Au	gers			ary Was k Core	ih			0	
HQ - Rock Co	оге, 2-	1/2"	CT - Co	ntinuous Tube	DC - Driving	Casing							B-0	0	

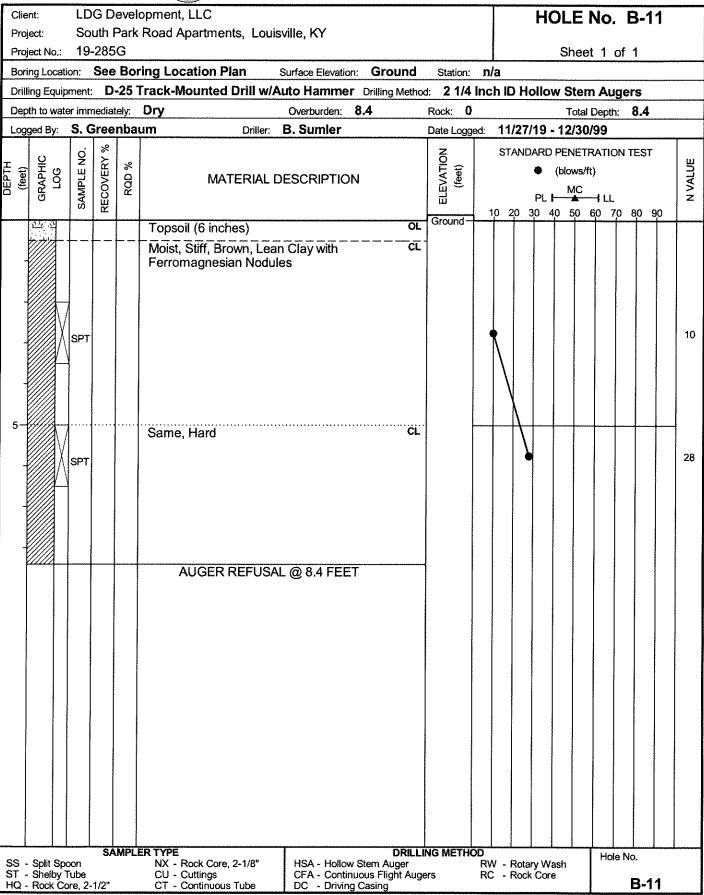


Clie Pro	ent: iject:					opment, LL Road Apar	C tments, Lou	isville, KY					НС	LE	No.	B-()9	
	ject No.			285										Shee	t 1 c	of 1		_
						ing Location		Surface Elevat		Station:								_
							Track-Mou		Drilling Meth			ID H	ollov					
	oth to w	***********					· · · · · · · · · · · · · · · · · · ·	Overburden:	11.3	Rock: 0					~~~~	11.	3	_
Log	ged By		s. G		nba	um	Driller:	J. Kindern	nan	Date Logg	T			12/14	***************************************	····		_
DEPTH (feet)	GRAPHIC	2	SAMPLE NO.	RECOVERY %	RQD %		MATERIAL	DESCRIPTION	ON	ELEVATION (feet)		STANE		PENETI (blows/i	t)		Γ	
a	20		SAN	REC	DE.						10	20	PL I- 30 4	MC 50			90	
	7/7 7					Topsoil (6	inches)		OI	Ground -			1 1				1	Γ
-						Moist, Me a trace of	dium Stiff, Bi Organics	rown, Lean C	lay with CI	-								
•••		\\\s	PT									***************************************				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
***						Moist, Stif	f, Brown, Lea	an Clay	ci		The state of the s	***************************************						
***		\ \ s	PT								1					- The state of the		
5										7.7777711111111111111111111111111111111								
•		S	PT		The state of the s	Moist, Ver with Ferro	y Stiff, Light magnesian I	Brown, Lean Nodules and	Clay ci Chert	•						T IN THE PROPERTY OF THE PARTY		
1																		
10-		\ s	PT															
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						AUG	ER REFUSA	L @ 11.3 FE	ĿΕΤ				***************************************		THE RESERVE THE PERSONS THE PE			
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																	THE PARTY OF THE P	
	Com 194 of	\		SA	MPLI	ER TYPE	Cara 2 4/0!	Tuca ii "		LING METH				-t-	Hole	No.	AND THE PROPERTY OF THE PROPER	
ST ·	- Split S - Shelb - Rock	y Tu	be	ויבי/ ו		CU - Cuttii	Core, 2-1/8" ngs nuous Tube		ow Stem Auger inuous Flight Au	gers		- Rota - Roc				B-(na	



Client:			opment, LLC	~ · · · · · · · · · · · · · · · · · · ·		HOLE N	No. B-10	
Project: Project No.:	Sout 19-2		Road Apartments, Louisville, h	(Y		Sheet	1 of 1	
			ing Location Plan Surface	Elevation: Ground	Station: n/			
Drilling Equip	ment:	D-25 T	rack-Mounted Drill w/Auto H	ammer Drilling Method	: 2 1/4 Inc	h ID Hollow Stem	Augers	
Depth to water	er imme	diately:	Dry Overb	urden: 6.6	Rock: 0		Depth: 6.6	
Logged By:	S. Gr	eenbai	u m Driller: B. Su	mler	Date Logged:	<u> 11/27/19 - 11/27/</u>	19	1
DEPTH (feet) GRAPHIC LOG	SAMPLE NO.	ROD %	MATERIAL DESCR	RIPTION	ELEVATION (feet)	STANDARD PENETR (blows/ft) PL MC)	N VALUE
7. 7.	S	āŽ	T1/7 :	OL.	Ground	0 20 30 40 50 6	50 70 80 90	ļ
7.34	\perp _ \perp		Topsoil (7 inches)			***************************************		
	SPT	***	Moist, Hard, Brown, Lean Cla					31
5-			Same, Very Stiff	CL				***************************************
	SPT		Same, with Weathered Limes	tone CL				12
SS - Split Sp ST - Shelby			AUGER REFUSAL @ 6	OPEET				
SS - Split Sp	noor	SAMPL	ER TYPE NX - Rock Core, 2-1/8" HS/	DRILL A - Hollow Stem Auger	ING METHOD	W - Rotary Wash	Hole No.	1
ST - Shelby HQ - Rock C	Tube	/2"	CU - Cuttings CFA	A - Continuous Flight Aug - Driving Casing		C - Rock Core	B-10	







_		ppment, LLC		HOLE N	No. B-12	
•	outh Park 3-285G	Road Apartments, Louisville, KY		Sheet	1 of 1	
		ing Location Plan Surface Elevation: Ground	Station: n			***************************************
		rack-Mounted Drill w/Auto Hammer Drilling Metho		······································	Augers	
Depth to water im	mediately:	Dry Overburden: 9.3	Rock: 0	Total (Depth: 9.3	
Logged By: S.	Greenbau	ım Driller: B. Sumler	Date Logged:	11/27/19 - 11/27/	19	
DEPTH (feet) GRAPHIC LOG SAMPLE NO.	RECOVERY %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETR (blows/ft PL MC PL A 10 20 30 40 50 6)	M VAII IE
2 × 2		Topsoil (7 inches)				+
		Moist, Stiff, Brown, Lean Clay with Cl Ferromagnesian Nodules	-			
SP	г					***************************************
SP	Г	Same, Very Stiff Ci	-			1
		AUGER REFUSAL @ 9.3 FEET				
SS - Split Spoon ST - Shelby Tube HQ - Rock Core,	÷	ER TYPE NX - Rock Core, 2-1/8" CU - Cuttings CT - Continuous Tube DC - Driving Casing		W - Rotary Wash	Hole No.	



							171 40213 (30	·····						····
Clie						opment, LLC	107			H	OLE	No.	B-13	
•	ject:					Road Apartments, Louisville	s, KY				OI.		4	
	ject No			285					<u> </u>		Sheet	1 of	1	
***************************************	ing Loc	***********					ce Elevation: Ground		n/a					
	~~~~~		***********			Track-Mounted Drill w/Auto			ch ID	Hollo		·····		
	oth to w					······································	erburden: 7.2	Rock: 0				Depth:	7.2	
Log	ged By	:	S. G		nba	um Driller: <b>B.</b> S	Sumler	Date Logged	11/	27/19	- 11/27/	19		
	ပ္		õ	RECOVERY %				N O	STA	ANDARD	PENETF	NOITAS	TEST	ш
DEPTH (feet)	E	3	LE	VER	RQD %	MATERIAL DESC	CRIPTION	EVATi (feet)		•	(blows/ft			N VALUE
<u> </u>	GRAPHIC	-	SAMPLE NO.	CO	8			ELEVATION (feet)		PL	MC	<b>-1</b> LL		>   Z
<u> </u>			S	ör.				0	10 2		40 50		80 90	
	77.7	İ				Topsoil (7 inches)	0	L						
						Moist, Very Stiff, Brown, Lea	an Clay Clay							
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		VI												
-		M	SPT											16
		4												
	1					AUGER REFUSAL @	7.2 FEET							
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				Ç A	MiDi	ER TYPE T	ner i	LING METHOD					<u> </u>	
	- Split S			SA.	u <b>7</b> 81″ <b>L</b> .!	NX - Rock Core, 2-1/8" H	SA - Hollow Stem Auger	F	RW - F	Rotary W		Hole N	10.	
HQ	- Shelb - Rock	y I Coi	ube re, 2-	1/2"		CU - Cuttings C CT - Continuous Tube D	FA - Continuous Flight Au C - Driving Casing	gers F	KC - F	Rock Cor	e		B-13	-



Client: Project:				opment, LLC Road Apartments, Louisvi	lle KY			НС	DLE N	lo.	B-14	4
Project No.:		2850		rodd r paramento, Louisvi	, , , , , , , , , , , , , , , , , , ,				Sheet	1 of	1	
Boring Location	on:	See	Bor	ing Location Plan કા	urface Elevation: Ground	Station:	n/a					
Drilling Equipa	ment:	D-:	25 T	rack-Mounted Drill w/Au	to Hammer Drilling Method	: 2 1/4 lr	nch ID	Hollov	v Stem	Auge	ers	
Depth to wate	er imm	ediate	ely:	Dry	Overburden: 8.4	Rock: 0				Depth:	8.4	
Logged By:	S. G	reer	nbau	u <b>m</b> Driller: <b>B</b>	3. Sumler	Date Logged	<u>: 11/</u>	27/19 -	11/27/	19		
DEPTH (feet) GRAPHIC LOG	SAMPLE NO.	RECOVERY %	RQD %	MATERIAL DE	SCRIPTION	ELEVATION (feet)	STA 10 2	● PL I	PENETR (blows/ft)  MC  10 50 6	) <del> </del>   LL		o I
Z'-X-Z'				Topsoil (7 inches)	OL	Ground -			<del>                                     </del>			
	SPT		A TABLE AND A SECURITY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE	Moist, Stiff, Brown, Lean	Clay CL				CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR O			
5-	SPT		-								***************************************	
SS - Split Sp ST - Shelby' HQ - Rock C				AUGER REFUSAL	@ 8.4 FEET							
	·	SA	MPL	ER TYPE		NG METHO		Rotani Mi	i	Hole	No.	·
SS - Split Sp ST - Shelby HQ - Rock Co	Tube	-1/2"		NX - Rock Core, 2-1/8" CU - Cuttings CT - Continuous Tube	HSA - Hollow Stem Auger CFA - Continuous Flight Aug DC - Driving Casing			Rotary W Rock Cor			B-1	4



Borii Drilli	ect No.:		JUUI		Waad Anar	tments, Lou	ievilla KV						-	. • •			В		
Drilli		: 19	-285		Noau Apai	uncino, coc	iisviiie, ivi							SI	heet	1 0	of 1		
	ng Loca	ation:	Sec	Bo	ring Locati	on Plan	Surface Eleval	tion: <b>Grou</b> r	nd	Station:	n/	a			~				
	ing Equ	ipmen	t: G	eop	robe 66DT	Track-Mou	nted Drill	Drilling M	ethod	: 21/4	Inc	h ID	Holl	ow S	item	Au	gers		
***************************************	th to wa	***************************************		***************************************	······································		Overburden:	5.5		Rock: 0				7	otal I	Depth	5	5	
Logg	ged By:	S.	Gree	nba	um	Driller:	J. Kindern	nan		Date Logg	ed:	12/	14/19	- 12	/14/	19			
_	ပ	õ	% >							Z O		STA	NDAF	D PEI	NETR	ATIO	N TE	ST	١,
(feet)	GRAPHIC	Ę	VER	RQD %		MATERIAL	DESCRIPTI	ON		ELEVATION (feet)			•		ws/ft				
בֿ בֿ	쮼	SAMPLE NO.	RECOVERY %	×						EE (									
	<u> </u>		<u>α</u>	-	Topsoil (7	' inches)			OL	Ground -	1	0 2	0 30	40	50 6	0 7	0 80	90	-
ŀ					L		n, Lean Clay		CL										
-		1			trace of C	rganics	ni, Lean Clay	/ Willia	<b>-</b>										
		۷I									•				-				
1		<u> </u>			Moist, Stif	f, Brown, Le	an Clay with	Chert	CL										
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5-7															1				
					AUG	SER REFUS	AL @ 5.5 FE	ET											
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 	Split S	noon	S/	AMPL	ER TYPE	Core, 2-1/8"	나이 나이	DF low Stem Auge		NG METH		v =	Rotary \	Maak		Hole	No.		
ST -	Shelby Rock (	/ Tube			CU - Cutti			ntinuous Flight		ers			Rotary N				D	-15	



Clier Proje					pment, LLC Road Apartments, Louisville, KY				HOLE	No.	B-1	6	
Proje	ect No.:	19-	285	G					Shee	et 1 o	f 1		
Borir	ng Locati	on:	See	Bor	ng Location Plan Surface Elevation: Gro	ound	Station:	n/a					
Drilli	ng Equip	ment:	D.	·25 T	rack-Mounted Drill w/Auto Hammer Drilling	g Method:	2 1/4 I	nch ID H	ollow Ste	m Aug	ers		
Dept	h to wate	er imn	nediat	ely:	Dry Overburden: 7.7	R	Rock: 0		Tota	l Depth:	7.7		
Logg	ed By:	S. 0	ree	nbau	m Driller: B. Sumler	D	ate Logge	1: 11/27	<u>/19 - 11/2</u>	7/19			
	O	ō.	% ,				š	STANE	ARD PENET	TRATIO	V TEST	-	1
(feet)	GRAPHIC LOG	SAMPLE NO.	RECOVERY %	%	MATERIAL DESCRIPTION		ELEVATION (feet)		• (blows				
7 (4)	& 31 L. ₹	₩.	CO	Rab	With Early to Describe 17614				PL   MC	— <b> </b> LL			
		Ŝ	RE				Ground	10 20	30 40 50		08 (	90	
	77.7	<u> </u>			Topsoil (6 inches)	- OL	Ground						
		T -		[	Moist, Very Stiff, Brown, Lean Clay with	CL							
-			***************************************		Ferromagnesian Nodules								
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		SPT						•					
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		SPT		.,	A	CL		1			İ		
		1			Same, with Weathered Limestone	CL							
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Î	9/28/	<del> </del>			AUGER REFUSAL @ 7.7 FEET								
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				AREDI	ER TYPE	DBII IN	IG METHO	n			- N3-		_
SS -	- Split Sp	coon	5/	-wirl.	NX - Rock Core, 2-1/8" HSA - Hollow Stem A	Auger		RW - Rot		Hole	e No.		
ST -	Shelby Rock C	Tube	-1/2"		CU - Cuttings CFA - Continuous FI CT - Continuous Tube DC - Driving Casing	light Auger a	rs	RC - Roo	k Core		B-	16	



LOG WITH WELL AND SPT GRAPH 19-285.GPJ 08-053.GPJ 12/26/19

O.		10	<u> </u>	امرد	opment, LLC	, 1 1 10	` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `	*		IOLE I			
Clie	ent: ject:				opment, LLC Road Apartments, Lou	ieville KV			F	HOLE N	NO. E	3-1/	
1 '	ject ject No.:		-285		. Noau Aparullelius, Euu	iavilie, iXI				Sheet	1 of	1	
	ing Loca				ring Location Plan	Surface Elevation	Ground	Station: I	 n/a	Once	1 01	1	
	ling Equi			************	Track-Mounted Drill w/					low Stem	Auger	's	*****
	oth to wa			***************************************	***************************************		7.8	Rock: 0	<u> </u>		Depth:		
	ged By:					B. Sumler		Date Logged:	11/27/1	9 - 11/27/			
		Ι	%						***	RD PENETR	***************************************	FST	
Εæ	GRAPHIC	SAMPLE NO.	<u>₹</u>	%				ELEVATION (feet)	•	(blows/ft)			H.
DEPTH (feet)	1 & 3	₽ I	RECOVERY	RQD %	MATERIAL	DESCRIPTION	N	EVATI(		L MC			N VALUE
	9	SA	REC	_				-		L <b>I ▲</b> 40 50 6		an an	Z
	25.5	1			Topsoil (8 inches)		OL.	Ground	ŤŤŤ	1 1			-
	7/7/						ith CL						
1					Moist, Very Stiff, Brown Ferromagnesian Nodu	n, Lean Clay w iles	ith CL						
									WW.				
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-		SPT											14
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		/											
-		SPT							•	7			19
		<b>\</b>				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	CL						
					Same, with Weathered	Limestone	CL.						
	1/6/64				AUGER REFUS	AL @ 78 FFF	T	1					
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<b> </b>		I	SA	MPL	ER TYPE			NG METHOD	<u> </u>		Hole No	L ).	1
ST -	- Split Sp - Shelby	Tube			NX - Rock Core, 2-1/8" CU - Cuttings	HSA - Hollow CFA - Contin	uous Flight Auge	ers F	W - Rotary C - Rock C	Wash ore			
	- Rock C		1/2"		CT - Continuous Tube	DC - Driving	Casing					<u>3-17                                    </u>	

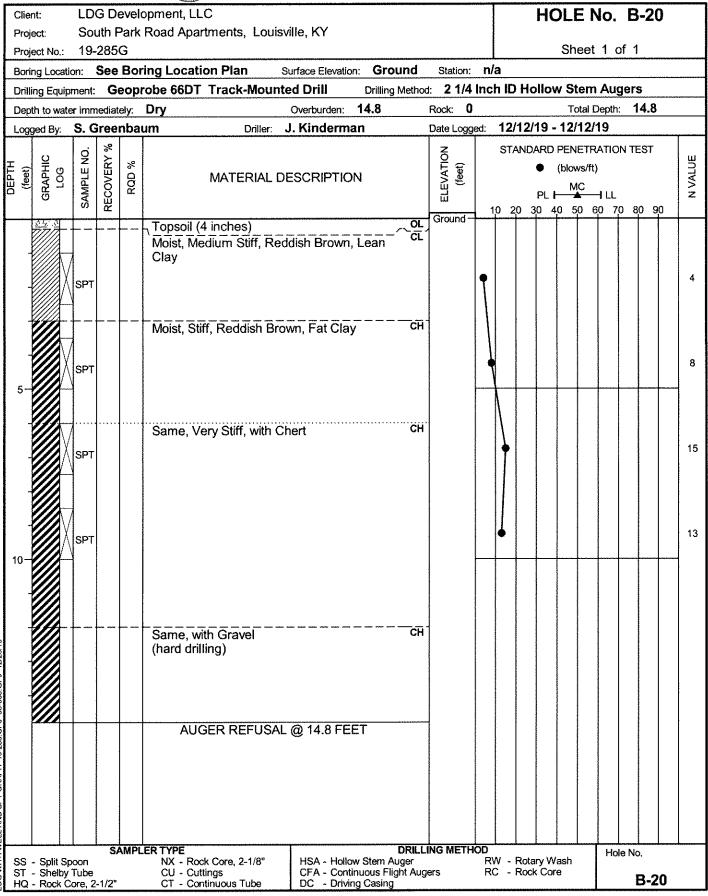


Client:			opment, LLC Road Apartments, Louisville, KY				HOLE N	No. B-1	8
Project: Project No.:	19-285		Noad Apartments, Louisville, N				Sheet	1 of 1	
	on: See	Bor	ing Location Plan Surface Elevation: Grou	nd	Station:	n/a			
Drilling Equipn	ment: <b>G</b>	eopr	obe 66DT Track-Mounted Drill Drilling N	/lethor	d: 2 1/4	Inch ID Ho			
Depth to water					Rock: 0		***************************************	Depth: 8.0	
Logged By:	S. Gree	nbau	ım Driller: <b>J. Kinderman</b>		Date Logge	ed: <b>12/12/</b>	19 - 12/12/	19	
DEPTH (feet) GRAPHIC LOG	SAMPLE NO. RECOVERY %	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)		ARD PENETR  (blows/ft)  MC  PL   40 50 6	) - <b>1</b> LL	21.147.14
3/8/2		<u> </u>	Topsoil (7 inches)	OL	Ground				
	SPT		Moist, Medium Stiff, Reddish Brown, Lean Clay	CL		•			
5	SPT		Same, Very Stiff, with a little Gravel  Moist, Very Stiff, Reddish Brown, Fat Clay	CL					4**
	SPT	WHEN THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPE	with a little Gravel						1
			AUGER REFUSAL @ 8.0 FEET						
SS - Split Spo ST - Shelby 1 HQ - Rock Co	oon Tube		ER TYPE  NX - Rock Core, 2-1/8"  CU - Cuttings  CT - Continuous Tube  CT - Driving Casing	ger	ING METH	OD RW - Rota RC - Rock		Hole No.	18



Client: Projec					opment, LLC Road Apartments, Louisville, KY				HOL	E N	o. B	-19	
Projec			285						S	Sheet 1	l of 1		
Boring						ound		/a					
Drilling	g Equip	ment:	G	eopi		g Metho	d: 2 1/4 Inc	ch ID H	lollow	Stem /	lugers	<b>.</b>	
Depth							Rock: 0			Total De		1.0	
Logge	d By:	<u>S. G</u>		nba	um Driller: J. Kinderman		Date Logged:	12/12	2/19 - 1:	2/12/19	)		_
(feet)	GRAPHIC LOG	SAMPLE NO.	RECOVERY %	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)			ows/ft)	LL		
2	7 7				Topsoil (8 inches)	OL	Ground						Γ
		SPT			Moist, Soft, Brown, Lean Clay with a tract of Organics	of CL					77 17 17 17 17 17 17 17 17 17 17 17 17 1	A THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF T	
