APPENDIX C – GEOTECHNICAL OVERVIEW

Report of Geotechnical Overview

Southeast Lexington Connectivity Study
Fayette and Jessamine Counties, Kentucky
Item No. 7-445.00
P-002-2020

Prepared by:
Stantec Consulting Services Inc.

February 12, 2020

Stantec Consulting Services Inc.
3052 Beaumont Centre Circle, Lexington KY 40513-1703

February 12, 2020
File: rpt_001_let_178558003

Attention: Mr. Michael Carpenter, PE
Kentucky Department of Highways
Division of Structural Design
Geotechnical Branch
1236 Wilkinson Boulevard
Frankfort, Kentucky 40601

Reference: Geotechnical Overview
Southeast Lexington Connectivity Study
Fayette and Jessamine Counties, Kentucky
P-002-2020

Dear Mr. Carpenter,

Enclosed is the geotechnical overview for the proposed Planning Study overview for the referenced project. The geotechnical overview is based upon research of available published data and preliminary data for the study area. The scope of work performed and results of the overview are presented in the accompanying report.

Regards,

STANTEC CONSULTING SERVICES INC.

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/rws

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1.0 PROJECT DESCRIPTION

The Kentucky Transportation Cabinet (KYTC) is conducting a connectivity study for southeastern Fayette and northeastern Jessamine Counties, Kentucky. The potential corridor will begin north of the Kentucky River and generally east of US 27 (Nicholasville Road) and extend to I-75. The project study area is shown in Figure 1. This project will examine transportation issues related to safety and congestion within the study area and to develop strategies to address these issues. The study will identify and evaluate potential improvement options to increase mobility and connectivity in southeast Fayette and northeast Jessamine Counties. This overview will be utilized to identify geotechnical considerations for the study area. The project location and corridor are presented on the drawing provided in Appendix A.

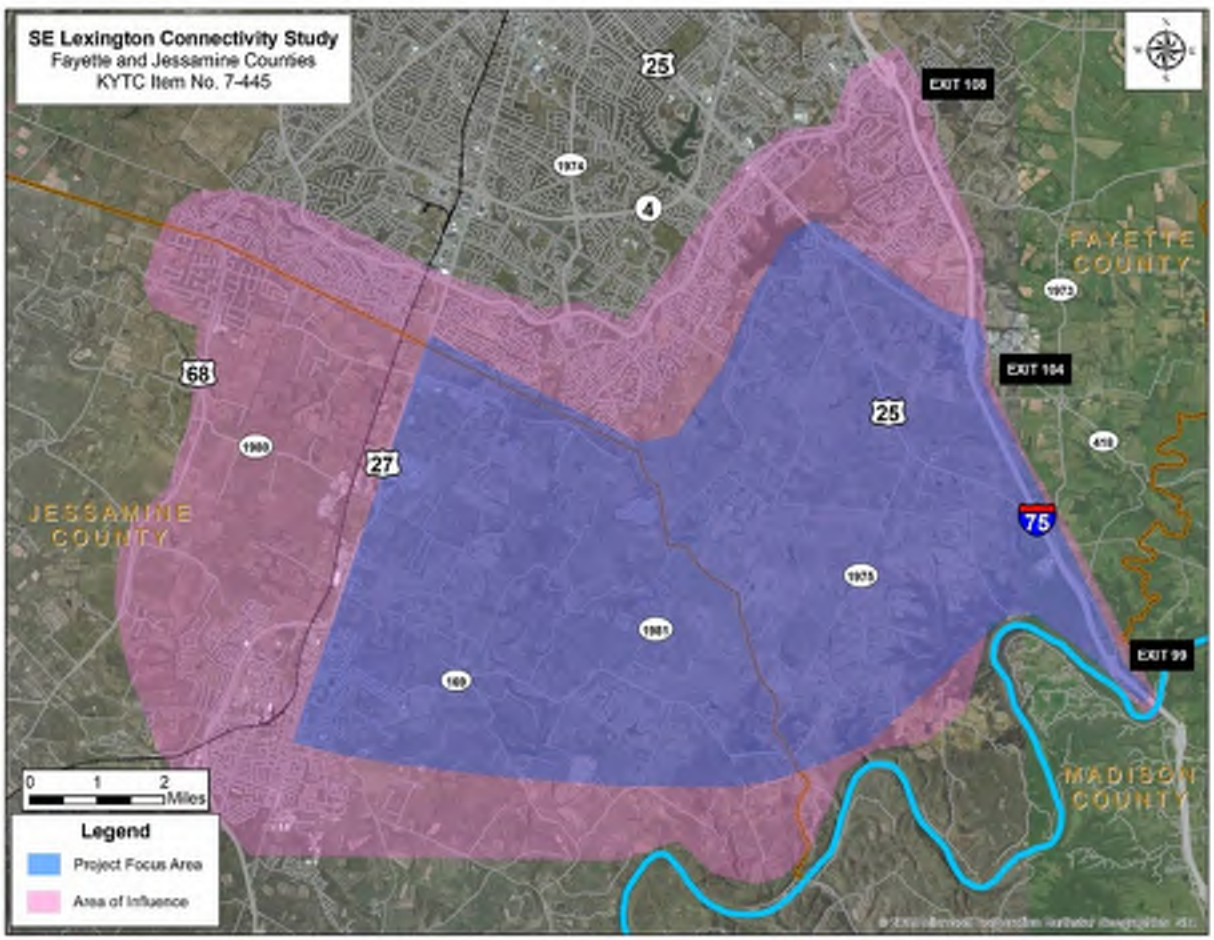


Figure 1 Study Area

2.0 SCOPE OF WORK

The scope of work for this study consists of performing a geotechnical overview for the proposed study area based upon research of available published data and Stantec's experience with highway design and construction within the region. General geotechnical and geologic characteristics of the study area have been identified and are discussed in this report. Stantec personnel, using a variety of sources, performed a literature search that included reviews of the following sources:

- Available topographic and geologic mapping of the project area published by the United States Geological Survey (USGS) and the Kentucky Geological Survey (KGS);
- The Geologic Map of Kentucky, published by the USGS and the KGS (1988);
- Kentucky Geologic Map Information Service http://kgs.uky.edu/kgsmap/kgsgeoserver/viewer.asp;
- KYTC Geotechnical Data, published by the KGS and KYTC, http://kgs.uky.edu/kgsmap/kytcLinks.asp;
- KYTC Projects Nearby (Identified by KYTC Report Number):

