APPENDIX E – GEOTECHNICAL OVERVIEW

Report of Geotechnical Overview

KY 8 - Licking River Bridge
Scoping Study
Item No. 6-1086.00
KY 8 – Mary Ingles Highway
MP3.266 to MP 7.902
Scoping Study
Kenton and Campbell Counties, Kentucky

Prepared by:
Stantec Consulting Services Inc.

October 29, 2015

Stantec

Stantec Consulting Services Inc.
10509 Timberwood Circle, Louisville KY 40223

October 29, 2015
File: 178554021

Mr. Brian Aldridge, PE
Stantec Consulting Services Inc.
400 East Vine Street, Suite 300
Lexington, Kentucky 40507

Reference: **Report of Geotechnical Overview**
KY 8 – Licking River Bridge Scoping Study
Item No. 6-1086.00
KY 8 – Mary Ingles Highway Scoping Study
MP 3.266 to MP 7.902
Kenton and Campbell Counties, Kentucky

Dear Brian,

Enclosed is the geotechnical overview for the proposed Scoping Study for the KY 8 Bridge over the Licking River, located in Kenton and Campbell Counties, and the scoping study for the Mary Ingles Highway from MP 3.266 to MP 7.902.. The overview is based upon research of available published data, preliminary data for the study area provided by your office, and a site visit performed on October 1, 2015. The scope of work performed and results of the overview are presented in the accompanying attachment.

Regards,

STANTEC CONSULTING SERVICES INC.

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/cdm

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1.0 PROJECT DESCRIPTION

1.1 KY 8 OVER THE LICKING RIVER

The Kentucky Transportation Cabinet (KYTC) is conducting a bridge replacement scoping study located in Kenton and Campbell Counties, KY where KY 8 crosses over the Licking River, just south of the confluence of the Licking and Ohio Rivers in Covington, KY (as depicted on the topographical map in Appendix A). The general study area would include a corridor approximately 2,000 feet wide centered on the existing KY 8 with a western boundary of KY 17 in Covington and an eastern boundary of KY 9 in Newport.

1.2 MARY INGLES HIGHWAY

As a second component to the scoping study, and in the vicinity of the bridge, an approximately 4.5 mile long section of the Mary Ingles Highway/KY 8 between the community of Dayton, Kentucky and its intersection with River Road has been identified as an area of concern due to repeated slippage and landslide occurrences. While maintenance activities have repeatedly been undertaken to minimize damage to the roadway, KYTC is seeking a more permanent solution to the underlying geotechnical issues.

This overview will be utilized to identify geotechnical considerations for the study area. The project locations and corridors are presented on the maps provided in Appendix A.

2.0 SCOPE OF WORK

The scope of work for this study consists of performing a geotechnical overview for the proposed study areas based upon research of available published data and Stantec's experience with highway design and construction within the region as well as a site visit conducted on October 1, 2015.

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/kgsweb/KYTC/search.asp
- Prior Projects Nearby:
  - R-042-1989
  - L-013-2000
  - S-134-2014
  - L-002-1997
  - L-020-2007
  - S-145-2013
- 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.

3.0 PHYSIOGRAPHIC AND STRATIGRAPHIC SETTING

3.1 TOPOGRAPHY AND DRAINAGE

The study areas are located in the Outer Bluegrass physiographic region of Kentucky. Other than the banks of the Licking River the site of the bridge crossing is relatively flat. Subsurface conditions throughout the corridor where KY 8 crosses the Licking River are characteristic of Alluvium and Glacial Outwash deposits of the Pleistocene series. The Mary Ingles Highway study area is on the southern bank of the Ohio River immediately above the floodplain and along the base of the valley slope. Subsurface conditions of the Mary Ingles Highway/KY 8 corridor between Dayton and its intersection with I- 275 consists primarily of artificial fill underlying the roadway and railway. Alluvium deposits of the Pleistocene series exist along the Ohio River while Shale and Limestone bedrock of the Upper Ordovician series become predominant where the corridor moves away from the Ohio River and onto adjacent valley slopes.

Surface drainage within the region is directed towards various named and unnamed ditches, streams, and creeks which ultimately flow into the Licking and Ohio Rivers.

3.2 STRATIGRAPHY

Available geologic mapping indicates that the project corridor surrounding the KY 8 Bridge over the Licking River is underlain by Alluvium and Glacial outwash deposits throughout the corridor and along the major drainage course of the Licking River with areas of artificial fill on the eastern side of the Licking River. The soils dominate the stratigraphic column in the vicinity of the bridge, are in excess of 70 feet in thickness, and are comprised of clays, silts, gravels and sands as reported by the referenced geologic mapping. Borings drilled in the vicinity of the eastern abutment and reported in report S-134-2014 were advanced to depths of roughly 50 feet below the existing ground surface and encountered primarily lean clay overburden material. Bedrock was not encountered in the borings. The alluvium and glacial outwash deposits in the vicinity of the KY 8 bridge are reportedly underlain by bedrock consisting of interbedded shale and limestone layers consistent with the Kope Formation.

Geologic mapping of the Mary Ingles Highway/ KY 8 corridor indicates that the roadway is primarily underlain by artificial fill of unknown origin. Alluvium deposits of the Pleistocene series are predominant along the bank of the Ohio River while shale and limestone bedrock of the Kope Formation dominates the stratigraphy where the corridor moves away from the river.

