Earthquake Hazard Mitigation of Transportation Facilities for Calloway County

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EARTHQUAKE HAZARD MITIGATION OF TRANSPORTATION FACILITIES FOR CALLOWAY COUNTY

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in cooperation with
Transportation Cabinet
Commonwealth of Kentucky

and

Federal Highway Administration
U.S. Department of Transportation

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Concern has grown in recent years over the seismic activity of the New Madrid seismic zone in Western Kentucky. Calloway County, Kentucky is located in this region. To permit emergency medical, supply, and equipment traffic into this area after an earthquake has occurred, the Kentucky Transportation Cabinet is interested in the possibility of keeping selected routes passable. This report lists the routes that have been investigated and recommended as being the routes in Calloway County that should be maintained in a passable condition. The recommended routes, KY 94, US 641, and KY 121 have been visually surveyed and all seismically significant features cataloged. These features are logged by their location on strip maps contained in Appendix A and a detailed listing of all the potentially critical features is given in Appendix B.
INTRODUCTION

An awareness of earthquakes and their possible effects upon the nation's infrastructure is critically important to the public, and in particular, to public officials. The nation's highway system is one of the most important components of the infrastructure. After the occurrence of an earthquake, the highway system is the primary mode of transporting emergency supplies and services into an affected area. Thus, it is important to catalog the important components of the highway system and attempt to anticipate the possible damage to these components from an earthquake.

Western Kentucky in general and Calloway County in particular are in a high risk earthquake zone. In 1811-1812, three of the most severe earthquakes in American history shook the country. The location of these quakes was not on the infamous San Andreas fault nor anywhere along the well-known fault laden Pacific coast but was near a small town on the Mississippi River where the states of Kentucky and Missouri share a border (Figure 1). It is this river town, New Madrid, Missouri, that is the namesake of a region now regarded by seismologists and disaster response planners as the most hazardous earthquake zone east of the Rocky Mountains -- the New Madrid seismic zone.

In addition to these three great earthquakes, there are several other well documented factors demonstrating the susceptibility of the New Madrid region to the recurrence of major earthquakes. Through a decade of extensive research, an ancient crustal rift has been found to underlie the relatively shallow sediments comprising the region's surface. This type of geologic structure is prone to seismic activity. The New Madrid rift has been identified as being of sufficient size to generate major earthquakes. Further evidence of the area's seismicity is the record of over 2,000 earthquakes detected in the zone since 1974. Though most have been of a magnitude below the threshold of human perception, their existence clearly indicates the high level of seismic activity occurring in the zone.

Seismologists have calculated the probabilities of recurrence of sizeable earthquakes in the New Madrid rift zone. The probability of a magnitude 6.3 earthquake (Richter scale) within 50 years is from 86 to 97 percent. The probability (1) of that same earthquake occurring within the next 15 years is from 40 to 63 percent. For comparison, the 1971 San Fernando earthquake (magnitude 6.6) killed 58 people and caused $480 million worth of damage. The 1988 Armenian earthquake of similar magnitude killed approximately 25,000 to 30,000 people.

The probability of a magnitude 7.6 earthquake occurring within 50 years is from 19 to 29 percent. The probability for this size earthquake occurring within 15 years drops to a range of 5.4 to 8.7 percent. On February 4, 1975, the Haicheng earthquake in China had a magnitude of 7.3 and destroyed or damaged about 90 percent of the structures in a city of 90,000 people.

When comparing historical earthquakes of similar magnitude, one must take into consideration
that death totals and damage estimates will vary greatly due to the geology, population density, types of building, and quality of construction.

For a given earthquake, effects at a given location are described by the Modified Mercalli Intensity (MMI) scale (2) which ranges from I (no damage and felt only by instruments) to XII (total destruction). Details of the MMI scale are given in Table 1. Values of MMI associated with the 1811-1812 earthquakes are shown in Figure 1. The potential for damage and destruction from earthquakes in the region is significant.

In 1982, the Governor's Task Force on Earthquake Hazards and Safety was created to evaluate Kentucky's earthquake risk and to make recommendations for responding to those risks. This task force recommended increased public awareness and education programs, improved emergency response planning and training, improved building codes and seismic restraint designs, evaluation of other mitigation measures, and participation in national and regional earthquake forums and funding programs.

In 1984, Governor Collins created the Governor's Earthquake Hazards and Safety Technical Advisory Panel (GEHSTAP) to analyze scientific and engineering data regarding seismic risks in Kentucky and to make specific recommendations on mitigation, public awareness, response planning, and policy development for public health and safety. The States are dependent on their highway systems for the movement of goods and services. Due to the possible adverse effects a major earthquake could have on this system, the Earthquake Stability and Transportation Subcommittee (ESTS) of GEHSTAP was formed.

ESTS has encouraged the Kentucky Transportation Cabinet to secure funding for generating and implementing an earthquake hazard mitigation plan in an attempt to safeguard the highway system against catastrophic earthquake failure. As a result, the Cabinet commissioned the Kentucky Transportation Center at the University of Kentucky to analyze and assess the possible effects of an earthquake on highway facilities. The study area includes the 26 western-most counties in Kentucky that are adjacent to the New Madrid seismic zone (Figure 1). To date, one of the results of that study has been the recommendation that over 1,000 miles of highways in the study area be utilized as emergency or "priority" routes. These would be the primary routes used for transporting emergency supplies and personnel after an earthquake. Also, it is anticipated that these would be the first routes repaired after an earthquake.

The initial task in identifying these priority routes was to decide where they should begin; that is, in the event of a major earthquake, the point at which the transport of goods and services would originate. Ideally, the city chosen should possess the following attributes:

1. Sufficient size to contain all necessary personnel, supplies, and facilities to respond quickly to a major emergency;
2. Proximity to the high hazard area to speed the relief effort but not so close as to suffer the same high risk potential;

3. Easy access from other major cities in the State; and

4. Sufficient routes to provide relatively direct access to all 26 high-risk counties.

The city best fitting these criteria is Bowling Green. Located at the eastern edge of the earthquake zone in Warren County, Bowling Green meets both the size criterion (population 40,450) and the accessibility criterion (Louisville and Nashville via I 65 and Lexington via the Bluegrass Parkway). Bowling Green provides access to the 26-county area via US 68/KY 80; this road was chosen as the main east-west artery because it crosses Lake Barkley and Kentucky Lake upstream from the dams impounding those bodies of water.

As a first step towards establishing an overall policy for earthquake hazard mitigation in the highway system, these priority routes have been visually surveyed and all natural and man-made features along these routes that are considered seismically significant were cataloged. With this information, a realistic and cost-effective plan for "hardening" these routes against earthquakes can be established. Such efforts are currently under way.