5		SPT			Moist, Stiff, Reddish Brown, Fat Clay with Chert	СН			Transferance .				
		SPT	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	7 1 1 1 1	Same, Very Stiff	СН		•	TO ANALYSIS OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE				
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SS - S ST - S HQ - R	helby 1	Tube		MPL	ER TYPE  NX - Rock Core, 2-1/8"  CU - Cuttings  CT - Continuous Tube  HSA - Hollow Stem A  CFA - Continuous F  DC - Driving Casing	Auger ight Aug	ING METHOD R ers R	W - Rot C - Roo	ary Wash		fole No.	J-19	-

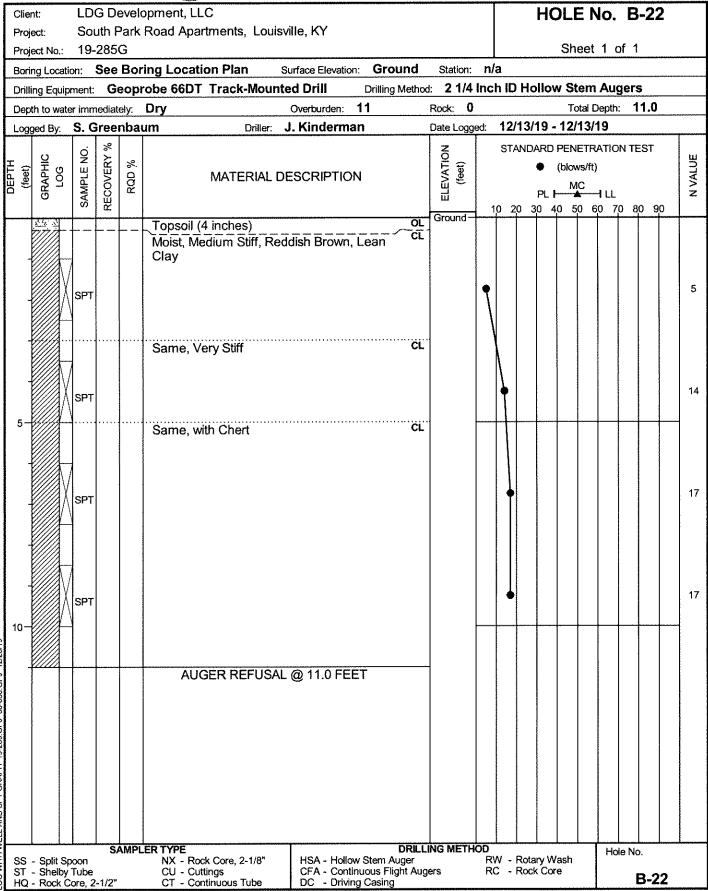






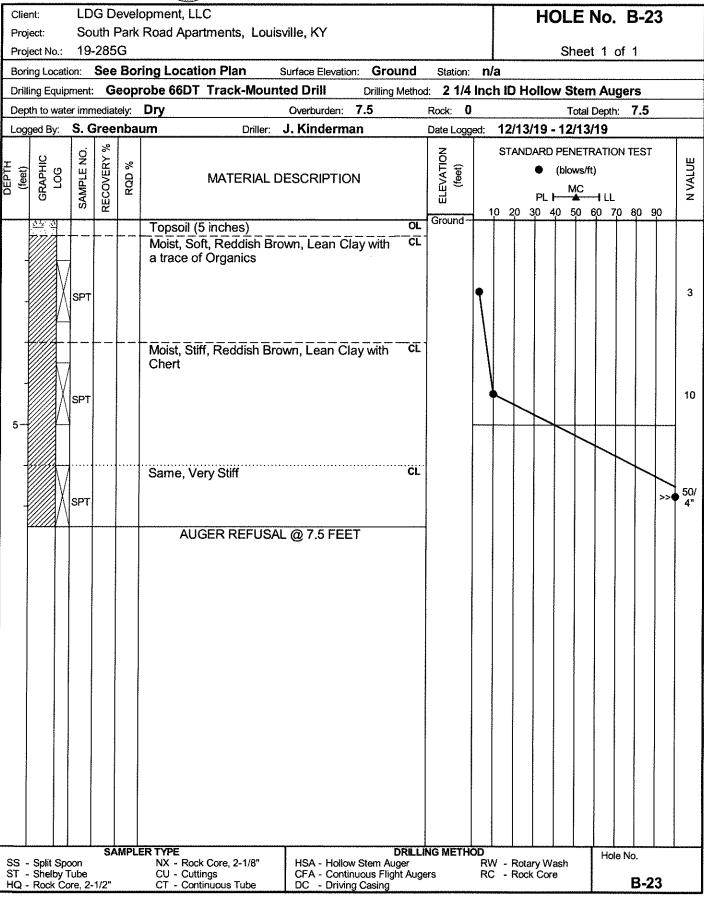
	ent: oject:				opment, LLC Road Apartments, Louis	ville KV				Н	OLE	No.	B-2	1	
	oject No.:		-285		Trodd Apartments, Louis	viiio, 101					Shee	et 1 o	of 1		
Bor	ring Loca	tion:	See	Bor	ring Location Plan	Surface Elevation:	Ground	Station:	n/a						
Dril	Iling Equi	pment:	G		robe 66DT Track-Mount		Drilling Metho			D Hollo	ow Ste	m Aug			
	pth to wa		**********		Dry		8.01	Rock: 0				l Depth:	10.8	3	_
Log	gged By:	S. 6	1	nba	um Driller:	J. Kinderman	1	Date Logg	***************************************	2/12/19				T	
I _	∫ ₂ ,	SAMPLE NO.	RECOVERY %	%				ELEVATION (feet)	S	TANDARI	D PENET (blows/		N TEST		
DEPTH (feet)	GRAPHIC	APLE	S S	ROD %	MATERIAL D	ESCRIPTION		EVATI							
	<u>o</u>	SA	REC	<u> </u>				ᆸ	10	PL 20 30	MC 1 ★		ነ ደሰ	an	
	77.77				Topsoil (6 inches)		OL	Ground -			7 7	ŤŤ	<del>,                                    </del>		
		†	<b>-</b> -		Moist, Medium Stiff, Red	ldish Brown, L	ean CL	1							
•		7			Clay										
		SPT							9						
									V						
					***************************************		***************************************		\ \						
					Same, Very Stiff, with C	nert	CL		$  \   \  $						
-										$\setminus$					
		SPT								<b>†</b>					
5-				Ì							1 1		_	1	
		<del>  -</del>			Moist, Very Stiff, Reddis	n Brown, Fat (	Clay CH	_							
		/			with Chert		<del>-</del> -y								
-		SPT		ĺ											
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SS	- Split Sp	oon	SĀ	MPLE	ER TYPE NX - Rock Core, 2-1/8"	HSA - Hollow S	Stem Auger	ING METHO	RW -	Rotary V	Vash	Hole	No.		
ST	<ul><li>Shelby</li><li>Rock C</li></ul>	Tube	1/2"		CU - Cuttings CT - Continuous Tube	CFA - Continue DC - Driving (	ous Flight Aug Casino	ers	RC -	Rock Co	re		B-2	1	







WITH WELL AND SPT GRAPH 19-285.GPJ 08-053.GPJ 12/26/19





Client: Project:			lopmen	t, LLC  Apartments, Lo	uieválla KV						НО	LE	No.	B-	24	
Project No.:	19-2		V I VOAG	mparunents, co	disville, ICI							Sheet	1 c	of 1		
Boring Locat	ion: S	ee Bo	ring Lo	cation Plan	Surface Elev	vation: <b>Gro</b>	und	Station:	n/a							
Drilling Equip	ment:	D-25	Track-	Mounted Drill w			Method	t: 2 1/4	Inch	ID H	ollow	Sten	ı Auç	jers		
Depth to water			•		Overburde			Rock: 0				Total		7.	6	
Logged By:	S. Gr	eenba	aum	Driller	B. Sumle	er		Date Logge	ed: 1	1/25/	19 -	11/25	19			-
DEPTH (feet) GRAPHIC LOG	SAMPLE NO.	RECOVERY %		MATERIAL	L DESCRIP	TION		ELEVATION (feet)			• (I	PENETF blows/fi MC A 50	:) ⊢.u.			N VALUE
7.7.7			Tops	oil (7 inches)			OL	Ground-			<u> </u>					
			Mois Ferro	t, Stiff, Reddish I omagnesian Noo	Brown, Lear dules	Clay with	CL.								AAAAAAAAA AAAAAAA	11
5-	SPT		Sam	e, Very Stiff			CL				**************************************					
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SS - Split Sp ST - Shelby HQ - Rock C	Tube	/2"	CU	- Rock Core, 2-1/8" - Cuttings - Continuous Tube	CFA - C	łollow Stem A Continuous Fli Oriving Casing	ght Aug	ers		- Rota - Rock				В	-24	

Clie Proj					opment, LLC Road Apartments, Louisville, KY				Н	OLI	E No	. В	-25	
	ect No.:		·285		Toda Apartments, Louisvine, KT					Sh	eet 1	of 1		
					<del></del>	ound	Station:	***************************************						
					Track-Mounted Drill w/Auto Hammer Drillin	ng Metho		ch ID	Holle					
	th to wa						Rock: 0				tal Dept	h: <b>6</b>	.8	
Logg	ged By:		T	nba	um Driller: <b>B. Sumler</b>		Date Logged	: 11/	25/19	<u>- 11/:</u>	25/19			1
DEPTH (feet)	GRAPHIC LOG	SAMPLE NO.	RECOVERY %	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)		● PL	(blow		<del>.</del>		NVALIF
	<u> </u>				Topsoil (8 inches)	OL	Ground							1
		SPT			Moist, Very Stiff, Brown, Lean Clay	CL.		**************************************		THE THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF T			The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	16
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ST -	Shelby Rock C	Tube	1/2"		CU - Cuttings CFA - Continuous F CT - Continuous Tube DC - Driving Casin	ight Aug	ers F		Rock Co			В	-25	



Client:				opment, LLC			HOLE !	No. B-26	••••
Project: Project No.:		uin r .285		Road Apartments, Louisville, KY			Sheet	: 1 of 1	
Boring Locati	on:	See	Bor	ing Location Plan Surface Elevation: Gr	ound	Station: 1	n/a		
Drilling Equip	ment:	D-	-25 T	rack-Mounted Drill w/Auto Hammer Drillin	ng Methor	d: 2 1/4 In	ch ID Hollow Stem	n Augers	
Depth to water	er imm	nediat	ely:	Dry Overburden: 6.9		Rock: 0	······································	Depth: 6.9	
Logged By:	<u>S. C</u>	ree	nbau	ım Driller: B. Sumler		Date Logged:	11/25/19 - 11/25/	<u>/19</u>	-T
(feet) GRAPHIC LOG	SAMPLE NO.	RECOVERY %	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)			1
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5	SPT			Same, with Ferromagnesian Nodules and Weathered Limestone	ĊL.				
				AUGER REFUSAL @ 6.9 FEET					
SS - Split Sr ST - Shelby HQ - Rock C	Tube		AMPL	ER TYPE  NX - Rock Core, 2-1/8"  CU - Cuttings  CT - Continuous Tube  CT - Driving Casin	Auger Flight Aug		RW - Rotary Wash RC - Rock Core	Hole No.  B-26	



Clie	ent: ject:				opment, LLC Road Apartments, Louis	ville KY				НС	DLE	No.	B-2	7
,	ject No.:	19-	285	G		vaio, 141					Shee	t 1 of	1	
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	ling Equip				Frack-Mounted Drill w/A				nch ID	Hollov				
	oth to wat ged By:				······································	Overburden: 8 B. Sumler	-1	Rock: 0  Date Logge	4. 4419	25/19 -		Depth:	8.1	
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ST -	- Shelby - Rock C	Tube	1/2"		CU - Cuttings CT - Continuous Tube	CFA - Continuo DC - Driving C	ous Flight Aug	ers	RC - R				B-2	7



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Proje Proje	ect: ect No.:		uth F ·285		oad Apartments, Louisville,	ΚY				Sł	eet	1 of	1		
					g Location Plan Surface	e Elevation: Ground	Station:	n/a						•	
Drilli	- ng Equip	ment:	D.	·25 T	ack-Mounted Drill w/Auto H	lammer Drilling Method	d: 2 1/4 li	nch ID	Hol	low S	tem /	Auge	rs		
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UEP I H (feet)	GRAPHIC LOG	SAMPLE NO.	RECOVERY %	RQD %	MATERIAL DESC	RIPTION	ELEVATION (feet)		F	RD PEN (blo PL I N 40 :	ws/ft)	LL			NVALLE
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ST -	- Shelby - Rock (	Tube	?-1/2"		CU - Cuttings Cf	A - Continuous Flight Aug C - Driving Casing	ers	RC -	Rock	Core			B-2	8	



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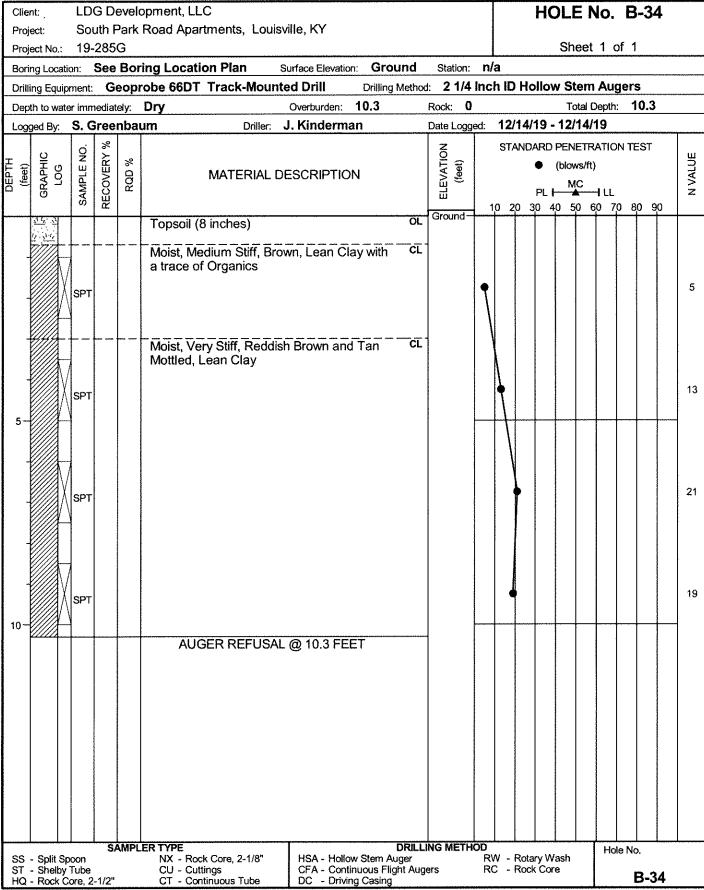
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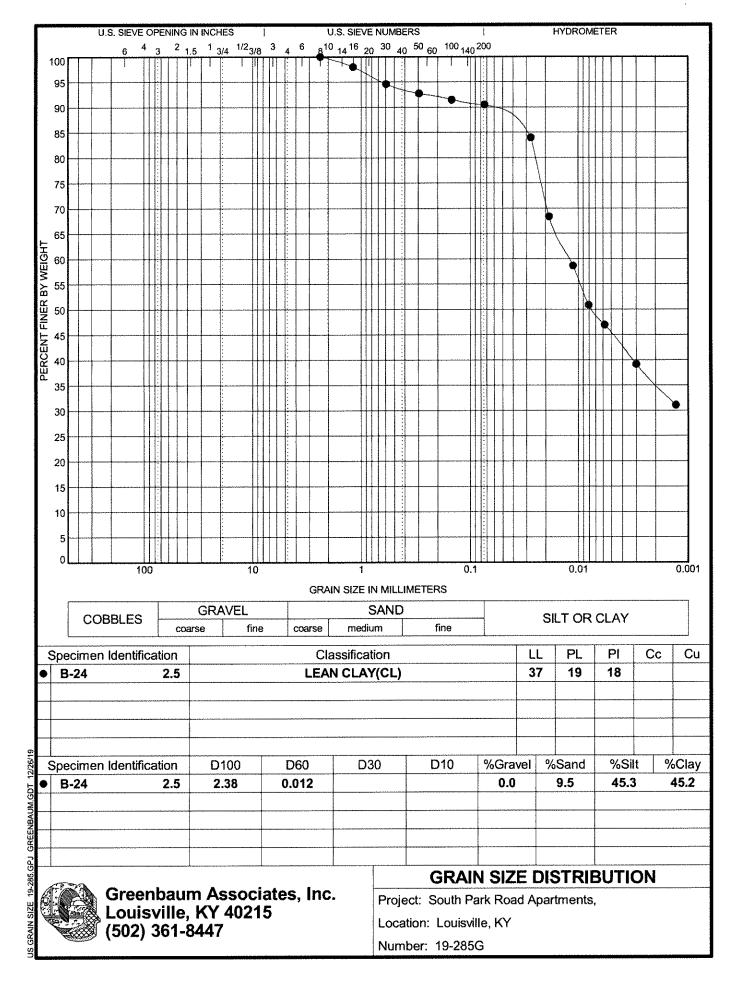


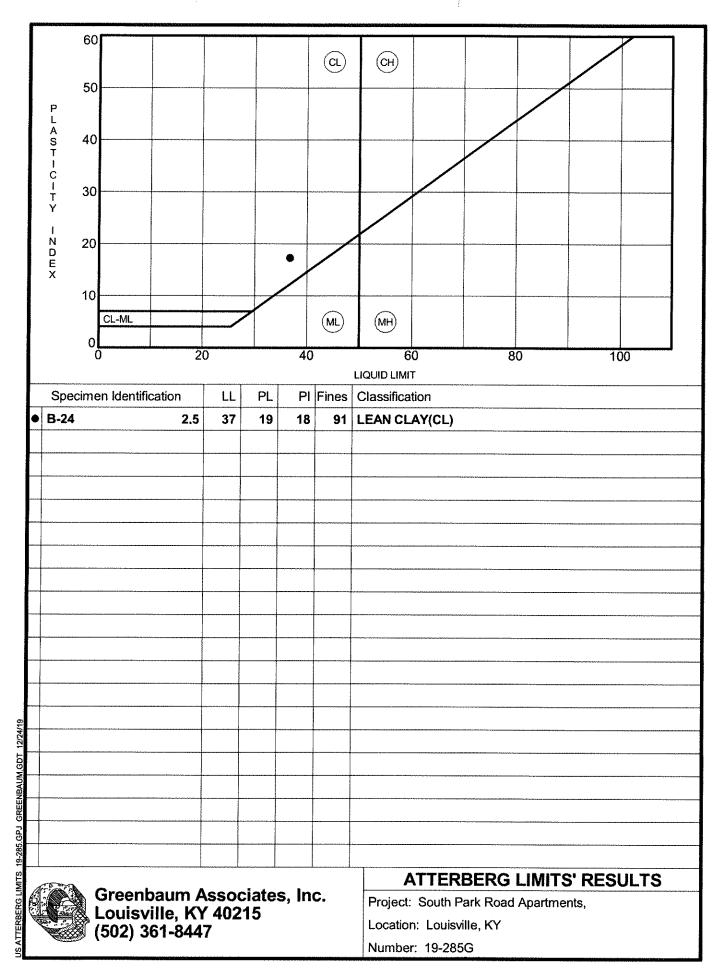
	LDG De	HOLE No. B-36									
	South F 19-2850	Sheet 1 of 1									
Boring Location: See Boring Location Plan Surface Elevation: Ground Station: n/a											
Drilling Equipment: D-25 Track-Mounted Drill w/Auto Hammer Drilling Method: 2 1/4 Inch ID Hollow Stem Augers											
Depth to water immediately: Dry Overburden: 7.9 Rock: 0 Total Depth: 7.9											
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CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES											
ASTM D2487 and D2488											
Ma	jor Divis	····	Group Symbols	Typical Names	Laboratory Classification Criteria						
an No.	se fraction	Gean Gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = D_{60}/D_{10}$ greater than 4 $C_u = (D_{30})^2/(D_{10} \times D_{60})$ between 1 and 3						
larger th	Nore than half of coars arger than No. 4 sieve)	Clean Gravi	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW Atterberg limits below "A" line with P. I. less than 4 C ₀ =C ₆₀ D ₁₀ greater than 4 C ₀ =(D ₃₀) ² /(D ₁₀ ×D ₆₀) between 1 and 3 Not meeting all gradation requirements for GW Atterberg limits below "A" line with P. I. less than 4						
aterial is	Gravels (More than half of coarse fraction larger than No. 4 sieve)	Gravels with fines (Appreciable amount of fines)	GM ^a d	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line with P. I. less than 4 I. between 4 and 7 are						
e than half of m 200 sieve size)	Gravels (I	Gravels (Apprecial	GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits below borderline cases						
Coarse-grained soils (More than half of material is <i>larger</i> than No. 200 sieve size)	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean Sands (Little or no fines)	sw	Well-graded sands, gravelly sands, little or no fines	follows: $C_0 = (D_{30})^2/(D_{10} \times D_{60})$ between 1 and 3						
	If of coarse lo. 4 sieve s	Clean San	SP	Poorly graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW SW SW						
e-grained	(More than half of coarse frac smaller than No. 4 sieve size)	Sands with fines (Appreciable amount of fines)	Sands with fines (Appreciable amount of fines)	SM ^a d u	Silty sands, sand-silt mixtures	Determined bercentage of fines (fraction small on percentage of fines) (fraction small					
Coarse	Sands (Mc			Sands w (Appreciat of fi	sc	Clayey sands, sand-clay mixtures	Operermin Standard St				
er than	sk	han 50)	ML	Inorganic silts and very fine sands, silty or clayey fine sands, or clayey silts with slight plasticity	60,						
al is small	Its and clays	limit less t	limit less t	limit less t	imit less t	limit less than 50)	limit less t	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	50 Cases and the control of the cont	
Fine-grained soils (More than half meterial is smaller than No. 200 sieve)	.S	(Liquid	OL	Organic silts and organic siltyclays of low plasticity	₹ 40						
	sh	that 50)	МН	Inorganic silts, micaceous or diatomaceous fine sand or silty soils, elastic silts	xe sti city index city of the						
	Silts and clays	(Liquid limit less that 50)	СН	Inorganic slays of high plasticity, fat clays	10 OL MH						
rained so	\$	(Liquid	ОН	Organic clays of medium to high plasticity, organic silts	0 10 20 30 40 50 60 70 80 90 100 Liquid Limit (%)						
Fine-gı	Highly organic soils		Pt	Peat and other highly organic soils	Plasticity Chart						

^a Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits :suffix d used when L. L. is 28 or less and the P. I. is 6 or les; the suffix u used when L. L. is greater than 28.

