

REZONING REPORT

▶ **FILE #:** 11-H-19-RZ

AGENDA ITEM #: 17

AGENDA DATE: 11/14/2019

▶ **APPLICANT:** BEACON DEVELOPMENT OF TN, INC.

OWNER(S): Austin, POA Lance

TAX ID NUMBER: 105 083

[View map on KGIS](#)

JURISDICTION: County Commission District 3

STREET ADDRESS: 9120 , 9124 Middlebrook Pk.

▶ **LOCATION:** South side of Middlebrook Pk., east of Old Cedar Bluff Rd.

▶ **APPX. SIZE OF TRACT:** 6.87 acres

SECTOR PLAN: Northwest County

GROWTH POLICY PLAN: Planned Growth Area

ACCESSIBILITY: Access is via Middlebrook Pike, a median divided, 4-lane major arterial with a right of way dedication of 112 feet.

UTILITIES: Water Source: West Knox Utility District

Sewer Source: West Knox Utility District

WATERSHED: Turkey Creek and Ten Mile Creek

▶ **PRESENT ZONING:** A (Agricultural)

▶ **ZONING REQUESTED:** PR (Planned Residential)

▶ **EXISTING LAND USE:** Dwelling (to be removed)

▶ **PROPOSED USE:** Senior Housing Development

DENSITY PROPOSED: 5 du/ac

EXTENSION OF ZONE: Yes, PR zoning abuts the property on the west side.

HISTORY OF ZONING: None noted.

SURROUNDING LAND USE AND ZONING: North: Rural residential - CA

South: Single family residential - RAE

East: Single family residential - RA

West: Multifamily and Commercial - PR and CA

NEIGHBORHOOD CONTEXT: The area is near the commercial node at the intersection with Middlebrook Pike and N Cedar Bluff Rd. A mix of commercial, office and multifamily uses surround the node transitioning back to the adjacent single family residential neighborhoods.

STAFF RECOMMENDATION:

▶ **Approve PR (Planned Residential) at 5 du/ac.**

Staff recommends approval of PR up to 5 du/ac consistent with the sector plan designation of MDR/O for this property as a transitional area between the more intense uses at the commercial node with the lesser intense adjacent single family residential.

COMMENTS:

REZONING REQUIREMENTS FROM ZONING ORDINANCES (must meet all of these):

THE PROPOSED AMENDMENT SHALL BE NECESSARY BECAUSE OF SUBSTANTIALLY CHANGED OR CHANGING CONDITIONS IN THE AREA AND DISTRICTS AFFECTED, OR IN THE CITY/COUNTY GENERALLY:

1. The Northwest County Sector continues to be the fastest growing part of Knox County.
2. A variety of housing types, especially for senior housing, are needed to accommodate the aging baby boomer segment of the population.

THE PROPOSED AMENDMENT SHALL BE CONSISTENT WITH THE INTENT AND PURPOSE OF THE APPLICABLE ZONING ORDINANCE:

1. The PR zoning is intended to provide optional methods of land development which encourage more imaginative solutions to environmental design problems. Residential areas thus established would be characterized by a unified building and site development program, open space for recreation and provision for commercial, religious, educational, and cultural facilities which are integrated with the total project by unified architectural and open space treatment.
2. Each planned unit development shall be compatible with the surrounding or adjacent districts. Such compatibility shall be determined by the planning commission by review of development plans for the district.

THE PROPOSED AMENDMENT SHALL NOT ADVERSELY AFFECT ANY OTHER PART OF THE COUNTY, NOR SHALL ANY DIRECT OR INDIRECT ADVERSE EFFECTS RESULT FROM SUCH AMENDMENT:

1. PR up to 5 du/ac will not adversely affect, directly nor indirectly, this area nor any other part of the county.
2. The PR zone district requires site plan review by the planning commission to address any issues through the design process.
3. The applicant has submitted a geotechnical report with the rezoning application so that Knox County Engineering and Knox Planning staff have additional information to address the closed depression on the property.

THE PROPOSED AMENDMENT SHALL BE CONSISTENT WITH AND NOT IN CONFLICT WITH THE GENERAL PLAN OF KNOXVILLE AND KNOX COUNTY, INCLUDING ANY OF ITS ELEMENTS, MAJOR ROAD PLAN, LAND USE PLAN, COMMUNITY FACILITIES PLAN, AND OTHERS:

1. This requested zone and density is consistent with the sector plan designation of MDR/O for this property.
2. This zone is not in conflict with any other adopted plans.

ESTIMATED TRAFFIC IMPACT: 113 (average daily vehicle trips)

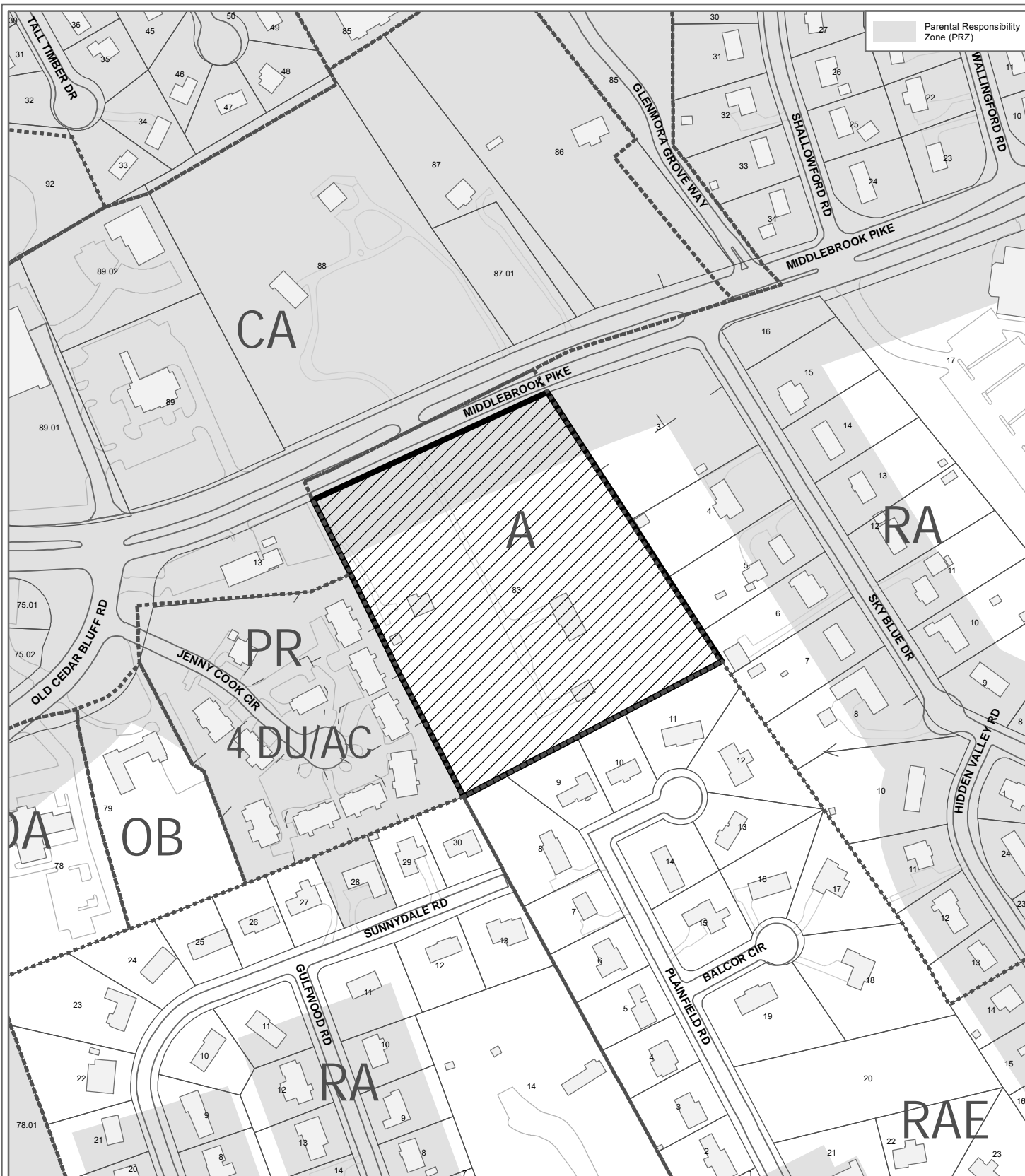
Average Daily Vehicle Trips are computed using national average trip rates reported in the latest edition of "Trip Generation," published by the Institute of Transportation Engineers. Average Daily Vehicle Trips represent the total number of trips that a particular land use can be expected to generate during a 24-hour day (Monday through Friday), with a "trip" counted each time a vehicle enters or exits a proposed development.

ESTIMATED STUDENT YIELD: 3 (public school children, grades K-12)

Schools affected by this proposal: Cedar Bluff Elementary, Cedar Bluff Middle, and Hardin Valley Academy.

- Potential new school population is estimated using locally-derived data on public school student yield generated by new housing.
- Students are assigned to schools based on current attendance zones as determined by Knox County Schools. Students may request transfers to different zones, and zone boundaries are subject to change.
- Estimates presume full build-out of the proposed development. Build-out is subject to market forces, and timing varies widely from proposal to proposal.
- Student yields from new development do not reflect a net addition of children in schools. Additions occur incrementally over the build-out period. New students may replace current population that ages through the system or moves from the attendance zone.

If approved, this item will be forwarded to Knox County Commission for action on 12/16/2019. If denied, Knoxville-Knox County Planning Commission's action is final, unless the action to deny is appealed to Knox County Commission. The date of the appeal hearing will depend on when the appeal application is filed. Appellants have 30 days to appeal a Planning Commission decision in the County.



**11-H-19-RZ
REZONING**

From: A (Agricultural)

To: PR (Planned Residential)



Petitioner: Beacon Development of TN, Inc.