PRIORITY ROUTE IN CALLOWAY COUNTY

Calloway County is located approximately 53 miles east of the center of the New Madrid Seismic Zone. Figure 1 indicates that Calloway County is located in IX band of the MMI scale. This indicates considerable damage could occur in Calloway County in the event of a major earthquake.

KY 94, US 641 and KY 121 have been designated as the priority routes for Calloway County. KY 94 starts at the Calloway County-Graves County line and continues east for 24.20 miles, ending at the Calloway County-Marshall County line. US 641 starts in the City of Hazard and continues north for 17.35 miles, ending at the Calloway County-Marshall County line. KY 121 starts at the junction of US 641 and continues north for 10.21 miles, ending at the Calloway County-Graves County line.

A number of features along the priority routes could potentially hamper rescue and relief efforts. These features included bridges, soil fills, cut slopes, gas pipelines, power lines, large trees, water impoundments, faults, a radio tower, a railroad tunnel, a water tower, and a gravel conveyor. These features are logged by their location on strip maps contained in Appendix A and a detailed listing of all potentially critical features is given in Appendix B.

BRIDGES

Bridges are the most significant and important features on the priority route. With few exceptions, existing highway bridges in the study area have not been designed to resist motions and forces that may be generated by earthquakes. Bridges located within the seismic zone could possibly be damaged, thus reducing their load-carrying ability. In some
cases, damage could be sufficiently great to cause complete collapse. Several types of damage could occur:

1. A bridge could fail at the bearing which supports the main spans, causing the spans to fall from the bearings and possibly from the piers or abutments.
2. Failure could occur in the columns, piers, or footings which would reduce the load-carrying capacity of the bridge, if the bridge was still in place.
3. An abutment could tilt allowing the entire span to fall.
4. Soil movement or slumping could affect the bridge approach fills, damaging the abutments or piers, or making the bridge inaccessible.

There are nine bridges on KY 94, six bridges on US 641, and one bridge on KY 121 in Calloway County. The bridges are located at the following:

**KY 94**
1. Ford Creek,
2. Jacksons Creek,
3. Butterworth Creek,
4. Clarks River Overflow,
5. Clarks River,
6. Clayton Creek,
7. Fork of Jonathan Creek,
8. Jonathan Creek,
9. Ledbetter Creek.

**US 641**
1. Clarks River,
2. Tributary of the Middle Fork of Clarks River,
3. Clarks River,
4. Bee Creek,
5. Rockhouse Creek, and
6. Rockhouse Creek Overflow.

**KY 121**
1. West Fork of Clarks River.

Research is currently under way studying the effects that an earthquake could have on these bridges and their approach fills.

**FILLS**

Highway fills are particularly important because of their tendency to fail from seismically induced motions. Fills fail in one of two major modes. The first is a generalized circular or wedge-shaped failure resulting in one or both traffic lanes moving down and out. If both lanes failed, this would certainly render the route impassable and immediate repairs would be necessary. The second mode of failure is a general slumping or settling of the embankment. The roadway would probably remain passable if settlement or slumping were not severe but reduced speed limits would be required for safety.

Large fills on priority routes in Calloway County are located as
follows:

**KY 94**

1. Approach fills for the bridge over Ford Creek,
2. Approach fills for the bridge over Jackson Creek,
3. Approach fills for the bridge over Butterworth Creek,
4. Approach fills for the bridge over Clarks River Overflow,
5. Approach fills for the bridge over Clarks River,
6. Approach fills for the bridge over Clayton Creek,
7. Approach fills for the bridge over Fork of Jonathan Creek,
8. Approach fills for the bridge over Jonathan Creek,
9. Approach fills for the bridge over Ledbetter Creek, and
10. 0.20 mile west of the Calloway County-Marshall County line.

**KY 121**

1. 0.97 mile south of the bridge over the West Fork of Clarks River,
2. Approach fills for the bridge over the West Fork of Clarks River,
3. 1.31 and 0.91 miles south of the Calloway County-Graves County line.

**POWER LINES**

High voltage power lines also were cataloged during the route surveys. The heights of the lines above the roadway were estimated visually. Power company officials speculated that a number of breaks along each power line would occur during a major earthquake. In most cases, fallen lines would not be transmitting power because power would be automatically cut off within a few seconds in the event of a break.

Additionally, power line support towers could potentially fall across a priority route.

Power lines cross priority routes at...
the following locations:

**KY 94**

1. 0.98 mile north of the junction of KY 1660 and KY 94,
2. 0.75 mile north of the junction of US 641 and KY 94,
3. 0.03 mile north of the bridge over Clarks River Overflow, and
4. 0.06 mile north of Clayton Creek bridge.

**US 641**

1. 0.18 mile north of the Bee Creek bridge.

**KY 121**

1. 0.50 mile north of the junction of US 641 and KY 121, and
2. 0.21 mile south of the Calloway County-Graves County line.

**GAS PIPELINES**

Two pipelines cross under KY 121 in Calloway County. It is possible that pipelines could fail under or near a priority route causing a temporary closure. If a pipeline failed, an explosion might destroy a section of the priority route. Repair could be delayed by further gas leaks, fire, and/or additional explosions.

It appears that most of the pipelines in Calloway County were constructed with little or no seismic considerations. Gas pipelines cross under the KY 121 at the following locations:

**KY 121**

1. 0.91 and 0.21 mile south of the Calloway County-Graves County line.

**GEOLOGIC FAULTS**

There are numerous geologic faults (breaks in the bedrock where movement has occurred in the past) in the study area. The faults are seismically significant since a large earthquake could trigger additional movement along one or more old slip planes. There are no precautionary measures that can be taken to reduce hazards from faults except that construction of bridges and other facilities over or near such faults requires special consideration. The faults are included for informational purposes only. Two faults cross under KY 94 and in Calloway County, and are listed below:

**KY 94**

1. A fault crosses under KY 94 and the Murray Waste Disposal Plant and 0.27 mile west of the plant.

**TREES**

The behavior of trees during an earthquake depends upon many factors including their condition, type, height, and size. Local soil conditions, geometry of the ground surface, and characteristics of the earthquake can also be important. Violent ground motions accompanied by surface rupture and perhaps permanent displacement of the soil surface produce sudden surface accelerations of the ground which can snap and uproot large trees (3).
Trees are so numerous that, if many of them fell, the priority routes in Calloway County could effectively be blocked for several hours or days before emergency crews could clear the debris. Groups of large trees are located near the road at the following sites:

**KY 94**

1. 1.00 and 1.70 miles east of the Calloway County-Graves County line,
2. 0.23, 1.23 and 1.73 miles east of the Ford Creek bridge,
3. 0.05 mile west of the Jacksons Creek bridge,
4. 0.25 mile east of the Jacksons Creek bridge,
5. 0.24 mile west of the Butterworth Creek bridge,
6. 0.16 and 0.86 mile east of the Butterworth Creek bridge,
7. 1.15 and 0.05 miles west of the junction of KY 121 and KY 94,
8. 0.15 mile east of the junction of US 641 and KY 94,
9. 0.10 mile west of the junction of KY 280 (east) and KY 94,
10. 0.70, 1.00, 1.90 and 2.60 miles east of the junction of KY 280 (east) and KY 94,
11. 0.20 mile east of the junction of KY 732 (east) and KY 94,
12. Adjacent to the Jonathan Creek bridge,
13. 0.20, 0.80, 1.30, 1.60 and 2.20 miles east of the Jonathan Creek bridge,
14. 0.0 and 0.60 mile east of the junction of KY 1551 (west) and KY 94,
15. 0.10, 0.80, 1.10, and 1.50 miles east of the junction of KY 1346 (west) and KY 94, and
16. 0.07 and 1.07 miles east of the Ledbetter bridge.

**US 641**

1. 0.60 mile south of the Clarks River bridge,
2. 0.45, 0.65, 0.95, 1.50, 2.10 and 2.60 miles north of Clarks River bridge, and
3. At the southern city limits of Murray.

**KY 121**

1. At the junction of KY 660 (north) and KY 121,
2. 0.20 mile north of the junction of KY 783 (north) and KY 121,
3. At the junction of KY 783 (south) and 0.30, 0.40 and 0.80 mile north of the junction,
4. 0.20 mile north of the junction of KY 299 (north) and KY 121,
5. 0.75 and 1.15 miles north of the junction of KY 299 (west) and KY 121, and
6. 0.50, 0.70 and 0.95 mile north of the junction of KY 1836 and KY 121.
WATER TOWER

A water tower is approximately 75 feet from KY 94 at milepost 14.60. It is possible that the tower could fail during a major earthquake and temporarily block the priority route.

SIGN

A large road sign located at milepost 10.20 on KY 94 could fail during an earthquake and temporarily block the route.

BUILDINGS

A three story masonry building is located on KY 94 in Murray at milepost 10.30. In many of the cities located on priority routes there are numerous buildings that are brick veneer and their seismic response is unknown. An analysis of each of those for seismic response would be prohibitive in terms of cost and time. Most cities including Murray should have multiple detours that could be used in the event collapse of a building closed a priority route.

QUARRY'S

There are several open pit sand and gravel quarry's in Calloway County. A major earthquake could collapse portions of the quarry walls and could temporarily block or destroy a section of a priority route. Several of the quarry's were logged from geologic quadrangle maps and are not visible from the priority route. Further inspection should be conducted to determine if there is a possible threat to a priority route. Quarry's were logged at the following locations:

KY 94

1. 0.23 mile east of the Clayton Creek bridge.

2. 0.15 mile west of the junction of KY 732 (east) and KY 94.

3. 0.98 mile east of the Jonathan Creek bridge, and

4. 0.05 mile east of the junction of KY 1346 (west) and KY 94.

KY 121

1. 0.65 mile north of the junction of US 641 and KY 121.

ALLUVIUM

Soil maps for Calloway County indicate that there are moderate amounts of alluvium present throughout the county. Alluvium is a loose, fine-grain soil which is deposited by flowing water such as creeks and rivers. Due to the nature of the alluvium, ground motions at the surface of the soil can be many times greater than those within the underlying bedrock and temporary liquefaction can occur (Figure 2). An alluvium map for Calloway County is shown in Figure 3.

CONCLUSIONS

In 1984, ESTS developed a fivefold plan of action for formulating and implementing a seismic mitigation policy for the western Kentucky seismic zone. To date, the Kentucky Transportation Center has established priority routes for all 26 counties in the western Kentucky seismic zone and developed seismic risk maps of all natural and man-made features that are susceptible to earthquake damage that could jeopardize the priority routes.

Current work is being conducted to
analyze these features and make
recommendations for hardening them
against earthquake damage.

Future work involves training key
personnel in the Transportation
Cabinet in hazard mitigation and
seismic safety; which includes bridge
inspectors, district engineers,
construction inspectors, designers,
and maintenance personnel.

Following the education of key
personnel, the mitigation plan
proposed by the Kentucky
Transportation Center will be
reviewed by the Kentucky
Transportation Cabinet and a
program will be established for
implementation. The final step
involves the use of relevant seismic
codes for all new construction,
repair, and maintenance.

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2. Green, N. B., "Earthquake
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Additional Information

The Commonwealth of Kentucky has prepared a State Emergency Operations Procedures (State EOP) manual that is produced by the Division of Disaster and Emergency Services (DES), Department of Military Affairs, Frankfort, 40601. Annexes H. on Transportation and DD on Earthquakes give additional information on disaster preparedness and response.

A copy of the State EOP and information on local hazard mitigation activities and response preparedness are available from the AREA 1 Office of DES which is located in Mayfield. The phone numbers at this office are (502) 564-8601 and (502) 247-9712.

Additional information about the study discussed in this report should be directed to David L. Allen, Project Director, at the Kentucky Transportation Center, (606) 257-4513. Requests to be placed on the mailing list for updated information should be submitted on your company or agency letterhead to the Kentucky Transportation Center at the University of Kentucky, Lexington Kentucky 40506-0043.
Figure 1: The twenty-six counties included in this study area.
Table 1: MODIFIED MERCALLI INTENSITY SCALE
Modified Mercalli Intensity Scale, 1956 Version

The following comments by Dr. Richter precede the published statement of the intensity scale:

Each effect is named at the level of intensity at which it first appears frequently and characteristically. Each effect may be found less strongly, or in fewer instances, at the next lower grade of intensity; more strongly or more often at the next higher grade. A few effects are named at two successive levels to indicate a more gradual increase.

Masonry A, B, C, D. To avoid ambiguity of language, the quality of masonry, brick or otherwise, is specified by the following lettering.

Masonry A. Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.

Masonry B. Good workmanship and mortar, reinforced by not designed to resist lateral forces.

Masonry C. Ordinary workmanship and mortar; no extreme weakness like failing to tie corners, but neither reinforced nor designed against horizontal forces.