County	Report Number	Route	Item Number
Fayette	R-001-1978	KY-418	07-0165.00
Fayette	R-001-1979	I-75	07-0009.40
Fayette	R-001-1980	KY-1974	07-0234.00
Fayette	R-001-1981	KY-418	07-0019.01
Fayette	R-001-1982	KY-418	07-0009.40
Fayette	R-001-1983	KY-1974	07-0234.00
Fayette	R-001-1984	I-75	07-0009.02
Fayette	R-001-1985	KY-418	07-0165.00
Jessamine	R-001-1986	U-9999	07-0249.00
Jessamine	R-001-1987	US-27	07-0232.00
Jessamine	R-001-1988	KY-3375	07-0305.00
Jessamine	R-001-1989	US-27B	07-0104.00
Jessamine	R-001-1990	U-9999	07-0376.00
Jessamine	R-001-1991	U-9999E	07-0087.10
Jessamine	R-001-1992	KY-7948E	07-0087.10
Jessamine	R-001-1993	KY-7948E	07-0087.10
Jessamine	R-001-1994	KY-7948E	07-0087.10
Jessamine	R-001-1995	U-0000	07-0376.00
Jessamine	R-001-1996	U-0000	07-0376.00
Jessamine	P-005-2007	US 25 to I-75	07-0249.00

- United States Department of Agriculture, Soil Conservation Service (SCS) Soil Survey Publications for affected counties;
- Physiographic Regions, published by KGS, http://kgs.uky.edu/kgsweb.Physiographic and Stratigraphic Setting

The KYTC Geotechnical Branch conducted a geotechnical overview (P-005-2007) which included the southern portion of this study area. The previous report is presented in Appendix B.

2.1 TOPOGRAPHY AND DRAINAGE

The project study area is located in the Inner Bluegrass physiographic region of Kentucky. Subsurface conditions are characteristic of Ordovician age bedrock. Surface drainage within the study area is directed towards named and unnamed tributaries of Kentucky River.

2.2 STRATIGRAPHY

Available geologic mapping indicates that the majority of the project corridor is underlain by multiple formations of the Ordovician System. The Lexington Limestone (upper (Olu) and lower (Ollr)) consists of the Brannon Member (Olb), and Tanglewood Member (Olt). These materials generally consist of suitable material for most highway purposes. Corridors that traverse over these groups are preferred. Also mapped in the area in lesser amounts are the Drakes Formation, Garrard Siltstone and the Clays Ferry Formation. These formations are generally mapped in the vicinity of mapped fault zones. The geologic mapping of the area is presented in Appendix C.

2.3 FAULTING IN THE AREA

Located within the study area are two major fault systems, the Kentucky River Fault System and the Lexington Fault System. Associated with faults is slight folding, dipping and highly fractured rock. Alignments for the proposed connector should avoid these areas by limiting the number of crossings through the faults. When an alignment approaches a fault, the roadway should cross perpendicular to the orientation of that fault. Any proposed structures should not be placed on top of or directly adjacent to a fault or faulted zone. This area is depicted on the geologic mapping in Appendix C.

2.4 SOILS AND UNCONSOLIDATED MATERIALS

Residual soils are the predominate soil type found within this area. Soil descriptions contained herein are based upon SCS soil surveys and on Stantec's knowledge of the study area. Soils within the area of the roadway have derived in-place from a weathering process of the parent shale, siltstone, and limestone rock formations. These soils consist of plastic clays and sandy silty clays.

Alluvial deposits consisting of tributary stream alluvium are mapped within the flood plain of the major drainage courses. These deposits consist of clays, sands and gravels with varying thicknesses up to approximately 30 feet along tributaries. Alluvial deposits along the Kentucky River can be up to about 80 feet.

2.5 REGIONAL SEISMICITY

Seismicity within the Commonwealth of Kentucky varies widely depending on location. The western portion of the state is dominated by the New Madrid and Wabash Valley source zones. In general, these zones are fairly active with many documented historical seismic events. Central and eastern portions of the state experience less frequent earthquakes because the source zones are quite distant from these areas.

The seismic hazard at a bridge site shall be characterized by the acceleration response spectrum for the site and the site factors for the relevant site class. A comprehensive geotechnical investigation will be required to determine the site class. However, based on anticipated depths to bedrock at/near stream locations, Site Class B/C can be expected. The 2017 AASHTO LRFD Bridge Design specifications provide guidelines for selecting a seismic performance category and a soil profile type for bridge sites. This information establishes the elastic seismic response coefficient and spectrum for use in further structural design and analyses. Refer to Section 3.10.2 of the AASHTO guidelines for specifications. The corridor alignment could be influenced by seismic activity from the New Madrid and Wabash Valley source zones and "local" seismic events.