Map No: 105

Jurisdiction: County



Original Print Date: 10/11/2019 Revised:
Metropolitan Planning Commission * City / County Building * Knoxville, TN 37902



DEVELOPMENT REQUEST

DEVELOPMENT

- Development Plan
- Use on Review / Special Use

SUBDIVISION

- Concept Plan
- Final Plat

ZONING

- Plan Amendment
- Rezoning



Benson Development of TN, Inc.
Applicant

9/30/19
Date Filed

11/14/19
Meeting Date (if applicable)

11-4-19-RZ
File Number(s)

CORRESPONDENCE

All correspondence related to this application should be directed to the approved contact listed below.

- Applicant
- Owner
- Option Holder
- Project Surveyor
- Engineer
- Architect/Landscape Architect

John Cerau Benson Development of TN, Inc.
Name Company

3061 W. Callahan Ferry Knoxville TN 37932
Address City State Zip

865-388-4313 jgcrauski@gmail.com
Phone Email

CURRENT PROPERTY INFO

Austin Lance POA For Mildred B Lance 901-569-4443
Owner Name (if different) Owner Address Owner Phone

9120 & 9124 Middlebrook Pike 105 083
Property Address Parcel ID

813 Middlebrook Pike, E of Old Cedar Bluff Rd 6.87
General Location Tract Size

3rd A
Jurisdiction (specify district above) City County Zoning District

Northwest County MDR/0 Planned
Planning Sector Sector Plan Land Use Classification Growth Policy Plan Designation

Dwelling (to be removed) N West Knox West Knox
Existing Land Use Septic (Y/N) Sewer Provider Water Provider

REQUEST

DEVELOPMENT

- Development Plan Use on Review / Special Use
- Residential Non-Residential
- Home Occupation (specify): _____
- Other (specify): _____

SUBDIVISION

- Proposed Subdivision Name _____ Unit / Phase Number _____
- Parcel Change
- Combine Parcels Divide Parcel Total Number of Lots Created: _____
- Other (specify): _____
- Attachments / Additional Requirements

ZONING

- Zoning Change: PR 5 du/ac
Proposed Zoning
- Plan Amendment Change: _____
Proposed Plan Designation(s)
- Proposed Property Use (specify) Senior Housing Development 5 du/ac Proposed Density (units/acre) Previous Rezoning Requests
- Other (specify): _____

STAFF USE ONLY

PLAT TYPE

- Staff Review Planning Commission

ATTACHMENTS

- Property Owners / Option Holders Variance Request

ADDITIONAL REQUIREMENTS

- Design Plan Certification (*Final Plat only*)
- Use on Review / Special Use (*Concept Plan only*)
- Traffic Impact Study

FEE 1:		TOTAL:
FEE 2:	843.50	
FEE 3:	74	
	74	843.50

AUTHORIZATION


Staff Signature

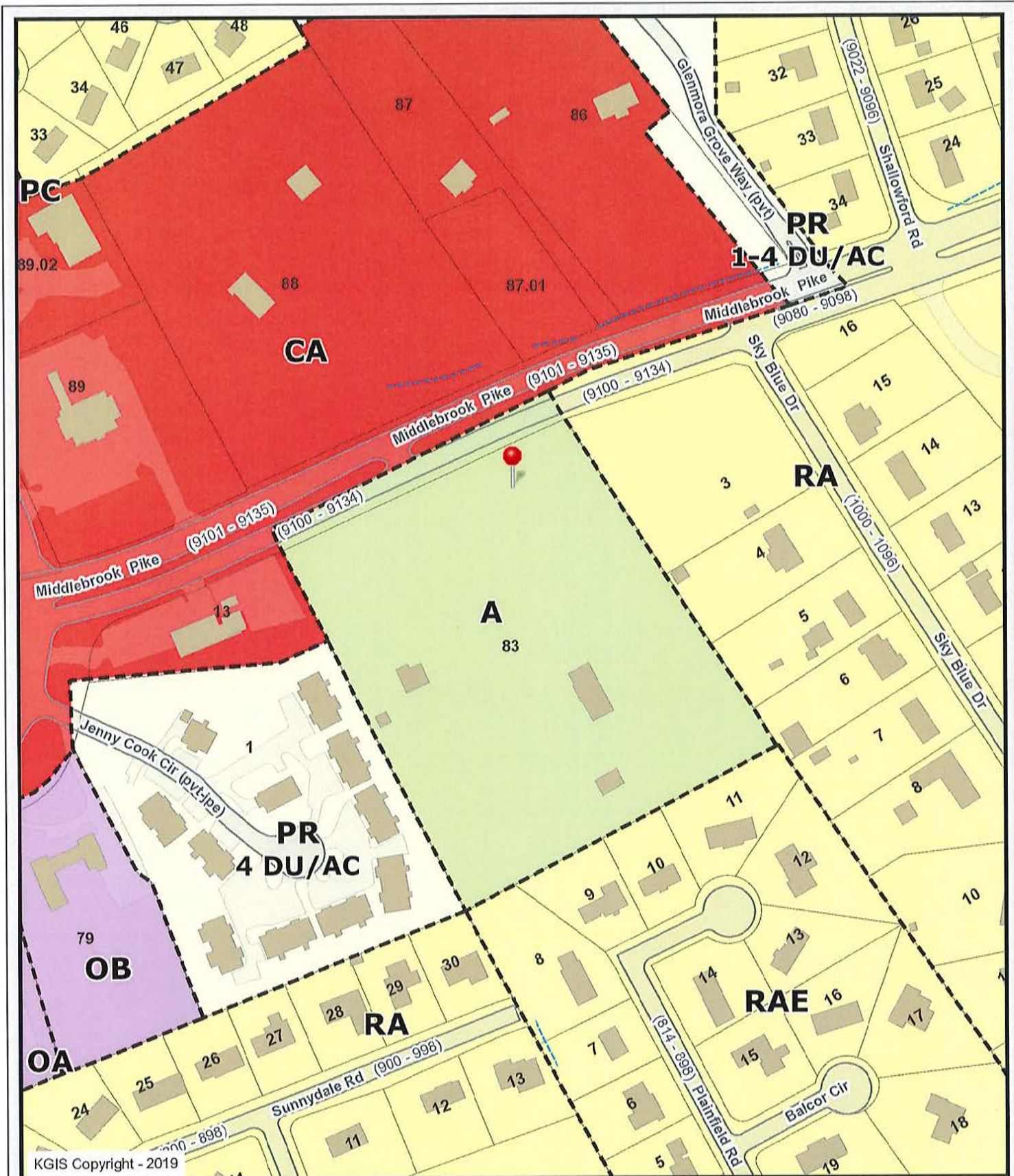

Please Print

9/30/19
Date


Applicant Signature


Please Print

9/30/19
Date



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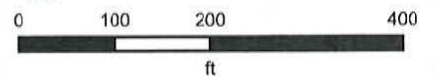
Letter Portrait

Knoxville - Knox County - KUB Geographic Information System

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Knoxville Knox County Planning
Knoxville City County Building
400 Main St SW #403,
Knoxville, TN 37902

September 26, 2019

Subject: Rezoning of Property 9120-9124 Middlebrook Pike

From: Austin Lance (Power of Attorney for Mildred B Lance – property owner)

I am writing this letter in support of Beacon Development of Tennessee's application to rezone this property.

This property has been in our family since the mid 1930's, originally as a 50-acre farm operated by my Grandfather, more recently as 7 acres my parents inherited and lived on since 1978. My Father passed away in 1999, my Mother stayed on the property until 3 years ago. She has Alzheimer's and is currently living at Abor Terrace Assisted Living. We are selling the property to enable her continued care.

The property is completely fenced with a chain link fence, and over the years the North, South, East and West borders have been planted with mostly evergreen trees to provide significant privacy barrier. The West side of the property is bordered by an apartment complex and the Horn of Plenty Commercial Business. The South side is bordered by 4 residential homes, which are part of the Gulfwood Estates - which was partially developed on my family's original farmland in the early 1980's. The east side of the property is bordered by 3 homes on Sky Blue Drive and approximately 280 feet of undeveloped land starting at the corner of Middlebrook Pike bordered by Sky Blue Drive.

Our interest in selling to Beacon Development of Tennessee is reinforced by their recognition of the property character and the residential aspect of the zoning change. We are excited that their plans will enable a good amount of the property aesthetics and integrity that my family has built over the years to remain.

If I can provide any information that will further help Knoxville Knox County Planning to process this zoning change, please contact me.



Austin Lance - POA for Mildred B Lance
138 Center Park Lane
Oak Ridge, TN
Email: alance.associates@gmail.com
Cell: 901 569 4443

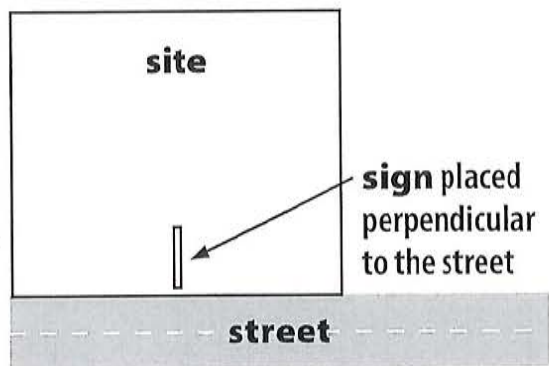
REQUIRED SIGN POSTING AGREEMENT

For all rezoning, plan amendment, concept plan, use on review, right-of-way closure, and street name change applications, a sign must be posted on the subject property, consistent with the adopted Administrative Rules and Procedures.

At the time of application, staff will provide a sign(s) to post on the property as part of the application process. If the sign(s) go missing for any reason and need to be replaced, then the applicant will be responsible for picking up a new sign(s) from the Planning offices. The applicant will be charged a fee of \$10 for each replacement sign.