3.3 FAULTING IN THE AREA

There are no faults depicted in the project vicinity.

3.4 SOILS AND UNCONSOLIDATED MATERIALS

Alluvial soils are the predominant soil types found within the area of the KY 8 Bridge over the Licking River. Soil descriptions contained herein are based upon SCS soil surveys, geologic mapping and previous borings drilled in the vicinities of the study areas. Since the study areas are located within the floodplain of the Ohio and Licking Rivers, the upper soil deposits were deposited by the rivers. However, the deeper alluvium was deposited by glacial meltwater and is referred to as glacial outwash, which tends to consist of coarser materials such as sands and gravels.

The Alluvium deposits consist of silt, clay, sand, and gravel and are generally weathered pale-grayish-orange to pale-yellowish-orange silty clay and clayey silt. The unit along the Licking River contains minor sand and gravel that consists of pebbles and small cobbles of chert, quartz, and quartzite. The Glacial outwash typically consists of sand, gravel, silt, and clay. The Sand is generally light-gray to dark-yellowish-orange, coarse to fine grained, and well to poorly sorted, in part pebbly, and commonly cross-bedded. The gravel consists of pebbles and cobbles of limestone, dolomite, igneous and metamorphic rocks, chert, quartz, and coal. The silt and clay are pale-grayish-orange to moderate-brown and pale-reddish-brown with mostly obsure bedding. Subsurface data indicate that water-bearing sand and gravel 20 to 75 feet thick and presumably of outwash origin underlie all of the bottom land at Newport.

3.5 BEDROCK

Based on USGS mapping, the bedrock underlying the soil deposits of both study areas can be described as the the Kope formation of the Upper Ordovician series. This formation consists primarily of shale and limestone. The shale, which makes up 75 to 80 percent of the unit, weathers and slumps readily and is typically medium-gray and light-bluish-gray, laminated, calcareous, mostly silty, and in beds as much as 6 feet thick. The limestone of the unit is of two main types. About two-thirds is finely to coarsely crystalline, fossil fragmental, medium-gray, in discrete regular to irregular beds as much as 12 inches thick but generally less than 8 inches thick. About one-third of limestone is fine grained, argillaceous and silty, medium-gray to medium-dark-gray, weathering dark-yellowish-orange, in mostly regular beds as much as 8 inches thick, and in part laminated or cross-laminated. The geologic mapping also indicates that much of the Kope formation is easily deformed shale, and oversteepened embankment slopes and cut slopes in this formation are prone to slumping and require adequate shoring and drainage. Roadway embankments constructed primarily of Kope shales and argillaceous limestones are prone to failure by sliding. The geologic mapping of the area is presented in Appendix B.

3.6 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. There were no geologic faults noted in the vicinity of the study areas.

4.0 GEOTECHNICAL CONSIDERATIONS

4.1 GENERAL

4.1.1 KY 8 OVER LICKING RIVER

Based on the location of the existing KY 8 Bridge over the Licking River, the location of significant historic structures adjacent to the bridge, the population density on both sides of the Licking River, and Stantec's experience with structures in the Newport and Covington areas, it is anticipated that the replacement structure for the existing KY 8 Bridge will have to be constructed at the same location as the current bridge. Significant geotechnical investigation and analyses will be required to determine if the existing bridge foundations could be used for support of the future structure.

4.1.2 MARY INGLES HIGHWAY

The Mary Ingles Highway Study Area has undergone repeated maintenance efforts and landslide repairs to maintain traffic on KY 8. This historical instability is primarily due to the location of the road at the interface between the alluvial soils of the Ohio River and the easily deformed shales of the Kope Formation which comprises the valley walls along the existing alignment. The weight of the roadway provides driving forces on marginally stable slopes and on slopes which are undergoing continuous weathering and creep during the geologic process. These forces, coupled with the introduction of subsurface water resulting from natural conditions or inadequate roadway drainage, result in slope roadway movement. As can be seen in the photographs in Appendix A, this results in undulations in the pavement surface, lateral displacement of the alignment (as noted in the roadway edge and guardrail) and the tilting of utility poles. It should be noted that the roadway had been recently resurfaced prior to the photographs being taken. Movements of the roadway occur without warning and typically result in sharp breaks in the roadway surface which are very hazardous to traffic.

4.2 STRUCTURE FOUNDATIONS

4.2.1 EXISTING KY 8 OVER THE LICKING RIVER

The existing structure of the KY 8 Bridge over the Licking River has an overall length of approximately 1,002 feet and is comprised of 14 spans. The west approach consists of Abutment No. 1 and Piers 1 through 3 on the western side of the Licking River. The east approach consists of the Abutment No. 2 and Piers 4 through 13 on the eastern side of the Licking River. In addition to the primary bridge structure, a retaining wall approximately 228 feet in length adjoins Abutment No. 2 on the eastern side of the Licking River and carries the bridge profile back to the existing ground surface elevation.