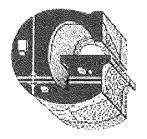
^b Borderline classifications, used for soils possessing characeristics of two groups, are sesignated by combinations of group symbols. For exampls: GW-GC, well-graded gravel-sand misture with clay binder.





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GREENBAUM ASSOCIATES, INC. GEOTECHNICAL & MATERIALS ENGINEERS

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

February 27, 2020

Ms. Ramona Vasta LDG Development, LLC 1469 S. 4th Street Louisville, KY 40208

Re: Karst Survey

Apartment Community South Park Road Louisville, Kentucky Project Number 19-285G

Dear Ms. Vasta:

On December 29, 2020, we provided the report of a geotechnical investigation that included a study of the geology, soils survey, and historic aerial photos along with the results of a program of drilling and laboratory testing. As part of that investigation, we walked the entire property and found no subsidence features that would result from karst development. We did note the possibility that shafts could have been excavated below the property as part of a quarrying operation that is exposed across South Park Road from the site. However, as a result of our concern, a seismic survey was performed by Dr. Kalinski and found that no mining has occurred below this property.

I will not elaborate more on the geology of the site here since that is discussed in detail in the geotechnical report referenced above, but no surface manifestation of karst development is present at this site, which includes the absence of:

- Sinkhole collapse features
- Sinkholes
- Surface drainage that flows into ground
- Ephemeral lakes
- Cave entrances
- Subsurface cave passages (verified by seismic survey)
- Springs
- Sinking streams

If you have any questions in regard to either the geotechnical or karst surveys, please call.

Sincerely,

GREENBAUM ASSOCIATES, INC.

Sandor R.

Greenbaum

Digitally signed by Sandor R. Greenbaum DN: cn=Sandor R. Greenbaum, o=Greenbaum Associates, Inc., ou, email=srg@geo-engineers.com, c=US Date: 2020.02.27 11:18:37 -05'00'

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Sandor R. Greenbaum, P.E. Principal Engineer

Ms. Ramona Vasta LDG Development, LLC 1469 S. 4th St. Louisville, KY 40208

RE: Report of findings of geophysical DC resistivity survey to identify and delineate tunnels under the LDG Development site in Louisville, Kentucky

Dear Ms. Vasta,

SUMMARY

I am pleased to provide this report describing the results of my geophysical direct-current (DC) resistivity survey at the LDG Development site in Louisville, Kentucky. The site is situated on an 18.64-acre tract of land adjacent to a water-filled quarry near the intersection of South Park Road and Blue Lick Road in Louisville, Kentucky. The site covers the following addresses in Louisville:

- 4011 South Park Rd.;
- 4201 South Park Rd.; and
- 9007 Blue Lick Rd.

The geophysical survey consisted of a grid of survey lines along which the direct-current (DC) electrical resistivity method was applied. The survey revealed the presence of a thin layer of soil over limestone. Values for electrical resistivity derived from analysis of the field data reveal that some of the limestone is weathered and contains some moisture. However, none of the zones in the limestone possessed unusually low electrical resistivity that could be associated with a water-filled cavity. Therefore, there was no indication on the geophysical data of the presence of any underground guarry workings beneath the site.

SURVEY DESCRIPTION

Prior to the survey, I conducted research to identify any information that may exist regarding the location of quarry workings at the site. Sources of information that I explored included the Kentucky Geological Survey, the University of Kentucky Department of Mining Engineering, the United States Geological

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Survey, the Mine Safety and Health Administration and the Mining Division of the Kentucky Energy and Environment Cabinet. Unfortunately, none of these sources yielded any information regarding the presence of existing mine workings at the site. I also spoke to the owner of the quarry, Jason Stanford, about the possibility of exploring an existing tunnel at the quarry. After discussing the matter with Jason, I concluded that entering the cave was too risky.

The geophysical survey was carried out in early February 2020 at the site. Field activities consisted of clearing brush and surveying the individual lines using a handheld GPS on February 3 and 7 and acquiring geophysical data on February 8, 14, 15 and 19. Line locations were selected to provide a uniform distribution of coverage over the entire site. It was also necessary to position the lines in the survey to maintain a reasonable distance between the survey lines and the existing metal fences at the site because the presence of the metal fences can negatively affect the quality of the field data. The locations of the lines (labeled A through E) are summarized in Table 1 and depicted on Fig. 1.

Direct-current (DC) electrical resistivity geophysical testing (Appendix A) was performed using an 84-electrode Advanced Geosciences Inc. (AGI) Sting-Swift data acquisition system (Fig. 2). Field acquisition includes installing a row of 84 steel electrodes into the ground and injecting current into the ground using a 12-volt car battery. Current is injected using different pairs of electrodes along the line and voltage is measured across separate pairs of electrodes. The magnitude of the measured voltage is a function of the position of the electrodes being used for the measurement and the electrical resistivity of the ground beneath the electrodes. Data are automatically acquired by computer and a dataset consisting of hundreds of individual measurements along the line is acquired. measurements contain information about how the electrical resistivity varies in the ground beneath the line. By analyzing the data, a two-dimensional profile showing variations in electrical resistivity is generated. This profile is interpreted to infer subsurface conditions at the site. For this site, zones of low (less than 10 ohmmeters) electrical resistivity were considered to be indicative of water-filled tunnels.

RESULTS

Direct-current resistivity testing was performed along five profile lines as described in the previous section. Data were acquired using an 84-electrode AGI Sting-Swift data acquisition system and analyzed using the AGI EarthImager 2D software. Results from analysis of the data are shown in Figs. 3-8. Each figure contains three profiles that depict the field data (top), the modeled data (middle) and the model that was used to calculate the modeled data (bottom). The x-axis

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of the profiles depicts the distance along the line on the ground surface in units of feet, and the y-axis depicts depth below the ground surface in units of feet. The colors on the profiles indicate values of electrical resistivity as shown in the attached legends, with red colors indicating high resistivity and blue colors indicating low resistivity.

The bottom profile in each figure (the model) is the one that most directly illustrates subsurface conditions in Figs. 3-8. The model profiles reveal the presence of a thin (a few feet) layer of soil with relatively low resistivity underlain by limestone. The electrical resistivity of the limestone varies from 100s to 1000s of ohm-meters, which indicates varying levels of weathering and moisture content within the limestone as expected. Cavities filled with groundwater, including karst features and flooded tunnels, typically possess electrical resistivity of around 10 ohm-meters or less as shown in the example from Thailand in Fig. 9. On the profiles acquired at the Louisville site, water-filled tunnels would appear as deep blue in color with dimensions on the order of tens of feet across. There are no anomalies on the profiles acquired in Louisville that indicate the presence of water-filled tunnels beneath the LDG site in Louisville. Moreover, an air-filled tunnel would possess an electrical resistivity in the hundreds of thousands of ohm-meters on the profiles. There is no evidence to indicate the presence of air-filled tunnels.

Thank you very much for providing me with the opportunity to provide geophysical services on this project. Please do not hesitate to contact me if you have any questions or require any additional information.

Sincerely,

Michael E. Kalinski

Michael E. Kalinski, Ph.D., P.E. University of Kentucky Department of Civil Engineering 161 Raymond Bldg. Lexington, KY 40506-0281

tel: (859) 321-3057

email: michael.kalinski@uky.edu

Attachment: Table 1

Figures 1-9 Appendix A Exp. 6/30/2021

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Line	Date Acquired	Electrode Spacing (ft)	Number of Electrodes	Total Length (ft)		
Α	Feb. 8, 2020	10	84	830		
В	Feb. 14, 2020	6	84	498		
С	Feb. 14, 2020	12	84	996		
D	Feb. 15, 2020	15	84	1,245		
Ε	Feb. 19, 2020	8	84	664		

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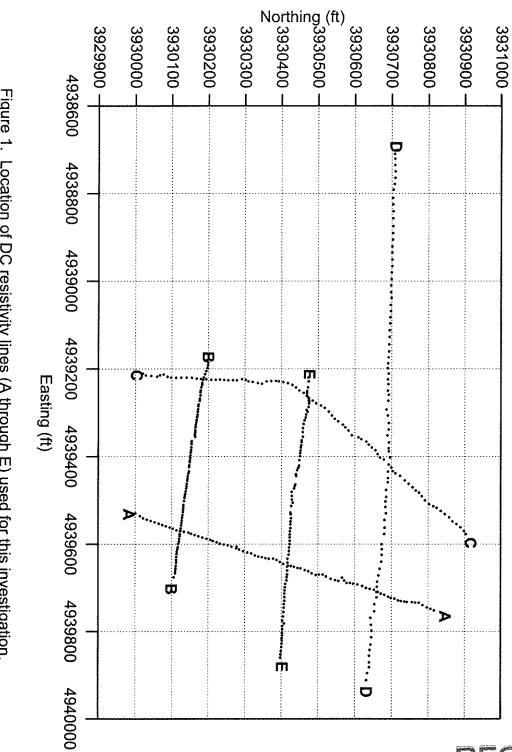


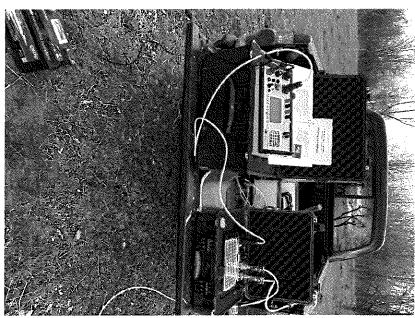
Figure 1. Location of DC resistivity lines (A through E) used for this investigation.

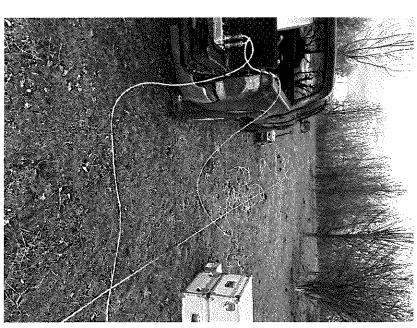
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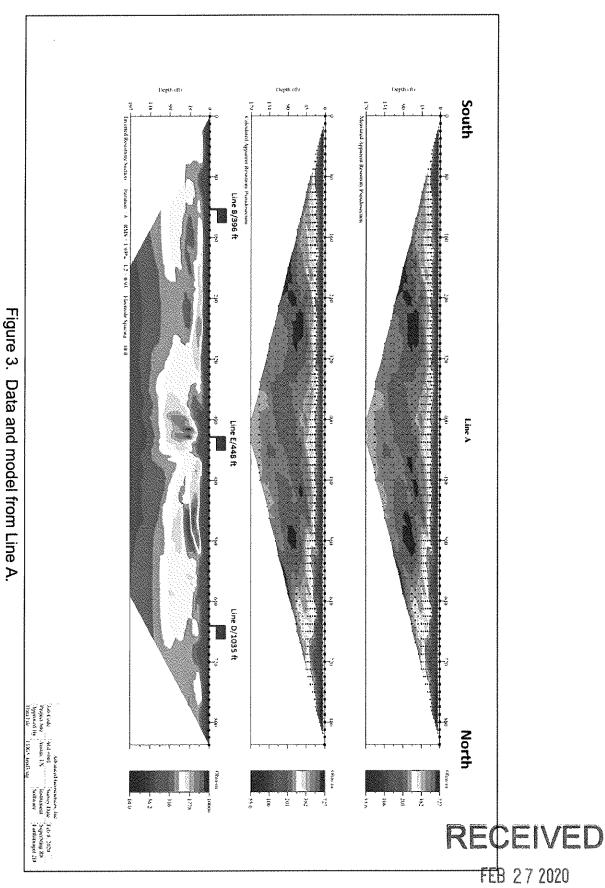
and electrical source (left) and electrode array (right). Figure 2. Photograph of DC resistivity data acquisition activities along Line A showing Sting data acquisition system

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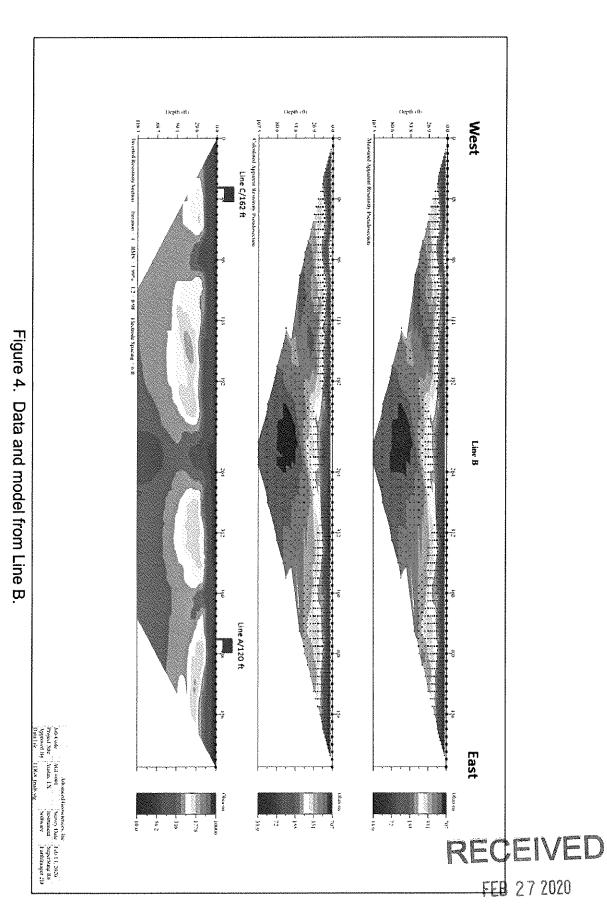
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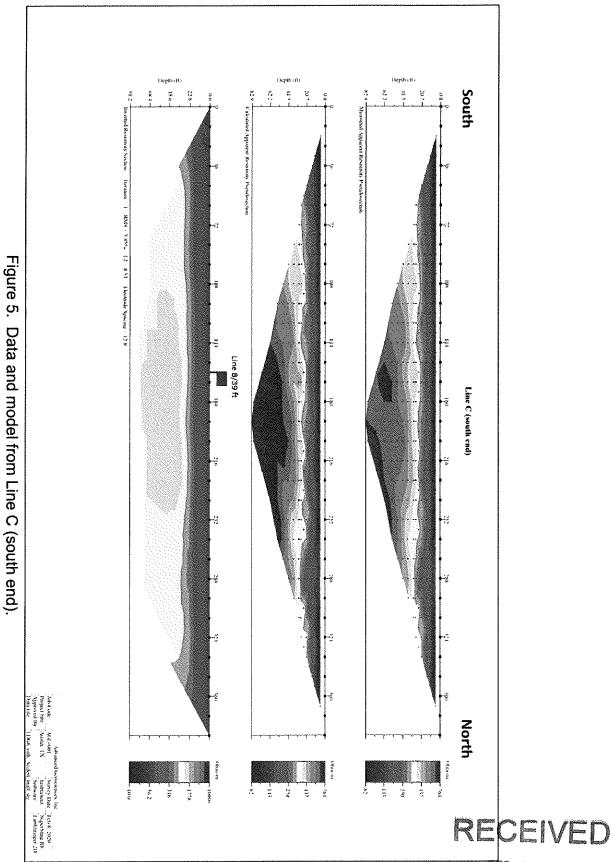
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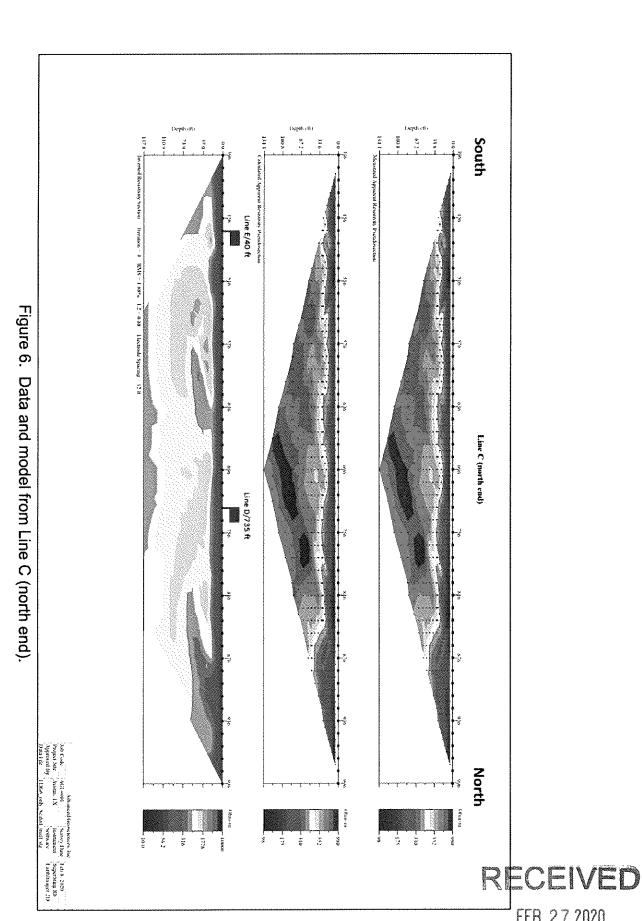
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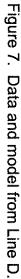
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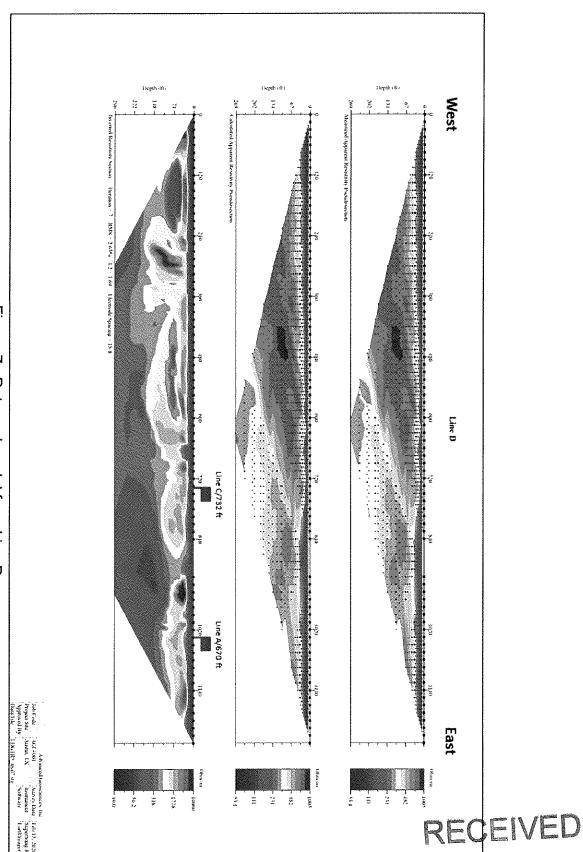




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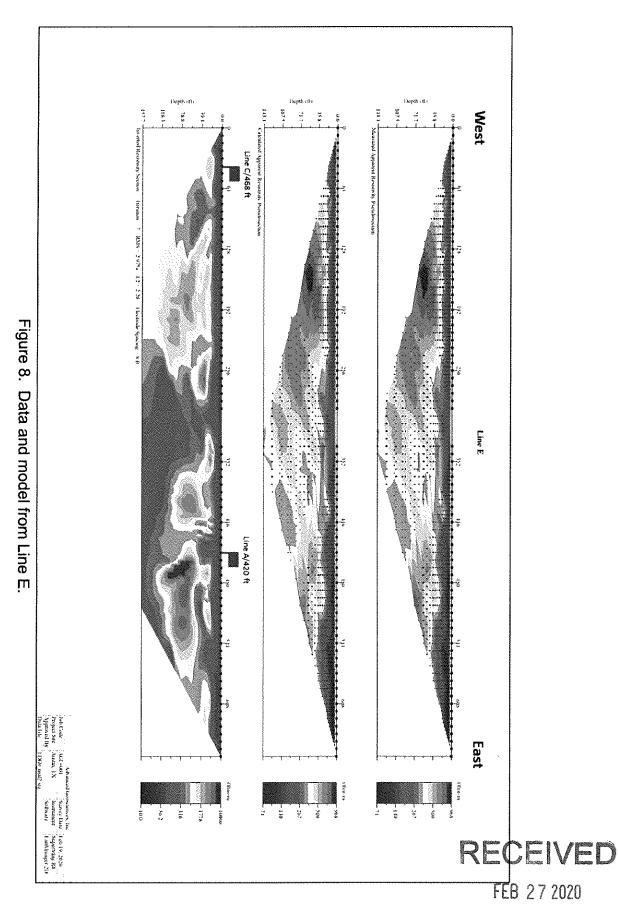




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with resistivity less than 10 ohm-meters.