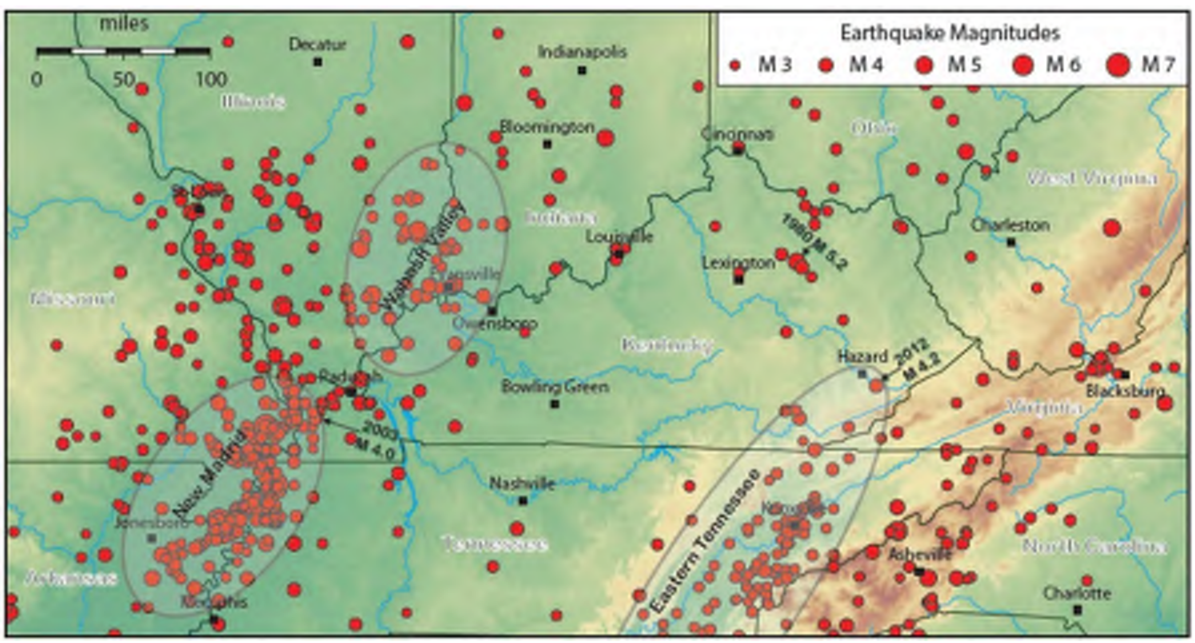


Figure 2 Earthquake epicenters and seismic zones in and around Kentucky

3.0 GEOTECHNICAL CONSIDERATIONS

3.1 GENERAL

Based on the project study area and Stantec's roadway experience, it is anticipated that the new alignment/reconstruction will generally follow the existing roadway alignments, where possible. Therefore, it is anticipated that portions of the alignment will consist more of widening while some areas will require new cuts and fill. For improved safety within portions where the existing roadway may be widened, it appears that several intersections and structures will need to be reworked/realigned along the corridor. The revisions to the interchanges will include: providing necessary clear zones, addressing geometric deficiencies in the roadway and adjusting the alignment. As the interchanges are reworked, the Project Team should keep in mind the geotechnical considerations that are included in Section 4 as they pertain to existing utilities, cut slopes, embankments and widened structures.

3.2 CUT SLOPE CONSIDERATIONS

Cut slope configurations in rock are generally controlled by bedrock lithology, bedrock quality, results of Slake Durability Index (SDI) tests in shales and siltstones, and by the presence of any fractures and/or joints. In general, if joint/fracture angles are high (as measured from horizontal), steeper cut slopes can be constructed, and an acceptable level of stability can be maintained. If discontinuities exhibit low angles and steep cut slopes are utilized, large block failures may occur along the open cut face.

Slope configurations for rock cuts in durable or Type I non-durable rock generally be 1H:2V pre-split slopes on approximate 30-foot intervals of vertical height with 18 to 20-foot intermediate benches. These types of cuts could be anticipated within this alignment. Cuts in nondurable shales and shallow cuts in bedrock may be best handled on 2H:1V slopes. Slope configurations along the corridor will be dependent on many factors, including but not limited to, roadway grade, geology and bedrock durability which will be evaluated during a geotechnical exploration.

Typical cuts within the existing corridor are shown in photographs presented in Appendix A.

Slope configurations for soil cuts are generally constructed on a 2H:1V or flatter.

3.3 EMBANKMENT CONSIDERATIONS

The anticipated excavated rock materials should be suitable for use in project embankments. Select rock types for use as rock embankment, rock roadbed, channel lining, etc., would be durable limestone. Foundation soils are likely to be plastic clays and silty sands.

Embankments constructed of durable rock materials generally exhibit adequate stability at 2H:1V slope configurations. However, flatter embankment slopes may be required for tall embankments constructed from nondurable shales or in areas where embankments are founded on alluvial materials. Alluvial soils can be expected along major drainage courses. In areas such as this, granular embankment material and/or retaining walls may be necessary depending on the proposed alignment.

Low shear strengths and high settlement potentials are generally associated with alluvial deposits. Consolidation settlements and short-term embankment stability problems are common for roadway embankments in alluvial floodplains. Controlled embankment construction rates, flatter embankment side slopes, and partial rock embankment are some of the techniques used to reduce these issues.

3.4 STRUCTURES

It is anticipated that if existing routes are utilized, bridges will need to be widened and or replaced to meet horizontal clearances with the new highway. At this time, it is unknown as to whether the proposed roadway would require new and/or widened substructure elements. It can be anticipated that most of the bridges within the project study area are likely supported by rock bearing foundation systems, which could be a spread footing or steel H-piles driven to bedrock. Culverts along the proposed alignment may be replaced or widened. The culverts within the study area are likely supported by either a non-yielding or yielding foundation system depending upon the location along the proposed alignment. A detailed geotechnical investigation will be required to determine the foundation support systems. Typical structures that are along the existing alignment are shown in Appendix A.

3.5 SATURATED, SOFT OR UNSTABLE AREAS

Based on topographic mapping and literature reviewed, the alignment may be near ponds, drainage swales or stream channels. Any saturated, soft or unstable areas encountered within embankment foundation limits should be drained and stabilized utilizing non-erodible granular embankment or durable limestone from roadway excavation. The rock platform shall be underlain with geotextile fabric. Ponds should be drained, and any soft or saturated material should be removed and/or stabilized. Additional rock may be required to stabilize soft soils and to maintain positive drainage. Based on observations, ponds exist within the project study area. Depending on the project alignment, these ponds will require treatment if they are located within the construction limits.

3.6 COAL SEAMS/MINING

Based on the available geologic mapping, there are no coal seams mapped in the vicinity of the project alignment. There are however, two active limestone quarries along with abandoned quarries in/near the study area. These sites are depicted on the geologic mapping in Appendix C.

3.7 GAS AND OIL WELLS

Based on the available geologic mapping, there are a few oil and gas wells in the vicinity of the project study area. These wells are depicted on the geologic mapping in Appendix C.

3.8 WATER WELLS AND SPRINGS

Based on available information, water wells and springs are noted within/near the proposed study area. These locations should be inventoried and verify their locations. If impacted during construction, special construction will be required to close the wells, and spring boxes and/or granular material may be required in the vicinity of springs.

3.9 KARST CONDITIONS

The potential for karst conditions exist within the study area. Sinkholes, springs, underground cavities, and a highly irregular rock surface are commonly found in the Lower Lexington Limestone (Ollr) and the Tanglewood Member (Olt). Any open sinkholes or solution cavities identified within the construction limits that are not utilized for drainage purposes should be filled and/or capped in accordance with Section 215 of the current edition of the Standard Specifications for Road and Bridge Construction.

Sinkholes are noted on the mapping presented in Appendix D within and near the study area. Any sinkholes utilized for drainage purposes for new roadway construction should incorporate adequate measures to minimize water infiltration into the subgrade and erosion control measures to minimize situation of open sinkholes.

Adequate drainage will be of primary concern with any new design or new construction in the area to minimize environmental impacts by surface runoff into the underlying karst network. Proper management of surface water will also lesson the occurrence of sinkhole dropouts during construction. Mitigation of surface runoff should be performed by silt checks, silt traps, sediment basins and lined ditches where appropriate. Situation of sinkholes should be avoided, especially those to remain open after construction.

4.0 CONCLUSIONS

4.1. The purpose of this overview was to provide a general summary of the bedrock, soil and geomorphic features likely to be encountered within the proposed alignment; and to identify geotechnical features that may have an adverse impact on the project alignment.

4.2. Geotechnical drilling will be needed for culverts, bridges, retaining walls and roadway cuts and fills. It is anticipated that conventional spread footing and/or pile foundation systems can be utilized for these structures.