As noted on the drawings in Appendix C, the following bottom elevations and foundations for the existing piers and abutments appear to be as follows: Abutment No. 1, Piers No. 1 and 2, and Piers No. 5 through 8 bear on concrete piles. Piles for Pier No. 2 and Pier No. 5 are 25 and 37.5 feet long on average, respectively, as noted in the plan drawings. Piles for Abutment No. 1, Pier1, and Piers 6 through 8 were driven to refusal or to sustain a load of 50 tons per pile, as indicated in the notes of the plan drawings. Plan drawings indicate that Piers No. 3 and 4 (the main river piers) were placed on solid rock at an elevation of 405 feet. Piers 9 through 13 and Abutment No. 2 have spread footing foundations that do not appear to be rock bearing.

Abutment No. 1 – Concrete piles, Elev. 497 feet
Pier No. 1 – Concrete piles, Elev. 475 feet
Pier No. 2 – Concrete piles, Elev. 459 feet
Piers No. 3 and 4 –Solid Rock, Elev. 405 feet
Pier No. 5 – Concrete piles, Elev. 460 feet
Pier No. 6 – Concrete piles, Elev. 578 feet
Pier No. 7 – Concrete piles, Elev. 480 feet
Pier No. 8 – Concrete piles, Elev. 481 feet
Pier No. 9 – Spread Footing, Elev. 481 feet
Pier No. 10 – Spread Footing, Elev. 481 feet
Pier No. 11 – Spread Footing, Elev. 481 feet
Pier No. 12 – Spread Footing, Elev. 483 feet
Pier No. 13 – Spread Footing, Elev. 478 feet
Abutment No. 2 – Spread Footing, Elev. 484 feet

4.2.2 REPLACEMENT STRUCTURE

At this point in time the existing specific location and span arrangement for the replacement structure are unknown. Typical foundations for a major structure such as this with bedrock less than 100 feet below the existing ground surface would be founded on bedrock to reduce the risk of foundation movement. The combination of rock bearing and soil bearing foundation systems utilized for the existing bridge would be avoided if possible. Typical foundation systems which have been utilized in similar overburden and bedrock situations are drilled shafts socketed into bedrock, auger cast piles bearing on bedrock, driven H-piles bearing on bedrock and driven pipe piles bearing on bedrock.

An alternative to constructing new foundations would be to bear the replacement bridge on the existing foundation systems. This would require determining the conditions and character of the existing foundations, as well as the effect of a new bridge structure and loadings on the existing foundations and if the existing foundations would perform adequately by current standards.

Regardless of the foundation system for the replacement bridge, it will be necessary to coordinate with the United States Army Corps of Engineers, Louisville District during the design process to accommodate the existing flood reduction structure (levee system) in Newport.

4.3 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.

The Kope Formation is comprised of nondurable shales and thin limestone beds. Cuts in nondurable shales may be most stable when excavated on 2H:1V slopes and allowed to re-vegetate. Steeper slopes in the Kope Formation are not typically recommended, but may be necessary due to right of way limitations. For example, a recently constructed cut slope at the interchange of KY 8 with River Road near I-275 is shown in Appendix A and appears to be on a grade of 1H:1V or 1.5H:V. All cut slopes in the Kope Formation should include an interceptor ditch at the top of the cut slope to reduce the amount of surface water which could spill over the slope face. Material generated from excavation of the Kope Formation should not be used for durable rock fill.

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

4.4 EMBANKMENT CONSIDERATIONS

Excavated Kope Formation rock materials should be suitable for use in project embankments, if placed and compacted in accordance with “Special Note for Construction of Shale

Embankments" Select rock types for use as rock embankment, rock road bed, channel lining, etc., would be durable shale. With the shales and argillaceous limestones present along the corridor, sufficient quantities of durable rock will not be generated during construction and the use of off-site sources should be considered. Foundation soils are likely to be silty clays and clayey silts, which can be considered moderate to poor soils for use in roadway construction.

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 the alignments of both study areas.

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, and controlled embankment construction rates and/or flatter embankment side slopes should be anticipated for these areas.

Because of the predisposition for movement when an embankment is constructed on or over the interface of the Kope Formation with alluvial deposits, care should be taken to construct the embankment either entirely on alluvial soils or entirely in a residual soil or rock cut. Embankments constructed partially on cut and partially on alluvium can yield abruptly at the interface in this area of the state.

4.5 GAS AND OIL WELLS

There are no oil or gas wells noted by the geologic mapping in the vicinity of the study area.

5.0 CONCLUSIONS

5.1. 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 study areas; and to identify geotechnical features or conditions that may have an adverse impact on the replacement bridge or on the Mary Ingles Highway alignment.

5.2. Prior to and during construction of the replacement bridge over the Licking River, a preconstruction survey should be performed and vibration monitoring performed to protect the public and existing historic structures in the immediate vicinity.

5.3. The existing piers, abutments and retaining walls of the existing KY 8 Bridge over the Licking River should be instrumented and monitored during construction of the replacement bridge to detect unacceptable movement or strains within the structure.

5.4. If embankment for the replacement bridge is constructed below the 100 year storm elevation, it should be armored against scour below the 100 year elevation.

5.5. To avoid potential environmental issues and delays during construction due to high water events, it is recommended that the main span of the replacement bridge span the river and bear on piers constructed in the dry on the riverbank.

5.6. It is possible that the foundations of the existing bridge could be used to support the replacement bridge. Significant geotechnical investigations and analyses will be required, as well as interaction with the structural engineer to establish the adequacy of the existing foundations.

5.7. Coordination with the Louisville District of the US Army Corps of Engineers will be necessary during the design and construction process for the replacement bridge to maintain the integrity of the flood reduction structure (levee) which crosses under the existing bridge on the east bank of the Licking River.