Masonry D. Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.

The following list represents the twelve grades of the scale.

I. Not felt. Marginal and long-period effects of large earthquakes.

II. Felt by persons at rest, on upper floors, or favorable places.

III. Felt indoors; Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.


V. Felt outdoors; direction estimated. Sleepers awakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Illusions, pictures move. Pendulum clocks stop, start, change rate.


VIII. Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none in masonry A. Fall of chimneys and some masonry walls. Fixtures, fall of chimneys, hanging objects, pipes, shutters, chandeliers, doors, windows, frames, houses moved on foundation if not bolted down; house pans; walls thrown out. Deceived piping broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.

IX. General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. Frame structures, if not bolted, shifted off foundations. Frames cracked. Severe damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluviated areas sand and mud ejected, earthquake fountains, sand crater.

X. Most masonry and frame structures destroyed with their foundations. Some will-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large land slides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat lands. Earth bent slightly.

XI. Rails bent greatly. Underground pipelines completely out of service.

XII. Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown in the air.
AMPLIFICATION OF SHAKING AND
DAMAGE DUE TO SHAKING

Figure 2: Amplification of shaking in softer rock & soil during an earthquake.
Figure 3. Alluvium map for Calloway County.
APPENDIX A

STRIP MAP FOR CALLOWAY COUNTY

KY 94, US 641, AND KY 121
LEGEND OF FEATURES

- BRIDGE
- OUT SLOPE
- BUILDING
- FILL
- OTHER
- TREE
- POWER LINE
- SIGN
- QUAD
- FRUIT
- PIPELINE
- MINE
- TANK
- DAM

SEE REPORT FOR DESCRIPTIONS OF OTHER
APPENDIX B

SEISMICALLY SIGNIFICANT FEATURES
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Report by Road and Milepoint
for Calloway County - Kentucky

KY 94

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<th>Data</th>
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Road Surface Type - Flexible |
| 5.10      | Trees   | Number of Trees 3  
Height 50 feet  
Diameter 20 in.  
Ending Milepoint 5.10  
Distance From Road 15 feet  
Road Surface Type - Flexible |
| 5.15      | Bridge  | Number of Spans 1  
Over Stream Concrete T-Beam  
End 1 Fixed  
End 2 Fixed  
Deck Type - Concrete  
Length 39 feet  
Width 19 feet  
Pier Type - Solid  
SPC Rating - C  
Surface Type - Flexible  
Expansion Type - Other  
End 1 Substructure - Full  
End 2 Substructure - Full  
Foundation Type - Unknown |
| 5.40      | Trees   | Number of Trees 20  
Height 50 feet  
Diameter 15 in.  
Ending Milepoint 5.60  
Distance From Road 15 feet  
Road Surface Type - Flexible |
| 5.60      | Other   | Junction KY 783 Heading South  
Road Surface Type - Flexible |
| 6.10      | Other   | Junction KY 783 Heading North  
Road Surface Type - Flexible |
| 6.20      | Trees   | Number of Trees 3  
Height 50 feet  
Diameter 15 in.  
Ending Milepoint 6.20  
Distance From Road 15 feet  
Road Surface Type - Flexible |
### Milepoint Feature Data