Fig. 9. Example of an inverted resistivity profile from a site in Thailand revealing a water-filled void at Station 360

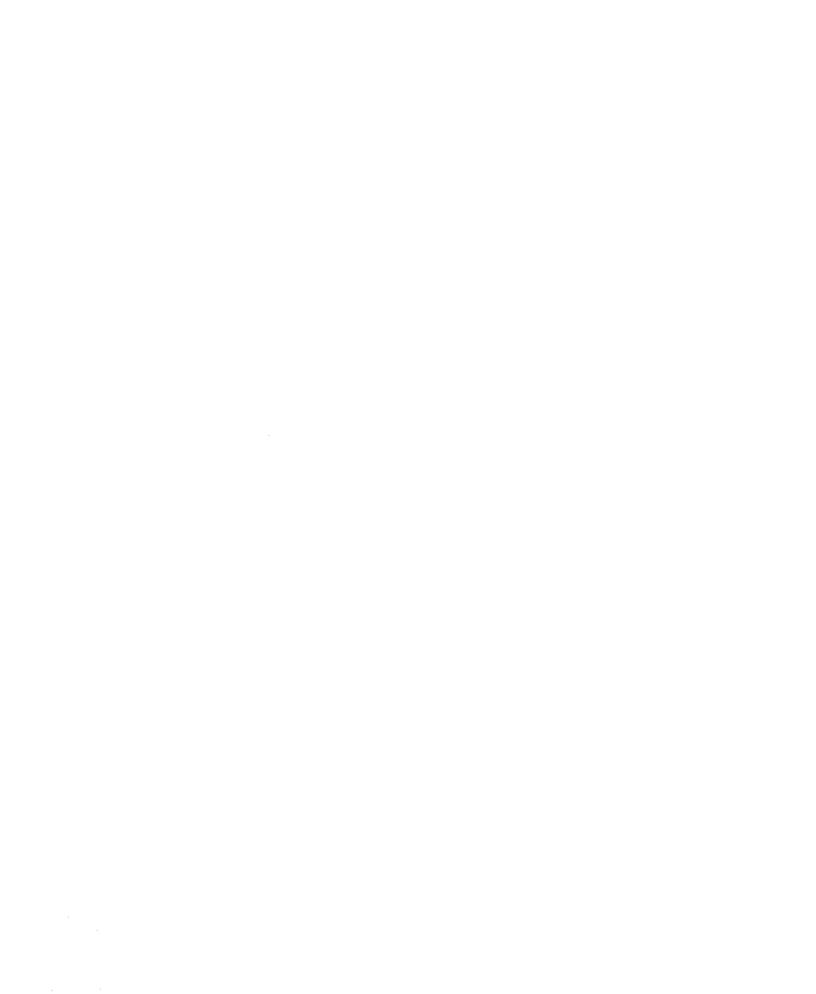
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APPENDIX A DESCRIPTION OF THE DC RESISTIVITY GEOPHYSICAL METHOD

Geophysical exploration is the practice of performing physical measurements at the surface of the earth in order to ascertain subsurface properties and conditions. Geophysics can be used for many different specific purposes, including mineral exploration, prediction of dynamic behavior, or characterization of groundwater resources. Geophysical methods allow measurement of the physical properties of soil and rock, including elastic properties and electrical properties¹. Electrical properties include parameters such as resistivity, conductivity, inductance, and capacitance. Once these properties are measured, they must be interpreted to infer subsurface conditions. Ultimately, such interpretations must be validated, and validation is typically achieved through exploratory drilling. However, the use of geophysical data as an interpretive aid allows a site investigation to be performed using fewer borings, which reduces the cost of the investigation and increases the likelihood of producing an accurate depiction of subsurface conditions.

Groundwater can exist in the pore spaces of soil or rock under saturated conditions (i.e. all of the pores, voids, and fractures are filled with water) or unsaturated conditions. It can also exist as underground rivers and lakes in karst environments. Since electricity can move more easily through water than soil or rock, the bulk electrical resistivity of the earth is highly dependent on the presence of water, as well as the salinity of the water. In general, the electrical resistivity of carbonate rock is on the order of thousands of ohm-meters. The electrical resistivity of soil is on the order of hundreds of ohm-meters, and the electrical resistivity of groundwater is on the order of ten ohm-meters. These ranges are general estimates, but illustrate the relative difference in electrical resistivity of earth materials. Other factors also play a role, including:

- Rock petrology: rocks containing large amounts of ferrous minerals tend to be less resistive;
- Soil mineralogy: clayey soils tend to be less resistive than sandy soils;
- Water content: saturated soils with more water tend to be less resistive than unsaturated soils; and

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¹ Reynolds, J. M., 1997, An Introduction to Applied and Environmental Geophysics, John Wiley & Sons, New York.



Ground water salinity: groundwater with a large amount of dissolved salts tends to be less resistive.

The dependence of soil petrology, rock mineralogy, water content, and ground water salinity on the bulk electrical resistivity of the earth is exploited using the direct-current (DC) resistivity geophysical method. With the DC resistivity method, variations in the bulk electrical resistivity of the earth are quantified. These values are then interpreted to infer groundwater conditions.

Traditional DC resistivity testing has been performed using the DC sounding method. To perform a sounding, a single stationary point is set at the center of the array. Two different types of arrays have been most commonly used as illustrated in Fig. A1. To perform a measurement, current (I) is passed through the current electrodes, while voltage (V) is measured across the potential electrodes. To use the Wenner array, electrodes are placed using a uniform spacing (a). After a measurement is made, the electrodes are moved further apart from each other. Larger electrode spacings correspond to deeper depth of investigation. The Wenner array is easy to deploy and provides good data in noisy environments. To use the Schlumberger array, the potential electrodes are kept at a fixed location with spacing (M), while the current electrodes are moved further and further apart as (L) is increased for successive measurements. The Schlumberger array is easier to deploy than the Wenner array, but the Schlumberger array is not as good as the Wenner array in noisy environments.

The Wenner and Schlumberger arrays are both effective for quantifying variations in resistivity with depth. Apparent resistivity is calculated for each electrode spacing and is a function of electrode spacing, current, and voltage. Plots of apparent resistivity versus electrode spacing are inverted to calculate a sounding of true resistivity versus depth for a single point as illustrated schematically in Fig A2.

Traditional four-electrode DC resistivity surveys using the Wenner or Schlumberger arrays were widely used in the past because data acquisition was These methods provided one-dimensional soundings showing variations in electrical resistivity with depth. However, the development of multiplechannel, multiple-electrode systems with automatic electrode switching capabilities has led to the practice of resistivity profiling, where electrical resistivity is calculated in two dimensions as a function of depth and lateral position. Dipoledipole arrays (Fig. A3) are often used for resistivity profiling and are beneficial for resolving lateral variations in resistivity. To perform a surface resistivity survey, an array of electrodes (typically 56 or more) is deployed along a line with a uniform RECEIVED

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spacing. Readings are taken by using various combinations of current and potential electrodes, and the multiple channel array is used to perform a series of four-electrode measurements. The lateral position of the electrodes and the electrode spacing are varied between measurements so that the zone of earth material sampled in the measurement varies with lateral position and depth (Fig. A4). A pseudo section of apparent conductivity is generated, where apparent resistivity is displayed as a function of dipole spacing and lateral position as seen in Fig. A5. The pseudo section is inverted to delineate zones of anomalously high or low electrical conductivity indicative of water-filled or air-filled subsurface voids, such as mine workings or karst features. Inversion is typically performed using commercially available computer software.

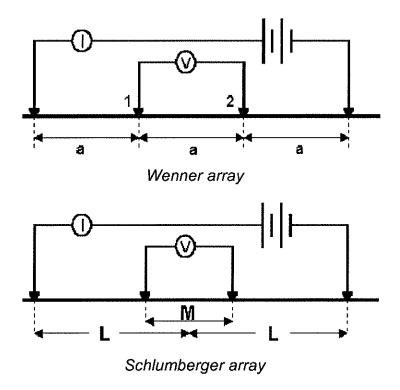


Figure A1. Wenner and Schlumberger arrays commonly used for DC resistivity sounding.

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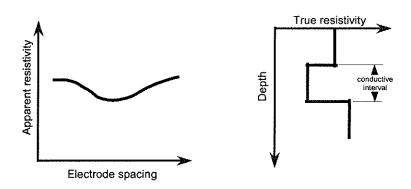


Figure A2. Apparent resistivity curve and inverted profile of true resistivity versus depth

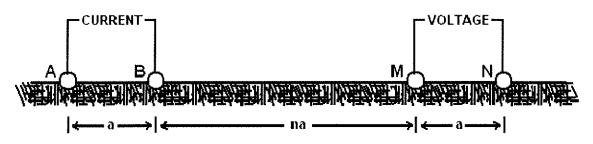


Figure A3. Dipole-dipole array used for surface resistivity prospecting.

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- ☐ Electrode Location
- Apparent Resistivity Plotting Location
- Transmitted Current
- V) Measured Voltage Gradient

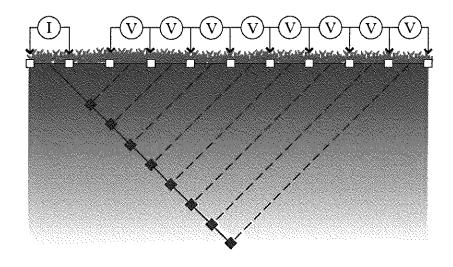


Fig. A4. Two-dimensional resistivity profiling using the dipole-dipole array.

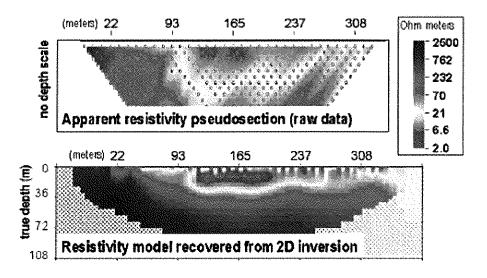


Figure A5. Pseudosection and inverted 2D resistivity profile derived from multiple-electrode DC resistivity measurement.

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PLANNING & DESIGN SERVICES The current state-of-practice method used today for DC resistivity data acquisition employs the use of an AGI Sting/Swift data acquisition system (Fig. A6). This system typically employs the use of 56 or more electrode with electrode spacings ranging from 5-20 ft. Using this system, dipole-dipole data are rapidly and automatically acquired along the entire line so that lateral variations in electrical resistivity indicative of tunnels or karst features be resolved. The resulting pseudosections are typically inverted using the RES2DINV software.



Figure A6. Typical data acquisition activities using the Sting/Swift system.

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PLANNING & DESIGN SERVICES

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February 3, 2020

Traffic Impact Study

South Park Road Apartments 4011 South Park Road Louisville, KY

Prepared for

Louisville Metro Planning Commission Kentucky Transportation Cabinet



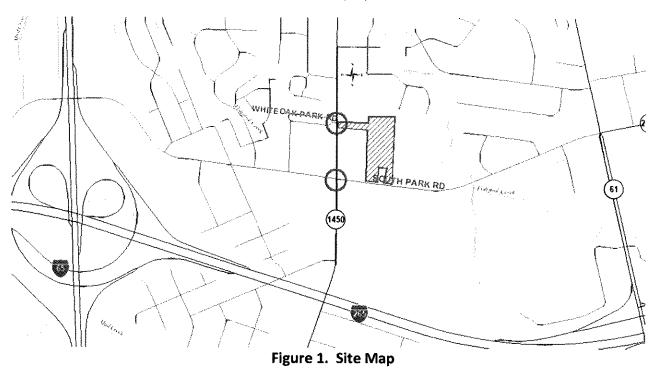


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INTRODUCTION

The development plan for an apartment community on South Park Road in Louisville, KY shows 312 apartment units. Figure 1 displays a map of the site. Access to the community will be from an entrance on Blue Lick Road (KY 1450) opposite White Oak Park Road and South Park Road. The purpose of this study is to examine the traffic impacts of the development upon the adjacent highway system. For this study, the impact area was defined to be the intersections of Blue Lick Road and South Park Road and the proposed entrances.



EXISTING CONDITIONS

Blue Lick Road, KY 1450, is a state-maintained road with an estimated 2020 ADT of 10,800 vehicles per day between South Park Road and Preston Highway (KY 61), as estimated from the 2018 Kentucky Transportation Cabinet count at station 584. The road is a two-lane highway with ten-foot lanes with two-foot shoulders through the study area. The speed limit is 35 mph. There are no sidewalks. The intersection with South Park Road, is controlled with a traffic signal. There are dedicated left-turn lanes on all approaches, and dedicated right-turn lanes on all approaches except westbound.

South Park Road is a maintained by Louisville Metro with an estimated 2020 ADT of 15,800 vehicles per day between Blue Lick Road and Preston Highway (KY 61), as estimated from the 2017 Kentucky Transportation Cabinet count at station 586. The road is a two-lane highway with eleven-foot lanes with two-foot shoulders through the study area. The speed limit is 35 mph. There are no sidewalks.

Peak hour traffic counts for the intersections were obtained on Thursday, November 21, 2019. The a.m. peak hour is 7:00 to 8:00 and the p.m. peak hour is 4:45 to 5:00. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data for each intersection.

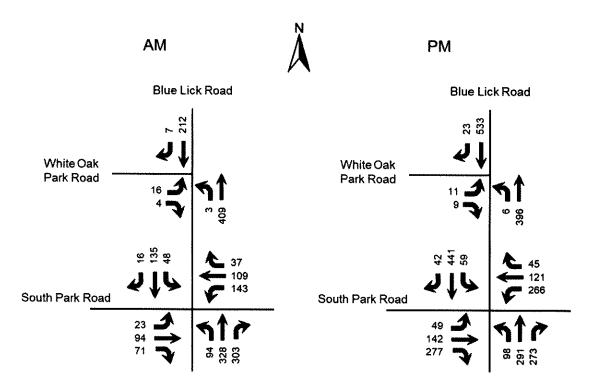


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2022. An annual growth rate of 1.0 percent was applied to all 2019 volumes. This was determined by the historical growth at KYTC station 584 and 586. The Kentucky Transportation Cabinet will be widening Blue Lick Road to include a two-way left turn lane beginning in the summer of 2020. This project should be completed with occupancy of this project. **Figure 3** displays the 2022 No Build peak hour volumes.

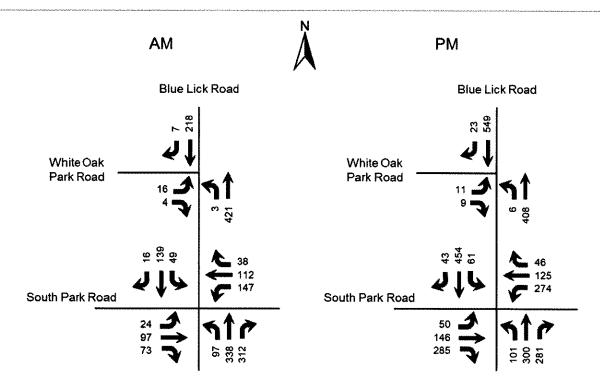


Figure 3. 2022 No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers <u>Trip Generation Manual</u>, 10th Edition contains trip generation rates for a wide range of developments. The land use of "Multifamily Housing Mid-Rise (221)" was reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. The trips were assigned to the highway network with the percentages shown in **Figure 5** shows the trips generated by this development and distributed throughout the road network during the peak hours. **Figure 6** displays the individual turning movements for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

	A.M.	Peak	Hour	P.M. Peak Hour			
Land Use	Trips	In	Out	Trips	ln	Out	
Multifamily Housing Mid-Rise (312 units)	104	27	77	132	81	51	

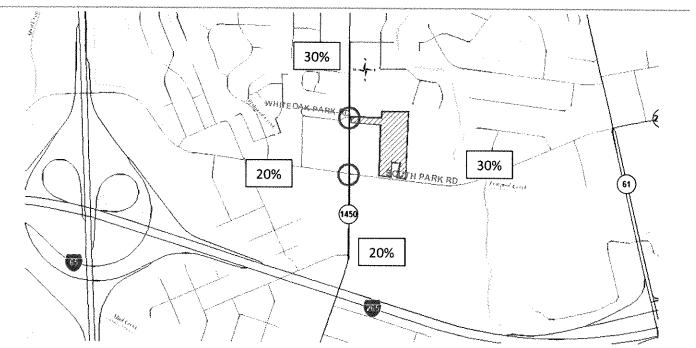


Figure 4. Trip Distribution Percentages

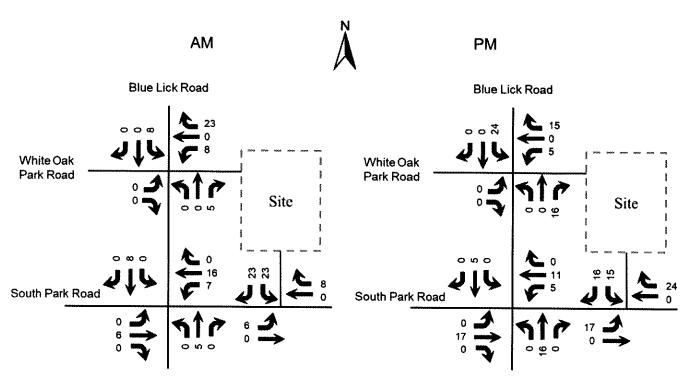


Figure 5. Peak Hour Trips Generated by Site

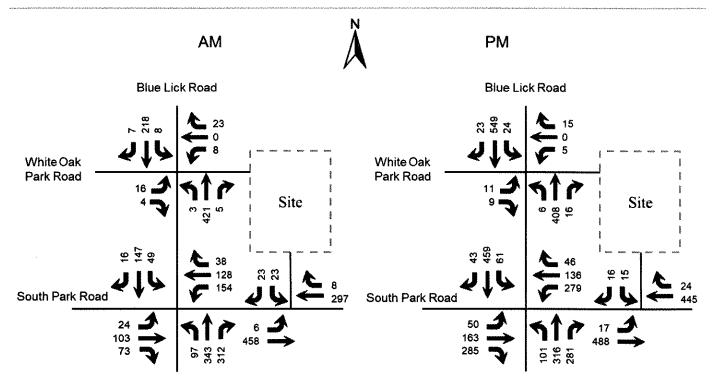


Figure 6. 2022 Build Peak Hour Volumes

ANALYSIS

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service". Level of Service is a ranking scale from A through F, "A" is the best operating condition and "F" is the worst. Level of Service results depend upon the facility that is analyzed. In this case, the Level of Service is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the <u>Highway Capacity Manual</u>, 6th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 7.8.5) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

	A.M.			P.M.			