4.3. Because a portion of this project may be a widening project, information on pavement structure should be obtained to assist the team on pavement structure and California Bearing Ratio (CBR) information. It should be anticipated that chemically or mechanically stabilized roadbed will be required because CBR values are expected to be 6 or less.

4.4. Once alignment and sections are identified, then open faced logging of exposed cuts and/or drilling should be performed. Depending on the project alignment and grade, additional geotechnical information may be desired in the vicinity of the fault systems. Sampling of foundation soils should be performed for embankment situations of sufficient height to evaluate stability.

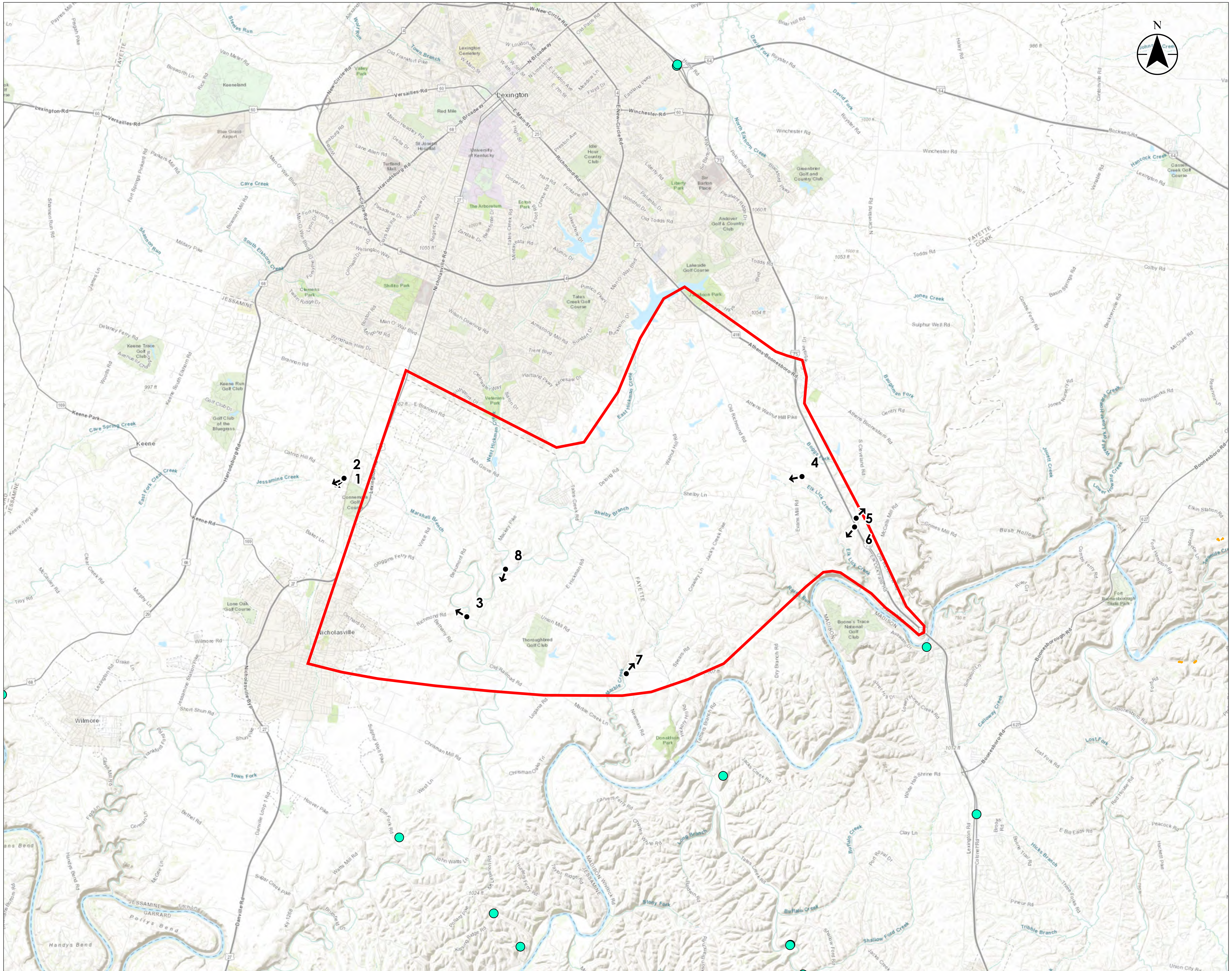
4.5. Water wells, monitoring wells and springs exist along/near the proposed corridor. The design team should inventory and survey active wells and springs.

4.6. The potential for karst conditions exists within the project study area. Sinkholes or solution cavities identified within the construction limits that are not accepting drainage should be filled and/or capped in accordance with Section 215 of the current edition of the Standard Specifications for Road and Bridge Construction.

Any sinkholes utilized for drainage purposes for the new roadway construction should incorporate adequate measures to minimize water infiltration into the subgrade and erosion control measures to minimize situation of open sinkholes. The Design Team should inventory the sinkholes and other karst features, such as caves, along the proposed alignment. The inventory should note whether or not the sinkhole accepts drainage.

4.7. The information presented in this overview should be reviewed in the general nature in which it was intended. A thorough geotechnical exploration of the proposed alignment and grade will be required to properly anticipate and plan for special requirements necessary for the design and construction of the proposed alignment.

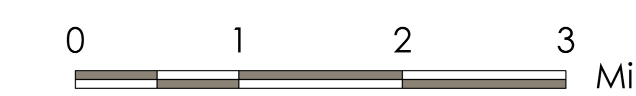
APPENDIX A
USGS TOPOGRAPHIC MAP



Stantec

Legend

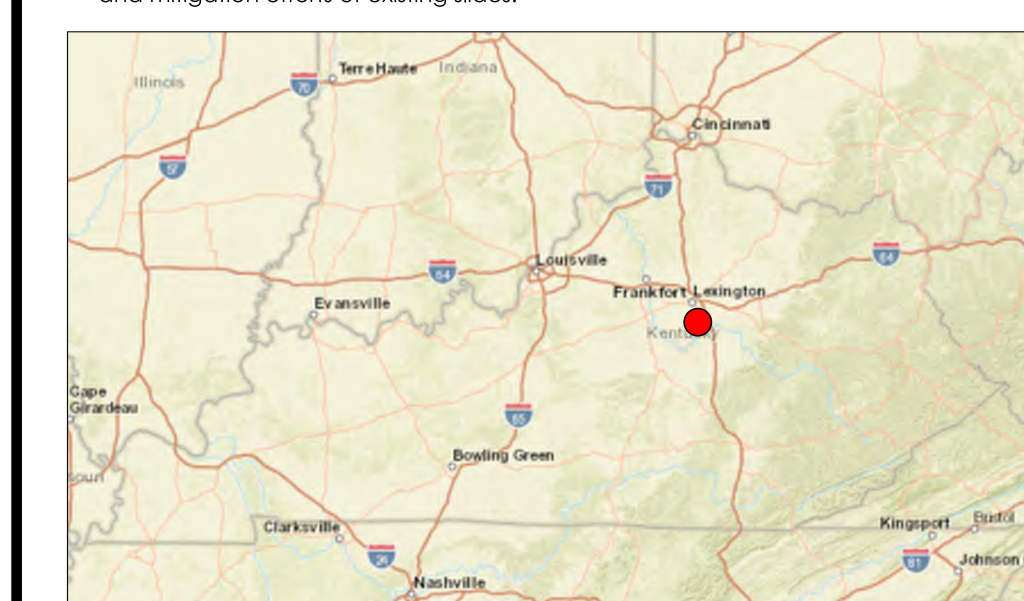
- Location of Photograph and Direction Taken
- KGS Landslide Inventory Data
- Landslide areas derived from aerial photography
- Focus Area