LOCATION AND VISIBILITY

The sign must be posted in a location that is clearly visible from vehicles traveling in either direction on the nearest adjacent/frontage street. If the property has more than one street frontage, then the sign should be placed along the street that carries more traffic. Planning staff may recommend a preferred location for the sign to be posted at the time of application.



TIMING

The sign(s) must be posted 15 days before the scheduled Planning Commission public hearing and must remain in place until the day after the meeting. In the case of a postponement, the sign can either remain in place or be removed and reposted 15 days before the next Planning Commission meeting.

I hereby agree to post and remove the sign(s) provided on the subject property consistent with the above guidelines and between the dates of:

10/30/19 and 11/15/19
 (15 days before the Planning Commission meeting) (the day after the Planning Commission meeting)

Signature: *John D. Gauski*

Printed Name: John D. Gauski

Phone: 865: 388-4313 Email: jgkauski@gnad.com

Date: 9/30/19

File Number: ~~11-H-19-RZ~~ 11-H-19-RZ

Knoxville Knox County Planning
Knoxville City County Building
400 Main St SW #403,
Knoxville, TN 37902

October 1, 2019



Subject: Rezoning of Property 9120-9124 Middlebrook Pike – Subsurface Exploration Report

From: Austin Lance (Power of Attorney for Mildred B Lance – property owner)

I am writing this letter in support of Beacon Development of Tennessee's application to rezone this property by adding some perspective around depressed areas of land to the east of subject property and the west front of subject property.

In my letter of September 26 in support of Beacon Development of Tennessee, I explained the subject property has been in our family since the mid 1930's, originally as a 50-acre farm operated by my Grandfather, more recently as 7 acres my parents inherited and lived on since 1978. I have included in this letter information related to changes to the property terrain, along with an attached Report of Subsurface Exploration, completed August 2018 by Professional Engineers, Inc of Knoxville.

First, my historical knowledge of property terrain changes. When my Grandfather bought the property in 1934, there was a farm pond between where the old farm home is today and Middlebrook Pike at the base of the gentle slope from today's Farmhouse. This pond was filled in prior to 1940 and used as pastureland for cattle. A new pond was constructed further southeast on the property behind a barn (since taken down). The old original pond location was exactly where the west front property depression shows on the geological maps. Adding to this depression was the excavation of Middlebrook Pike 4 lanes. Prior to the early 1980's when Middlebrook Pike was 4-laned, our property front from the old farmhouse had a gentle slope toward Middlebrook and within 40 feet of the road was virtually flat to its intersection with Middlebrook Pike. (Reference the photo included in the Engineering Report of my Grandfather and horses with Middlebrook Pike and the farmhouse in the background showing this slope and road intersection). Middlebrook Pike as a 2-lane road had a downward slope of the road west to east from where the Horn of Plenty Commercial facility sits today all the way to the Chert Pit Road intersection. When the Middlebrook 4 lane was excavated, the State elevated Middlebrook Pike along this section. During the 4-lane project, the State purchased 10-15 feet of the front of my family's property to construct the expansion. In the negotiations to sell, my Father asked the State to construct a raised bank or berm from Middlebrook Pike along the front of his property past the entrance to his house. He then planted white pine trees along this berm to barrier road noise and allow privacy. He also had the State elevate the slope of his driveway from Middlebrook to smooth out the change. These terrain changes accentuated the look of the west depressed area.

Second, relative to the adjacent depressed property along Middlebrook Pike due east of the subject property, owned by Bernard and Carol Grubb, Middlebrook Pike was raised in the 6 feet range above the old 2 lane road slope toward Chert Pit Road. Today, if you stand at the base of Mr. Grubb's property, you can see the terrain fill line of old vs new Middlebrook Pike. I mention this because the depression scale of this site was also accentuated from historical levels by the excavation of the now 4 lane Middlebrook Pk. As to the history of this depression, it has been as it is since my family purchased the subject property in the mid 1930's, with the exception that trees have grown up in the depression that use to not be there. It originally was pastureland of

an adjacent farm pre the Sky-Blue Subdivision being built. The depressed area never presented any problem to our property. In the early 2000's I planted white pines fronted by several hardwood trees along the property line between Mr. Grubb's property and the subject property to allow additional privacy for my Mother from Middlebrook Pike. I have noticed, and you can see from a google map attached, a storm drain installed in the base of this depression below the South sidewalk of Middlebrook Pike. I assume this was installed by the State to take water away from the depression they accentuated during construction.

Due to questions asked of me by potential buyers of the subject property, and to resolve concerns about these 2 depressions, I engaged Professional Engineers, Inc of Knoxville, Tennessee to evaluate the west front terrain depression and also the subject property along the east boundary to Mr. Grubb's property. Attached you will find their report. They bored 3 sites in the west depressed zone to bedrock and found no concerning issues. They bored 3 sites north to south adjacent to Mr. Grubb's property line to bedrock and found no concerning issues. I have included the full report for your review and use. Professional Engineers would also be willing to discuss their findings.

I appreciate your reviewing this information and encourage you to find this property suitable for the requested zoning change submitted by Beacon Development of Tennessee.

Kindest Regards,

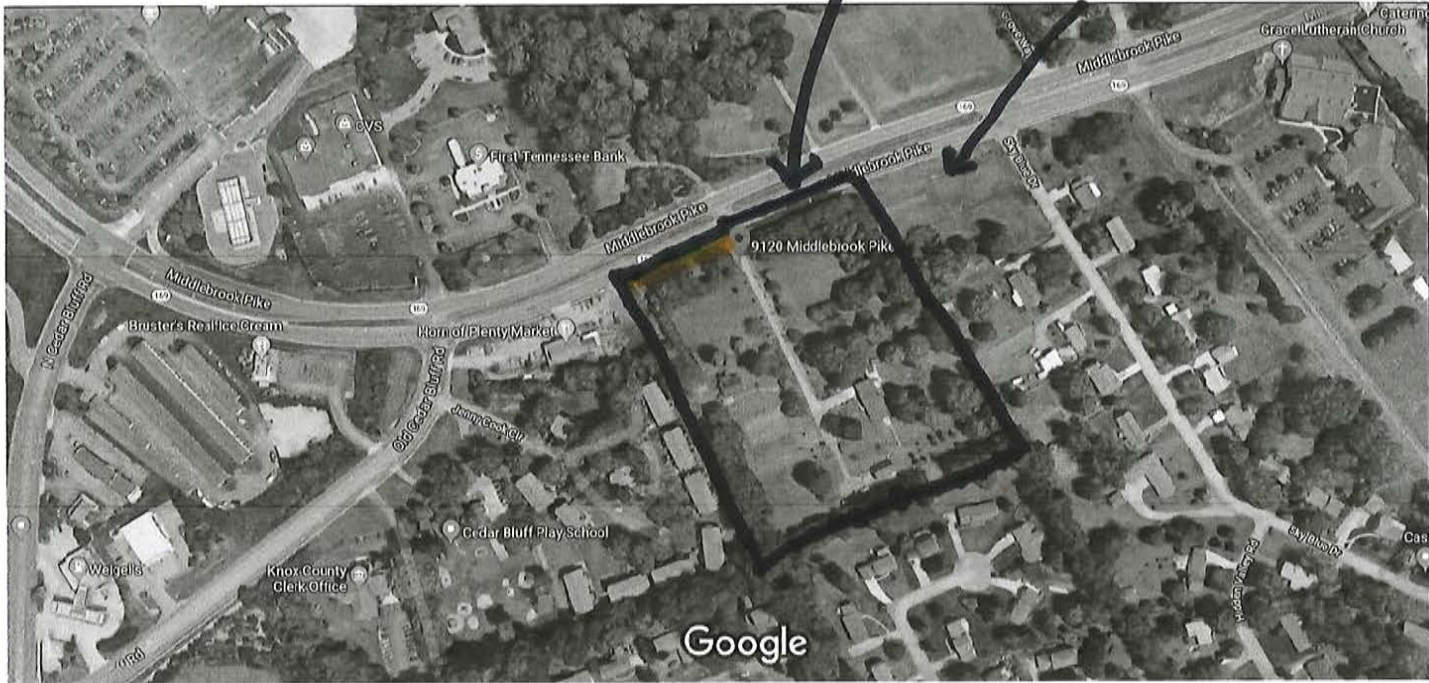


Austin Lance (POA for Mildred B. Lance)
138 Center Park Ln
Oak Ridge, TN 37830

Google Maps 9120 Middlebrook Pike

ADJACENT PROPERTY DEPRESSION

9120



Imagery ©2019 Google, Imagery ©2019 Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency, Map data ©2019

200 ft



9120 Middlebrook Pike

Knoxville, TN 37923



Directions



Save



Nearby



Send to your phone



Share

WWR6+J3 Cedar Bluff, Knoxville, TN

Photos



**PROFESSIONAL
ENGINEERS, INC.**



REPORT OF SUBSURFACE EXPLORATION

**MILDRED B. LANCE PROPERTY
MIDDLEBROOK PIKE
KNOXVILLE, TENNESSEE**

Prepared for:

**MR. AUSTIN LANCE
Knoxville, Tennessee**

Prepared by:

**PROFESSIONAL ENGINEERS, INC.
Knoxville, Tennessee**

Project No. 102665

August 14, 2018



**PROFESSIONAL
ENGINEERS, INC.**

127G PERIMETER PARK ROAD • KNOXVILLE, TN 37922 • PHONE 865-690-6262 • FAX 865-690-4473 • www.proengineersinc.com

August 14, 2018

Mr. Austin Lance
138 Center Park Lane
Oak Ridge, Tennessee 37830
alance.associates@gmail.com

**Subject: Report of Subsurface Exploration
Mildred B. Property
9124 Middlebrook Pike
Knoxville, Tennessee
PE Project Number 102665**

Dear Mr. Lance:

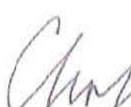
PROFESSIONAL ENGINEERS, INC. (PE) is pleased to submit this Report of Subsurface Exploration for the Mildred B. Lance property located at 9124 Middlebrook Pike in Knoxville, Tennessee. Our services, as authorized by you, were provided in general accordance dated July 16, 2018, and its terms and conditions.