Approach	2019	2022	2022	2019	2022	2022	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Existing	No Build	Build	Existing	No Build	Build	
Blue Lick Road (KY 1450) at South Park Road	С	С	С	С	С	С	
	32.3	32.6	32.6	34.2	34.5	35.0	
South Park Road Eastbound	C	С	С	D	D	D	
	27.9	28.1	28.4	48.6	48.2	48.2	
South Park Road Westbound	С	С	С	D	D	D	
	24.3	24.4	24.6	37.7	37.6	38.5	
Blue Lick Road Northbound	D	D	D	С	С	С	
	36.2	36.6	36.6	22.8	23.5	23.9	
Blue Lick Road Southbound	С	С	С	С	С	С	
	34.1	34.4	34.7	32.3	33.7	34.1	
Blue Lick Road at White Oak Park Road							
White Oak Park Road Eastbound	В	В	В	С	В	С	
White Oak Park Road Eastbound	13.6	12.1	13.4	16.2	13.7	15.2	
Entrance Westbound			В			В	
			12.2			12.5	
Blue Lick Road Northbound (left)	Α	Α	Α	Α	Α	Α	
	7.7	7.7	7.7	8.6	8.7	8.7	
Blue Lick Road Southbound (left)			Α			Α	
			8.4			8.3	
South Park Road at Entrance							
South Park Road Eastbound (left)			Α			Α	
			7.9			8.4	
Entrance Southbound			В			С	
			14.1			16.5	

Key: Level of Service, Delay in seconds per vehicle

The entrance was evaluated for turn lanes using the Kentucky Transportation Cabinet <u>Highway Design Guidance Manual</u> dated March, 2017. The traffic impact policy requires using volumes for ten years beyond build-out, or 2032. The 2032 volumes were determined by applying a one percent annual growth rate from 2019. **Figure 7** illustrates the 2032 No Build volumes. **Figure 8** illustrates the 2032 Build Volumes. Using the volumes in Figure 8, no turn lanes are required at the entrances. **Table 3** summarizes the delay and Level of Service for 2032.

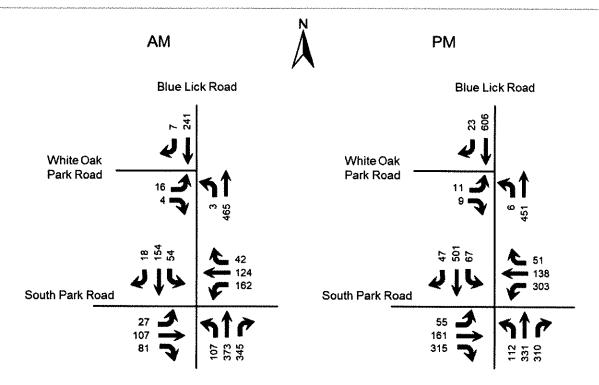


Figure 7. 2032 No Build Peak Hour Volumes

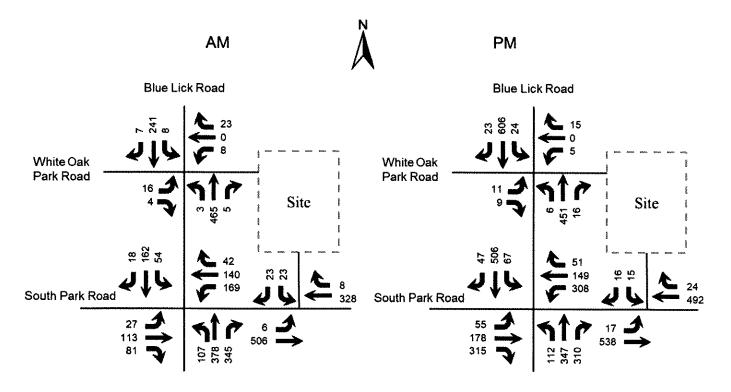


Figure 8. 2032 Build Peak Hour Volumes

Table 3. Peak Hour Level of Service

	A.M.			P.M.			
Approach	2019 Existing	2032 No Build	2032	2019	2032	2032	
			Build	Existing	No Build	Build	
Blue Lick Road (KY 1450) at South Park Road	C 32.3	C	C	C	D	D	
	ļ	33.7	33.7	34.2	36.8	37.3	
South Park Road Eastbound	C	С	С	D	D	D	
	27.9	28.6	29.0	48.6	46.6	46.6	
South Park Road Westbound	С	С	С	D	D	D	
	24.3	24.8	25.0	37.7	37.8	39.0	
Blue Lick Road Northbound	D	D	D	С	С	С	
and troiting and	36.2	38.0	38.0	22.8	26.4	26.8	
Blue Lick Road Southbound	С	D	D	С	D	D	
Dide Liek Node Couling and	34.1	35.5	35.8	32.3	40.1	40.7	
Blue Lick Road at White Oak Park Road						·····	
White Oak Park Road Fastbound	В	В	В	C	В	С	
White Oak Park Road Eastbound	13.6	12.6	14.0	16.2	14.4	16.2	
Entrance Westbound			В			В	
			12.8			13.1	
Blue Lick Road Northbound (left)	Α	Α	Α	Α	Α	Α	
	7.7	7.8	7.8	8.6	8.9	8.9	
Blue Lick Road Southbound (left)			Α			Α	
			8.5			8.4	
South Park Road at Entrance							
South Park Road Eastbound (left)			Α			Α	
			8.0			8.6	
Entrance Southbound			В			С	
End different Country			14.9		***************************************	18.2	

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2022 and 2032, there will be a slight impact to the existing highway network. No improvements are required at the adjacent intersections. No turn lanes are required at the entrance on South Park Road.

APPENDIX

South Park Road Apartments Traffic Impact Study

Jefferson County, KY Classified Turn Movement Cou



Traffic Counts

41 Peabody Street, Nashville, TN 37210 10 Glenlake Parkway, Suite 130, Atlanta, GA 30328 555 Fayetteville Street, Suite 201, Raleigh, NC 27601 1229 South Shelby Street, Louisville, KY 40203 6565 North MacArthur Boulevard, Suite 225, Dallas, TX 75039

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1 (800) 615-3765

S Park Rd (West)

Site 1 of 2

Blue Lick Rd (North)

S Park Rd (East) Blue Lick Rd (South)

38.116328°, -85.689493°

Date Thursday, November 21, 2019 Weather Cloudy

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0745 - 0800	0	15	41	4	0	60	0	32	25	13	0	70	0	32	97	79	0	208	0	4	26	18	0	48	396
0745 - 0800	0	11	27	6	0	44	0	32	26	8	0	66	0	18	56	59	0	133	0	5	27	14	0	46	289
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1615 - 1630	0	27	95	3	0	125	0	58	27	11	0	96	0	24	64	49	0	137	0	12	33	54	0	99	457
1630 - 1645	0	20	102	10	0	132	0	58	31	9	0	98	0	22	61	57	0	140	0	8	36	53	0	97	467
1645 - 1700	0	13	116	10	0	139	0	63	33	16	0	112	0	26	74	51	0	151	0	7	41	55	0	103	505
1700 - 1715	0.0	13	105	10	2	130	0	65	40	10	0	115	0	23	60	58	0	141	0	10	34	59	0	103	489
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0730 - 0745	_	14	41	2	0	57	0	44	38	8	0	90	0	20	88	71	0	179	0	5	19	22	0	46	372
0745 - 0800	0	15	41	4	0	60	0	32	25	13	0	70	0	32	97	79	0	208	0	4	26	18	0	48	386
AM TOTAL	0	11	27	6	0	44	0	32	26	8	0	66	0	18	56	59	0	133	0	5	27	14	0	46	289
1645 - 1700		48	135	16	0	199	0	143	109	37	0	289	0	94	328	303	0	725	0	23	94	71	0	188	1401
1700 - 1715	0	13	105	10	2	130	0.	65	40.	10	0	115	0	23	60	58	0	141	0	10	34	59	0	103	489
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South Park Road Apartments Traffic Impact Study

Jefferson County, KY
Classified Turn Movement Count

Site 2 of 2 Blue Lick Rd (North)

Blue Lick Rd (South) Whiteoak Park Rd (West)

Lat/Long

38.118377°, -85.689484°

Marr Traffic
Transportation Data Collection

41 Peabody Street, Nashville, TN 37210
10 Gienlake Parkway, Suite 130, Atlanta, GA 30328
555 Fayetteville Street, Suite 201, Raleigh, NC 27601
1229 South Shelby Street, Louisville, KY 40203
6565 North MacArthur Boulevard, Suite 225, Dallas, TX 75039

hello@mantraffic.com www.mantraffic.com

1 (800) 615-3765

Date

Thursday, November 21, 2019

Weather Cloudy

52°F Eastbound Southbound Northbound Blue Lick Rd (North) Blue Lick Rd (South) Whiteoak Park Rd (West) U-Tum Thru Right Peds App U-Tum Thru Peds App U-Tum Left Right Peds Арр int 0700 - 0715 0715 - 0730 0730 - 0745 0745 - 0800 0800 - 0815 0815 - 0830 0830 - 0845 0845 - 0900 1600 - 1615 1615 - 1630 1630 - 1645 1645 - 1700 Ó U 1700 - 1715 1715 - 1730 1730 - 1745 1745 - 1800 0700 - 0715 0715 - 0730 0730 - 0745 0745 - 0800 AM TOTAL 1700 - 1715 1715 - 1730 1730 - 1745 1745 - 1800

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Uncoordinated No S	imult. Gap E/W	On	Yellov	atemania	0.0	45.6 3.5	3.8 3.5	6.2 0.0	The second second	Щ.,	را پ	L	J, j	
Force Mode Fixed S	imult. Gap N/S	On	Red	3.0	0.0	2.0	2.8	0.0				- -	-/	•
						4, 7, 2			,0		# I			
Timer Results			EB		EBT	WB		WBT	NB		NBT	SB		SBT
Assigned Phase		· · · · · · · · · · · · · · · · · · ·	7	- 1200 J. 1200	4	3	-	8	5		2	1		-
Case Number		5930-9573	1.1	0.00000000000	3.0	1.1	rokea kata	TO THE PROPERTY OF THE PARTY OF		0.000		\$		6
Phase Duration, s			10	and the state of 		Commence	terretarion of the second	4.0	1.1	navasaning maga	3.0	1.1	William Control	3.0
Change Period, (Y+R c),					58.6	16.3		64.9	14.		53.4	11.7		51.1
			6.3	imaning mains	5.5	6.3	interior properties	5.5	6.5	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	5.5	6.5	0/100-100000000000000000000000000000000	5.5
Max Allow Headway(<i>MA</i>		10 15 15 15 15 15 15 15 15 15 15 15 15 15	5.1		5.1	5.1		5.1	5.1		0.0	5.1		0.0
Queue Clearance Time (3.2	this in the same of the same of	7.2	9.5	······································	61,3	7.3	manual man		4.8		
Green Extension Time (g	'e), S		0.0	อาหารเหมืองเรา	2.0	0.5		0.0	0.3	mercender, com	0.0	0.1		0.0
Phase Call Probability	the second second second second second second second second second second second second second second second se		0.63	3	1.00	1.00	0	1.00	0.9	3		0.87	70a k aa	
Max Out Probability			0.00)	0.00	0.09	9	1.00	0.0	1		0.00)	uma ing injunj
					W-1									
Movement Group Resul				E8			WB			NB			SB	
Approach Movement			L	T	R	L	T	R	L.	T	R	L	T	F
Assigned Movement			7	4	14	3	8	18	5	2	12	1	6	1
Adjusted Flow Rate (v),			25	103	78	157	160		103	360	333	53	148	1
Adjusted Saturation Flow	Rate (s), veh/h/lr	1	1810	1841	1572	1725	1746		1781	1870	1598	1725	1811	15
Queue Service Time (g =), S	www.cjnissisis.	1.2	5.2	4.2	7.5	8.2	1	5.3	22.0	21.6	2.8	8.4	1.
Cycle Queue Clearance T			1.2	5.2	4.2	7.5	8.2	l.	5.3	22.0	21.6	2.8	8.4	1
Green Ratio (g/C)			0.41	0.38	0.43	0.46	0.42	1	0.38	0.34	0.41	and the second	general mention of the second	of reasons
Capacity (c), veh/h			100	697	679	598	739	1	- Brown and the second			0.36	0.33	0.3
Volume-to-Capacity Ratio	/ Y \			0.148	·		Š Przezowanie w Przezowa Przez	1	481	640	661	289	591	54
THE CONTRACTOR OF THE PROPERTY	a de la companya del companya de la companya de la companya del companya de la co	Soggeogra	THE RESIDENCE OF THE PARTY OF		Garanan and and and and and and and and and and 	0.263	<u> </u>		· Carrier and American	THE PARTY OF THE P	0.503	Garden and the same of the sam	0.251	0.0
Back of Queue (Q), ft/in			25.4	108.2	72.6	140.6	Secretario comence	***************************************	107.1	- www.resentroseco.	316.6	57	168.4	19
Back of Queue (Q), veh/			1.0	4.2	2.8	5.4	5.8	<u> </u>	4.2	14.8	12.6	2.2	6.4	0.
Queue Storage Ratio (RC		ie)	0.24	0.00	0.69	0.94	0.00	1333	0.82	0.00	2.26	0.52	0.00	0.
Uniform Delay (d +), s/ve	- Only of the state of the stat	*****************	35.1	28.6	23.8	22.3	25.6		28.8	37.5	30.4	30.9	34.6	29
ncremental Delay (d 2),			1.9	0.1	0.1	0.3	0.2		0.3	3.6	2.7	0.4	1.0	0.
nitial Queue Delay (d ɜ),	s/veh	1	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	0.0	0.0	0.0	0.
Control Delay (d), s/veh		NAME	37.0	28.8	23.9	22.7	25.8	Laws.	29.2	41.1	33.1	31.4	35.6	29
evel of Service (LOS)			D	С	С	С	С	1	С	D	C	C	D	1 7
Approach Delay, s/veh / L	os	an Avena	27.9		C	24.3	precional desirement	C	36.2		D	34.1	Transminagenties (194)	C
ntersection Delay, s/veh /			AND DESCRIPTION OF THE PERSON			2.3	***************************************		1	man di man		Braining		
					77				a Company			C		
Multimodal Results				EB			WB		Signaturas	N IO	toggi military	personal co	~~	
	and action of the could be to be true for	gradantis 👔	pananya ka	- 44			4452		₽	NB			SB	
Pedestrian LOS Score / Lo	ns	i i	2.12)	В	2.11		В	1.93		В	2.13	···	В

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HCS™ Streets Version 7.8.5

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General Information								Interse	ction In	ormati	on		(4) D, 4-1	
Agency D	iane B. Zimmerma	n Traffi	c Engin	eering	HICA 2014-04-0-4-08-0-00-0-00-0-0-0-0-0-0-0-0-0-	***************************************		Duratio	n, h	0.250)	لے ا	J. L	
Analyst D	BZ	***************************************	Analys	sis Date	2/3/20	20	inanii inanii inanii inanii inanii inanii inanii inanii inanii inanii inanii inanii inanii inanii inanii inanii	Area T	/pe	Othe				
Jurisdiction		condition to the condition of the condit	Time I	Period	AM P	eak	elady-blankillaharangga Konsedi	PHF	*************************************	0.91				
Urban Street B	lue Lick Road		Analys	sis Year	2022	,		Analys	s Period	1> 7:	00	7		
Intersection S	outh Park Road		File N	ame	Blue L	ick 22 I	NB AM	.xus	Monte la constituit en consumeron	eroidos escuencios				-
Project Description A	partments	#1401 #3-86181610-#-#30461-#	eller og en en en en en en en en en en en en en		engen market en	liai bidida kan ati Sublah asia	Mariable Vannagen	***************************************	الريد ويستهم وهوهم موسطتهم مهست	reneti ne et biblionio in incinitati	al-dread at a collection	- N	4144	* 1°
Demand Information				EB			Wi	3		NB			SB	
Approach Movement		nim/which to think	L	T	R	L	T	R	L	T	R	L	T	F
Demand (v), veh/h			24	97	73	147	11;	2 38	97	338	312	49	139	11
Signal Information					W	14.		acoustic and	5					
	Reference Phase	2			1-11	× 84	7	7		k	•	Y	" "	-€
manama ana ana ana ana ana ana ana ana a	Reference Point	End	Green	5.3	2.4	45.4	3.8	0.	52.	9			1	Ā
and the second contract of the second contrac	Simult. Gap E/W	On	Yellow	<u> </u>	0.0	3.5	3.5				\ 4)	7	Ē
Force Mode Fixed S	Simult. Gap N/S	On	Red	3.0	0.0	2.0	2.8	2.6	3 2.0	J	10	- 6	7	
				and the					ar engineer				and the same	
Timer Results			EBI		EBT	WB	L	WBT	NB	L	NBT	SBI	L	SBT
Assigned Phase			7		4	3	***************************************	8	5		2	1		6
Case Number			1.1		3.0	1.1	month of the second of the sec	4.0	1.1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	3.0	1.1	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	3.0
Phase Duration, s			10.1		58.4	16.	***************************************	64.8	14.	many energy beautiful	53.3	11.8	mana di mana	50.9
Change Period, (Y+Rc)	ĦŢŔŔĬĬijŔŖŔĸĬĸŖĸſĬĸĸĬĬĸĸŊŖĬĬĬĸĸĬĸĬĸĸĸĸĸĬĬĸĬĬŖĸĸŊĸĸŊĸĸŊĸŊĠĸŊŊŊĸĸŶĠŊijĸĸĸŔĸŊĸĸ		6.3		5.5	6.3		5.5	6.5		5.5	6.5		5.5
Max Allow Headway (MA	katikaningga digilika palakanan ya manana digunya papanjanan ya papanja da ka		5.1		5.1	5.1		5.1	5.1	and the second	0.0	5.1	recommendation	0.0
Queue Clearance Time (3.2		7.4	9,7		61.2	7.5	maning mean		4.9		
Green Extension Time (g	7 e), S		0.0	anarina barana	2.1	0.5	annonne di promo	0.0	0.3		0.0	0.1		0.0
Phase Call Probability			0.64	successive subjective sections	1,00	1,0(Minimuter passe	1.00	0.9		-	0.88	navana kana	
Max Out Probability			0.00)	0.00	0.11		1.00	0.0	1		0.00)	
Movement Group Resul	160		i dan sayasa	EB		1000000	WB	1800	i kanasa	A ID			OD	
market in the contract of the	II S		390.480.680	gyvenyaminines inseci		9888888		30000000		NB T	T n	500,000,000	SB	
Approach Movement Assigned Movement	k k felisir ni ikali ke kerja ya kerja ya fi ki ki ki ki ki kerja kipi ipang Kepensalishan selalisa isang da		1 7	1 4	R	L 3	L T	R	L 5	T	R	L	T	R
Adjusted Flow Rate (v),	b. /b.	***************************************	26	107	14	162	8	18	107	2	12	1	6	16
Adjusted Flow Rate (V), Adjusted Saturation Flow	40004404000000000000000000000000000000	on the second second	g services and the service of the se	-	80	·	165	_	originario con	371	343	54	153	18
Queue Service Time (g s			1810 1.2	1841 5.4	1572 4.3	1725 7.7	1746 8.4		1781 5.5	1870 22.8	1598 22.4	1725	1811 8.7	153
Cycle Queue Clearance		ga li iliaan	1.2	5.4	4.3	7.7	8.4	-	5.5	&		2.9	<u> de mantes en man</u>	1
Green Ratio (g/C)	1816 (Ac)'2		0.40	0.38	0.43	0.46	0.42		0.38	22.8 0.34	22.4 0.41	2.9 0.36	8.7 0.32	0.3
Capacity (c), veh/h		01.000.004	-	territoria de la constitución de	O HOUSE PROPERTY AND ADDRESS OF THE PARTY AND	g-o-minimum men	Second reserve	catific de materiales	rein (September 1997)	(· 	-	-	-
Volume-to-Capacity Ratio	~ / V \	eshore) A commod a local da es	101	694	679	596	739		477	640	664	281	588	54
Back of Queue (Q), ft/in			0.261	0.154	0.118			ood-waaaaaa	wadii waxaa aa aa aa aa aa aa aa aa aa aa aa aa	0.581	ومرجوع وتستسلوه يؤو	0.192	0.260	, Santaniano de la constanta de la constanta de la constanta de la constanta de la constanta de la constanta d
Back of Queue (Q), full Back of Queue (Q), veh		01	26.5 1.1	112.3 4.4	74.8 2.9	144.1 5.5	155.4 6.0		110.9 4.4	390.2 15.4	a potensiones de la companie de la c	58.5	173.1	19.
