Appendix F

Geotechnical Assessment

P-007-2013

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M E M O R A N D U M

TO: Keith Dotson
Division of Planning

BY: Bart Asher, P.E., P.L.S.
Geotechnical Branch Manager

DATE: September 25, 2013

SUBJECT: **McCracken County**
Proposed Spot Improvements
KY 1286/KY 998 Planning Study
Item # 1-153.00
MARS # 8687701P
Preliminary Geotechnical Assessment

The Division of Planning is conducting a study for improvements on KY 1286 (Friendship Road) and KY 998 in McCracken County, Kentucky. This project is located in McCracken County, KY between US 45 to US 60 as depicted on the site map. This abbreviated review will discuss some general geotechnical concerns with the area.

The study area is located in the Mississippian Embayment or Jackson Purchase Physiographic Region. The Kentucky Geological Survey web site states that:

The Jackson Purchase, or Mississippi Embayment Region is located in western Kentucky where Cretaceous and Tertiary sediments occur at the surface. The Jackson Purchase is the northeastern part of the upper Mississippi Embayment, a part of the Gulf Coastal Plain. The Mississippi River Valley is situated along the axis of the embayment. Because most of the Cretaceous, Tertiary and Quaternary deposits are unconsolidated sediment instead of rock, they are easily eroded, and, consequently, this part of Kentucky is relatively flat lying, with numerous lakes, ponds, sloughs, and swamps. Local relief is generally less than 100 feet, and the lowest spot in the State, at only 260 feet above sea level, is found here.

The approximate coordinates for the center of this site are : 37.053097 degrees North and -88.676922 degrees West. The site is located in the Paducah West (657) Geologic Quadrangles.
Available mapping indicates that the study area may have a fault running through the northwest portion of the area. Mapping also indicates that bank gravel has been mined in numerous places in the area. Glauconite outcrops and boulders in excess of 3 feet in dimension could be encountered in the area of the alignment. The mapping indicates the material in the area consists of alluvium, loess, Porters Creek Clay, Wilcox Formation (clay), and Continenal Deposits. Clays in this area, most notably of the Porters Creek Formation, are known to be expansive.

Foundations for bridges in this area would typically be founded on deep foundations such as steel or concrete friction piles. Culverts and walls are typically supported on shallow (yielding) foundations.

Soils in the area are generally suitable for embankment construction. Generally, embankments built from the native soils can be constructed to a height of 60 feet with 2H:1V side slopes if the foundation is suitable and proper compaction methods are used. Soil cuts over approximately 10 feet often require analyses to design proper side slopes. In no case should soil cuts be steeper than 2H:1V. Suitable rock for embankment construction and rock roadbed is readily available in this area of the state. Soils in the area are considered erodible.

California Bearing Ratio (CBR) values used in pavement design generally range from 2-5 for soils subgrades in the area. Chemical modification of subgrade is sometimes used in the area. Wet areas could require undercutting and replacement of soils.

Previously completed Geotechnical Investigations within the study area are:

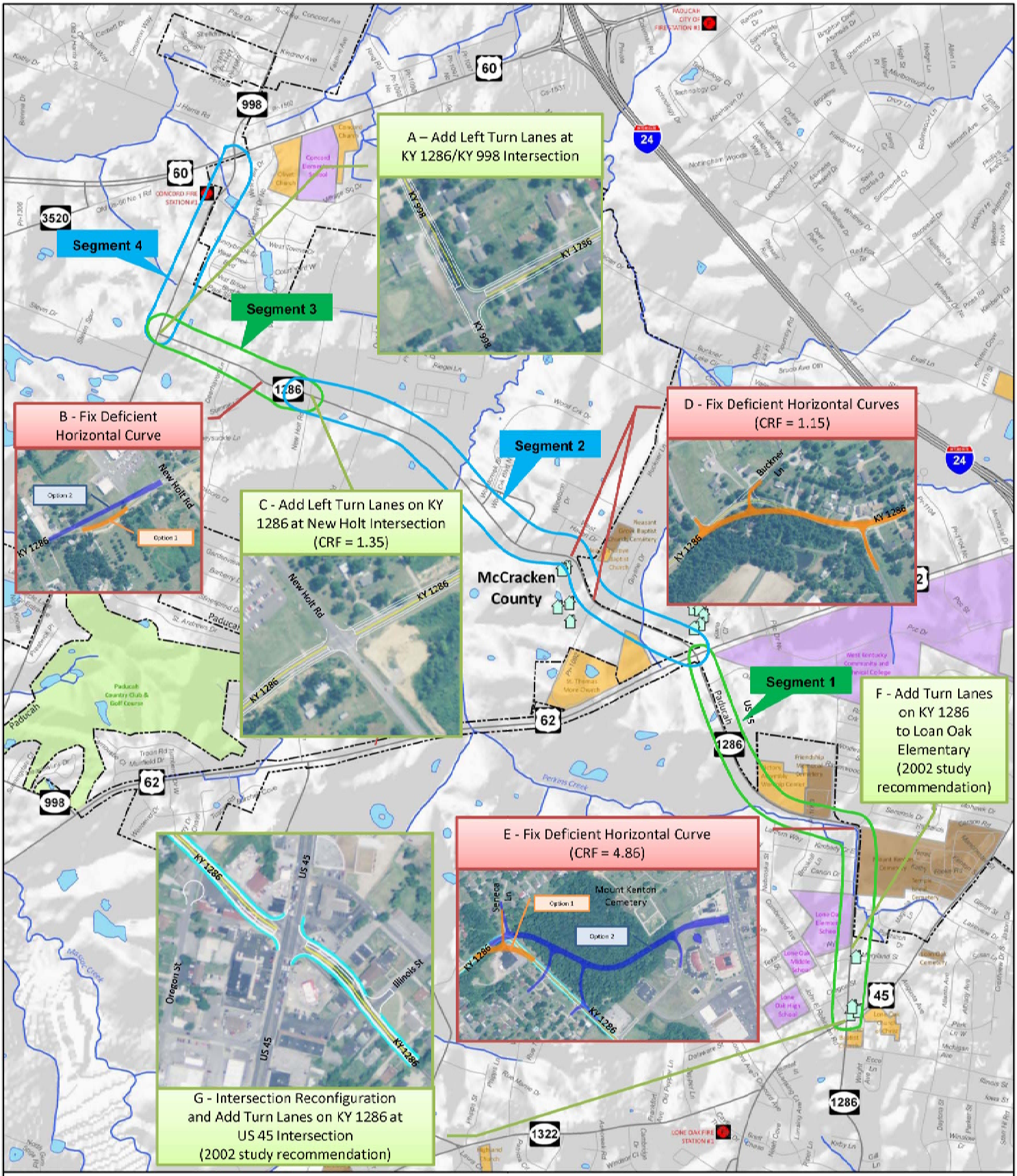
Report No.	Route	Structure Over	Report Type	Description
S-045-1987	US-62		Roadway	Section 1: From Station 29+00 to Station 97+20 Section 2: From Station 125+00 to Station 170+00
R-021-1992	US-60		Roadway	From Sta 225+00 to 358+80
S-074-2003	KY-1286	Perkins Creek	Structure	Bridge over Perkins Creek and report for culvert at Station 143+31
R-005-1975	US-62	Perkins Creek	Structure	0.5 miles north of US 62 @ station 28+55

The reports are located on the KYTC Geotechnical Branch Database which can be accessed through the KYTC Division of Structural Designs home page (Click on Geotech and Search KYTC Completed Projects).

Site specific Geotechnical investigations are critical in this region for design.

Please feel free to contact this office for additional information.

Attachments:
Site Map
GQ Site Map


A – Add Left Turn Lanes at KY 1286/KY 998 Intersection
KY 998
KY 1286
B - Fix Deficient Horizontal Curve
New Holt Rd
KY 1286
Option 2
Option 1
C - Add Left Turn Lanes on KY 1286 at New Holt Intersection (CRF = 1.35)
New Holt Rd
KY 1286
D - Fix Deficient Horizontal Curves (CRF = 1.15)
Buckner Ln
KY 1286
E - Fix Deficient Horizontal Curve (CRF = 4.86)
Mount Kenton Cemetery
Seneca Ln
Option 1
Option 2
KY 1286
F - Add Turn Lanes on KY 1286 to Loan Oak Elementary (2002 study recommendation)
G - Intersection Reconfiguration and Add Turn Lanes on KY 1286 at US 45 Intersection (2002 study recommendation)
KY 1286
US 45
Oregon St
Illinois St
Segment 1
Segment 2
Segment 3
Segment 4
McCracken County
Paducah
Perkins Creek
Massac Creek
60
998
3520
1286
62
24
45
1322
N
S
E
W
Fix Horizontal Curve
Intersection Improvement
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N

Paducah West

Legend

- Interstates
- US Highways
- State Roads
- Local Roads
- Tw — Wilcox Formation
- Tp — Porters Creek Clay
- TKcm — Clayton & McNairy Formation
- Ql — Loess
- QTc — Continental deposits
- Qal — Alluvium
- af — Artificial Fill

0 1,200 2,400 4,800 Feet