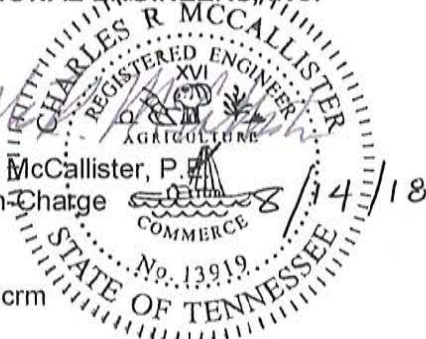
This report reviews the information provided to us, discusses the site and subsurface conditions, and presents our conclusions and recommendations. The Appendices include a Site Location Map, a Boring Location Plan, a Subsurface Fence Diagrams, and the Boring Logs.

We will be pleased to discuss our conclusions and recommendations with you and look forward to providing the engineering and material-testing services needed to successfully complete your project.

Sincerely,

PROFESSIONAL ENGINEERS, INC.


Charles R. McCallister, P.E.
Principal-In-Charge
CRM/DKB:crm



David K. Berry, P.E.
Principal-In-Charge



**PROFESSIONAL
ENGINEERS, INC.**

REPORT OF SUBSURFACE EXPLORATION

**MILDRED B. LANCE PROPERTY
MIDDLEBROOK PIKE
KNOXVILLE, TENNESSEE**

Prepared for:

**MR. AUSTIN LANCE
Knoxville, Tennessee**

Prepared by:

**PROFESSIONAL ENGINEERS, INC.
Knoxville, Tennessee**

Project No. 102665

August 14, 2018

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1.0 OBJECTIVES OF EXPLORATION

The objectives of our services were to obtain data on general subsurface conditions at the site and to evaluate the data obtained to assess the relative potential for sinkhole development at the site. Our geotechnical investigation services were not intended to address any environmental or natural resource concerns that may or may not be associated with development of the property.

2.0 CONCLUSIONS

Six borings were drilled at the site within topographically depressed areas of concern. The depressed areas are located in the northwest portion of the site and along the east property line within the topographically higher portion of the depression on the adjacent property. Detailed summaries of the findings in these borings are included in this report.

The borings did not encounter any subsurface soil conditions which we believe are particularly indicative of sinkhole activity. Based on our experience with similar Knoxville sites, we judge the risks associated with commercial development of this site to be no higher than for nearby sites in the same geology which have been successfully developed without experiencing significant negative consequences due to post-construction sinkhole or drop-out development.

Our site reconnaissance and our review of client-provided pictures of the subject property taken prior to the widening of Middlebrook Pike in the mid-1990's from a two-lane to a four-lane road indicates fill was placed to achieve present grades along Middlebrook Pike. The fill placed for the widening of Middlebrook Pike forms the southern edges of the depression in the northwest portion of the site as well as the depression on the adjacent property immediately east of the site. It appears the fill placed for Middlebrook Pike along the northwest property line has actually created a topographic depression that did not exist prior to the fill placement.

While the borings did not encounter any subsurface soil conditions which we believe are particularly indicative of sinkhole activity, we must advise that based on our knowledge of the Knoxville area geology and the occurrence of sinkholes in some Knoxville area locations, there remains a "low to moderate" inherent risk for sinkhole development at this site. In our opinion, a similar risk exists for any site in the local carbonate bedrock geology that undergoes soil disruption, such as grading and excavations into the subsurface. Our experience has been that most local developers have been willing to accept this risk by understanding and taking actions pre- and post-construction to control the mechanisms that cause and/or contribute to these geologic hazards as part of the proposed design

and construction to be implemented at the site. We note there are many commercial developments near the Lance property that demonstrate successful commercial construction.

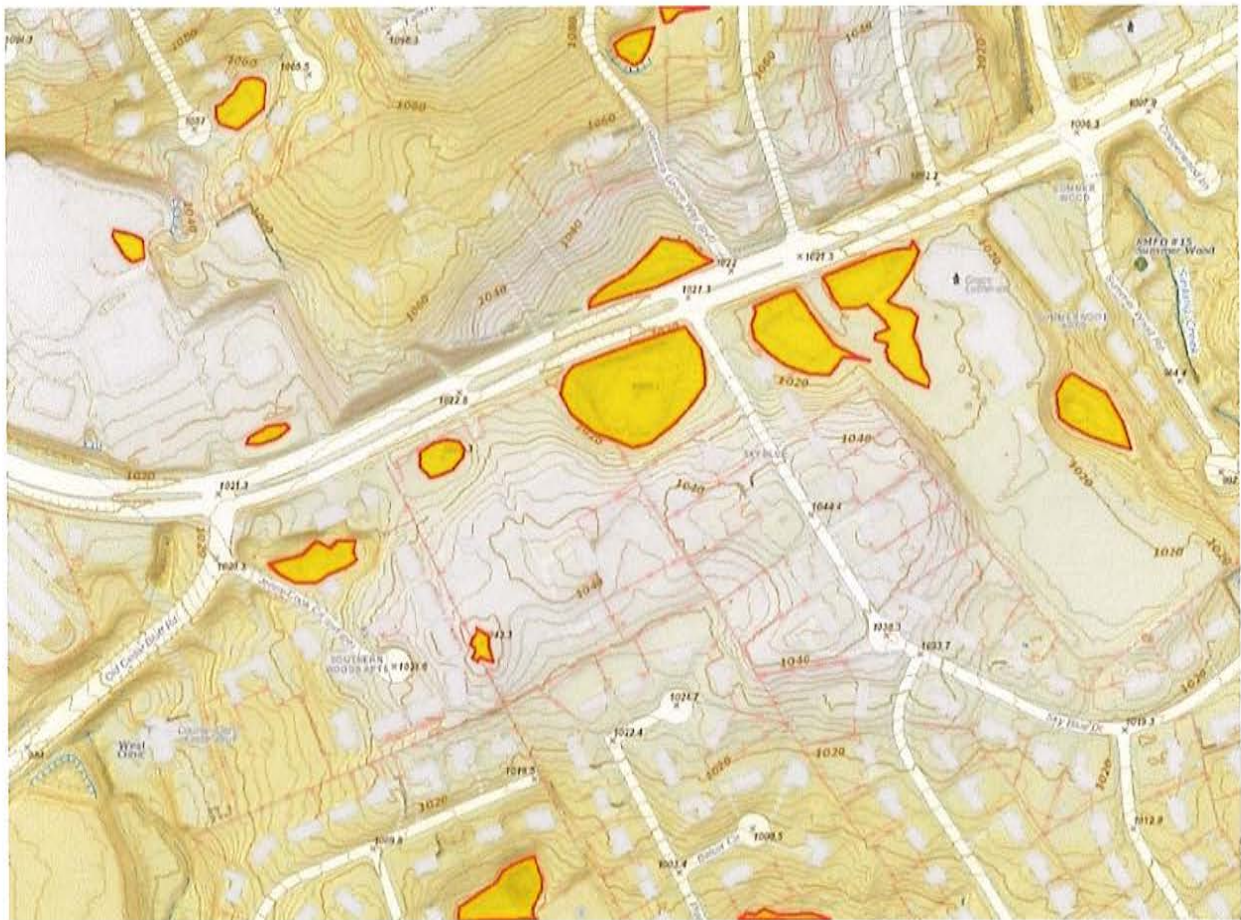
3.0 PROJECT INFORMATION AND SITE CONDITIONS

Project information was provided to us by Mr. Austin Lance via email and during an on-site meeting and site walkover. Mr. Lance advises that he intends to sell the property (approximately seven acres located at 9124 Middlebrook Pike. He is very familiar with the history of the property since the property has belonged to his family for decades. Others have asserted that possible sinkholes (i.e., closed topographic depressions) exist in the northwestern portion the property and immediately east of the property that could adversely impact the development plans for the property. As such, Mr. Lance authorized this geotechnical study to obtain subsurface data to either substantiate or disprove this assertion and to evaluate the relative risks of commercial development of this site.

We viewed historic photographs prior to the widening of Middlebrook Pike in the mid-1990's from two lanes to four lanes. The following photograph taken in the 1940's shows the northwest portion of the site and its relatively flat to gently-sloping topography down to Middlebrook Pike. The current depression in the northwest portion of the site would be located in the right-central portion of the photograph. Middlebrook Pike is visible just before the tree line.



The following excerpt from the Knox GIS shows the topography of the site and near-vicinity. The areas highlighted in yellow indicate the topographic depressions on the site and in the vicinity of the site. Based on our review of historic photographs and our site reconnaissance, it appears the depression in the northwest portion of the site was likely created and/or accentuated by the placement of fill for the widening of Middlebrook Pike. Further, it appears the fill embankment for Middlebrook Pike bisects a relatively large former depression that existed east and northeast of the site prior to construction of Middlebrook Pike.



Following are photographs of the depression in the northwest portion of the site and the topographically higher portion of the depression immediately east of the site along the east property line.



Photograph 1 – Western view of “depression” in northwest portion of property immediately south of Middlebrook Pike.



Photograph 2 – Southward view generally along the east property line of the subject property. This portion of the property lies within the “depression” primarily situated immediately east of the property.