<table>
<thead>
<tr>
<th>Milepoint</th>
<th>Feature</th>
<th>Data</th>
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</thead>
</table>
| 6.44      | Bridge | Number of Spans 1 Over Stream Concrete T-Beam  
End 1 Fixed  
End 2 Fixed  
Deck Type - Concrete  
Length 25 feet  
Width 19 feet  
Pier Type - Solid  
SPC Rating - C  
Surface Type - Flexible  
Expansion Type - Other  
End 1 Substructure - Full  
End 2 Substructure - Full  
Foundation Type - Unknown |
| 6.60      | Trees  | Number of Trees 40 Height 40 feet  
Diameter 13 in.  
Ending Milepoint 6.90  
Distance From Road 12 feet  
Road Surface Type - Flexible |
| 7.30      | Trees  | Number of Trees 40 Height 50 feet  
Diameter 15 in.  
Ending Milepoint 7.60  
Distance From Road 10 feet  
Road Surface Type - Flexible |
| 7.70      | Other  | Junction KY 1660 Heading North-South  
Road Surface Type - Flexible |
| 8.68      | Power Line | Electrical Power Line 3 Lines Height 35 feet  
Wood Support Structure - Unknown  
Volts  
Road Surface Type - Flexible |
| 8.70      | Trees  | Number of Trees 500 Height 35 feet  
Diameter 24 in.  
Ending Milepoint 9.70  
Distance From Road 15 feet  
Road Surface Type - Flexible |
| 9.80      | Trees  | Number of Trees 100 Height 35 feet  
Diameter 24 in.  
Ending Milepoint 10.00  
Distance From Road 12 feet  
Road Surface Type - Flexible |
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<tr>
<td>9.85</td>
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<td>9.85</td>
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<td>Junction US 641 Heading North-South</td>
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<td>10.00</td>
<td>Trees</td>
<td>Number of Trees 100</td>
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<tr>
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<td></td>
<td>Height 45 feet</td>
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<td></td>
<td>Diameter 12 in.</td>
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<td></td>
<td>Ending Milepoint 10.40</td>
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<td>Distance From Road 15 feet</td>
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<td>Road Surface Type - Flexible</td>
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<tr>
<td>10.20</td>
<td>Sign</td>
<td>Roadside Sign Height 25 feet</td>
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<tr>
<td></td>
<td></td>
<td>Area 50 square feet</td>
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<tr>
<td></td>
<td></td>
<td>Road Surface Type - Flexible</td>
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<tr>
<td></td>
<td></td>
<td>Aluminum Support Structure</td>
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<td>10.30</td>
<td>Building</td>
<td>Urban Location Masonary Building</td>
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<td></td>
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<td>Area/Floor Approximately 50,000 square feet</td>
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<td>Community Use - 3 Floors</td>
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</tr>
<tr>
<td>10.60</td>
<td>Power Line</td>
<td>Electrical Power Line 3 Lines Height 25 feet</td>
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<td></td>
<td></td>
<td>Wood Support Structure Unknown Volts</td>
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<td>Road Surface Type - Flexible</td>
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<tr>
<td>10.72</td>
<td>Fault</td>
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<td>10.99</td>
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<td>Road Surface Type - Flexible</td>
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<tr>
<td>10.99</td>
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<td>Murray Waste Disposal Plant</td>
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<tr>
<td>11.00</td>
<td>Other</td>
<td>City of Murray</td>
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<td>Road Surface Type - Flexible</td>
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<td>Milepoint</td>
<td>Feature</td>
<td>Data</td>
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<tr>
<td>11.10</td>
<td>Fill</td>
<td>Material Type: Soil, Height: 20 feet, Road Slope: 2:1, Length: 1,000 feet, Crest: 40 feet, Type Fill: Side Hill, Road Surface Type: Flexible.</td>
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</table>
| 11.40     | Fill | Material Type: Soil, Height: 20 feet, Road Slope: 2:1, Length: 500 feet, Crest: 40 feet, Type Fill: Other, Road Surface Type: Flexible.
<table>
<thead>
<tr>
<th>Milepoint</th>
<th>Feature</th>
<th>Data</th>
</tr>
</thead>
</table>
| 11.44     | Bridge    | Number of Spans: 4  
Over Stream: Concrete I-Beam  
End 1 Neoprene  
Pier 1 Neoprene  
Pier 2 Neoprene  
Pier 3 Neoprene  
End 2 Neoprene  
Deck Type: Concrete  
Length: 222 feet  
Width: 44 feet  
Pier Type: Solid  
SPC Rating: C  
Surface Type: Flexible  
Expansion Type: Poured Compression  
End 1 Substructure: Full  
End 2 Substructure: Full  
Foundation Type: Unknown |
| 11.50     | Power Line| Electrical Power Line  
12 Lines  
Height: 60 feet  
Steel Support Structure: Unknown  
Volts: Unknown  
Road Surface Type: Flexible |
| 11.67     | Other     | Quarry  
Road Surface Type: Flexible |
| 12.80     | Trees     | Number of Trees: 10  
Height: 45 feet  
Diameter: 30 in.  
Ending Milepoint: 12.81  
Distance From Road: 12 feet  
Road Surface Type: Flexible |
| 12.90     | Other     | Junction KY 280 Heading East  
Road Surface Type: Flexible |
| 13.15     | Other     | Minnow Pond  
Road Surface Type: Flexible |
| 13.60     | Trees     | Number of Trees: 2  
Height: 55 feet  
Diameter: 24 in.  
Ending Milepoint: 13.60  
Distance From Road: 20 feet  
Road Surface Type: Flexible |
| 13.90     | Trees     | Number of Trees: 2  
Height: 55 feet  
Diameter: 24 in.  
Ending Milepoint: 13.90  
Distance From Road: 20 feet  
Road Surface Type: Flexible |
<table>
<thead>
<tr>
<th>Milepoint</th>
<th>Feature</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>14.80</td>
<td>Trees</td>
<td>Number of Trees 100  Height 45 feet  Distance From Road 15 feet  Road Surface Type - Flexible</td>
</tr>
<tr>
<td>14.80</td>
<td>Trees</td>
<td>Number of Trees 50  Height 40 feet  Distance From Road 10 feet  Road Surface Type - Flexible</td>
</tr>
<tr>
<td>15.75</td>
<td>Other</td>
<td>Quarry  Road Surface Type - Flexible</td>
</tr>
<tr>
<td>15.90</td>
<td>Other</td>
<td>Junction KY 732 Heading East  Road Surface Type - Flexible</td>
</tr>
<tr>
<td>16.10</td>
<td>Trees</td>
<td>Number of Trees 25  Height 40 feet  Distance From Road 20 feet  Road Surface Type - Flexible</td>
</tr>
<tr>
<td>16.49</td>
<td>Bridge</td>
<td>Number of Spans 1  Over Stream  Concrete T-Beam  End 1 Fixed  End 2 Fixed  Deck Type - Concrete  Length 45 feet  Width 19 feet  Pier Type - Solid  SPC Rating - C  Surface Type - Flexible  Expansion Type - Other  End 1 Substructure - Full  End 2 Substructure - Full  Foundation Type - Unknown</td>
</tr>
<tr>
<td>17.10</td>
<td>Trees</td>
<td>Number of Trees 15  Height 35 feet  Distance From Road 15 feet  Road Surface Type - Flexible</td>
</tr>
</tbody>
</table>
## Report by Road and Milepoint for Calloway County - Kentucky

