U.S. Department of Transportation
Federal Highway Administration

Brent Spence Bridge
Replacement/Rehabilitation Project

KENTUCKY TRANSPORTATION CABINET

Ecological Survey Report

KYTC Project Item No. 6-17

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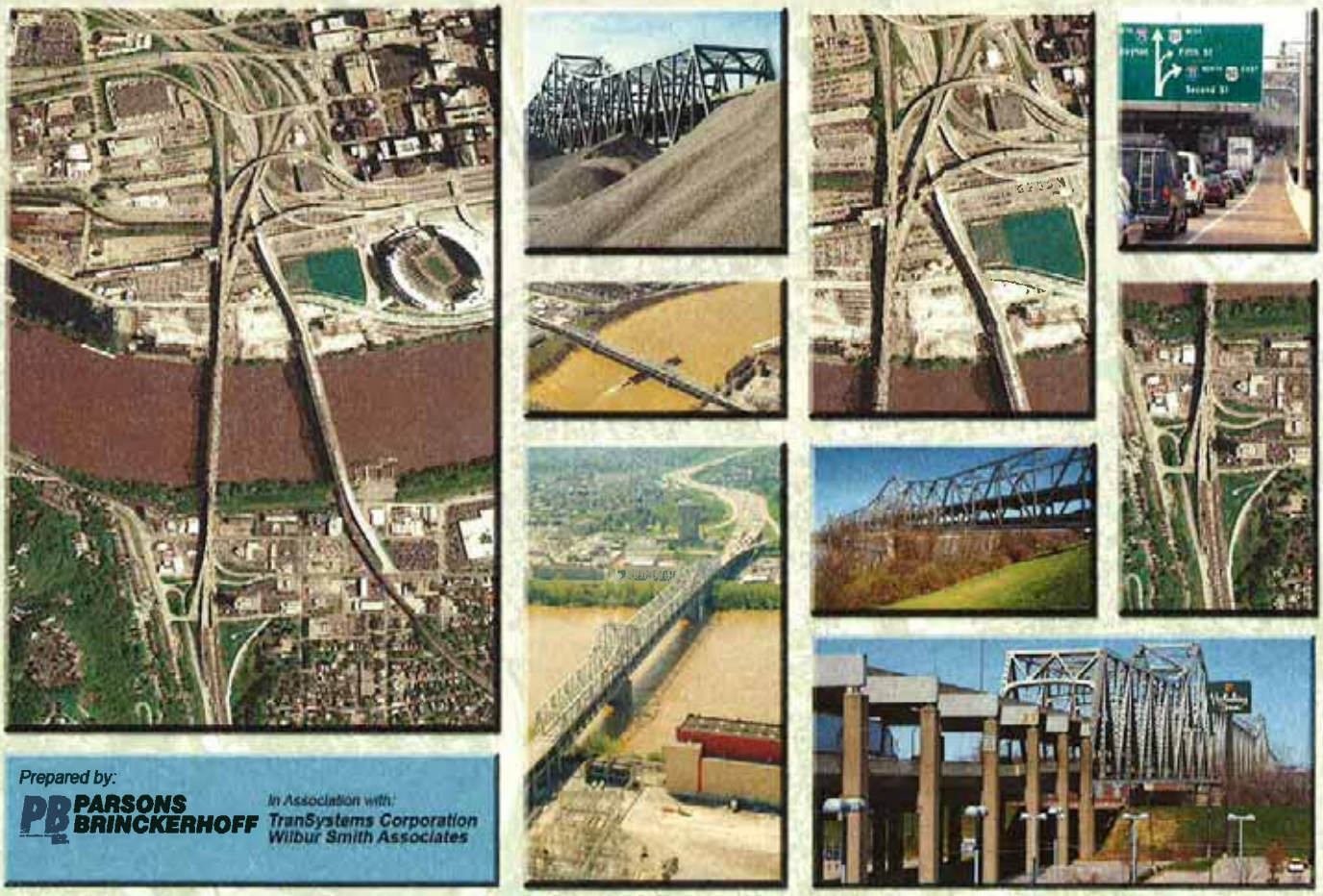

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1.0 PROJECT DESCRIPTION

Interstate 75 (I-75) within the Greater Cincinnati/Northern Kentucky region is a major thoroughfare for local and regional mobility (Exhibit 1). Locally, it connects to I-71, I-74 and US Route 50. The Brent Spence Bridge provides an interstate connection over the Ohio River and carries both I-71 and I-75 traffic. The bridge also facilitates local travel by providing access to downtown Cincinnati, Ohio, and Covington, Kentucky. Safety, congestion and geometric problems exist on the structure and its approaches. The Brent Spence Bridge, which opened to traffic in 1963, was designed to carry 80,000 vehicles per day. Currently, approximately 160,000 vehicles per day use the Brent Spence Bridge and traffic volumes are projected to increase to 200,000 vehicles per day by 2035.