5.8. The existing Mary Ingles Highway displays multiple locations of previous landslides and slope/roadway movement within the study area. Continual and extensive roadway repairs and re-surfacing have been necessary to maintain a safe traffic route. In order to provide a route which would require less maintenance, significant remedial efforts would be required along the majority of the alignment. Such remediation could consist of cleaning up and reshaping the slopes uphill of the existing roadway and moving the alignment into a full cut section where applicable. This scenario could prove problematic in areas where there is insufficient right of way to construct stable cut slope configurations. In areas where the alignment is required to remain on embankment fill previously noted to have experienced movement, an earth retaining structure would be required. A typical retaining structure used in similar situations of deep soil movement would be a pile and lagging wall tied back into competent bedrock. In areas of shallow soil movement, predrilled railroad rail walls have been used successfully. Extensive geotechnical investigations, analyses and designs would be required to develop a more maintenance free roadway alignment. This scenario is very similar to the required reconstruction of KY9 in Wilder, KY, approximately 2.8 miles west of this study area.

5.9. In the Mary Ingle Highway study area the continued addition of pavement layers to re-establish a smooth roadway surface increases static driving forces which can, in turn, increase the movement in a failure area. A potential solution to the excessive driving forces would be to remove a portion of the subgrade and replace it with lightweight fill and a new roadway surface.

5.10. An active rail line is operated in close proximity to the Mary Ingles Highway. Construction of retaining structures between the roadway and the railroad would require extensive coordination with the railroad.

5.11. The information presented in this overview should be reviewed in the general nature in which it was intended. A thorough geotechnical exploration of both the bridge replacement study and the Mary Ingles Highway study will be required to properly anticipate and plan for special requirements necessary for design and construction.

APPENDIX A

USGS Topographic Map

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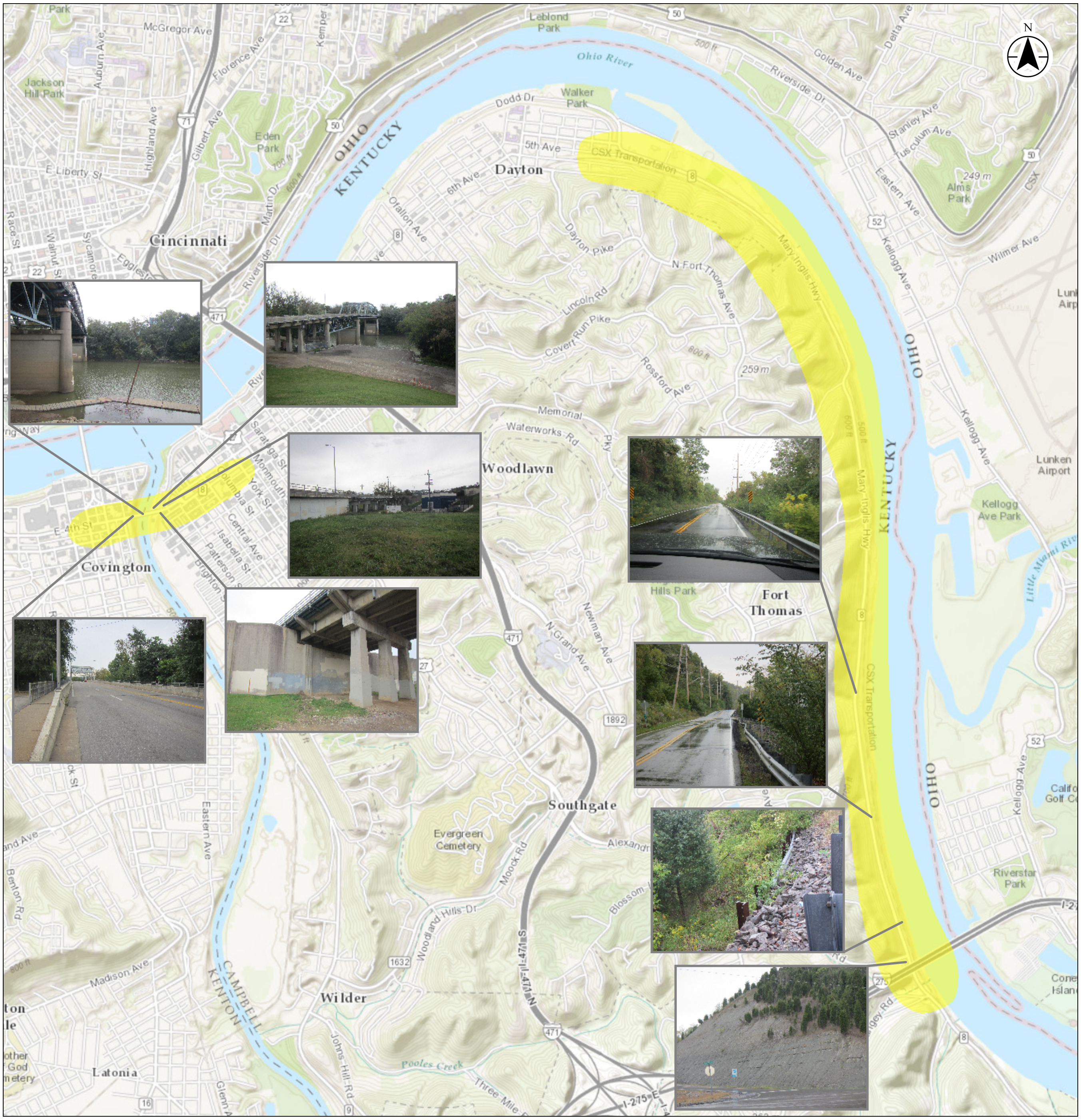
Z:\AndrewWischerth\CovingtonBridgeKY8 Topo.mxd   Revised: 2015-10-23 By: eroggenkamp