### KY 94

<table>
<thead>
<tr>
<th>Milepoint</th>
<th>Feature</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>17.10</td>
<td>Bridge</td>
<td><strong>Number of Spans</strong>: 2  <strong>Over Stream</strong>: Concrete T-Beam  <strong>End 1 Fixed Pier</strong>: 1 Fixed  <strong>End 2 Fixed Pier</strong>: 1 Fixed  <strong>Deck Type</strong>: Concrete  <strong>Length</strong>: 77 feet  <strong>Width</strong>: 19 feet  <strong>Pier Type</strong>: Solid  <strong>SPC Rating</strong>: C  <strong>Surface Type</strong>: Flexible  <strong>Expansion Type</strong>: Other  <strong>End 1 Substructure</strong>: Full  <strong>End 2 Substructure</strong>: Full  <strong>Foundation Type</strong>: Unknown</td>
</tr>
<tr>
<td>17.30</td>
<td>Trees</td>
<td><strong>Number of Trees</strong>: 50  <strong>Height</strong>: 35 feet  <strong>Diameter</strong>: 15 in.  <strong>Ending Milepoint</strong>: 17.50  <strong>Distance From Road</strong>: 15 feet  <strong>Road Surface Type</strong>: Flexible</td>
</tr>
<tr>
<td>17.90</td>
<td>Trees</td>
<td><strong>Number of Trees</strong>: 70  <strong>Height</strong>: 50 feet  <strong>Diameter</strong>: 18 in.  <strong>Ending Milepoint</strong>: 18.30  <strong>Distance From Road</strong>: 15 feet  <strong>Road Surface Type</strong>: Flexible</td>
</tr>
<tr>
<td>18.08</td>
<td>Other</td>
<td><strong>Gravel Pit</strong>  <strong>Road Surface Type</strong>: Flexible</td>
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<tr>
<td>18.40</td>
<td>Trees</td>
<td><strong>Number of Trees</strong>: 50  <strong>Height</strong>: 40 feet  <strong>Diameter</strong>: 13 in.  <strong>Ending Milepoint</strong>: 18.60  <strong>Distance From Road</strong>: 15 feet  <strong>Road Surface Type</strong>: Flexible</td>
</tr>
<tr>
<td>18.70</td>
<td>Trees</td>
<td><strong>Number of Trees</strong>: 8  <strong>Height</strong>: 40 feet  <strong>Diameter</strong>: 13 in.  <strong>Ending Milepoint</strong>: 18.80  <strong>Distance From Road</strong>: 15 feet  <strong>Road Surface Type</strong>: Flexible</td>
</tr>
<tr>
<td>19.00</td>
<td>Other</td>
<td><strong>Junction KY 464 Heading West</strong>  <strong>Road Surface Type</strong>: Flexible</td>
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<tr>
<td>19.30</td>
<td>Trees</td>
<td><strong>Number of Trees</strong>: 5  <strong>Height</strong>: 50 feet  <strong>Diameter</strong>: 18 in.  <strong>Ending Milepoint</strong>: 19.32  <strong>Distance From Road</strong>: 20 feet  <strong>Road Surface Type</strong>: Flexible</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Milepoint</th>
<th>Feature</th>
<th>Data</th>
</tr>
</thead>
</table>
| 19.60     | Other   | Junction KY 1551 Heading West  
|           |         | Road Surface Type - Flexible |
| 19.60     | Trees   | Number of Trees 25  Height 40 feet  
|           |         | Diameter 15 in.  Ending Milepoint 20.20  
|           |         | Distance From Road 10 feet  
|           |         | Road Surface Type - Flexible |
| 20.50     | Trees   | Number of Trees 40  Height 40 feet  
|           |         | Diameter 15 in.  Ending Milepoint 21.00  
|           |         | Distance From Road 15 feet  
|           |         | Road Surface Type - Flexible |
| 21.00     | Other   | Junction KY 1346 Heading West  
|           |         | Road Surface Type - Flexible |
| 21.05     | Other   | Gravel Pit  
|           |         | Road Surface Type - Flexible |
| 21.10     | Trees   | Number of Trees 150  Height 45 feet  
|           |         | Diameter 15 in.  Ending Milepoint 21.40  
|           |         | Distance From Road 10 feet  
|           |         | Road Surface Type - Flexible |
| 21.80     | Trees   | Number of Trees 200  Height 45 feet  
|           |         | Diameter 13 in.  Ending Milepoint 22.00  
|           |         | Distance From Road 15 feet  
|           |         | Road Surface Type - Flexible |
| 22.10     | Trees   | Number of Trees 75  Height 60 feet  
|           |         | Diameter 13 in.  Ending Milepoint 22.30  
|           |         | Distance From Road 15 feet  
|           |         | Road Surface Type - Flexible |
| 22.50     | Trees   | Number of Trees 20  Height 40 feet  
|           |         | Diameter 13 in.  Ending Milepoint 22.51  
|           |         | Distance From Road 15 feet  
<p>|           |         | Road Surface Type - Flexible |</p>
<table>
<thead>
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<td>22.70</td>
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<td>Junction KY 497 Heading East</td>
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<td>Road Surface Type - Flexible</td>
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<tr>
<td>23.03</td>
<td>Bridge</td>
<td>Number of Spans 2 Over Stream Concrete T-Beam</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End 1 Fixed Pier 1 Fixed End 2 Fixed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deck Type - Concrete Length 46 feet</td>
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<tr>
<td></td>
<td></td>
<td>Width 19 feet Pier Type - Solid</td>
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<td></td>
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<td>SPC Rating - C Surface Type - Flexible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expansion Type - Other</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End 1 Substructure - Full</td>
</tr>
<tr>
<td></td>
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<td>End 2 Substructure - Full</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foundation Type - Unknown</td>
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<td>23.10</td>
<td>Trees</td>
<td>Number of Trees 60 Height 40 feet</td>
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<td>Diameter 12 in. Ending Milepoint 23.80</td>
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<td>Distance From Road 15 feet</td>
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<td>Road Surface Type - Flexible</td>
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<td>24.00</td>
<td>Fill</td>
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<td>Side slope 1.5 Length 300 feet</td>
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<td>Crest 30 feet Type Fill - Other</td>
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<td>24.10</td>
<td>Trees</td>
<td>Number of Trees 15 Height 45 feet</td>
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<td>Distance From Road 15 feet</td>
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<tr>
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Report by Road and Milepoint for Calloway County - Kentucky