Queue Storage Ratio (R			0.25	0.00	0.71	-	0.00	1000	0.85	&	13.0	2.2	6.6	0.
Uniform Delay (d :), s/ve	lainektiisaan oliiisaanisiin nisianisiin oliisaasia	rG)	35.1	28.8	&manusconomi	0.96 22.4	25.7	·····	28.9	37.8	2.33	0.53	0,00	0.1
Incremental Delay (d 2), s/vi			· caromerane	- commonwood	23.8	-	รู้ของเหตรทุกการเกรา	-	erroller och state i der state i der state i der state i der state i der state i der state i der state i der s	germannen august a	30.5	31.2	34.9	29
			1.9	0.1	0.1	0.3	0.2	ia Pasanda	0,3	3.8	2.9	0.5	1.1	0.
Initial Queue Delay (d 3)	Sein Gerffel die der BerGebellte gerkgeben bij vor voor genomme keinen gewone		0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.
Control Delay (d), s/veh			37.1	29.0	23.9	22.7	26.0	-	29.3	41.6	33.3	31.7	35.9	29
Level of Service (LOS)	00	emiceconsiderations	D	С	С	C	С	<u></u>	C	D	C	C	D	_ C
Approach Delay, s/veh / i			28.1		င	24.4	1 (6) 1	С	36.0	<u> </u>	D O	34.4	+ (10) (10)	C
Intersection Delay, s/veh	1 LUO				J.	2.6						C		
Multimodal Results			1000000	EB	essible d		WB		a Franko	NB		10000000	SB	e e e e e e e e e e e e e e e e e e e
Pedestrian LOS Score / L		***************************************	2.12	**********	В	2.11	ara na mandanasa	В	1.9	ionoi-evonuiv <u>ge adamin</u>	B	2.13	-	ALLOS
, cacaman LOS SWIC/L		en-energen	0.84	•	U	۷.۱۱		D	1.3	-	U	Z.13	-	В

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HCSTV Streets Version 7.8.5

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General Information			altrana (satisface)	alara merekania				41 .					
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-constitution and a second and a second and a second and a second and a second and a second and a second and a	DBZ	CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR	rsis Date	. 101010	000	maces was recorded	Duratio	Nitride and the American Control	0.25	************			
Jurisdiction			Period	2/3/2 AM F	-	····	Area Ty	'Pe	Othe	<u>:</u> [			
**************************************	Blue Lick Road				····	naaneen een een een een een een een een	PHF	- 0 - 1 - 1	0.91			*	•
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	South Park Road	~~~~ <del>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</del>	sis Yea	<del></del>	99-1-0-1			s Period	1>7	:00	_ 3		
**************************************	Apartments	File N	ame	blue	Lick 22	D AM.X	us	leinikan kan malaan salah maranan salah	ONE TRANSPORT OF THE PARTY OF T		_	11	
r roject Description	Aparunents												1.954 -
Demand Information			EB		an Inggrad	W	١		N8	i de la companya de la companya de la companya de la companya de la companya de la companya de la companya de		SB	
Approach Movement	ellerjani var erskistine en sussa senska sussa juniore francussom.	L	1 T	T R	İι	TT	I R		T	R	L	T	R
Demand (v), veh/h		24	103	73								147	
					10			11 0,	, on) JIZ		141	1 10
Signal Information			TT		Į.	7		Z.	χ. Τ		1	1	
Cycle, s 140.0	Reference Phase	2		1 1					7.	\	10		_2
Offset, s 0	Reference Point	End Gree	152	2.4	45.4		4-	4	E	4	[2]		y
Uncoordinated No	Simult. Gap E/W	On Yellov		0.0	3.5	3.8 3.5	0.5 3.5		- POSSESSES	< ,	K .	ا را	Ą
Force Mode Fixed	Simult. Gap N/S	On Red	3.0	0.0	2.0	2.8	2.8	entre en mai Participario			•	- 7 ,	
								,	, <u>7</u>				
Timer Results		EB	L	EBT	WE	L	WBT	NB	L	NBT	SB	L	SBT
Assigned Phase		7		4	3	T	8	5		2	1		6
Case Number		1.1		3.0	1.1		4.0	1.1		3.0	1.1		3.0
Phase Duration, s		10.	1	58.0	17.	0	64.8	14.	- maring and a second	53.3	11.	annoce proces	50.9
Change Period, (Y+R c), s	6.3		5.5	6.3		5.5	6.5	5	5.5	6.5	········	5.5
Max Allow Headway (M	IAH), s	5.1		5.1	5.1	mniewska	5.1	5.1		0.0	5.1		0.0
Queue Clearance Time	(gs),s	3.2	2 1	7.7	10.	2	61.2	7.5			4.9	ymracadany,	
Green Extension Time (g e), s	0.0)	2.3	0.5	j	0.0	0.3	anarem garan a	0.0	0.1		0.0
Phase Call Probability		0.6	4	1.00	1.0	Marian Barrer	1.00	0.9	-		0.8	enimused ja saans	· · · · · · · · · · · · · · · · · · ·
Max Out Probability		0.0	0	0.00	0.14	nemerous de mario	1.00	0.0			0.0	***************************************	
											0.0		
Movement Group Resu	ilts		EB			WB			NB	60/1705/1901		SB	
Approach Movement		L	T	R	L	T	R	L	T	R	L	TT	│ R
Assigned Movement		7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v)		26	113	80	169	182		107	377	343	54	162	18
Adjusted Saturation Flo		1810	1841	1572	1725	1754		1781	1870	1598	1725	1811	153
Queue Service Time (g		1.2	5.7	4.3	8.2	9,4		5.5	23.3	22.3	2.9	9.3	1.1
Cycle Queue Clearance	Time (gc), s	1.2	5.7	4.3	8.2	9.4		5.5	23.3	22.3	2.9	9.3	1.1
Green Ratio (g/C)	**************************************	0.40	0.37	0.43	0.46	0.42		0.38	0.34	0.42	0.36	0.32	0.3
Capacity (c), veh/h		101	689	675	592	742		469	639	668	277	588	540
olume-to-Capacity Rati	o(X)	0.261	0.164	0.119	0.286	0.246		0.227	0.589	0.513	0.195	0.275	0.03
Back of Queue (Q), ft/li		26.7	120.1	75.2	150.2	170		110.9	396.9	324.5	58.5	182	19.
Back of Queue (Q), vet			4.7	2.9	5.7	6.5		4.4	15.6	12.9	2.2	6.9	0.7
Queue Storage Ratio (F	7.00-04	0.25	0.00	0.72	1.00	0.00		0.85	0.00	2.32	0.53	0.00	0.1
Jniform Delay (d ₁), s/v		35.2	29.2	24.0	22.5	26.0		29.0	38.0	30.2	31.3	35.1	29.
ncremental Delay (d 2)	, s/veh	1.9	0.2	0.1	0,4	0.2		0.3	4.0	2.8	0.5	1,2	0.1
nitial Queue Delay (d 3), s/veh	0.0	0.0	0.0	0.0	0.0	T-	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/vet	1	37.1	29.4	24.2	22.9	26.2	VARAGE V	29.3	41.9	33.0	31.8	36.2	29.8
evel of Service (LOS)	- Commence of the American State of the Amer	D	C	С	С	С	1	С	D	l c	С	D	С
Approach Delay, s/veh /	LOS	28.4		С	24.6		O	36.6	3 1 1	D	34.7	·	C
ntersection Delay, s/veh	/LOS			32	2.6	more alleise de	material and the second	1	territorio de la constitución de	on and the second of the second	C	o de la composição de la composição de la composição de la composição de la composição de la composição de la c	
Multimodal Results		COTATO DE ROCA DE CARRO CONTRA DE PARA DE CARRO	EB	65.85.8		WB			NB			SB	
Pedestrian LOS Score /		2.12	2	В	2.11		В	1.93	3	В	2.13	arineason approximation	В
licycle LOS Score / LOS	Self-film of the Artist of the Self-film of the Self-film.	0.8		Α	1.07	- STORES	A	1.85		В	0.87		A

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General information		Wood Wood		de almite and				Intersec	tion inf	ormati	on		ي ماهيات ا	į, į,
Agency [Diane B. Zimmerman	Traffi	c Engin	eering	-0.0003140000040400		***************************************	Duration	, h	0.250	**************************************			
<u>annotation tamentation to a contraction and a consequence and a contraction to the contraction of the contr</u>	DBZ	W7000000000			2/3/20	020		Area Typ)e	Othe	-			
Jurisdiction	indused (included and company and a company company of the company	***************************************	Time F		- Configuration	eak No	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		***************************************	0.91				
Urban Street	Blue Lick Road		Analys	is Year	2032	RAMANA KENINGSON	*****	Analysis	Period	1> 7:	00	(
Intersection S	South Park Road	والمتناوا والمتناولة والمتناولة والمتناولة والمتناولة والمتناولة والمتناولة والمتناولة والمتناولة والمتناولة و	File N		hard attraction in terminal	Lick 32 !	anatanana maka				***************************************		٠.,	-
Project Description	Apartments		E. CALLWARD COLORS			***************************************	DATE OF THE PARTY	***************************************	-	***************************************	ANNOUNCE AND LEADING	- 4	[老李安林 	1
	·		1											
Demand Information			3883383	EB			W	3		NB	Aris Au		SB	
Approach Movement			L	T	R	L	T	R	L	Т	R	L	Т	R
Demand (v), veh/h	A Controlled Complete Controlled Association (Controlled Controlle		27	107	81	162	12	4 42	107	373	345	54	154	18
Signal Information					And a second	14.			- L	\searrow				
	Reference Phase	2		5		~ * *	r T	2			S	Y	' H'	-3
	SANS-PARAMETER SECTION AND AND AND AND AND AND AND AND AND AN	End	Green	5.4	3.0	44.7	4.1	0.7	52.0) <u> </u>	1			
variations and the second of the second of the second of the second of the second of the second of the second	Simult. Gap E/W	On	Yellow		0.0	3.5	3.5	3.5	3.5)		•
Force Mode Fixed	Simult, Gap N/S	On	Red	3.0	0.0	2.0	2.8	2.8	2.0		10		7	
Timer Results			EBI		EBT	WB	L	WBT	NB	L	NBT	SB		SBT
Assigned Phase			7		4	3		8	5		2	1		6
Case Number			1.1		3.0	1.1	X	4.0	1.1		3,0	1.1		3.0
Phase Duration, s			10.4		57.5	17.4	1	64.5	14.9	3	53.2	11.9	•	50.2
Change Period, (Y+R c), s		6.3		5.5	6.3		5.5	6.5		5.5	6.5		5.5
Max Allow Headway (M.	AH), s		5.1		5.1	5.1		5.1	5.1		0.0	5.1		0.0
Queue Clearance Time	(g),s		3.4		8.0	10.6	3	61.0	8.1			5.2		
Green Extension Time (g e), S		0.1		2.3	0.5		0.0	0.3		0.0	0.2		0.0
Phase Call Probability			0.68		1.00	1.00)	1.00	0.99)	e (w) (e	0,90)	
Max Out Probability	ra De Maria de Artico de os Arestes (de el circulo e ser consciente de consciente consciente de consciente de		0.00		0.00	0.20)	1.00	0.03	3		0.00)	ini Aziri ki kananalaro i
Movement Group Resu	ilts		\$18355E	EB			WB	NO.		NB		(3)	SB	
Approach Movement		innesi (interdesi heli	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement			7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v)	, veh/h		30	118	89	178	182		118	410	379	59	169	20
Adjusted Saturation Flov	v Rate (s), veh/h/ln		1810	1841	1572	1725	1746		1781	1870	1598	1725	1811	1535
Queue Service Time (g	s), S		1.4	6.0	4.8	8.6	9.4		6.1	25.9	25.2	3.2	9.8	1.2
Cycle Queue Clearance	Time (g c), s		1.4	6.0	4.8	8.6	9.4		6.1	25.9	25.2	3.2	9.8	1.2
Green Ratio (g/C)			0.40	0.37	0.43	0.46	0.42		0.38	0.34	0.42	0.36	0.32	0.35
Capacity (c), veh/h			105	683	677	590	736		464	637	672	255	579	536
Volume-to-Capacity Rati	o(X)	1	0.284	0.172	0.131	0.302	0.248	3	0.253	0.643	0.564	0.233	0.292	0.037
Back of Queue (Q), ft/lr	n (90 th percentile)		30.1	124.4	83.8	157	170.7		121.8	438.2	ģemeenue,	65.3	191.2	21.9
Back of Queue (Q), vel	SMIRINGS (4) Printed the New York of the Commence of the Comme	:)	1.2	4.8	3.3	6.0	6.6	1	4.8	17.3	14.4	2.5	7.3	0.8
Queue Storage Ratio (F	HANGO Completic Color biologica de la Color de C	marine participation of the contract of the co	0.29	0.00	0.80	1.05	0.00	***************************************	0.94	0.00	2.59	0.59	0.00	0.17
Uniform Delay (d +), s/v			35.2	29.6	24.1	22.6	26.2	-	29.2	39.0	30.8	32.2	35.7	30.1
Incremental Delay (d 2)			2.1	0.2	0.1	0.4	0.2		0.4	4.9	3.4	0.7	1.3	0.1
Initial Queue Delay (d 3	TELECONOMIC CONTROL CO		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/vel	XVIII (1900) (1900) (1900) (1900) (1900) (1900) (1900) (1900) (1900) (1900) (1900) (1900) (1900) (1900) (1900)		37.3	29.8	24.2	23.0	26.4		29.6	43.9	34.2	32.8	37.0	30.2
Level of Service (LOS)			D	С	С	C	С	1	C	D	C	C	D D	C
Approach Delay, s/veh /	LOS		28.6	***************************************	C	24.6	 	c	38.0	Economy	D	35.5	<u> </u>	D
Intersection Delay, s/veh			y			3.7				-	6-3-4 <u>1111</u> 6-3-411	L	NOT MAKE A PARTY OF THE PARTY O	
					J.				F.					
Multimodal Results				EB			WB			NB		0,000	SB	
	IOS		2.12	ereneral famous and	В	2.11		В	1.93	onavrotnovejska ocaz	В	2.13		В
Pedestrian LOS Score /														

	nco	n old	liali2	eu IIII	erse	suon i	Kesu	its Su	mma	ry Figure 1				
General information	W. Carlos Commission of the Co		302 (11)		No zameno avidento		1	Interse	ction in	format	ion		Marian Sa	24 GA
Agency	Diane B. Zimmerm	an Traff	ic Engi	neering	W ielen erre ens were	**************************************		Duration	ettermene aranga	0.25		- I	2.1	
Analyst	DBZ	SEPERATURE AND AND AND AND AND AND AND AND AND AND	THE PROPERTY OF THE PARTY OF TH	sis Date	e 2/3/2	020	·maseemer-	Area Ty	·	Othe	_	- 7		
Jurisdiction			Time	Period	AM F	eak Bu	nananan energije	PHF	ANNOUS SERVICES	0.91	CONTRACTOR OF THE PROPERTY OF			
Urban Street	Blue Lick Road		Analy	sis Yea	r 2032	**************************************		Analysis	Period	~~~ _				
Intersection	South Park Road	10000000000000000000000000000000000000	File N	lame	Blue	Lick 32	and the second s							
Project Description	Apartments		***************************************		***************************************		***************************************	NA PARTICIPATION OF THE PARTIC	Seleky Chielomy in referencier yn som	NEW PARTICIPATION COMPANIES AND ASSESSMENT OF STREET		I	14.14.7	
Demand Information				EB			W	В	1	NE			SB	
Approach Movement			L	T	R	L	T	R	l L	T	R	L	T	TF
Demand (v), veh/h			27	113	81	169) 14	0 42	107	378	3 345	54	162	
er anne en en en en en en en en en en en en												Harris III		
Signal information			Security Sec	\	200	71.7	17			Ч				
Cycle, s 140.0	Reference Phase	2		1	l d	7 1	7.7	<u> </u>	X	¥**	`	₩.	4	_2
Offset, s 0	Reference Point	End	Green	1 5.4	3.0	44.7		1.2	51.	8	- 4	1 4		¥
Uncoordinated No	Simult. Gap E/W	On	Yellov		0.0	3.5	3.5		3.5	-	S 2	i i	ابرك	•
Force Mode Fixed	Simult. Gap N/S	On	Red	3.0	0.0	2.0	2.8		2.0			6		
											A			
Timer Results			EB	L I	EBT	WE	SL	WBT	NB	L	NBT	SB	L	SBT
Assigned Phase			7		4	3	···	8	5		2	1		6
Case Number			1.1		3.0	1.1		4.0	1.1		3,0	1.1		3.0
Phase Duration, s	·		10.	4	57.1	17.	9	64.5	14.	9	53.1	11.9	9	50.2
Change Period, (Y+R a		Kira (SAGIS)	6.3	3	5.5	6.3	3	5.5	6.5		5.5	6.5	i	5.5
Max Allow Headway (A	CONTRACTOR CONTRACTOR		5.1		5.1	5.1		5.1	5.1	······································	0.0	5.1		0.0
Queue Clearance Time			3.4		8.4	11.0	0	61.0	8.1			5.2		
Green Extension Time (g e), s		0.1		2.5	0.5	j	0.0	0.3		0.0	0.2		0.0
Phase Call Probability			0.6	В	1.00	1.00	0	1.00	0.9	aran dan aran		0.90	taririnami de la company	
Max Out Probability			0.0	0	0.00	0.20	6	1.00	0.03	enconsumbjection	and the state of t	0.00	animalistic de la comercia	anti-principa
Movement Group Res	ults	-		_ E8			WB			NB		100000000000000000000000000000000000000	SB	
Approach Movement			L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement			7	4	14	3	8	18	- 5	2	12	1	6	16
Adjusted Flow Rate (v			30	124	89	186	200		118	415	379	59	178	20
Adjusted Saturation Flo		n	1810	1841	1572	1725	1753		1781	1870	1598	1725	1811	153
Queue Service Time (g			1.4	6.4	4.8	9.0	10.4		6.1	26.4	25.1	3.2	10.4	1.