1:63,360 (At original document size of 22x34)

Notes

1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
2. Basemap Sources: ESRI World Topographic Map and ESRI World Street Map
3. Landslide location data courtesy of Kentucky Geological Survey (KGS). This map shows the locations of known landslides and areas susceptible to landslides in a geologic and geomorphic context. This map serves as an overall view of landslide hazards across the state. There are several landslide data layers represented as points, lines, and polygons. Locations come from Kentucky Geological Survey research, state and local government agencies, the public, and the media, thus making attributes and spatial accuracy highly variable. All landslide types, sizes, and states of activity are represented. This map can be used to identify landslide locations and serve as a basis for landslide hazard assessment and risk reduction. It is not intended for site specific investigations. A professional geologist or geotechnical engineer should be consulted for planned construction at identified landslide locations or in identified landslide areas. A professional geologist or geotechnical engineer should also be consulted for control and mitigation efforts of existing slides.



Project Location

Fayette and Jessamine Counties, Kentucky

178558003

Prepared by WSW on 2020-01-02
Technical Review by DB on 2020-01-02
Independent Review by XXX on 2020-01-02

Client/Project

Fayette and Jessamine Counties
Southeast Lexington Connectivity Study
Item #7-445.00

Figure No.

Title

Southeast Lexington Connectivity Study
Topographic Map

IMG_1802.jpg

Observation ID: 1

General Location : Entrance to Lexington Quarry

Latitude and Longitude Coordinates:

37.933667, -84.559167

Remarks:

View of the entrance to Lexington Quarry off Catnip Hill Road looking Southwest

IMG_1804.jpg

Observation ID: 2

General Location : Entrance to Lexington Quarry

Latitude and Longitude Coordinates:

37.933819, -84.559608

Remarks:

View of the entrance to Lexington Quarry off Catnip Hill Road looking South.

IMG_1805.jpg

Observation ID: 3

General Location : KY 169 over Hickman Creek

Latitude and Longitude Coordinates:

38.830836, -84.458253

Remarks:

Typical Bridge crossing Hickman Creek looking West.

IMG_1807.jpg

Observation ID: 4

General Location : Sink Area Off US 25

Latitude and Longitude Coordinates:

37.932458, -84.386764

Remarks:

View a Sink Area/Karst Topography off US 25 looking South.

IMG_1818.jpg

Observation ID: 5

General Location : Cut Along US 25

Latitude and Longitude Coordinates:

37.919772, -84.366547

Remarks:

Existing Limestone cut off US 25 Looking Northeast.

IMG_1819.jpg

Observation ID: 6

General Location : Vulcan Materials

Latitude and Longitude Coordinates:

37.917164, -84.367211

Remarks:

View of the entrance to Vulcan Materials Company looking Southwest.

IMG_1821.jpg

Observation ID: 7

General Location : KY 1975

Latitude and Longitude Coordinates:

37.874292, -84.454094

Remarks:

Existing Limestone cut off KY 1975 Looking Northeast.

IMG_1822.jpg

Observation ID: 8

General Location : Mackey Pike

Latitude and Longitude Coordinates:

37.906017, -84.499131

Remarks:

View Mackey Pike crossing Hickman Creek looking Northwest.

APPENDIX B
PREVIOUS GEOTECHNICAL OVERVIEW
(P-005-2007)

M E M O R A N D U M **P-005-2007**

TO: Daryl Greer, P.E.
Director
Division of Planning

FROM: William Broyles, P.E.
Geotechnical Engineering
Branch Manager
Division of Structural Design

BY: Christian Wallover, P.G.
Geotechnical Branch

DATE: May 25, 2007

SUBJECT: Jessamine County
US 27 to I-75
Scoping Study to Determine Appropriate Corridors
Mars No. 7954701P
Item No. 7-249.00

The Geotechnical Branch has completed a detailed evaluation based on available mapping for the proposed connector between US 27 and I-75. As requested, the following geotechnical concerns are expressed in the subsequent paragraphs and are represented on the attached geologic map.

The project area is situated on top of multiple formations of the Ordovician System which have been condensed into five groups. The High Bridge Group and the Lexington Limestone consist of suitable material for most highway purposes. Corridors that traverse mainly over these groups are preferred. Alignments south of the main faulted zones through the "Okc" Group (Garrard Siltstone, Kope and Clays Ferry Formations) are adequate, but will encounter primarily non-durable clay shales interbedded with limestone.

Located within the study area are two major fault systems, the Kentucky River Fault System and the Lexington Fault System. Associated with faults is slight folding, dipping and highly fractured rock. Alignments for the proposed connector should avoid these areas by limiting the number of crossings through the faults. When an alignment approaches a fault, the roadway should cross perpendicular to the orientation of that fault. Any proposed structures should not be placed on top of or directly adjacent to a fault or faulted zone.