The I-75 corridor within the Greater Cincinnati/Northern Kentucky region is experiencing problems, which threaten the overall efficiency and flexibility of this vital trade corridor. Areas of concern include, but are not limited to, growing demand and congestion, land use pressures, environmental concerns, adequate safety margins, and maintaining linkage in key mobility, trade, and national defense highways.

The I-75 corridor has been the subject of numerous planning and engineering studies over the years and is a strategic link in the region's and the nation's highway network. As such, the Ohio Department of Transportation (ODOT) and the Kentucky Transportation Cabinet (KYTC), in cooperation with the Federal Highway Administration (FHWA), are proposing to improve the operational characteristics of I-75 and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky region through a major transportation project.

The Brent Spence Bridge Replacement/Rehabilitation Project is currently in Step 6 of the Ohio Department of Transportation's (ODOT) Project Development Process (PDP). Two feasible alternatives and the no build alternative are being developed and studied in more detail. The two feasible alternatives consist of Alternative E and a combination of Alternatives C and D from Step 5 of the PDP. The two feasible alternatives will be designed to provide three lanes in each direction on I-75.

1.1 Purpose and Need

The purpose of the Brent Spence Bridge Replacement/Rehabilitation Project is to improve the operational characteristics within the I-71/I-75 corridor for both local and through traffic. In the Greater Cincinnati/Northern Kentucky region, the I-71/I-75 corridor suffers from congestion and safety–related issues as a result of inadequate capacity to accommodate current traffic demand. The objectives of this project are to:

- improve traffic flow and level of service
- improve safety
- correct geometric deficiencies
- enhance connections to key regional and national transportation corridors

1.2 Study Corridor

The overall project corridor is located along a 7.8-mile segment of I-75 within the Commonwealth of Kentucky (state line mile 186.7) and the State of Ohio (state line mile 2.7) (Exhibit 1; Photograph 1). The southern limit of the project is 5,000 feet south of the midpoint of the Dixie Highway Interchange on I-71/I-75 in Fort Wright, south of Covington,

Kentucky. The northern limit of the project is 1,500 feet north of the midpoint of the Western Hills Viaduct interchange on I-75 in Cincinnati, Ohio. The eastern and western limits of the study area generally follow the existing alignment of I-75. The study area for this ecological assessment is limited to the portion of the overall corridor located in Kentucky.

1.3 Conceptual Alternatives

The development of conceptual alternatives for the Brent Spence Bridge was initiated in 2003 by KYTC and documented in the *Feasibility and Constructability Study of the Replacement/Rehabilitation of the Brent Spence Bridge* (May 2005). This report recommended six conceptual alternatives for further study.

In 2006, 25 conceptual alternatives including the No Build Alternative, and the six conceptual alternatives from the KYTC study, were developed as part of Step 4 of the ODOT PDP. These 25 conceptual alternatives were evaluated using a two-phased comparative analysis screening process which eliminated 19 of the 25 conceptual alternatives from further study and evaluation. The results of the conceptual alternatives considered and dismissed are presented in the *Planning Study Report* (September 2006). At the end of Step 4, a total of six conceptual alternatives were recommended for further study in Step 5 of the PDP. These alternatives included the No Build Alternative and five mainline build alternatives:

- Mainline Alternative 1 - Queensgate Alignment for I-75
- Mainline Alternative 2 - Queensgate Alignment for I-71/I-75
- Mainline Alternative 3 - New Bridge Just West for I-75
- Mainline Alternative 4 - New Bridge Just West for all Traffic
- Mainline Alternative 5 - Construct New Bridges for I-75

The No Build Alternative maintains the existing configuration of the I-71/I-75 corridor and consists of minor, short-term safety and maintenance improvements to the interstate, which would maintain its continuing operation. The No Build Alternative is retained as a baseline for evaluation of the build alternatives.

1.3.1 Step 5 Conceptual Alternatives

The five conceptual build alternatives and sub-alternatives were further developed in more detail and refined during Step 5 of the PDP. These efforts included environmental studies, traffic analysis, refinement of horizontal and vertical alignments, cost estimates, utilities coordination, and stakeholder coordination. As a result, the mainline alternatives and sub-alternatives evolved into eight conceptual alternatives. The eight conceptual alternatives were identified as Alternatives A through H.