4.0 SCOPE OF EXPLORATION

Briefly, the services provided for this subsurface exploration included:

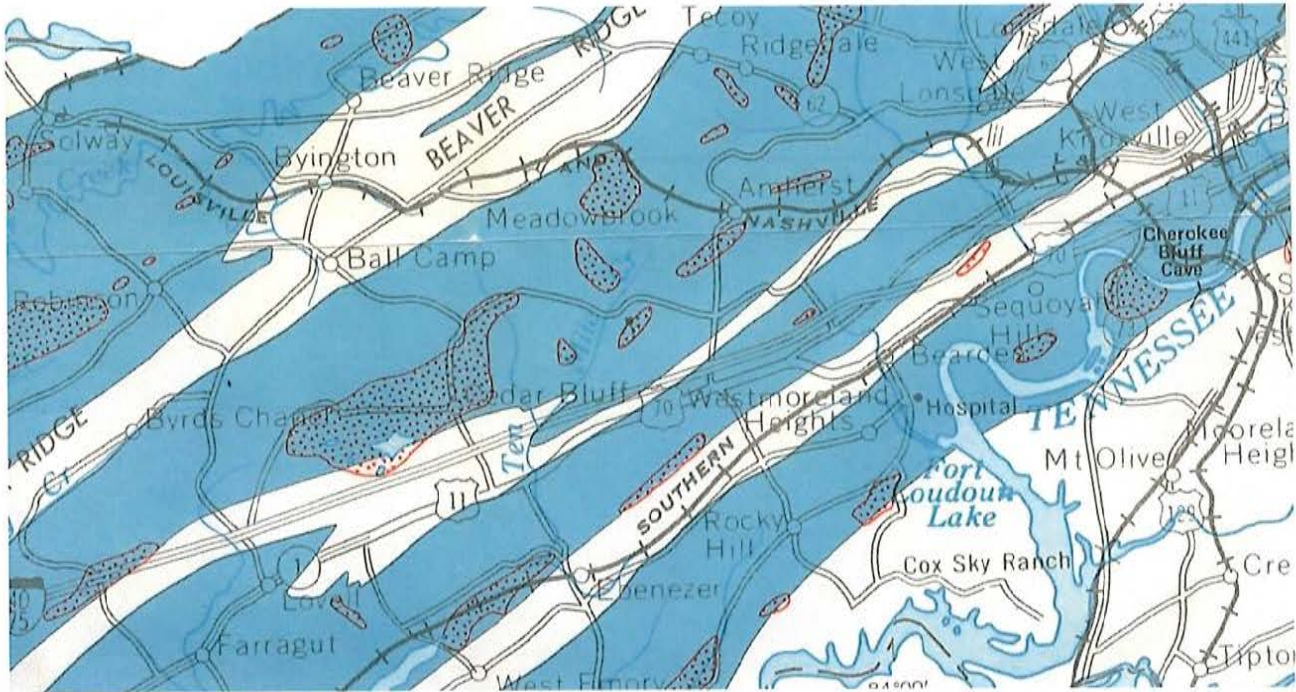
- Layout of the borings by measuring distances relative to existing structures and landmarks shown on the topographic site plan.
- Drilled six soil test borings (i.e., three within the depressed area in the northwest portion of the site and three on the slope along the east property line) to refusal.
- Performed standard penetration testing (SPT) in the soil test borings at the ground surface, on about 2½-foot centers in the upper 20 feet and on 5-foot centers thereafter to boring refusal.
- Obtained the depth to groundwater, if present, in the borings at the time of drilling.
- Backfilled each boring with expansive bentonite chips.
- Prepared this Report of Subsurface Exploration that includes the following:
 - Boring Location Plan for all borings drilled at the site
 - Subsurface findings presented as Boring Logs and Subsurface Sections
 - Our review of the general subsurface conditions encountered in the borings with discussion concerning any indications of sinkhole activity (e.g., voids in the soil overburden, especially moist and soft soils, and/or low-density soils)
 - Our assessment of relative risk of developing the property in view of its sinkhole potential

5.0 AREA AND SITE GEOLOGY

Knoxville, Tennessee, is located in the Appalachian Valley and Ridge Physiographic Province. This province extends as a continuous belt from Central Alabama, through Georgia and Tennessee, northward into Pennsylvania. The formations that underlie this province consist primarily of limestone, dolostone, shale, and sandstone, which have been folded and faulted in the geologic past. These formations range in age from Cambrian to Pennsylvanian and have been subject to at least one extensive period of erosion since their structural deformation. The erosion has produced a series of sub-parallel, alternating ridges and valleys. The valleys are formed over more soluble bedrock (limestone and dolostone), whereas bedrock more resistant to solution weathering forms ridges (sandstone, shale, and cherty dolostone).

The USGS Geologic Map of the Bearden Quadrangle, Knoxville, Tennessee, indicates the subject site is underlain by the Newala formation. The lower part of the Newala formation is primarily composed of dense or fine-grained gray dolomite and blue or brown limestone. The upper part of the formation is composed primarily of light-gray dolomite with blue-gray limestone lenses. Rounded nodules and lenses of chert are relatively abundant in the Newala formation.

The USGS Map I-767 F, "Areas with Abundant Sinkholes in Knox County, Tennessee" (1973) indicates the site is underlain calcareous bedrock as well as in an area of Knox County where "abundant" sinkholes or other solution features exist. The following is an excerpt from the above referenced map. The "dotted" pattern on the map indicates areas with abundant sinkholes.



6.0 SUBSURFACE FINDINGS

Subsurface conditions were explored with six soil test borings drilled at the approximate locations shown on the Boring Location Plan in Appendix B. Our geotechnical staff located the borings in the field by measuring distances relative to existing property lines and nearby roadways.

Subsurface conditions encountered at the boring locations are shown on the Boring Logs which represent our interpretation of the subsurface conditions based on both the field logs and visual examination of the SPT samples by our geotechnical staff. The lines designating the interfaces between various strata on the Boring Logs represent the approximate interface locations. The ground surface elevations at the boring locations were estimated based on topographic information available via Knox GIS.

Borings encountered the following soil intervals:

- Topsoil: Organically-laden near-surface soils that readily support plant growth.
- Water-softened Residuum: Soils that have weathered in-place from bedrock but have been softened by surface water infiltration.

- Residuum: Soils that have weathered in-place from bedrock.
- Refusal materials: Materials that could not be practically penetrated using conventional augers, i.e., bedrock.

The following table generally summarizes of the subsurface conditions encountered at the boring locations; refer to the individual boring logs in Appendix B for detailed descriptions of the soils encountered at each boring location.

Boring	Topsoil (feet)	Water-softened Residuum (feet)	Residuum (feet)	Refusal (feet)	Comments
B-1	2.0	6.0	67.0	67.0	Stiff and very stiff residual soils encountered from about 6.0 feet to 22.0 feet; firm residual soils encountered from about 22.0 feet to refusal at 67.0 feet; no groundwater encountered at time of drilling
B-2	1.5	N/A	48.5	48.5	Stiff and very stiff residual soils encountered from about 6.0 feet to about 27.0 feet; firm to stiff residual soils encountered from about 27.0 feet to refusal at about 41.2 feet; no groundwater encountered at time of drilling
B-3	1.5	3.5	41.2	41.2	Stiff and very stiff residual soils encountered from about 4.0 feet to about 72.0 feet; groundwater encountered at about 39.0 feet at time of drilling
B-4	0.4	N/A	71.2	71.2	Very stiff residual soils encountered to about 11.0 feet; firm and stiff residual soils encountered to refusal at about 71.2 feet; groundwater encountered at about 55.0 feet at time of drilling
B-5	0.6	N/A	43.3	43.3	Stiff residual soils encountered to about 8.5 feet; firm residual soils encountered from about 8.5 feet to refusal at about 43.3 feet; no groundwater encountered at time of drilling
B-6	0.4	N/A	15.6	15.6	Stiff residual soils encountered to about 13.5 feet; firm residual soils encountered from about 13.5 feet to refusal at about 15.6 feet; no groundwater encountered at time of drilling

7.0 SINKHOLE CONSIDERATIONS AND RISK ASSESSMENT

In geologies prone to sinkhole development, it is not unusual for voids to exist within the bedrock, at the soil/bedrock interface, or within the soil overburden. The internal erosion of the soil and continuing surface water infiltration and solution of the bedrock by groundwater causes these voids to enlarge with time. Eventually, the erosion progresses upward to the point that the soil will no longer arch and support itself, and there is a ground collapse. These ground collapses are commonly termed "sinkholes" and are often denoted on topographic maps by hachured topographic contours referred to as closed depressions (see the previous topographic insert). Again, sinkholes are quite common in areas of East Tennessee underlain by soluble bedrock; therefore, all sites underlain by soluble bedrock have the potential for sinkhole development. This site and the vicinity have been identified to be located within an area of "abundant sinkholes".

Sinkholes are the final surface expression of the collapse or subsidence of the overlying soil into voids within the bedrock. Sinkhole development is generally a slow ongoing natural process; however, the collapse or subsidence can be accelerated by activities such as construction, introduction of surface drainage, leaking pipes, etc.

The relatively closely-spaced borings drilled at this site did not encounter any apparent open cavities in the soil overburden and the volume of bentonite chips required to backfill the borings closely approximated the volume of open boreholes suggesting to us that no voids were encountered in the soil overburden. In addition, the borings did not encounter any particularly moist, low-density or "crumbly" soils typically associated with voids in the soil overburden and erosive soils with high potential for raveling/migration with the introduction of water.

Five of the six borings encountered relatively deep overburden soils which were typically stiff to very stiff in consistency in the upper portions of the borings and decreased in consistency with boring depth. This is characteristic of overburden soils in this geology. Borings B-1 through B-5 refused on apparent bedrock at depths ranging from about 41.2 and 71.2 feet. Boring B-6 refused at a relatively shallow depth of about 15.6 feet on apparent bedrock. We view this erratic top-of-rock profile to be characteristic of bedrock in this geology as well. Groundwater was encountered at the time of boring in borings B-3 and B-4 only at depths of about 39.0 and 55.0 feet.