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Stantec

Project Location
Campbell County, KY
Kenton County, KY

178554021
Prepared by ER on 2015-10-23
Technical Review by KS on 2015-10-26
Independent Review by AW on 2015-10-26

Client/Project
KYTC District 6
KY 8
Scoping Study

Figure No.
1

Title
Licking River Bridge and Mary Ingles Hwy Topographic

Notes
1. Coordinate System: NAD 1983 StatePlane Kentucky North FIPS 1601 Feet
2. ESRI World Topographic Basemap

APPENDIX B

USGS Geologic Map

Stantec

Z:\AndrewWischerth\CovingtonBridge\KY8_GQ.mxd   Revised: 2015-09-16 By: eroggenkamp

Legend - Century Gothic, 7pt font

Op / Opb — Point Pleasant Formation; Opb, *Bromley Shale Member*	af — Artificial fill
Qal — Alluvium	Ok — Kope Formation
Qt — Terrace deposits	Qwo — Glacial outwash

0 4,000 Feet

1:48,000 (at original document size of 8.5x11)

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Notes

1. Coordinate System: NAD 1983 StatePlane Kentucky North FIPS 1601 Feet
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
3. U.S. Geologic Survey

Project Location 178554021

Campbell County, KY
Kenton County, KY

Prepared by ER on 2015-09-15
Technical Review by KS on 2015-09-16
Independent Review by AW on 2015-09-16

Client/Project

KYTC District 6
KY 8
Scoping Study

Figure No.

1

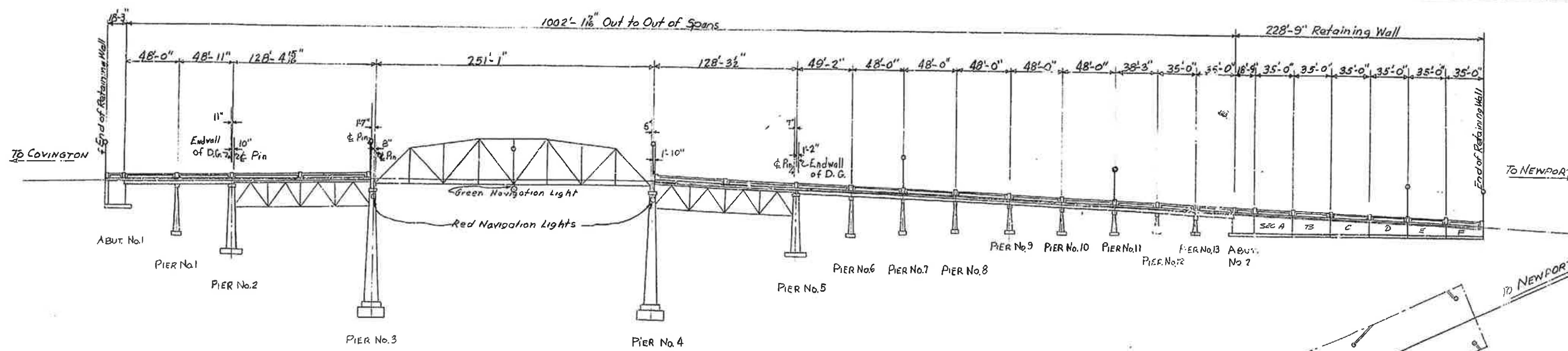
Title

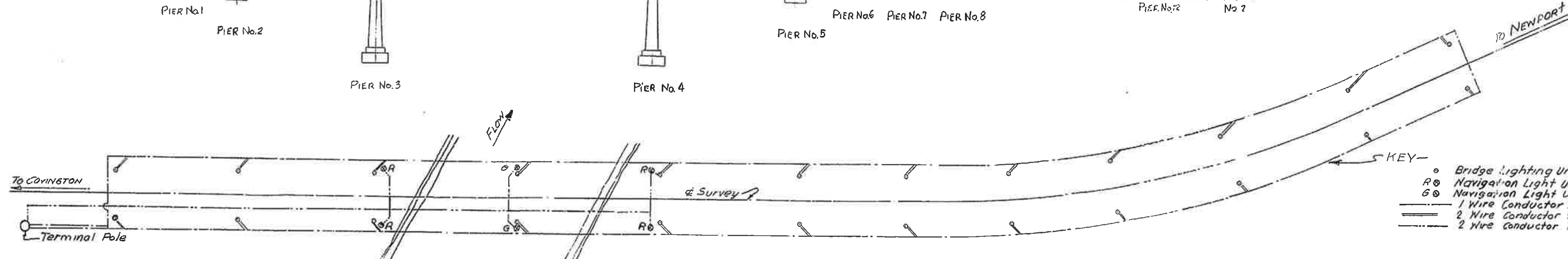
Licking River Bridge and Mary Ingles Hwy Geologic