<table>
<thead>
<tr>
<th>Milepoint</th>
<th>Feature</th>
<th>Data</th>
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</thead>
</table>
| 0.10      | Other   | City of Hazel in Kentucky  
Road Surface Type - Flexible |
| 0.55      | Trees   | Number of Trees 10  
Height 45 feet  
Diameter 18 in.  
Ending Milepoint 0.59  
Distance From Road 15 feet  
Road Surface Type - Flexible |
| 1.10      | Fill    | Material Type - Soil  
Height 10 feet  
Side slope 2:1  
Length 150 feet  
Crest 40 feet  
Type Fill - Other  
Road Surface Type - Flexible |
| 1.15      | Bridge  | Number of Spans 4  
Over Stream  
Concrete I-Beam  
End 1 Fixed Pier 1 Fixed Pier 2 Fixed Pier 2 Fixed  
Deck Type - Concrete  
Length 173 feet  
Width 45 feet  
Pier Type - Cantilever  
SPC Rating - C  
Surface Type - Flexible  
Expansion Type - Poured Compression  
End 1 Substructure - Full  
End 2 Substructure - Full  
Foundation Type - Unknown |
| 1.20      | Fill    | Material Type - Soil  
Height 7 feet  
Side slope 3:1  
Length 150 feet  
Crest 40 feet  
Type Fill - Other  
Road Surface Type - Flexible |
| 1.60      | Trees   | Number of Trees 20  
Height 45 feet  
Diameter 18 in.  
Ending Milepoint 1.68  
Distance From Road 18 feet  
Road Surface Type - Flexible |
| 1.80      | Trees   | Number of Trees 10  
Height 40 feet  
Diameter 18 in.  
Ending Milepoint 1.86  
Distance From Road 15 feet  
Road Surface Type - Flexible |
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<tbody>
<tr>
<td>2.10</td>
<td>Trees</td>
<td>Number of Trees 1 Height 40 feet Diameter 15 in. Ending Milepoint 2.10 Distance From Road 10 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>2.65</td>
<td>Trees</td>
<td>Number of Trees 2 Height 45 feet Diameter 24 in. Ending Milepoint 2.67 Distance From Road 8 feet Road Surface Type - Flexible</td>
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<tr>
<td>3.25</td>
<td>Trees</td>
<td>Number of Trees 12 Height 50 feet Diameter 18 in. Ending Milepoint 3.31 Distance From Road 20 feet Road Surface Type - Flexible</td>
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<tr>
<td>3.50</td>
<td>Other</td>
<td>Junction KY 1828 Heading East &amp; West Road Surface Type - Flexible</td>
</tr>
<tr>
<td>3.75</td>
<td>Trees</td>
<td>Number of Trees 1 Height 40 feet Diameter 18 in. Ending Milepoint 3.75 Distance From Road 12 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>5.49</td>
<td>Bridge</td>
<td>Number of Spans 1 Over Stream Concrete I-Beam End 1 Fixed End 2 Fixed Deck Type - Concrete Length 80 feet Width 40 feet Pier Type - Unknown SPC Rating - C Surface Type - Flexible Expansion Type - Poured Compression End 1 Substructure - Full End 2 Substructure - Full Foundation Type - Unknown</td>
</tr>
<tr>
<td>5.50</td>
<td>Fill</td>
<td>Material Type - Soil Height 6 feet Side slope 2:1 Length 100 feet Crest 40 feet Type Fill - Other Road Surface Type - Flexible</td>
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<tr>
<td>Milepoint</td>
<td>Feature</td>
<td>Data</td>
</tr>
<tr>
<td>-----------</td>
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</table>
| 5.60      | Fill    | Material Type - Soil  Height 7 feet  
|           |         | Side slope 5:2  Length 200 feet  
|           |         | Crest 40 feet  Type Fill - Other  
|           |         | Road Surface Type - Flexible |
| 5.65      | Fill    | Material Type - Soil  Height 10 feet  
|           |         | Side slope 2:1  Length 250 feet  
|           |         | Crest 48 feet  Type Fill - Other  
|           |         | Road Surface Type - Flexible |
| 5.66      | Bridge  | Number of Spans 3  Type Unknown  Concrete T-Beam  
|           |         | End 1 Fixed  Pier 1 Fixed  Pier 2 Fixed  
|           |         | End 2 Fixed  Deck Type - Concrete  Length 238 feet  
|           |         | Width 48 feet  Pier Type - Solid  
|           |         | SPC Rating - C  Surface Type - Flexible  
|           |         | Expansion Type - Other  
|           |         | End 1 Substructure - Full  
|           |         | End 2 Substructure - Full  
|           |         | Foundation Type - Unknown |
| 5.75      | Fill    | Material Type - Soil  Height 15 feet  
|           |         | Side slope 3:1  Length 250 feet  
|           |         | Crest 48 feet  Type Fill - Other  
|           |         | Road Surface Type - Flexible |
| 6.30      | Other   | City of Murray  
|           |         | Road Surface Type - Flexible |
| 6.30      | Trees   | Number of Trees 10  Height 50 feet  
|           |         | Diameter 18 in.  Ending Milepoint 6.33  
|           |         | Distance From Road 15 feet  
|           |         | Road Surface Type - Flexible |
| 8.90      | Fill    | Material Type - Soil  Height 6 feet  
|           |         | Side slope 2:1  Length 150 feet  
|           |         | Crest 80 feet  Type Fill - Other  
<p>|           |         | Road Surface Type - Flexible |</p>
<table>
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<tr>
<th>Milepoint</th>
<th>Feature</th>
<th>Data</th>
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<tbody>
<tr>
<td>8.92</td>
<td>Bridge</td>
<td>Number of Spans 3, Over Stream Concrete Box Beam&lt;br&gt;End 1 Fixed Pier 1 Neoprene Pier 2 Neoprene&lt;br&gt;End 2 Fixed&lt;br&gt;Deck Type - Concrete Length 79 feet&lt;br&gt;Width 80 feet Pier Type - Solid&lt;br&gt;SPC Rating - C Surface Type - Flexible&lt;br&gt;Expansion Type - Other&lt;br&gt;End 1 Substructure - Stub&lt;br&gt;End 2 Substructure - Stub&lt;br&gt;Foundation Type - Unknown</td>
</tr>
<tr>
<td>8.95</td>
<td>Fill</td>
<td>Material Type - Soil Height 10 feet&lt;br&gt;Side slope 5:2 Length 200 feet&lt;br&gt;Crest 80 feet Type Fill - Other&lt;br&gt;Road Surface Type - Flexible</td>
</tr>
<tr>
<td>9.10</td>
<td>Power Line</td>
<td>Electrical Power Line 30 Lines Height 3 feet&lt;br&gt;Steel Support Structure Unknown Volts&lt;br&gt;Road Surface Type - Flexible</td>
</tr>
<tr>
<td>11.75</td>
<td>Other</td>
<td>Junction KY 1429 Heading West&lt;br&gt;Road Surface Type - Flexible</td>
</tr>
<tr>
<td>12.30</td>
<td>Other</td>
<td>Junction KY 1824 Heading North&lt;br&gt;Road Surface Type - Flexible</td>
</tr>
<tr>
<td>13.80</td>
<td>Other</td>
<td>Junction KY 464 Heading East &amp; West&lt;br&gt;Road Surface Type - Flexible</td>
</tr>
<tr>
<td>14.45</td>
<td>Fill</td>
<td>Material Type - Soil Height 30 feet&lt;br&gt;Side slope 5:1 Length 800 feet&lt;br&gt;Crest 120 feet Type Fill - Other&lt;br&gt;Road Surface Type - Flexible</td>
</tr>
<tr>
<td>15.60</td>
<td>Fill</td>
<td>Material Type - Soil Height 15 feet&lt;br&gt;Side slope 2:1 Length 300 feet&lt;br&gt;Crest 60 feet Type Fill - Other&lt;br&gt;Road Surface Type - Flexible</td>
</tr>
<tr>
<td>Milepoint</td>
<td>Feature</td>
<td>Data</td>
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</tbody>
</table>
| 15.65     | Other   | North and Southbound Bridges  
Road Surface Type - Flexible |
| 15.70     | Fill    | Material Type - Soil  
Height 15 feet  
Side slope 2:1  
Length 400 feet  
Crest 60 feet  
Type Fill - Other  
Road Surface Type - Flexible |
| 15.81     | Bridge  | Number of Spans 3  
Over Stream  
Concrete I-Beam  
End 1 Neoprene  
Pier 1 Fixed  
Pier 2 Fixed  
END 2 Neoprene  
Deck Type - Concrete  
Length 225 feet  
Width 40 feet  
Pier Type - Open  
SPC Rating - C  
Surface Type - Flexible  
Expansion Type - Poured Compression  
End 1 Substructure - Stub  
End 2 Substructure - Stub  
Foundation Type - Unknown |
| 15.85     | Fill    | Material Type - Soil  
Height 15 feet  
Side slope 2:1  
Length 150 feet  
Crest 60 feet  
Type Fill - Other  
Road Surface Type - Flexible |
| 16.30     | Other   | Junction KY 1346 Heading East  
Road Surface Type - Flexible |
| 17.45     | Other   | Calloway Co - Marshall Co Boundary  
Road Surface Type - Flexible |
<table>
<thead>
<tr>
<th>Milepoint</th>
<th>Feature</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>14.60</td>
<td>Other</td>
<td>Junction US 641 Heading North-South Road Surface Type - Flexible</td>
</tr>
<tr>
<td>15.10</td>
<td>Power Line</td>
<td>Electrical Power Line 3 Lines Height 30 feet Wood Support Structure Unknown Volts Road Surface Type - Flexible</td>
</tr>
<tr>
<td>15.25</td>
<td>Other</td>
<td>Quarry Road Surface Type - Flexible</td>
</tr>
<tr>
<td>15.40</td>
<td>Other</td>
<td>City of Murray Road Surface Type - Flexible</td>
</tr>
<tr>
<td>16.70</td>
<td>Other</td>
<td>Junction KY 660 Heading North Road Surface Type - Flexible</td>
</tr>
<tr>
<td>16.70</td>
<td>Trees</td>
<td>Number of Trees 30 Height 45 feet Diameter 18 in. Ending Milepoint 16.80 Distance From Road 15 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>17.30</td>
<td>Other</td>
<td>Junction KY 783 Heading North Road Surface Type - Flexible</td>
</tr>
<tr>
<td>17.50</td>
<td>Trees</td>
<td>Number of Trees 30 Height 45 feet Diameter 18 in. Ending Milepoint 17.80 Distance From Road 15 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>18.40</td>
<td>Other</td>
<td>Junction KY 783 Heading South Road Surface Type - Flexible</td>
</tr>
<tr>
<td>18.40</td>
<td>Trees</td>
<td>Number of Trees 20 Height 45 feet Diameter 18 in. Ending Milepoint 18.60 Distance From Road 15 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>Milepoint</td>
<td>Feature</td>
<td>Data</td>
</tr>
<tr>
<td>-----------</td>
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</tr>
<tr>
<td>18.70</td>
<td>Trees</td>
<td>Number of Trees 4 Height 45 feet Diameter 18 in. Ending Milepoint 18.70 Distance From Road 15 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>18.80</td>
<td>Trees</td>
<td>Number of Trees 20 Height 45 feet Diameter 18 in. Ending Milepoint 18.85 Distance From Road 15 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>19.20</td>
<td>Trees</td>
<td>Number of Trees 12 Height 45 feet Diameter 18 in. Ending Milepoint 19.21 Distance From Road 15 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>19.40</td>
<td>Other</td>
<td>Junction KY 299 Heading North Road Surface Type - Flexible</td>
</tr>
<tr>
<td>19.60</td>
<td>Trees</td>
<td>Number of Trees 12 Height 45 feet Diameter 18 in. Ending Milepoint 19.61 Distance From Road 15 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>19.85</td>
<td>Other</td>
<td>Junction KY 299 Heading West Road Surface Type - Flexible</td>
</tr>
<tr>
<td>20.60</td>
<td>Trees</td>
<td>Number of Trees 5 Height 50 feet Diameter 22 in. Ending Milepoint 20.62 Distance From Road 15 feet Road Surface Type - Flexible</td>
</tr>
<tr>
<td>20.60</td>
<td>Fill</td>
<td>Material Type - Soil Height 25 feet Side slope 2:1 Length 100 feet Crest 26 feet Type Fill - Other Road Surface Type - Flexible</td>
</tr>
<tr>
<td>21.00</td>
<td>Trees</td>
<td>Number of Trees 70 Height 45 feet Diameter 15 in. Ending Milepoint 21.30 Distance From Road 15 feet Road Surface Type - Flexible</td>
</tr>
</tbody>
</table>
Milepoint | Feature | Data
--- | --- | ---
21.57 | Bridge | Number of Spans 8 Over Stream Concrete I-Beam
| | | End 1 Fixed Pier 1 Fixed Pier 2 Fixed
| | | Pier 3 Fixed Pier 4 Fixed Pier 5 Fixed
| | | Pier 6 Fixed Pier 7 Fixed End 2 Fixed
| | | Deck Type - Concrete Length 266 feet
| | | Width 43 feet Pier Type - Unknown
| | | SPC Rating - C Surface Type - Flexible
| | | Expansion Type - Other
| | | End 1 Substructure - Full
| | | End 2 Substructure - Full
| | | Foundation Type - Unknown