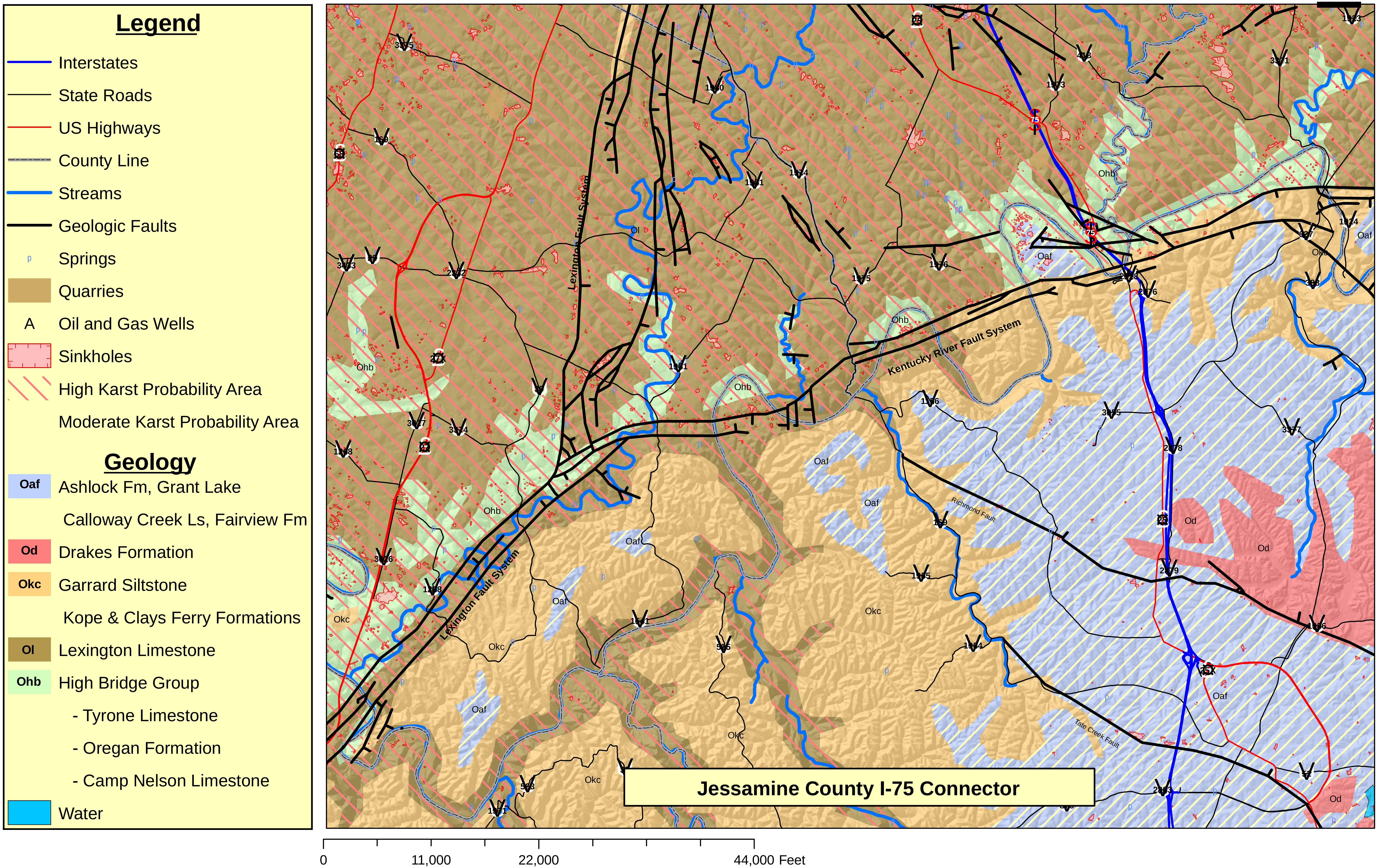
Karst topography is present in the study area, and is symbolized on the map by the karst probability and all know features. Sinkholes, springs, underground cavities, and a highly irregular rock surface are commonly found in the Lexington Limestone, High Bridge Group and moderately produced in the "Oaf" Group (Ashlock Formation, Grant

Lake, Calloway Creek Limestone and Fairview Formation). Sinkholes encountered during construction and are not utilized for drainage will need to be filled and capped in accordance to standard department procedures.

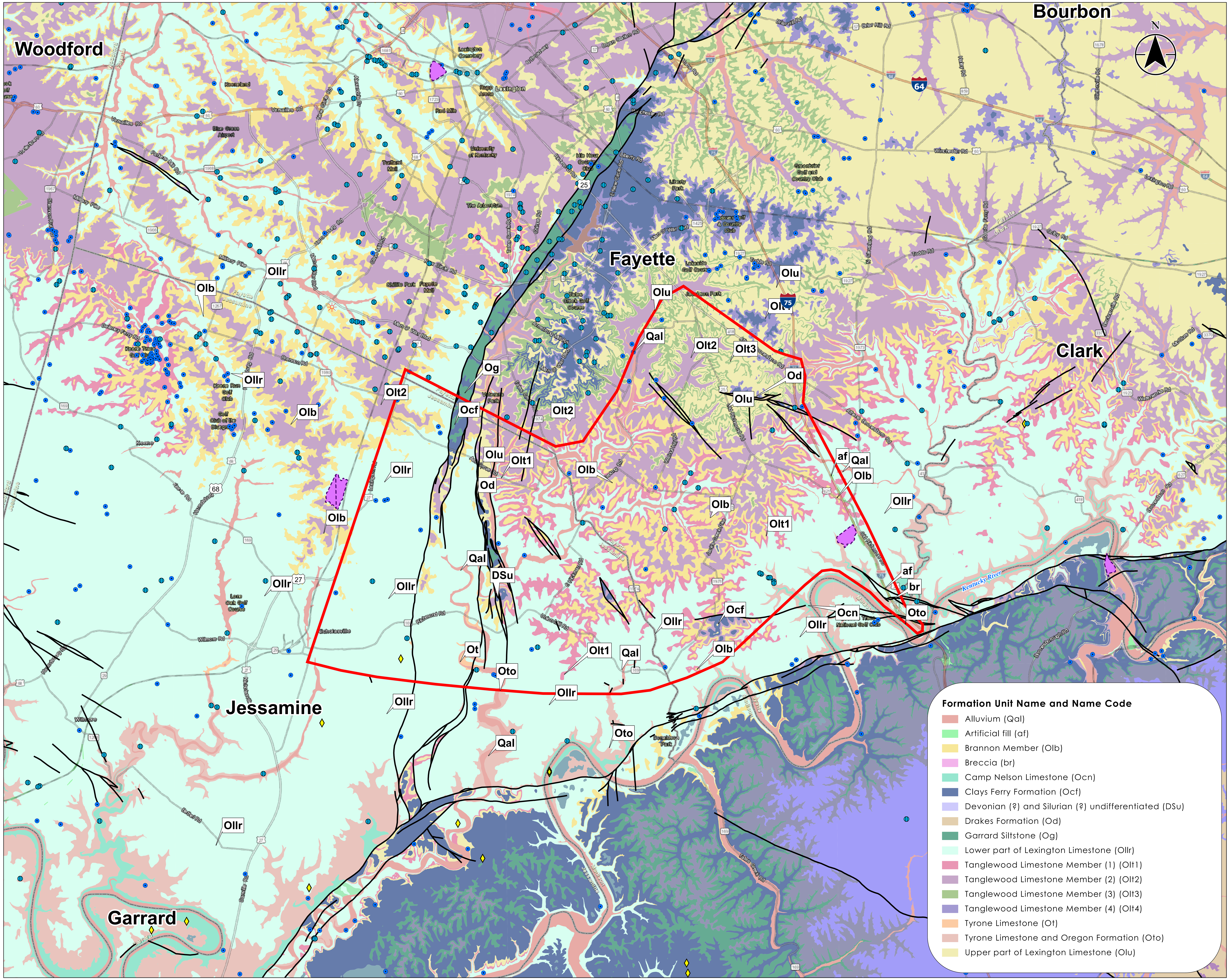
Alluvial deposits are commonly found along the stream valleys of the Kentucky River and its tributaries. The deposits (composed of unconsolidated clay, silt, sand and gravel) range in thickness from zero to 90+ feet. Alluvium is considered highly erodable and may require deep foundations for structures in these areas. Embankments constructed on top of the unconsolidated sediment may require preloading and/or waiting periods to allow foundation settlement to occur.