APPENDIX C

Plan Drawings

Stantec

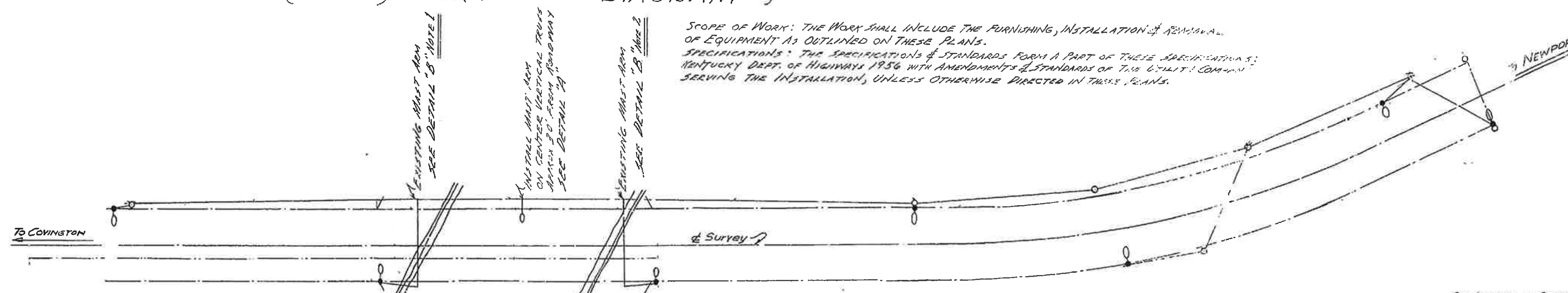




Key—
- Bridge Lighting Unit - Series Circuit.
- R⊗ Navigation Light Unit - Red - Parallel Circuit.
- G⊗ Navigation Light Unit - Green - Parallel Circuit.
- 1 Wire Conductor for Series Bridge Circuit.
- 2 Wire Conductor for Series Bridge Circuit.
- 2 Wire Conductor for Parallel Navigation Circuit.

(Existing) WIRING DIAGRAM

SCOPE OF WORK: THE WORK SHALL INCLUDE THE FURNISHING, INSTALLATION & REMOVAL OF EQUIPMENT AS OUTLINED ON THESE PLANS.
SPECIFICATIONS: THE SPECIFICATIONS & STANDARDS FORM A PART OF THESE SPECIFICATIONS; KENTUCKY DEPT. OF HIGHWAYS 1956 WITH AMENDMENTS & STANDARDS OF THE UTILITY COMPANY SERVING THE INSTALLATION, UNLESS OTHERWISE DIRECTED IN THESE PLANS.

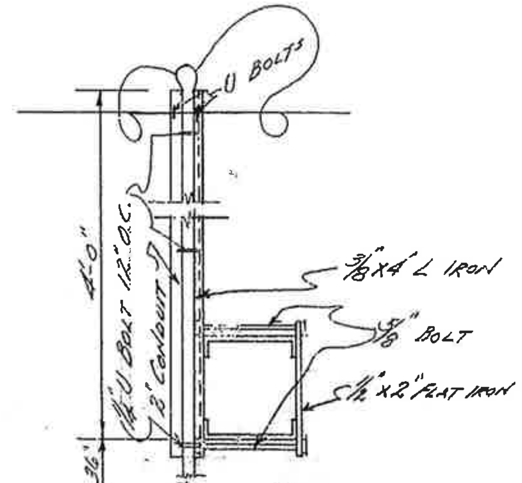


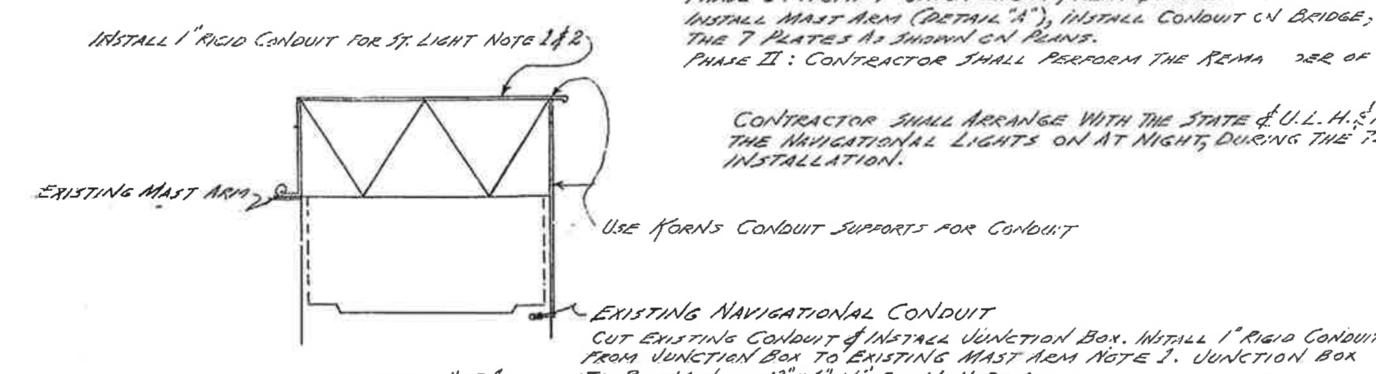
Borings
Sept 2014

CONTRACTOR SHALL REMOVE ALL UNUSED EQUIPMENT SUCH AS, ALL EXISTING STREET LIGHTS, STANDARDS, EXPOSED CONDUIT & WIRE AND RETURN TO THE STATE AT THE BOONE COUNTY MAINTENANCE BARN.