The six borings drilled at this site as part of this exploration did not encounter any subsurface soil conditions which we believe are particularly indicative of sinkhole activity. Nevertheless, based simply on the site geology and the occurrence of sinkholes in the site vicinity, there remains a "low to moderate"

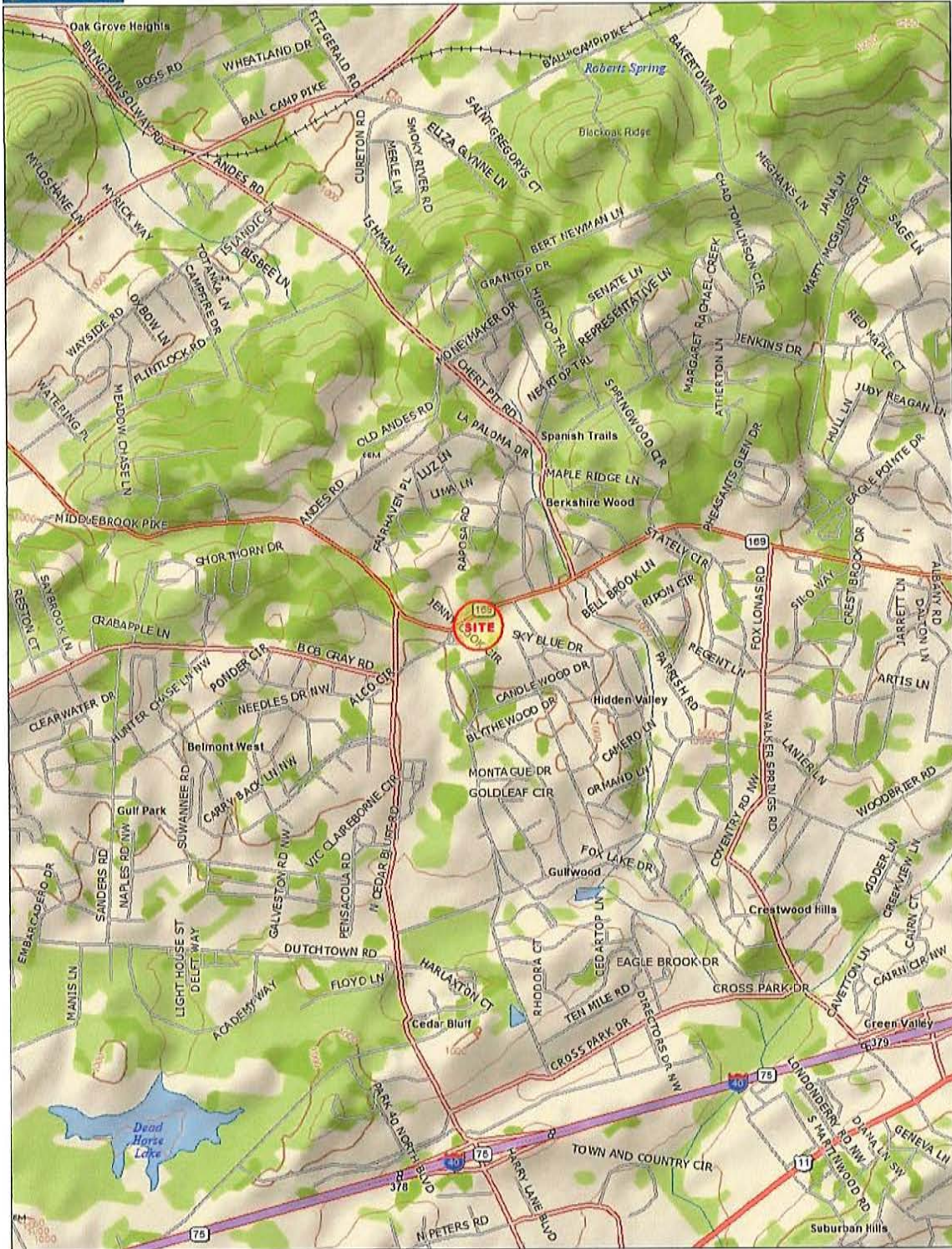
inherent risk for sinkhole development at this site which should not be totally dismissed. In our view, the risk can be reduced, but never completely eliminated, by understanding and taking actions to control the mechanisms that cause and/or contribute to these geologic hazards as part of the proposed design and construction to be implemented at the site.

Based on our experience locally with similar sites, we judge the risks associated with commercial development of this site to be no higher than for nearby sites in the same geology which have been successfully developed without negative consequences due to post-construction sinkhole or drop-out development. Our experience has been that most local developers have been willing to accept this risk by understanding and taking actions pre- and post-construction to control the mechanisms that cause and/or contribute to these geologic hazards.

8.0 BASIS OF RECOMMENDATIONS

- Recommendations provided herein are based on the subsurface conditions discovered and on project information provided to us to date; they apply only to the specific project and site discussed in this report.
- If the project information section in this report contains incorrect information, and/or as additional information or more detailed information becomes available, you should convey the information to us. We will review our recommendations in light of the corrected and/or additional information and modify them and/or provide additional recommendations as judged appropriate.
- Regardless of the thoroughness of a geotechnical exploration, there is always a possibility conditions between test borings will differ, sometimes significantly, from those at specific test boring locations, and conditions will not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions.

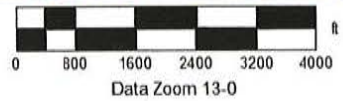
APPENDIX A
SITE LOCATION MAP



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SITE LOCATION MAP

MILDRED B. LANCE PROPERTY
 KNOXVILLE, TENNESSEE

DATE: AUGUST, 2018

SCALE: AS SHOWN

PROJECT NO: 102665

APPENDIX B

FIELD EXPLORATORY PROCEDURES

BORING LOCATION PLAN

SUBSURFACE FENCE DIAGRAMS

BORING LOGS

FIELD EXPLORATORY PROCEDURES

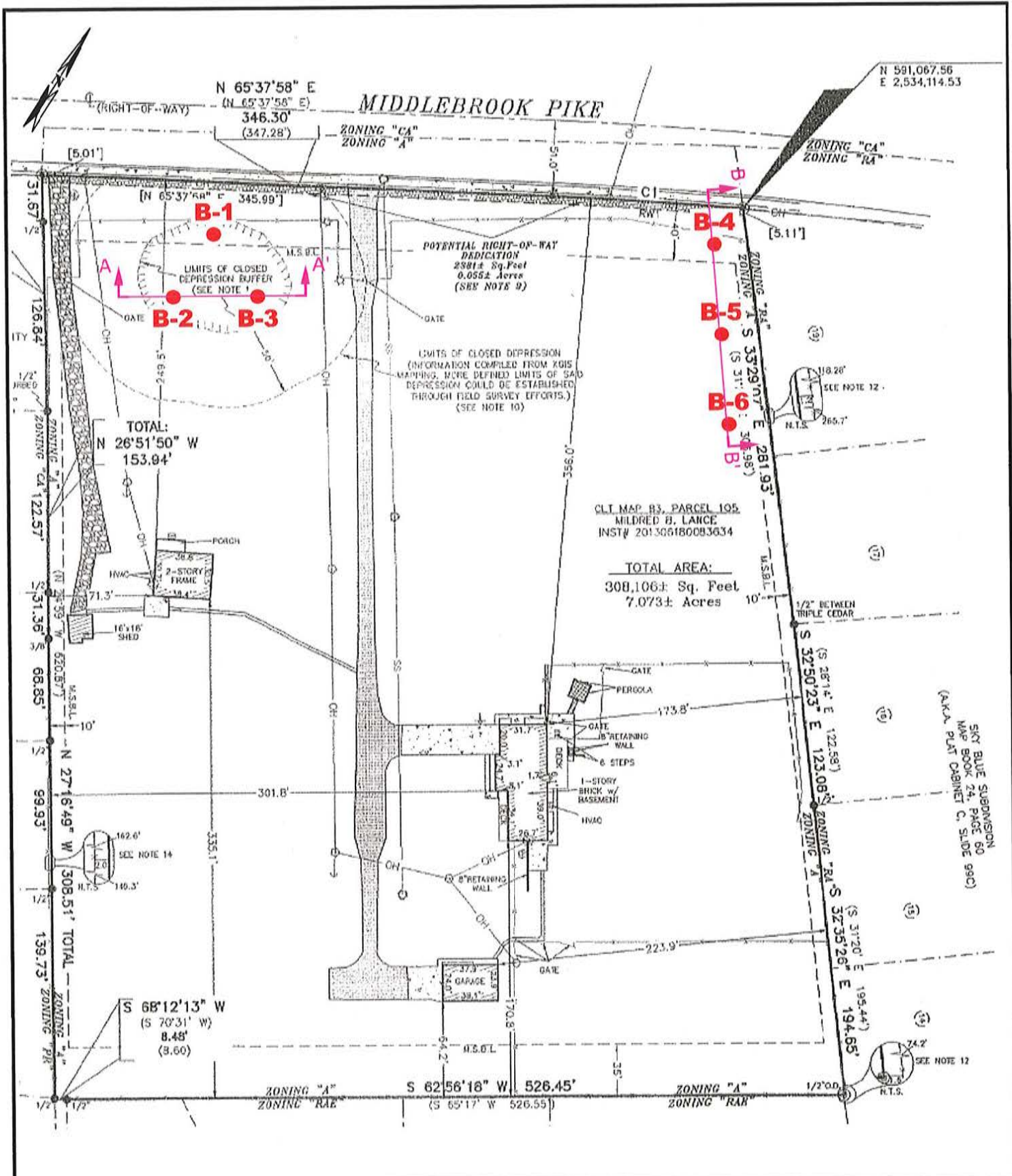
Soil Test Boring (Hollow Stem)

All boring and sampling operations were conducted in general accordance with ASTM D 1586. The borings were advanced by mechanically twisting continuous steel hollow-stem auger flights into the ground. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D., split-tube sampler. The sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot of penetration was recorded and is designated the "standard penetration resistance (SPT)". Proper evaluation of the penetration resistance provides an index to the soil's strength, density, and ability to support foundations.