22.20 | Other | Junction KY 1836 Heading South
| | | Road Surface Type - Flexible

22.70 | Trees | Number of Trees 15 Height 45 feet
| | | Diameter 15 in. Ending Milepoint 22.80
| | | Distance From Road 15 feet
| | | Road Surface Type - Flexible

22.90 | Other | Junction KY 1836 Heading North
| | | Road Surface Type - Flexible

22.90 | Trees | Number of Trees 10 Height 45 feet
| | | Diameter 15 in. Ending Milepoint 22.91
| | | Distance From Road 15 feet
| | | Road Surface Type - Flexible

23.15 | Trees | Number of Trees 20 Height 50 feet
| | | Diameter 18 in. Ending Milepoint 23.40
| | | Distance From Road 20 feet
| | | Road Surface Type - Flexible

23.50 | Fill | Material Type - Soil Height 15 feet
| | | Side slope 2:1 Length 500 feet
| | | Crest 25 feet Type Fill - Other
| | | Road Surface Type - Flexible
<table>
<thead>
<tr>
<th>Milepoint</th>
<th>Feature</th>
<th>Data</th>
</tr>
</thead>
</table>
| 23.90     | Pipeline| Pipeline Type - Natural Gas  
|           |         | Road Surface Type - Flexible |
| 23.90     | Fill    | Material Type - Soil  
|           |         | Height 15 feet  
|           |         | Side slope 2:1  
|           |         | Length 500 feet  
|           |         | Crest 25 feet  
|           |         | Type Fill - Other  
|           |         | Road Surface Type - Flexible |
| 24.60     | Power   | Electrical Power Line  
|           |         | 3 Lines  
|           |         | Height 30 feet  
|           |         | Wood Support Structure - Unknown Volts  
|           |         | Road Surface Type - Flexible |
| 24.80     | Pipeline| Pipeline Type - Natural Gas  
|           |         | Road Surface Type - Flexible |
| 24.81     | Other   | Junction KY 893 Heading North-South  
|           |         | Road Surface Type - Flexible |
| 24.81     | Other   | Calloway Co - Graves Co Boundary  
|           |         | Road Surface Type - Flexible |