Cycle Queue Clearance	Time (g ∈), s		1.4	6.4	4.8	9.0	10,4		6.1	26.4	25.1	3.2	10.4	1.3
Green Ratio (g/C)	790000044994)(2000000000000000000000000000000000000		0.40	0.37	0.43	0.46	0.42	1	0.38	0.34	0.42	0.36	0.32	0.3
Capacity (c), veh/h			105	677	673	586	739	S SSOCORAL	457	637	677	251	579	53
/olume-to-Capacity Rat			0.284	0.183	0.132	0.317	0.271	T	0.257	an motorius municipal	0.560	0.237	0.308	0.03
Back of Queue (Q), ft/l			30.2	130.7	84.3	163	185.6		121.8	(>±iniming (management)	360.7	65.4	200.2	21
Back of Queue (Q), ve	h/In (90 th percentil	le)	1.2	5.1	3.3	6.2	7.1	1	4,8	17.5	14.3	2.5	7.6	0.0
Queue Storage Ratio (I	RQ) (90 th percent	ile)	0.29	0.00	0.80	1.09	0.00		0.94	0.00	2.58	0.59	0.00	0.1
Jniform Delay (d ₁), s/			35.3	30.0	24.3	22.8	26.5		29.3	39.1	30.5	32.3	36.0	30.
ncremental Delay (d 2			2.1	0.2	0.1	0,4	0.3	1 330 (868)	0.4	5.1	3.3	0.7	1.4	0.
nitial Queue Delay (d 3), s/veh		0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/ve	ή		37.4	30.2	24.4	23.2	26.7	1000000	29.7	44.2	33.8	32.9	37.3	30.
aval of Candon (LOC)			D	С	С	С	С		C	D	C	C	D D	C
ever of service (LOS)	LOS		29.0	A CONTRACTOR OF THE PARTY OF TH	C	25.0	kanaarennyarenees	C	38.0	THE PROPERTY OF THE PROPERTY O	D	35.8		ם
CONTRACTOR OF SECURIOR AND AND ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR ADDRESS OF THE SECURIOR			O CONTRACTOR OF THE PARTY OF TH	1	-	7			00.0	1				
.evel of Service (LOS) Approach Delay, s/veh / ntersection Delay, s/veł	1/LOS			as vestor					1	viele is see a suit			an saks lakta	
pproach Delay, s/veh /	r/LOS													
pproach Delay, s/veh /	1/LOS			EB			WR		Emiliar.	NΒ	Children and		QD.	
approach Delay, s/veh / Intersection Delay, s/veh			2.12	EB	В	2.11	WB	В	1.93	NB	В	2.13	SB	В

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HCS™ Streets Version 7.8.5

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General Inform	ıation	g/=::::::::::::::::::::::::::::::::::::				XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	(CLC)		Intersec	tion Inf	ormatic	on		11 71 40 1	
Agency		Diane B. Zimmerma	an Traffi			~ccp~mmercmmo			Duration	, h	0.250			• • •	
Analyst	2000-00-00-00-00-00-00-00-00-00-00-00-00	DBZ	CANCEL MARKET MA	Analy	sis Date	· · · · · · · · · · · · · · · · · · ·	A SAN SAN MARKANIA DA SAN AND AND AND AND AND AND AND AND AND A		Area Typ	e	Other		_ <u></u>		
Jurisdiction			***************************************	Time (Period	PM P	eak		PHF		0.92		† 3		-
Urban Street		Blue Lick Road		Analy:	sis Year	2019			Anaiysis	Period	1> 4:	45	*		
Intersection		South Park Road		File N	ame	Blue I	Lick 19 F	PM.xus	3						
Project Descript	lion	Apartments			A designation of the same	-William Constitution	***************************************	Tu-04-00000000	MILEN - TOO TO BE SEEN - COME PROCESS AND	Set Library Control Control	1110 Marie 1110 Marie 1110 Marie 1110 Marie 1110 Marie 1110 Marie 1110 Marie 1110 Marie 1110 Marie 1110 Marie 1			1 4 3 4 W	* 7
Demand Inform	nation		***************************************		EB			WE	3		NB	303380	a Nassas	SB	
Approach Move	ment			L	T	R	L	l T	R	L	T	R	L	T	R
Demand (v), v	eh/h			49	142	277	266	12	1 45	98	291	237	59	441	42
			Control Section								1000				
Signal Informa					1 7	Avector	4 ×							لسر	_
Cycle, s	140.0	Reference Phase	2		5	1	~ K.	7		SE	k' (diam)	•	Υ,	Tri	-6
Offset, s	0	Reference Point	End	Green	5.5	1.5	60.0	5.2	7.2	30.	5				K
Uncoordinated	No	Simult, Gap E/W	On	Yellow	THE STREET STREET	0.0	3.5	3.5	CHIPTON DIRECTOR CO.	3.5		S K) (1	→	77
Force Mode	Fixed	Simult, Gap N/S	On	Red	3.0	0.0	2.0	2.8	2.8	2.0			- 6	7	
				1 20035									1000		
Timer Results			AVEN S	EB	L	EBT	WB	L	WBT	NB	L	NBT	SBI	L	SBT
Assigned Phase				7		4	3		8	5		2	1		6
Case Number				1.1	sanconación con con	3.0	1.1	manazan Banan	4.0	1.1	anno adjustacio	3.0	1.1		3.0
Phase Duration	<u> </u>	ningin panginiph kingin pinangan pangangan kapangan kangan kapangan berangan		11.5	vanas valia massa	36.0	25.0	mandende	49.5	13.5		67.0	12.0		65.5
Change Period,	HTGGOOGGEVATATIOGNA FORM	NEEDEN STANDES STANDARD AND STANDARD AND AND AND AND AND AND AND AND AND AN		6.3	ennemaljerem	5.5	6.3	tamino o rivera di panamana	5.5	6.5		5.5	6.5		5.5
Max Allow Head	AND THE PARTY OF T			5.1		5.2	5.1	งงงงงคู่คนระคมเค	5.2	5.1		0.0	5.1		0.0
Queue Clearan	NA CONTRACTOR AND A	electivistiksia (1988) karantioi on olekoi estateen ole aluktuora aranti	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	5.3		27.0	20.2	2	13,1	6.6	www.collence.co		4.7		
Green Extensio		(ge), S		0.1		3.5	0.0	พระสมเหติ	4.2	0.5	rich rechnishmen en en	0.0	0.3		0.0
Phase Call Prob	pability	Control Control of Con		0.87		1.00	1.00) [1.00	0.98	}		0.92	2	
Max Out Probal	bility		-3000000-2000-2000	0.00)	0.08	1.00)	0.00	0.00) [0.00) [
Movement Gro	un Bos	ulte			EΒ		The state of	WB		Established	MD	a de la company	. Industrial	CD	energy and a
	M. 100 M.		nember de monte de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti	L	T	l o	-	T	T R		NB T	Г р		SB	Ī 0
Approach Move Assigned Move		algoritad i esta que a destipación logo associana a la longo a adecamentam ser accosa, her accosado		7	4	R 14	L 3	8	18	L 5	7 2	R 12	L	T 6	R
Adjusted Flow F	titidika katalon atau atau katalon ka	Vah/h		53	154	301	289	180	10	107	316	258	1 64	479	16 46
n State M Million M Print State M March State Annothing State Annothing State Annothing State Annothing State A), ven/n ow Rate (s), veh/h/i	n	1753	1900	1535	1697	1741	92300	107 1795	1870	1598	-	Į	ali resumentament
Queue Service	middestrament many block			3.3	9.7	25.0	18.2	1741	-	4.6	16.0	11.5	1810 2.7	1811 28.8	1547
Cycle Queue Cl	ucuterruntarius	***************************************		3.3	9.7	25.0	18.2	11.1	-	4.6	16.0	11.5	2.7		2.3
		c inic (y c), 5 %		0.26	<u></u>	}	0.37		· Francisco			***************************************	<u> </u>	28.8	2.3
Green Ratio (g	euroranaeri eranoueri		20,000,000	<u> </u>	0.22	0.27	E commence con contraction con contraction con contraction contrac	0.31	+	0.48	0.44	0.57	0.47	0.43	0.47
Capacity (c), v Volume-to-Capa	WSEA SOSSINITE CONTRACTOR CONTRACTOR	Minimum V V	***************************************	375	414	0.732	453	547 0.330		346	821	915	458	776	721
	-			0.142	Partine de la composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition del	0.732 366.7	Electronic de la constante de	green and the second	and reconstruction	0.308	0.385	Šerovine romanie	0.140	0.618	- Commercial Commercia
		(in (90 th percentile)	topoconocococo	67	186	**********	306.9	198.5		91.1	277.6	176.6	53.6	469.8	40.4
enjeneenstatustetaminärjoisemmeen muutota ominatoroi		eh/in (90 th percenti	COMPANIES CONTRACTOR C	2.6	7.4	14.0	11.5	7.6		3.6	10.9	7.0	2.1	17.9	1.6
	anno de la companya del companya de la companya del companya de la	RQ) (90 th percent	u(C)	0.64	0.00	3.49	2.05	0.00	<u> </u>	0.70	0.00	1.26	0.49	0.00	0.32
Uniform Delay (Mark Sentertand desirable de co	intellaliten errene errene errene errene errene errene errene errene errene errene errene errene errene errene		40.0	46.6	46.7	34.6	36.7	ļ	23.6	26.5	15.2	21.6	31.1	20.6
Incremental Del	uaiamuùamona	allika kan Salaka kersala maska maska maska maska maska maska maska maska kan maska kan maska kan maska kan ma	vinensoulbeichauslad	0.2	8.0	4.1	3.4	0.5		0.7	1.4	0.8	0.2	3.7	0.2
Initial Queue De	The same of the s	بجية ويشجه ويسمنا في بوسيس بمنطق والميان في المراجع والم	danimin transportation	0.0	0.0	0.0	0.0	0.0	neekvenneenneenne	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (SHEKADIT SHEKADA KITA HEKADA SA	\$606E46+546U464F48UE4640A00004640G4640G4660G46	***************************************	40.2	47.4	50.7	38.0	37.2		24.3	27.9	16.0	21.8	34.8	20.8
Level of Service	(mentenante production of the contraction of the co			D	D	D	D	D	1	C	C	В	С	L C	T_C
Approach Delay	DAMAGE DAYON DODGE DOWN	шенфонулорифирантранорический комперия функция (пред нежим)		48.0)	D	37.7		D	22.8	5 01 70	C	32.3	5 (8) (8)	С
Intersection Del	ay, s/ve	n / LOS				3-	1.2						C		
	nu Me				en.			LAIP			A I C			~~	
	SUILS .	apparators is a transferigit plantifity	ere a sa si si ci		EB	g problem of		WB	200000000000000000000000000000000000000		NB		R VERSE	SB	Bara (la la
Multimodal Re Pedestrian LOS	I SAN AND FRANKSKI KANALANA	/ t 00	(American contention c	2.14	4	В	2.13	>	В	1.92	1	В	2.11		В

			9		1116			Jul	Ul	ımmaı	y				
General inform		allo de la companya de la companya de la companya de la companya de la companya de la companya de la companya	in valent mass same	v-1	er e le Maetavar na			r							
-70-10-20-20-20-20-20-20-20-20-20-20-20-20-20	IBUON	Inter- D. William	***		100000 -		777	rassessessessessesselfer		ction in		Patricia de la composición dela composición de la composición de la composición de la composición de la composición dela composición dela composición dela composición de la composición de la composición de la composición de la composición dela composición de la composición dela composición dela composición dela composición dela composición dela composición dela composic		74.A4.	
Agency	***************	Diane B. Zimmerm	an Traff	and the second contraction of the second	CONTRACTOR		·	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Duratio	•	0.25	- Firebin-commitment on the control			
Analyst	· Control of the cont	DBZ	New State of the S			2/3/2	Andreas and the second	Hiller State Contract	Area Ty	/pe	Othe	THE TAXABLE PARTY OF THE PARTY			
Jurisdiction	·	<u> </u>	**************************************		Period	PM P			PHF	********	0.92			**	
Urban Street	Managan pangangan pang	Blue Lick Road	ON COMPANY OF THE PARTY OF THE	Analy	sis Yea	r 2022	No Buil	d .	Analysi	s Perlod	1> 4	:45	3,		
Intersection	n destiglierinski symmetric (occupany) proper	South Park Road	***************************************	File N	ame	Blue	Lick 22	NB PM	.xus					111	
Project Descript	lion	Apartments							TTOM TO THE OWNER OF THE	erene en en en en en en en en en en en en	NYMANY SANONINA	TO SERVICE STATE OF THE SERVICE STATE STATE OF THE SERVICE STATE STATE STATE OF THE SERVICE STAT	m r	² (18) (18) (18)	
Demand Inform	initiation production			1000	, EB			WE	3		NB			SB	
Approach Move				L	T	l R	L	T	R	L	T	R	L	Т	F
Demand (v), v	eh/h			50	146	285	274	12	5 46	101	300	281	61	454	4:
Signal Informa				Symmetric				1		Ч.	\				
Cycle, s	140.0	Reference Phase	2	Accessor	15	15		*	~		· · ·	>	₩.	4	_4
Offset, s	0	Reference Point	End	Green	15.5	1.7	59.0		7.1	31.	વ	- 1	12	1.5	_ <u>¥</u>
Uncoordinated	No	Simult. Gap E/W	On	Yellow	The second second	0.0	3.5	3.5	3.5			. 2	6 . (ا برك	•
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	0.0	2.0	2.8	2.8	NATIONAL CONTRACTOR OF THE PARTY OF THE PART				-	•
Timer Results				EB	L	EBT	WB	L /	WBT	NB	L i	NBT	l SB	L	SBT
Assigned Phase	•			7		4	3	1	8	5		2	1 1		6
Case Number				1.1		3.0	1,1		4.0	1.1		3.0	1 1	torresi basi	3.0
Phase Duration	. S			11.6	and the second second	36.8	25.	Name of Street, Street	50.2	13.	anne en angles en e	66.2	12.	anaman danama	64.5
Change Period,	(Y+R	c).S	Salar e van de Gr	6.3		5.5	6.3		5.5	6.8		5.5	6.5	arrent de la colonia de la co	5.5
Max Allow Head			***************************************	5.1	*****************	5.2	5.1	in the second second	5.2	5.1		0.0			- Contraction
Queue Clearand			issaventso	5.3		27.7	20.	waraning ama	13.4	6.8	····	V.U	5.1	-	0.0
Green Extension				0.1	- The second second	3.6	0.0	***************************************	nice and a second	in the second	***************************************	~ ~	4.9		-
Phase Call Prot	BOOM OF THE PROPERTY OF THE	(9 ° /, 3		0.8	marranightum	1.00	Š		4.4	0.5		0.0	0.3	·	0.0
Max Out Probat	determination of the second	nth eff sociation de historianistica de la securita del securita de la securita de la securita del securita de la securita del securita de la securita del securita	CONTRACTOR OF THE PROPERTY.	***********	aranner ann an an an an an an an an an an an an	uncontrated at the second	1.0	manina di seria	1.00	0,9	*************		0.9	ananan kana	
Max Out Flobal	лису			0.00	,	0.10	1.0)	0.00	0.0	0		0.0	0	
Movement Gro	up Res	ults		1000	EB			WB		N DOMESTIC	NB		l leasen	00	
Approach Move	201 - 201 A A A A A A A A A A A A A A A A A A A			L	T	R	L	T	R	L	T	T	ļ	SB	T =
Assigned Mover				7	4	14	3	8	nijemen manasa.		\$	R	L	T	R
Adjusted Flow R	Marine de Salación de Compresi	\ veb/b		54	159	germania and a second	g-manageres		18	5	2	12	1	6	16
til til atkanlar kritiskaproproproproproproproproproproproproprop		w Rate (s), veh/h/	(Alexandre	Sincerveness	<u></u>	310	298	186	100000000000000000000000000000000000000	110	326	305	66	493	47
TO Production of the Comment of the			11 1	1753	1900	1535	1697	1742	-	1795	1870	1598	1810	1811	154
Queue Service				3.3	9.9	25.7	18.7	11.4	ļ	4.8	16.7	14.3	2.9	30.3	2.4
Cycle Queue Cl		e (ime (g e), s		3.3	9.9	25.7	18.7	11.4	S 1000	4.8	16.7	14.3	2.9	30,3	2.4
Green Ratio (g/			Anna de la composição de la composição de la composição de la composição de la composição de la composição de	0.26	0.22	Commission of the Contract of	0.37	0.32	ļ	0.47	0.43	0.57	0.46	0.42	0.4
Capacity (c), vo	TO SHOW WHEN THE PARTY OF THE P			381	424	422	456	556		331	811	906	444	764	71
Volume-to-Capa	Western Commence			personana managa	0.374	Brassessangsyntymy	80-mm-2000000	0.334	andro room con room	0.332	0.402	0.337	0.149	0.646	0.06
MANUTERIOR CONTRACTOR AND AND AND AND AND AND AND AND AND AND	market in the second of the second	in (90 th percentile	ni orinti occanii na ma	67.9	189.5	375.3	314.9	202.4	130000	95.3	289.4	212	56.3	493.4	42.
Back of Queue (Q), ve	eh/in (90 th percent	ile)	2.6	7.6	14.3	11.8	7.8	I	3.8	11.4	8.4	2.3	18.8	1.6
Queue Storage	Ratio (RQ) (90 th percen	tile)	0.65	0.00	3.57	2.10	0.00		0.73	0.00	1.51	0.51	0.00	0.3
Uniform Delay (***			39.4	46.1	46.1	34.3	36.3		24.4	27.2	16.2	22.2	32.2	21.
Incremental Del				0.2	8.0	4.2	3.8	0.5	1999	0.8	1.5	1.0	0.2	4.2	0.2
Initial Queue De			Maria Palamara Sanan	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (Sec. 200	THE TAXABLE PROPERTY OF THE TAXABLE PROPERTY OF THE TAXABLE PROPERTY OF THE TAXABLE PROPERTY OF THE TAXABLE PROPERTY OF THE TAXABLE PROPERTY OF THE TAXABLE PROPERTY OF THE TAXABLE PROPERTY OF TAXABLE PROPERTY OF THE TAXABLE PROPERTY OF TAXABLE PR		39.7	46.9	50.4	38.0	36.8	ligation in	25.3	28.7	17.2	22.4	36.4	21.
Level of Service				D	D	D	D	D D	1	C	20.7	B	22.4 C	***********	eginsonisoisia
Approach Delay	·	/LOS	V6 0000000	48.2		D	37.6	: 	ן ס	-Servenmannerse		å	<u> </u>	D	C
Intersection Dela	de recominación como	THE PROPERTY OF THE PROPERTY OF THE PARTY OF		73.7.6			-		IJ	23.8	<i>J</i> 1	C	33.7		С
	-j, 3/15	, 200				<i>ب</i> ن ا	1.5			1			С	7. S. 75.	