Representative portions of the soil samples obtained from the split-tube sampler were sealed in plastic bags and transported to our laboratory, where they were examined by our engineer to verify the driller's field classifications. Boring Logs are attached, graphically showing the soil descriptions and penetration resistances.

Boring Backfill

The borings were backfilled shortly after drilling for safety purposes. Each boring was backfilled with bentonite chips. You are advised that there is the possibility of future borehole subsidence depending on actual subsurface conditions, surface drainage, etc. The property owner should monitor the boring locations over time to discover subsidence and make the necessary repairs

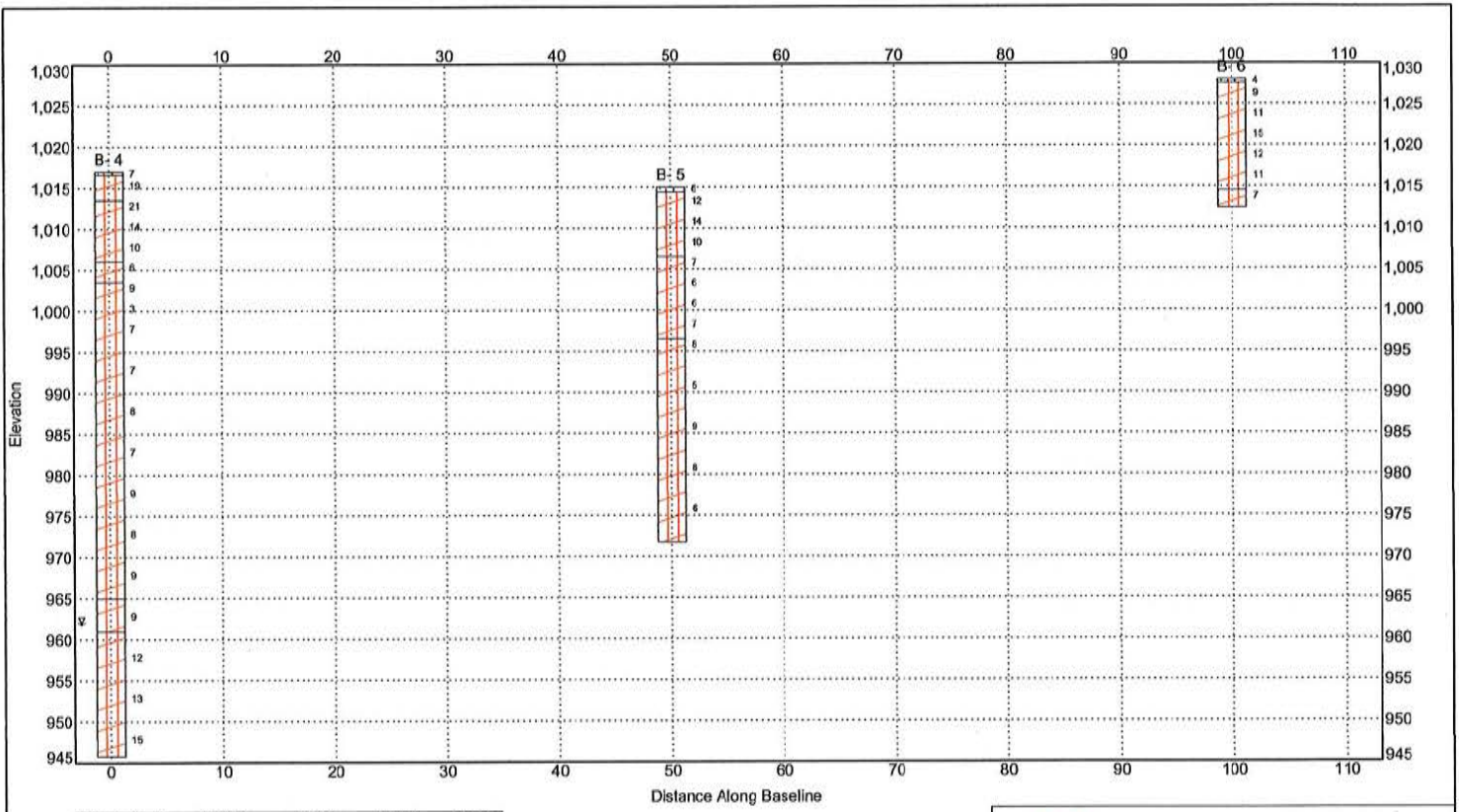


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BORING LOCATION PLAN

MILDRED B. LANCE PROPERTY
 KNOXVILLE, TENNESSEE

DATE: AUGUST, 2018	SCALE: NOT TO SCALE	PROJECT NO: 102665
-----------------------	------------------------	-----------------------



Borehole	North	East	Elev.	Depth
B- 4	0	0	1017.0	71.2
B- 5	0	50	1015.0	43.3
B- 6	0	100	1028.0	15.6

DISTANCES:
 Beginning 0
 Ending 110
 VIEWING ANGLES (degrees):
 Horizontal 0.0
 Vertical 0.0

Position	North	East
Left, Front	0	0
Right, Front	0	110
Left, Back	0	0
Right, Back	0	110



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Subsurface Fence Diagram: SECTION B-B'

**MILDRED B. LANCE PROPERTY
 KNOXVILLE, TENNESSEE**

Project #	Date	Figure
102665	Aug 18	2



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Date Drilled: 7/25/18	Driller: Stillwell	REMARKS: No ground water encountered at time of boring.
Casing Length: N/A	Ground Elevation: 1023'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: DRY	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	STD. PENETRATION TEST DATA (blows/ft)			
						1st 6"	2nd 6"	3rd 6"	N Value
	0.0	TOPSOIL		0.0	S-1	2	3	3	7
	2.0	SOFT BROWN AND RED-BROWN SILTY CLAY - WATER SOFTENED RESIDUUM		1.5	S-2	2	3	4	7
1018.0	6.0	STIFF BROWN AND RED-BROWN SILTY CLAY - RESIDUUM		4.0	S-3	3	2	2	4
	8.5	STIFF RED-BROWN SILTY CLAY - RESIDUUM		6.5	S-4	3	5	7	12
1013.0	11.0	VERY STIFF RED-BROWN SILTY CLAY - RESIDUUM		9.0	S-5	3	5	6	11
	16.0	STIFF RED-BROWN SILTY CLAY - RESIDUUM		11.5	S-6	4	6	10	16
1008.0	22.0	FIRM RED-BROWN SILTY CLAY - RESIDUUM		14.0	S-7	2	9	11	20
				16.5	S-8	4	5	6	11
1003.0				19.0	S-9	5	6	6	12
				24.0	S-10	3	2	3	5
998.0				29.0	S-11	2	3	3	6
993.0				34.0	S-12	2	3	3	6
988.0									

PE_BORING LOGS 102665.GPJ SC_DOT.GDT 8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B-1
Project Number: 102665	Offset: NONE



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Date Drilled: 7/25/18	Driller: Stillwell	REMARKS: No ground water encountered at time of boring.
Casing Length: N/A	Ground Elevation: 1023'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: DRY	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT			N Value	STD. PENETRATION TEST DATA (blows/ft)							
						1st 6"	2nd 6"	3rd 6"		5	10	20	40	70			
		FIRM RED-BROWN SILTY CLAY - RESIDUUM															
983.0				39.0	S-13	4	3	4	7								
978.0				44.0	S-14	4	4	4	8								
973.0				49.0	S-15	3	4	4	8								
968.0				54.0	S-16	3	4	3	7								
963.0				59.0	S-17	3	4	4	8								
958.0				64.0	S-18	2	3	3	6								
	67.0	AUGER REFUSAL AT 67.0'															
953.0																	

PE_BORING_LOGS_102665.GPJ SC_DOT_GDT_8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B-1
Project Number: 102665	Offset: NONE



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Date Drilled: 7/24/18	Driller: Stillwell	REMARKS: No ground water encountered at time of boring.
Casing Length: N/A	Ground Elevation: 1023'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: DRY	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	STD. PENETRATION TEST DATA (blows/ft)			
						1st 6"	2nd 6"	3rd 6"	N Value
	0.0	TOPSOIL		0.0	S-1	1	1	1	2
	1.5	FIRM RED-BROWN SILTY CLAY - RESIDUUM		1.5	S-2	3	2	4	6
	3.5	STIFF RED-BROWN SILTY CLAY WITH SOME CHERT - RESIDUUM		4.0	S-3	3	6	9	15
1018.0	6.0	VERY STIFF TO STIFF RED-BROWN SILTY CLAY WITH SOME CHERT - RESIDUUM		6.5	S-4	4	7	9	16
	9.0			9.0	S-5	5	7	8	15
1013.0	10.5	FIRM TO SOFT TAN SILTY CLAY - RESIDUUM		11.5	S-6	3	3	3	6
	14.0			14.0	S-7	2	1	2	3
1008.0	16.0	FIRM RED-BROWN SILTY CLAY - RESIDUUM		16.5	S-8	4	2	3	5
	18.5	STIFF RED-BROWN SILTY CLAY WITH SOME CHERT - RESIDUUM		19.0	S-9	9	5	4	9
1003.0	22.0	FIRM RED-BROWN SILTY CLAY - RESIDUUM		24.0	S-10	2	4	3	7
998.0	27.0	STIFF RED-BROWN SILTY CLAY WITH SOME CHERT - RESIDUUM		29.0	S-11	2	8	5	13
993.0	32.0	FIRM RED-BROWN SILTY CLAY - RESIDUUM		34.0	S-12	3	4	3	7
988.0									