THE CONTRACTOR SHALL PERFORM HIS CONTRACT IN THE FOLLOWING ORDER:
PHASE I: NOTIFY UNION LIGHT, HEAT & POWER CO. 1 WEEK BEFORE START OF WORK. INSTALL MAST ARM (DETAIL "A"), INSTALL CONDUIT ON BRIDGE, DRILL POST & INSTALL THE 7 PLATES AS SHOWN ON PLANS.
PHASE II: CONTRACTOR SHALL PERFORM THE REMAINDER OF HIS CONTRACT.

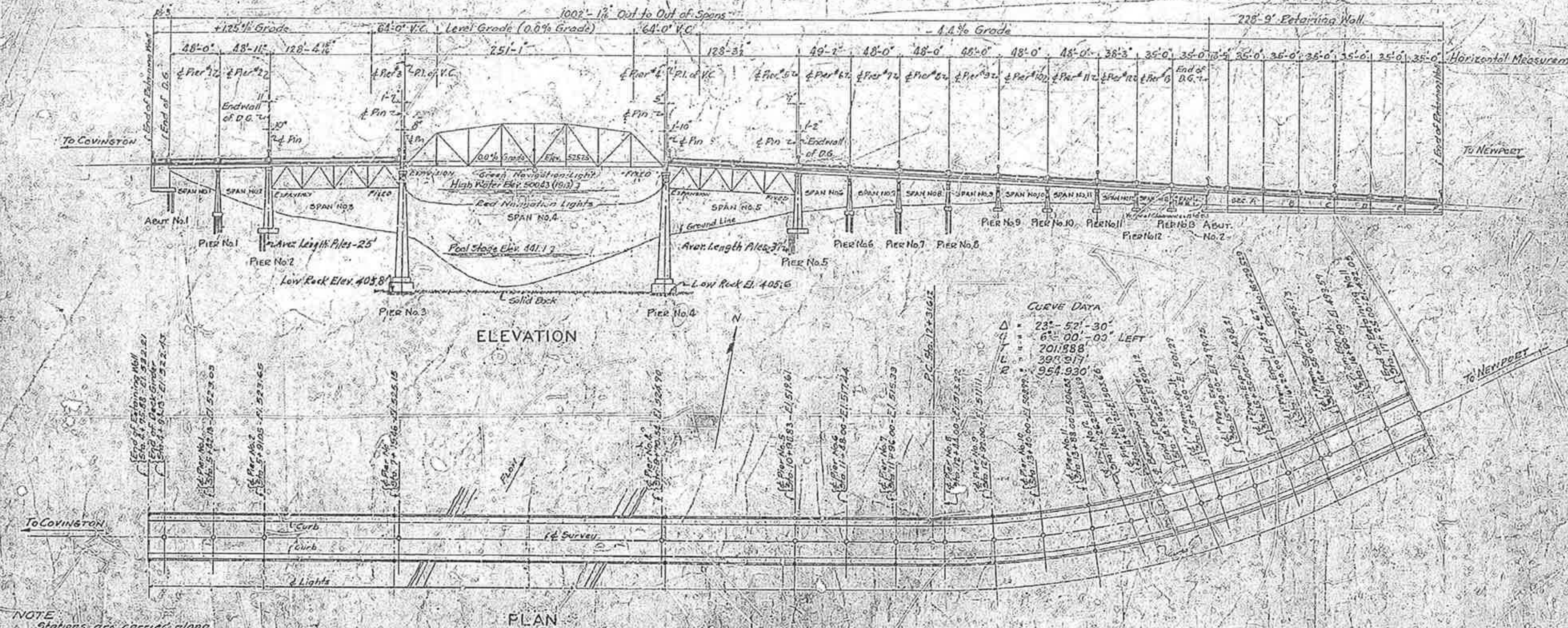
CONTRACTOR SHALL ARRANGE WITH THE STATE & U.L.H.&P. CO. TO KEEP THE NAVIGATIONAL LIGHTS ON AT NIGHT, DURING THE TENURE OF THIS INSTALLATION.





DETAIL "B"

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT
COUNTY OF KENTON
COVINGTON-NEWPORT



NOTE:
Stations are carried along
℄ Survey on arc Measurements
Elevations are ℄ Grade
at Station Shown.