This project is in a classified Seismic Zone 1, which is defined as an area of minor damage due to earthquake activity.

Should you have additional questions, please contact the Geotechnical Branch at (502) 564-2374.


Legend
Interstates
State Roads
US Highways
County Line
Streams
Geologic Faults
Springs
Quarries
Oil and Gas Wells
Sinkholes
High Karst Probability Area
Moderate Karst Probability Area
Geology
Oaf Ashlock Fm, Grant Lake
Calloway Creek Ls, Fairview Fm
Od Drakes Formation
Okc Garrard Siltstone
Kope & Clays Ferry Formations
Ol Lexington Limestone
Ohb High Bridge Group
- Tyrone Limestone
- Oregan Formation
- Camp Nelson Limestone
Water
Jessamine County I-75 Connector
Lexington Fault System
Kentucky River Fault System
Richmond Fault
Tate Creek Fault
0
11,000
22,000
44,000 Feet

APPENDIX C
USGS GEOLOGIC MAP



Stantec

Legend

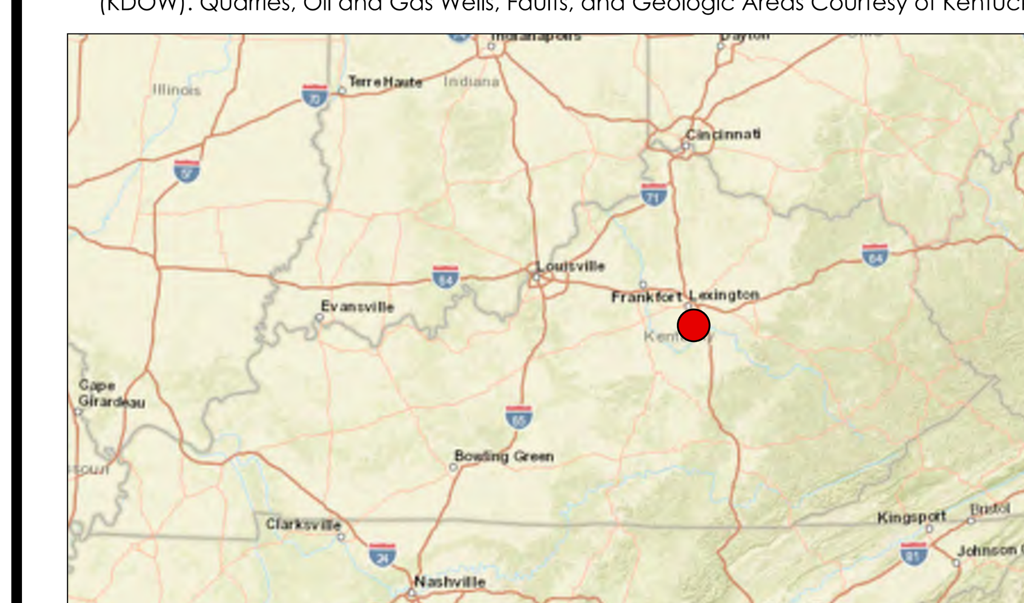
- Groundwater Well
- Dry and Abandoned Well
- Gas Well
- Other Well
- Springs
- Fault
- County Boundaries
- Quarries
- Focus Area

0 1 2 3 Miles

1:63,360 (At original document size of 22x34)

Notes

1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
2. Basemap World Hybrid Overlay: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
World Street Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
3. Data Sources: Springs and Groundwater Wells Courtesy of Kentucky Division of Water (KDOW). Quarries, Oil and Gas Wells, Faults, and Geologic Areas Courtesy of Kentucky