PE_BORING_LOGS_102665.GPJ_SC_DOT.GDT 8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B-2
Project Number: 102665	Offset: NONE



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Date Drilled: 7/24/18	Driller: Stillwell	REMARKS: No ground water encountered at time of boring.
Casing Length: N/A	Ground Elevation: 1023'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: DRY	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	STD. PENETRATION TEST DATA (blows/ft)														
						1st 6"	2nd 6"	3rd 6"	N Value											
		FIRM RED-BROWN SILTY CLAY - RESIDUUM																		
983.0				39.0	S-13	2	4	4	8											
978.0				44.0	S-14	5	5	10	15											
	48.5	AUGER REFUSAL AT 48.5'																		
973.0																				
968.0																				
963.0																				
958.0																				
953.0																				

PE_BORING_LOGS_102665.GPJ_SC_DOT.GDT_8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B-2	
Project Number: 102665	Offset: NONE	



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Date Drilled: 7/23/18	Driller: Stillwell	REMARKS:
Casing Length: N/A	Ground Elevation: 1023'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: 39.0'	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	STD. PENETRATION TEST DATA (blows/ft)								
						1st 6"	2nd 6"	3rd 6"	N Value					
	0.0	TOPSOIL		0.0	S-1	1	2	1	3					
	1.5	SOFT BROWN SILTY CLAY (WET) - WATER SOFTENED RESIDUUM		1.5	S-2	2	1	2	3					
	3.5	FIRM RED-BROWN AND BROWN SILTY CLAY - RESIDUUM		4.0	S-3	2	3	4	7					
1018.0	6.0	VERY STIFF RED-BROWN SILTY CLAY WITH TRACE OF CHERT - RESIDUUM		6.5	S-4	5	7	11	18					
	9.0			9.0	S-5	3	7	10	17					
1013.0	11.0	STIFF RED-BROWN SILTY CLAY WITH TRACE OF CHERT - RESIDUUM		11.5	S-6	6	7	8	15					
	14.0			14.0	S-7	4	8	7	15					
1008.0	16.5			16.5	S-8	4	6	8	14					
	18.5	VERY STIFF TO STIFF RED-BROWN AND BROWN SILTY CLAY WITH CHERT - RESIDUUM		19.0	S-9	6	6	10	16					
1003.0	24.0			24.0	S-10	6	4	6	10					
998.0	27.0	FIRM RED-BROWN SILTY CLAY - RESIDUUM		29.0	S-11	3	2	4	6					
993.0	32.0	STIFF RED-BROWN SILTY CLAY - RESIDUUM		34.0	S-12	3	5	6	11					
988.0														

PE_BORING_LOGS_102665.GPJ_SC_DOT.GDT_8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B-3
Project Number: 102665	Offset: NONE



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Date Drilled: 7/23/18	Driller: Stillwell	REMARKS:
Casing Length: N/A	Ground Elevation: 1023'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: 39.0'	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"			N Value	STD. PENETRATION TEST DATA (blows/ft)					
						1st 6"	2nd 6"	3rd 6"		5	10	20	40	70	
983.0	41.2	STIFF RED-BROWN SILTY CLAY - RESIDUUM		39.0	S-13	4	27	50/0.4	77/0.9						
		AUGER REFUSAL AT 41.2'													
978.0															
973.0															
968.0															
963.0															
958.0															
953.0															

PE BORING LOGS 102665.GPJ SC_DOT.GDT 8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B-3
Project Number: 102665	Offset: NONE



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Date Drilled: 7/25/18	Driller: Stillwell	REMARKS:
Casing Length: N/A	Ground Elevation: 1017'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: 55.0'	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	STD. PENETRATION TEST DATA (blows/ft)								
						1st 6"	2nd 6"	3rd 6"	N Value					
1012.0	0.0	TOPSOIL		0.0	S-1	2	3	4	7					
	0.4	VERY STIFF RED-BROWN SILTY CLAY - RESIDUUM		1.5	S-2	6	8	11	19					
	3.5	VERY STIFF TO STIFF RED-BROWN SILTY CLAY WITH TRACE OF CHERT - RESIDUUM		4.0	S-3	7	10	11	21					
	6.5			6.5	S-4	6	6	8	14					
	9.0			9.0	S-5	3	4	6	10					
1007.0	11.0	FIRM AND AND RED-BROWN SILTY CLAY - RESIDUUM		11.5	S-6	2	3	3	6					
	13.5	FIRM RED-BROWN AND BROWN SILTY CLAY - RESIDUUM		14.0	S-7	3	5	4	9					
1002.0				16.5	S-8	3	2	4	3					
				19.0	S-9	2	3	4	7					
997.0				24.0	S-10	3	3	4	7					
				29.0	S-11	3	4	4	8					
992.0				34.0	S-12	4	4	3	7					
987.0														
982.0														

PE_BORING_LOGS_102665.GPJ SC_DOT.GDT 8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B-4
Project Number: 102665	Offset: NONE



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Date Drilled: 7/25/18	Driller: Stillwell	REMARKS:
Casing Length: N/A	Ground Elevation: 1017'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: 55.0'	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	STD. PENETRATION TEST DATA (blows/ft)			N Value												
						1st 6"	2nd 6"	3rd 6"													
		FIRM RED-BROWN AND BROWN SILTY CLAY - RESIDUUM	[Red Hatched Pattern]																		
977.0				39.0	S-13	5	4	5	9												
				44.0	S-14	3	4	4	8												
972.0				49.0	S-15	3	4	5	9												
967.0	52.0	STIFF RED-BROWN AND BROWN SILTY CLAY - RESIDUUM			54.0	S-16	4	4	5	9											
962.0	56.0	FIRM RED-BROWN AND BROWN SILTY CLAY - RESIDUUM			59.0	S-17	6	4	8	12											
957.0				64.0	S-18	4	6	7	13												
952.0				69.0	S-19	17	6	9	15												
947.0	71.2	AUGER REFUSAL AT 71.2'																			

PE_BORING_LOGS_102665.GPJ_SC_DOT.GDT_8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B-4
Project Number: 102665	Offset: NONE



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Date Drilled: 7/26/18	Driller: Stillwell	REMARKS: No ground water encountered at time of boring.
Casing Length: N/A	Ground Elevation: 1015'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: DRY	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	STD. PENETRATION TEST DATA (blows/ft)								
						1st 6"	2nd 6"	3rd 6"	N Value					
1010.0	0.0	TOPSOIL		0.0	S-1	2	3	3	6					
	0.6	STIFF RED-BROWN SILTY CLAY - RESIDUUM		1.5	S-2	4	6	6	12					
				4.0	S-3	5	7	7	14					
				6.5	S-4	3	4	6	10					
1005.0	8.5	FIRM RED-BROWN SILTY CLAY - RESIDUUM		9.0	S-5	3	3	4	7					
				11.5	S-6	2	3	3	6					
1000.0				14.0	S-7	3	3	3	6					
				16.5	S-8	3	3	4	7					
995.0	18.5	FIRM RED-BROWN AND BROWN SILTY CLAY - RESIDUUM		19.0	S-9	3	4	4	8					
				24.0	S-10	4	2	3	5					
990.0				29.0	S-11	5	5	4	9					
985.0				34.0	S-12	2	4	4	8					
980.0														

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B- 5
Project Number: 102665	Offset: NONE

PE_BORING_LOGS_102665.GPJ SC_DOT.GDT_8/8/18



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Date Drilled: 7/26/18	Driller: Stillwell	REMARKS: No ground water encountered at time of boring.
Casing Length: N/A	Ground Elevation: 1015'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: DRY	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"			N Value	STD. PENETRATION TEST DATA (blows/ft)					
						1st 6"	2nd 6"	3rd 6"		5	10	20	40	70	
975.0		FIRM RED-BROWN AND BROWN SILTY CLAY - RESIDUUM		39.0	S-13	0	3	3	6	●					
	43.3	AUGER REFUSAL AT 43.3'													
970.0															
965.0															
960.0															
955.0															
950.0															
945.0															

PE_BORING_LOGS_102665.GPJ_SC_DOT.GDT_8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B- 5
Project Number: 102665	Offset: NONE



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Date Drilled: 7/26/18	Driller: Stillwell	REMARKS: No ground water encountered at time of boring.
Casing Length: N/A	Ground Elevation: 1028'	
Hammer Type: <input type="checkbox"/> Gravity <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Other:		
Water Level: DRY	Drilling Method: POWER AUGER	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6" / 2nd 6" / 3rd 6"			N Value	STD. PENETRATION TEST DATA (blows/ft)									
						1st 6"	2nd 6"	3rd 6"		5	10	20	40	70					
	0.0			0.0															
	0.4	TOPSOIL																	
		STIFF RED-BROWN AND RED-BROWN AND TAN SILTY CLAY - RESIDUUM			S-1	2	2	2	4										
				1.5	S-2	3	4	5	9										
1023.0				4.0	S-3	4	5	6	11										
				6.5	S-4	4	7	8	15										
1018.0				9.0	S-5	3	4	8	12										
				11.5	S-6	3	4	7	11										
1013.0	13.5	FIRM BROWN AND RED-BROWN SILTY CLAY - RESIDUUM		14.0	S-7	3	3	4	7										
	15.6	AUGER REFUSAL AT 15.6'																	
1008.0																			
1003.0																			
998.0																			
993.0																			

PE_BORING_LOGS_102665.GPJ SC_DOT.GDT 8/8/18

Project Name: MILDRED B. LANCE PROPERTY KNOXVILLE, TENNESSEE	LOG OF BORING No. B-6	
Project Number: 102665	Offset: NONE	