BRIDGE OVER LICKING RIVER

REFERENCES

1	GENERAL LAYOUT	29	RET. WALL SEC. D
2	SUBSTRUCTURE LAYOUT	30	" " " E
3	LIGHTING DETAILS	31	" " " F
4	GENERAL NOTES	32-33 & 34	SPANS 1-2-6 & 7
5&6	ABUTMENT NO. 1	35-36 & 37	SPAN 8
7	PIER NO. 1	38-39 & 40	SPANS 9-10 & 11
8&9	" " 2	41-42 & 43	SPAN 12
10&11	" " 3&4	44-45 & 46	" 13
12&13	" " 5	47-48 & 49	" 14
14	" " 6	50	DRAINS, EXPANSION PLATES & COPPER STRIPS
15	" " 7	51	TYPICAL HANDRAIL DETAILS
16	" " 8	52	HANDRAIL ABUT. 1, SPANS 1-2 & 6
17	" " 9	53	" SPANS 7 & 8
18	" " 10	54	" " 9-10 & 11
19	" " 11	55	" SPAN 12
20	" " 12	56	" SPANS 13 & 14 ABUT. 2, RET. WALL SECS. A & B
21	" " 13	57	" RETAINING WALL SECS. C-D-E & F
22&23	ABUTMENT NO. 2	58-59-60 & 61	250' THRU TRUSS SPAN-STEEL DETAILS
24&25	RET. WALL SEC. A	62-63-64 & 65	126' DECK TRUSS SPAN-STEEL DETAILS
26&27	" " " B	66	HANDRAIL 126' DECK SPAN
28	" " " C	P.2	14" R.C. PILE
		P.3	16" R.C. PILE
		3 DR	EXPANSION & CONTRACTION JOINTS

TOTAL ESTIMATE OF QUANTITIES

FOR STEEL SUPERSTRUCTURE

Concrete - Class "A"	517.0 Cu. Yds.
Concrete - Class "D"	41.2 Cu. Yds.
Structural Steel	1,296,630 Lbs.
Steel Reinforcement	120,480 Lbs.

FOR SUBSTRUCTURE & CONCRETE APPROACHES

Concrete - Class "A"	6539.7 Cu. Yds.
Concrete - Class "D"	113.8 Cu. Yds.
Steel Reinforcement	834,040 Lbs.
Class "B" Bronze	8085 Lbs.
Cast Iron Drains	2400 Lbs.
Structure Excavation	17200 Cu. Yds.
14" R.C. Piles	7800 Lin. Ft.
16" R.C. Piles	7650 Lin. Ft.
Lighting System	1 Each
Removal of Existing Structure	[illegible]

List of Drawings for Substructure
Standard Drawings P2, P3 & 3DR &
Sheets 1 to 57 inclusive, 60 Sheets.

List of Drawings for Superstructure
Standard Drawing 3DR,
Sheets 1 & 4 & 58 to 66 inclusive, 12 Sheets.

P2
P3
3DR

COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT
FRANKFORT
COUNTY OF
KENTON-CAMPBELL
COVINGTON — NEWPORT
ROAD
STATION

GENERAL NOTES:

SPECIFICATIONS: Standard Specifications, Kentucky, State Highway, Department, 1932 Edition, with adopted amendments and approved Special Provisions.

CONCRETE: Class "A" concrete shall be used thruout, except in handrail and Piles. Class "D" concrete shall be used in handrail and Piles.

REINFORCEMENT: Dimensions from face of concrete are clear distances. Precast mortar or concrete blocks supporting reinforcement shall be spaced not farther apart than 50 diameters of the supported bar.

STRUCTURAL STEEL: All structural steel shall be Medium Carbon Steel conforming to the requirements of the Special Provisions attached to the Proposal Forms.

WEARING SURFACE: Top of concrete roadway Slab and Sidewalk shall be finished in accordance with the requirements for Monolithic Wearing Surface.

BEVELED EDGES: All exposed corners shall be beveled 7/8 inch unless otherwise shown on plans for concrete structures.

EXPANSION JOINT FILLER: All expansion joint filler shall meet the requirements for premolded filler as shown on sheet 3-DR. of Plans. Cost to be included in price for Class "A" concrete.

REAMED WORK: General reaming will be required on Structural Steel Work.

PAINT: Shop coat on steel work to be Red Lead or Basic Sulphate Blue Lead.

COPPER STRIP: To be as specified on plans. The cost to be included in the price bid per Cubic Yard for Class "A" concrete.

STEEL EXPANSION ANGLES: Expansion angles on the concrete spans at junction with the steel spans to be furnished by the contractor for steel spans and placed by the contractor for concrete spans. Contractor for concrete spans shall notify the Commission at least 60 days in advance of the need of expansion angles.

BEARING AREAS: All concrete under masonry plates and bearing plates of steel spans shall be poured 1/4" higher than elevation shown on plans for an area approximately 6" outside the limits of the plates, and ground down to elevation shown on plans to provide a smooth level bearing surface. The sub-structure contractor shall perform this work and shall not be paid extra for labor connected with preparation of bearing areas.

REMOVAL OF EXISTING STRUCTURE: The lump sum bid price for removal of existing structure shall be full compensation for all labor, materials, equipment, tools, and all incidentals necessary for removal of super-structure and substructure of the existing bridge. See Special Provisions attached to Proposal Forms for requirements.

RIVER NAVIGATION REQUIREMENTS: The work shall be so conducted at all times, that the full navigation of the waterway shall not be interfered with. See Special Provisions attached to the Proposal Forms for requirements.

PILING: Piles to be driven to refusal or to sustain a load of 50 tons per pile. Concrete test piles to determine length of piling required shall be driven at locations shown on substructure layout. Test piles shall be accurately located, so as to be used as bearing piles in the finished Structure.

GENERAL NOTES

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				

Bridge over Licking River. Sheet 4 of 66

COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT
FRANKFORT
COUNTY OF
KENTON-CAMPBELL
COVINGTON-NEWPORT
ROAD
STATION PROJECT NO.