Project Location

Fayette and Jessamine Counties, Kentucky

178558003
Prepared by WSW on 2020-01-07
Technical Review by DB on 2020-01-07
Independent Review by XXX on 2020-01-07

Client/Project

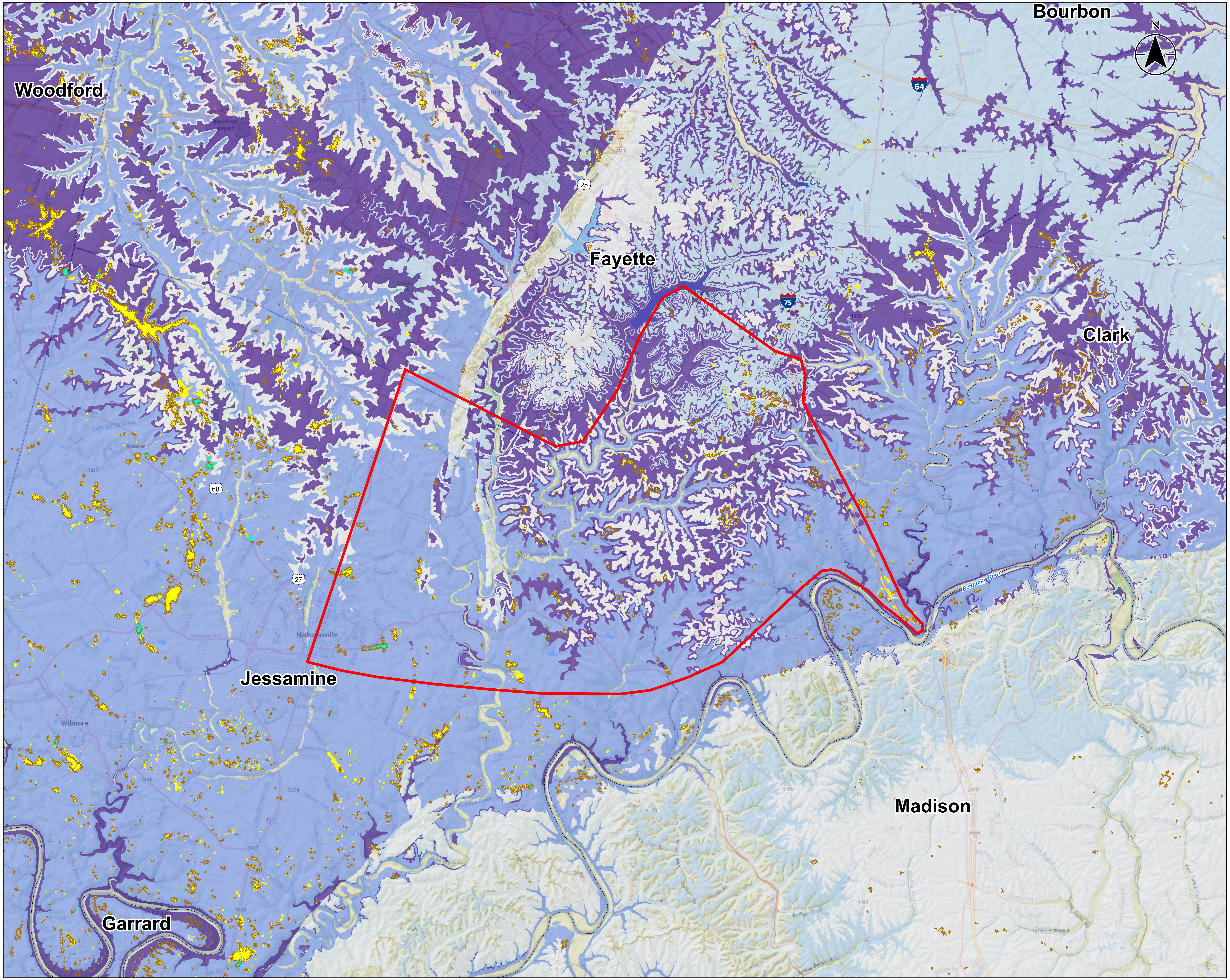
Fayette and Jessamine Counties
Southeast Lexington Connectivity Study
Item #7-445.00

Figure No.

Title

Southeast Lexington Connectivity Study
Geologic Map

APPENDIX D
KARST POTENTIAL



Stantec

Legend

- Focus Area
- County Boundaries
- Sinkhole[4]

LiDAR-Derived Sinkholes[5]

- Not Field Verified
- Field Verified

Karst Potential

- Very High
- High
- Medium
- Low

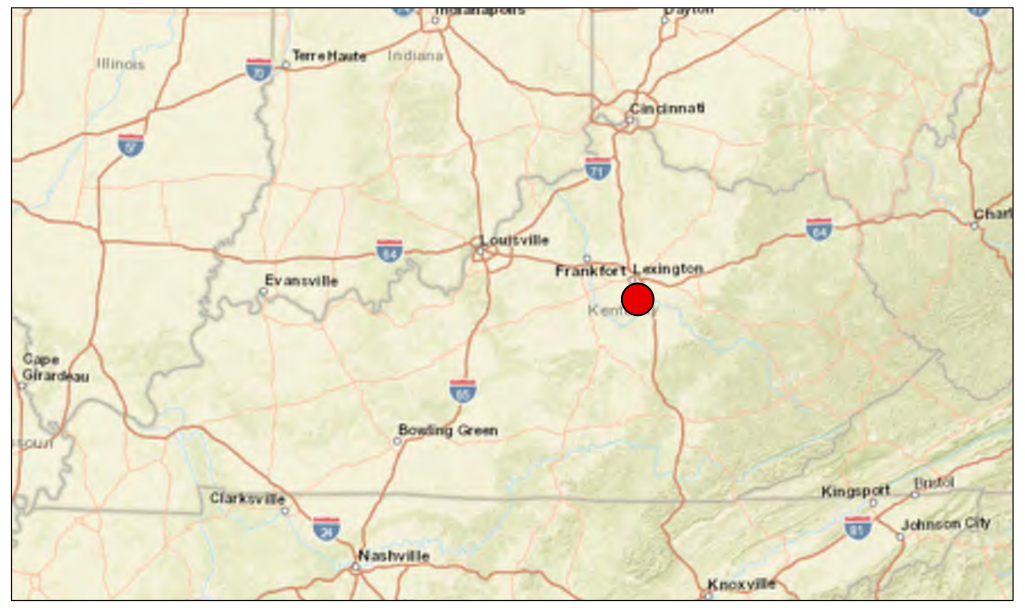
Note: Unshaded areas represent non-karst regions

0 1 2 3 Miles

1:63,360 (At original document size of 22x34)

Notes

1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
2. Basemap National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp. World Street Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
3. Karst potential was determined by KGS staff for each formation by a weighted matrix of lithologic characteristics determined for each unit: grain size, bedding thickness, %CaCO3, and % insoluble rock and minerals. The last (% insoluble rock and minerals) being weighted the most. Please note, this is unpublished and still a work in-progress. Polygons digitized from the 1:24,000 Geologic Map Series maps (original maps published by Kentucky Geological Survey - U.S. Geological Survey from 1960 to 1980).
4. These data represent digital GIS sinkhole coverage for all of Kentucky. Digitization was done onscreen using digital raster graphic files of the 7 ½ minute topographic contours, registered and projected to the Kentucky State Plane coordinate system. The highest elevation, closed, topographic contour of each mapped sinkhole was digitized as a GIS polygon. The second highest elevation contour was also digitized where very large, shallow, karst valleys were so expansive that the area covered by the polygon obscured patterns in sinkhole distribution. The spacing of contour intervals on the topographic maps of the state vary in from 40 foot to 10 foot. No attempt was made to use a constant elevation, standardize the outline to a uniform contour interval, or record the elevation of the digitized contour.
5. The sinkhole maps are derived from LiDAR data using ArcGIS versions 10.1 and higher. LiDAR data were used to create digital elevation model (DEMs). Surface depressions were then extracted from the DEMs and visually inspected for sinkholes. Field verification suggests that the accuracy of the identified sinkholes to be real sinkholes is over 85%. LiDAR data were provided by the Louisville/Jefferson County Information Consortium (LOJIC) through Kentucky Division of Geographic Information. The LiDAR was flown in August, 2009 and the average point spacing is 1.0 meter. DEMs were created using LAS Class 2 surface with 5 feet resolution. Each sinkhole is presented as a polygon feature. It



Project Location | 178558003
Fayette and Jessamine Counties, Kentucky
Prepared by WSW on 2020-01-07
Technical Review by DB on 2020-01-07
Independent Review by XXX on 2020-01-07

Client/Project

Fayette and Jessamine Counties
Southeast Lexington Connectivity Study
Item #7-445.00

Figure No.

Title

Southeast Lexington Connectivity Study
Karst Potential Map