Multimodal Res	uite				EB),Airo		l management	, LIM	cover de sec			
Pedestrian LOS	************	U OS	-	2 4 4	en en en en en en en en en en en en en e	D D	0.40	WB			NB			SB	
		L-U-U		2.14		В	2.13)	В	1.92	:	В	2.11		В

		., .	, o,g	HUHL	. W 1110	CISCO	uon i	(CSG)	ica Ot	mmar	y				
General inform	nation								Interse	ction in	ormati	on		Jak Bada A	ال ال
Agency		Diane B. Zimmerma	an Traff	ic Engir	eerino	o-de-classes de la compo	noAmenio worketos zuwa	avocamandy a	Duratio		0.250				
Analyst	***************************************	DBZ			0.000000000000000000000000000000000000	2/3/20	າ2ຄ	acconservação	Area Ty	-	Othe	-			
Jurisdiction	THOUSEN SCHOOL STATE			-	Period	PM Po	NO PERSONAL PROPERTY AND ADDRESS OF THE PERSONAL	WAY CAN DO NOT THE REAL PROPERTY.	PHF	F ~	0.92	, 			
Urban Street	555 1 4558/4556 11 4/5348.40	Blue Lick Road	بترسويم وتناويمه منط فتتصدد	discussion and	sis Year				NEW ROOM () A CONTRACTOR ()	s Period	1> 4:	45	3		
Intersection		South Park Road	المتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية و	File N	~~~~	- 	ick 22 l	والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع وا	ON THE PROPERTY AND ADDRESS OF THE PARTY AND A	31 01100			- 1		_
Project Descrip	tion	Apartments			E I I I C	DIGC L	JON ZZ	J 1 141.70	.uo	***************************************				14.1 K-Y	
. rejest Dassilp		Aparamento													
Demand Inform	nation			acesta.	EB			WE	3		NB			SB	
Approach Move	ement		ARCHORDONINO SOLICIONES	L	Т	R	ŤL	T	R	L	T	R	TI	T	F
Demand (v), v	THE PERSON NAMED IN COLUMN 2 I		WHICH CHARLES	50	163	285	279	136	3 46	101	316	281	61	459	4
,															
Signal Informa	tion					PAN-	W.	77		54					
Cycle, s	140.0	Reference Phase	2			L M		"			. Fi	Y	V	/	4
Offset, s	0	Reference Point	End	Green	5.5	1.7	58.9	5.3	7.1	31.	4	4	14		Ľ
Uncoordinated	No	Simult. Gap E/W	On	Yellow	CONTRACTOR CONTRACTOR	0.0	3.5	3.5	3.5		`⊢_`,	S 2	6 4	ا ر	9
Force Mode	Fixed	Simult, Gap N/S	On	Red	3.0	0.0	2.0	2.8	2.8		7	9	6	7	
Timer Results			(VASCE)	EB	30	EBT	WB	L	WBT	NB	L	NBT	SB	L	SBT
Assigned Phase	е			7		4	3		8	5		2	1	and the same of th	6
Case Number	designation		53.55	1.1		3.0	1.1		4.0	1.1		3.0	1.1	3000 600	3.0
Phase Duration	, 5			11.6	3	36.9	25.0)	50.3	13.	7	66.0	12.0	0	64.4
Change Period,	(Y+R	c), S		6.3		5,5	6.3		5.5	6.5		5.5	6.5		5.5
Max Allow Head				5.1		5.2	5.1		5.2	5.1		0.0	5.1		0.0
Queue Clearan	ce Time	(gs), S		5.3		27.6	20.7	7	14.2	6.8			4.9	1300	
Green Extensio	n Time	(ge), S		0.1		3.8	0.0		4.6	0.5		0.0	0.3	i	0.0
Phase Call Prol	bability			0.88	3	1.00	1,00)	1.00	0.99)		0.9	2	
Max Out Probal	bility			0.00) [0.11	1.00)	0.00	0.00)	Marie Sendani Imma Sur	0.0	0	***************************************
				===											
Movement Gro		ults	***********		EB			WB			NB		100000000000000000000000000000000000000	SB	
Approach Move	ORGONIA STREET, CONTRACTOR OF THE PROPERTY OF		apagapanajasanarapi)	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Move				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow F	CHIEDONIO CONTRACTOR C		symmetric plant of section of	54	177	310	303	198	*	110	343	305	66	499	47
ununnniannia miikknun munchich dei kaamaessaa suur	***************************************	w Rate (s), veh/h/l	n	1753	1900	1535	1697	1746		1795	1870	1598	1810	1811	154
Queue Service				3.3	11.2	25.6	18.7	12.2	ļ	4.8	17.9	14.4	2.9	30,8	2.4
Cycle Queue Cl		e Time (<i>g c</i>), s		3.3	11.2	25.6	18.7	12.2		4.8	17.9	14.4	2.9	30.8	2.4
Green Ratio (g	SATURATION OF THE PARTY OF THE		************	0.26	0.22	0.28	0.37	0.32		0.47	0.43	0.57	0.46	0.42	0.4
Capacity (c), v	THE RESIDENCE OF THE PERSONS		0440444144444	373	426	423	444	559	I MARK	325	809	904	429	762	70
Volume-to-Capa	anna ann an an an an an an an an an an a			0.146	Character and the second	0.732	g-constitution-constitution-			0.337	0.425	ผู้จะเกลเขมขนะของ	0.154	0.655	agreement .
	CALABORA COMMISSION	in (90 th percentile)		67.8	209.2	374.7	323	214	1	95.7	305.8	Same and the same of the same	56.5	501.8	42.
		eh/in (90 th percenti		2.6	8.4	14.3	12.1	8.2		3.8	12.0	8.4	2.3	19.2	1.0
the first track the state of the second second section (see particular second second section (see particular second secon	The state of the s	RQ) (90 th percent	ile)	0.65	0.00	3.57	2.15	0.00		0.74	0.00	1.52	0.51	0.00	0.3
Uniform Delay (CONSTRUCTION OF THE PARTY OF			39.3	46.4	46.0	34.7	36.5		24.6	27.6	16.3	22.4	32.4	21.
Incremental Del		MICHORANO CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONT		0.3	0.9	4.2	4.7	0.5	1	0.9	1.6	1.0	0.2	4.4	0.
Initial Queue De	weenchin/discovers	randa constitui provinti a materia de la constitui de la constitui de la constitui de la constitui de la const	Kalipeli akseksasi (yikki mayband	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.
Control Delay (39.6	47.4	50.2	39.4	37.0	1	25.5	29.2	17.3	22,7	36.8	21
Level of Service	enteriori excession	and the second section of the second section of the second section of the second secon	enterannenteletormikajen	D	D	D	D	D	ĺ	С	С	В	С	D	С
Approach Delay	AND THE PROPERTY OF THE PROPER	990—94 0 — talentaria de la completa com la completa del la completa del la completa del la completa de la completa de la completa del la completa de la completa del la completa del la completa del la completa del la completa del la completa del la completa del la completa del la completa del la completa del la completa del la completa del la completa del la completa del la completa del la com		48.2)	D	38.8		D	23.9)	0	34.		C
Intersection Del	ay, s/ve	h/LOS				35	5.0						С		
Muitimodal Re					EB			WB			NB			SB	
Pedestrian LOS	Score .	/LOS		2.14	1	В	2.13	1	В	1.92)	В	2.11	ı	В

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HCS™ Streets Version 7.8.5

	5-5-34-5- 3 5	HCS	7 Sig	nalize	ed int	ersec	tion F	Resu	lts Su	mmar	у				
				4.44.000											
General inform	ation			COPPRESSIONES PROFINE	r húddiðir mantamr maners.		rioszek iraniosz mana	·····	Interse	tion inf	ormati	On			
Agency	TT 2420-404-888-48-48-48-	Diane B. Zimmerma	an Traffi	c Engir	eering	******************************	****		Duration	ı, h	0.250)		21.	
Analyst	***************	DBZ		Analy	sis Date	2/3/20)20		Area Ty	эе	Othe	r	A.		
Jurisdiction				Time	Period	РМ Р	eak	1	PHF	***************************************	0.92	boron/			
Urban Street		Blue Lick Road	erente er annen an eksteration	Analy	sis Year	2032	No Buil	d .	Analysis	Period	1> 4:				
Intersection		South Park Road		File N	ON COMPANY OF THE PARTY OF THE PARTY.	.veg	ick 32	mistarar made		*****************	and and and	***************************************		٠,,,	۲
Project Descrip	tion	Apartments	STEEL STATE OF THE	Antonio maria	ordonoloo+nomiki-kilibi-i-i-	nvillan innersembe		indernissimer varioussisse		And the second second		West transmission Number 1994			* 7
Demand Inform	nation				EB			WE	3		NB			SB	
Approach Move	ment			L	T	R	L	T	R	L	Т	R	L	T	F
Demand (v), v	eh/h		(2) (2) (4) (4) (4) (4)	55	161	315	303	13	8 51	112	331	310	67	501	4
									(a	357,000	(1000)	and the first section	-		
Signal informa	tion						IJ.	17		5_	N.				
Cycle, s	140.0	Reference Phase	2	Unanaecce	L <	L A	1					`	**		//
Offset, s	0	Reference Point	End	Green	5.6	2.4	55.6	5.4	7.0	33.9	,	- 4	12		_ 3
Uncoordinated	No	Simult. Gap E/W	On	Yellow	- A ccession	0.0	3.5	3.5		3.5	-	ς /	k 4	ا پرك	Ġ
Force Mode	Fixed	Simult, Gap N/S	On	Red	3.0	0.0	2.0	2.8		2.0				7	L.
Timer Results				EB		EBT	W8	L	WBT	NB		NBT	SB		SB1
Assigned Phase	3		refresi de la companione de la companion	7	1	4	3	1	8	5		2	1		6
Case Number				1.1		3.0	1.1		4.0	1.1		3.0	1.1		3.0
Phase Duration	, S	The statement of the st		11.7	managan e	39.4	25.0	commency and	52.7	14.8	and the second second	63.4	12.	on managements	61.1
Change Period,	, 1988-1981-1982-1982-1982-1982-1982-1982-	c), S	980392433	6.3		5.5	6.3		5.5	6.5		5.5	6.5		5.5
Max Allow Head	annico anticipio	THE STATE OF THE PARTY OF THE P		5.1	1	5.2	5.1		5.2	5.1	THE PERSON NAMED IN COLUMN TWO	0.0	5.1		0.0
Queue Clearan				5.6	$\neg +$	30.2	20.	-en-mandren	14.4	7.6	mirana andisa any a	U.U	5.3	area a san a la como co	V.V
Green Extensio			uovi0040861	0.2	andense granes	3.8	20. 0.0		4.9	0.5		0.0	Same and the same	Company of the Company	^ ^
Phase Call Prot		(7 ') '	300 550 551	0.9	order namen Geraraan e	1.00	1.00		1.00	0.99		U.U	0.3	and the second	0.0
Max Out Probat	THE PROPERTY OF THE PARTY OF TH			0.00	Marian Printers	0.20	1.00	orominion gasem	0.00	0.00			0.9		transministra
	y			0.00	'	V.ZU	1.0		0.00	I U.U.	,		0.00	,) 	
Movement Gro	up Res	ults		7. 7	EB			WB		100000000000000000000000000000000000000	NB			SB	
Approach Move				L	T	R	L	T	∏ R	L	T	R	L	T	TF
Assigned Move			60000000	7	4	14	3	8	18	5	2	12	1	6	1 1
Adjusted Flow F	or management), veh/h		60	175	342	329	205	10	122	360	337	73	grander and the second	S. S. S. S. S. S. S. S. S. S. S. S. S. S
TOTOTOTOTOTOTOTOTOTOTOTOTOTOTOTOTOTOTO		ow Rate (s), veh/h/l	n	1753	1900	1535	1697	1741	10050000	Branconnection and	Enrichmentalisation		Secretarian	545	5
Queue Service				3.6	10.8	28.2	18.7	12.4	 	1795	1870	1598	1810	1811	15
Cycle Queue Cl				3.6	10.8	28.2	germannen er en en en en en en en en en en en en en	<u> </u>	1	5.6	19.5	16.9	3.3	36.3	2
Green Ratio (<i>g</i> /		C TRICITATION	****	or mosmoodiscroo		and the second	18.7	12.4		5.6	19.5	16.9	3.3	36.3	2.
Capacity (c), v	WAY PRODUCTION TO THE PRODUCTION OF THE PRODUCTI		\$2245.00 A	0.28	0.24	0.30	0.39	0.34	1	0.45	0.41	0.55	0.44	0.40	0.4
Capacity (c), v Volume-to-Capa		tio / V)		390	460	460	469	587	-	274	774	875	394	719	67
			gga Ngga Litan	0.153	0.380	-	<u></u>	0.350	Andrew American	0.445		di communication	0.185	0.758	0.0
		In (90 th percentile)		72.6	202.1	407	343.8	garanananananananananananananananananana	1	112.6	332.2	algram inistration (constitution)	65.6	593.3	48
		eh/in (90 th percenti		2.8	8.1	15.5	12.9	8.3	<u> </u>	4.5	13.1	9.8	2.6	22.6	1.
		RQ) (90 th percent	lie)	0.69	0.00	3.88	2.29	0.00		0.87	0.00	1.76	0.60	0.00	0.3
Uniform Delay (on we consider the second	37.5	44.3	44.2	34.2	34.9	-	27.8	29.8	18.2	24.5	36.4	23
incremental Del	etariate en l'attendant par	CONTRACTOR AND AND AND AND AND AND AND AND AND AND		0.3	0.7	4.8	5.2	0.5	1	1.6	2.0	1.3	0,3	7.3	0.
nitial Queue De		PANONE MARKATAN AND AND AND AND AND AND AND AND AND A		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.
Control Delay (CONTRACTOR NAMES OF THE	eh .		37.7	45.0	49.0	39.3	35.4		29,5	31.8	19.5	24.8	43.8	23
evel of Service	************			D	D	D	D	D	- Landa de la constitución de la	С	С	8	С	D	C
Approach Delay	elektriskum på tradition (skyleter			46.6		D .	37.8		O	26.4		C	40.1		D
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HCS¹² Streets Version 7.8.5

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General Inform	ation								Intersec	tion inf	ormati	on		1404	
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Jurisdiction				Time	Period	PM P	eak	The same of the sa	PHF		0.92	······			-
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-минимическующей общений и подраждений и под	танжиции рушинен	ow Rate (s), veh/h/l	n	1753	1900	1535	1697	1746	***************************************	1795	1870	1598	1810	1811	1547
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		In (90 th percentile)		72.5	221.5	406.4	353.8			113	PARTICIPATION AND AND AND AND AND AND AND AND AND AN	246.3	65.7	602.9	48.5
		eh/In (90 th percenti		2.8	8.9	15.5	13.3	8.8	-	4.5	13.8	9.8	2.6	23.0	1.9
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Multimodal Res	suite				EB			WB			NB		Training	SB	
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Pedestrian LOS															

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Analysis Year	2019						Nort	h/South	Street		Blue	Lick Roa	d			
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Intersection Orientation		1-South				**************************************	Anal	ysis Time	Period	(hrs)	0.25					
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Lanes													9 (S) (S)			
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Vehicle Volumes and Adju	ıstme	nts														
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Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%)		16	Marina Marina Marina	4		0				LT 3				0		TF
Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles (%) Proportion Time Blocked		16	LR	4		0				LT 3		0		0		TF
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General Information							Site	Infori	natio	Ŋ						
Analyst	DBZ	REPORT SOURCE	THE CONTRACT OF THE CONTRACT O	BOOK SHIP CONTRACTOR	NAMES OF THE OWNER, WHEN THE OWNER,		Inters	ection	***************************************	ilanomine (valerino) ,	Blue	Lick at V	/hite Oa	k	the continues	
Agency/Co.	Diane	B Zimr	nerman 1	Traffic En	gineerin	g	Junisc	iction					AMAY MANAGEMENT			
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Analysis Year	2022			TO THE PERSON NAMED IN		**********	North	√South	Street	and the second second	Blue	Lick Roa	d		- Warrannee - ma	RWITTER
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Intersection Orientation	North	-South	MARKATAN TANAH			TO COMMISSION OF THE PROPERTY	Analy	sis Time	Period (hrs)	0.25		entra en en en en en en en en en en en en en	CCCC TO THE COLUMN TO		******
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Vehicle Volumes and Adju Approach Movement	istme:		ound T	To the second	Wajor	DISSORIO SONO	bound	l R	U	а -положности	bound T	I R		Secondinamiento	nbound T	
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Approach LOS

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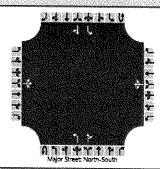
Control Delay (s/veh)

Level of Service (LOS)

Approach Delay (s/veh)

	HCS7 Two-Way Sto	p-Control Report	
General Information		Site Information	
Analyst	DBZ	Intersection	Blue Lick at White Oak
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	2/3/2020	East/West Street	White Oak Park Road
Analysis Year	2022	North/South Street	Blue Lick Road
Time Analyzed	AM Peak Build	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	South Park Apartments	<u> </u>	L.

Lanes



Vehicle Volumes and Ad	justme	nts										***************************************				
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Priority	many many many many many	10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
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Proportion Time Blocked															Selection	†
Percent Grade (%)	- Andrewski Andr	Divis quijaming i i	0	Bironini venire	1	Van Karana	0	A statement of the state of the		A. C. C. C. C. C. C. C. C. C. C. C. C. C.	ł.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	п	<u> </u>	Antautonomina,		
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Median Type Storage	***************************************	**************************************		Left	Only	Onit Management of the Control of th	(7)	**************************************		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Maria de Colonia de Colonia de Colonia de Colonia de Colonia de Colonia de Colonia de Colonia de Colonia de Co	**************************************	1	mandy virtue of the Author	P. T. T. T. T. T. T. T. T. T. T. T. T. T.	Pirothian data
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Critical Headway (sec)	S 59355V	7.10	6.53	6.20		7.13	6.53	6.23	9,00000	4.10			-2620022	4.13	3543455	
Base Follow-Up Headway (sec)		3.5	4.0	3.3	**************	3.5	4.0	3.3	CORRECTION OF THE PERSON OF TH	2.2	NEW YORK STREET	a de la contracta de la contra	-	2.2	***************************************	-
Follow-Up Headway (sec)	****	3,50	4.03	3.30	1	3.53	4.03	3.33	(30.33303)	2.20				2.23	1000000	
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Flow Rate, v (veh/h)		***************************************	23	***************************************			35	Местонаточнация		3	***************************************	<u> </u>	WWw.wasside	9	White Contract Contra	T*************************************
Capacity, c (veh/h)		***************************************	452	***************************************			532			1321			SSASS	1073		300000
v/c Ratio		assaras (III)	0.05	***************************************			0.07		CONTRACTOR OF THE PARTY OF THE	0.00	CONTRACTOR CONTRACTOR			0.01	ZARRAWICHII PORTONIA	omeraconium
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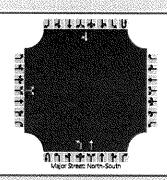
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	HCS7 Two-Way Sto	p-Control Report	
General Information		Site Information	
Analyst	DBZ	Intersection	Blue Lick at White Oak
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	2/3/2020	East/West Street	White Oak Park Road
Analysis Year	2032	North/South Street	Blue Lick Road
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.88
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	South Park Apartments	A CONTRACTOR OF THE CONTRACTOR	

Lanes



Vehicle Volumes and Adju	ıstme	nts														
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Priority		10	11	12	Ī	7	8	9	10	1	2	3	4U	4	5	6
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Base Follow-Up Headway (sec)		3.5	Service Contract Cont	3.3			Frommonica Frommonica	***************************************	NASSISTANIA AMARIA	2.2		S. C. C. C. C. C. C. C. C. C. C. C. C. C.		branco con montes con	end Homes de Albania Canada	-
Follow-Up Headway (sec)		3.50	1000	3.30		NO.				2.20				¥995500		
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Control Delay (s/veh)	***************************************		12.6				<u> </u>			7.8	***************************************				***************************************	Sinker) (10° dinasaran)
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		ŀ	ICS7	Two	-Way	/ Sto	o-Co	ntro	Rep	ort						
General Information			n, si				Site	Infor	matio	n				Processor Advisors	e sense resource	
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Agency/Co.	Diane	B Zimn	nerman '	Traffic Er	ngineerin	ng .	<u> </u>	diction		70475000		8888888	c 02			
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Analysis Year	2032	***************************************			**************************************			h/South	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	9800000		Lick Roa	************	305 35 S	S24869.690	1400.49
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Lanes		AND THE PROPERTY OF			**************		eyezikinin engilejeyey	lla Llanger			77	-	VI-N-OH-In-manual-	A7/A14/WALLEN	- Joseph Anglood	//III
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Agency/Co.	Diane	B Zimn	erman 1	raffic En	gineenin	g	Jurisc	liction		***************************************						
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Agency/Co.	Diane	e B Zimr	nerman]	Traffic En	gineerin	g	Jurisc	liction	HE-HERING DAVIS	W/AGRONEROSA				Characteristics		
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General Information							Site	Infor	natio	n						
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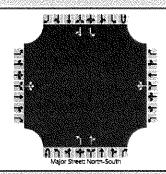
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	HCS7 Two-Way Sto	op-Control Report	
General Information		Site Information	
Analyst	D8Z	Intersection	Blue Lick at White Oak
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	2/3/2020	East/West Street	White Oak Park Road
Analysis Year	2032	North/South Street	Blue Lick Road
Time Analyzed	PM Peak Build	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	South Park Apartments		

Lanes



Anproach	
Vehicle Volumes and Adjustn	ents

Approach	Eastbound					Westbound				Northbound				Southbound				
Movement	U	L	T	R	U		Ţ	R	υ		J	R	U	L	T	R		
Priority		10	11	12		7	8	9	เป	1	2	3	4U	4	5	6		
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Critical and Follow-up Headways

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Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3	2.2		2.2		
Follow-Up Headway (sec)		3,50	4.00	3.30		3.50	4.00	3.30	2.20		2.20	1000000	
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Control Delay (s/veh)			16.2			13.1			8.9			8.4		
95% Queue Length, Q _{ss} (veh)			0.2		18.53.53	0.1		1350.38	0.0			0,1		
v/c Ratio			0.06			0.05		ATTIVISTIA PROPERTIA PROPERTIA PRO	0.01			0.02		
Capacity, c (veh/h)			343			463			936			1082		
Flow Rate, v (veh/h)			21			21			6		Continue Con	25		

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General Information							Site	Infor	matio	n									
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Vehicle Volumes and Adju	ıstme								r				T		- A11 (A5)			
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General Information							Site	infori	matio	n						
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