- Alternative A (Alternative 1, I-71/US 50 Interchange Sub-Alternative 1, Hybrid of Collector-Distributor Roads Sub-Alternative 1 and Arterial Improvements Sub-Alternative 2 from the *Planning Study Report*)

- Alternative B (Alternative 2, I-71/US 50 Interchange Sub-Alternative 2, Hybrid of Collector-Distributor Roads Sub-Alternative 1 and Arterial Improvements Sub-Alternative 2 from the *Planning Study Report*)

- Alternative C (Variation of Alternative 3, I-71/I-75/US 50 Interchange Sub- Alternative, 1, Hybrid of Collector-Distributor Roads Sub-Alternative 1 and Arterial Improvements Sub-Alternative 2 from the *Planning Study Report*)

- Alternative D (Variation of Alternative 3, I-71/I-75/US 50 Interchange Sub- Alternative 3, Hybrid of Collector-Distributor Roads Sub-Alternative 1 and Arterial Improvements Sub-Alternative 2 from the *Planning Study Report*)

- Alternative E (Variation of Alternative 3, I-71/I-75/US 50 Interchange Sub-Alternative 3, Hybrid of Collector-Distributor Roads Sub-Alternative 1 and Arterial Improvements Sub-Alternative 2 from the *Planning Study Report*)

- Alternative F (Variation of Alternative 4, I-71/I-75/US 50 Interchange Sub-Alternative 2, Hybrid of Collector-Distributor Roads Sub-Alternative 1 and Arterial Improvements Sub-Alternative 2 from the *Planning Study Report*)

- Alternative G (Variation of Alternative 4, I-71/I-75/US 50 Interchange Sub- Alternative 3, Hybrid of Collector-Distributor Roads Sub-Alternative 1 and Arterial Improvements Sub-Alternative 2 from the *Planning Study Report*)

- Alternative H (Alternative 5 from the *Planning Study Report*)

A comparative analysis of the eight conceptual alternatives eliminated some of the alternatives, including Alternatives A, F, and H. Alternatives A and H were eliminated from further consideration due to fatal flaws, which were identified as the alternatives were developed in more detail. Alternative F was eliminated from further consideration because it was very similar to Alternative G and did not provide any additional benefit. Alternatives evaluated throughout Step 5 were Alternatives B, C, D, E, and G. These five alternatives then were compared for their ability to meet the project's purpose and need, impacts, constructability, and estimated costs. Impacts were determined using the construction limits of each alternative.

The conceptual alternatives developed and evaluated in Step 5 all have comparable impacts at both the southern and northern ends of the study area. Distinction among the alternatives is made by evaluating the impacts of each within the Central Business Districts (CBD) and adjacent communities of both Covington, Kentucky and Cincinnati, Ohio. The difference between the conceptual alternatives is the area between the limits of KY 12th Street and Ezzard Charles Drive. Alternative B, the "Queensgate alignment" is west of Longworth Hall (a Section 4(f) resource) through the Queensgate area. Alternatives C, D, E, and G, "Existing alignment," are all alignment variations which follow the existing interstate corridor. Among these alternatives, access to both CBD areas varies from providing direct access via new interchanges with I-71/I-75 to providing CBD access with a system of collector-distributor (C-D) roadways that connect to CBD access points.

Based on the adverse impacts to communities and property acquisition associated with Alternative B, as well as the overall complexity, constructability, risk, and cost, it was recommended that Alternative B be eliminated from further consideration.

Alternatives C and D are very similar in overall design. Based on the comparative analysis with respect to horizontal and vertical alignments, impacts, and the flow of traffic of Alternatives C and D, it was recommended that a hybrid alternative of the northbound portion of Alternative C and the southbound portion of Alternative D should be advanced for further consideration.

Alternative G was recommended to be eliminated from further consideration due to the high costs of this alternative and the higher property acquisition associated with it. Alternative G would result in 31 residential and 41 business displacements. The business displacements would affect over 1,300 employees. However, the following beneficial design features of Alternative G will be carried forward for further analysis and incorporated into the feasible alternatives:

- access to north end of Clay Wade Bailey Bridge from I-75 southbound using a connector-distributor roadway and US 50 eastbound;
- two access points into Covington;
- access from a northbound connector-distributor roadway from KY to I-71 northbound in Ohio; and
- access ramp just north of Ezzard Charles Drive for Freeman Ave and local traffic to I-75 northbound.

1.3.2 Recommended Feasible Alternatives

The comparative analysis led to the recommendation of carrying forward two feasible alternatives. The two feasible alternatives consist of Alternative E and a combination of Alternatives C and D (Exhibit 2A-2D; Exhibit 3A-3D). Based on the analyses completed and feedback as part of community input, it was also recommended that certain design elements (as listed above) of Alternative G be incorporated into the two feasible alternatives in Step 6 of the PDP. The critical proposed cross sections of the feasible alternative are presented in Appendix I.

Alternative C/D

Alternative C/D utilizes the existing I-71/I-75 alignment from the southern project limits at the Dixie Highway Interchange north to the Kyles Lane Interchange. The Dixie Highway and Kyles Lane interchanges will be modified slightly to accommodate a connector-distributor (C-D) roadway, which will be constructed along both sides of I-71/I-75 between the two interchanges. North of the Kyles Lane Interchange, the alignment shifts to the west to accommodate additional I-71/I-75 travel lanes. Between Kyles Lane and KY 12th Street, six lanes will be provided in each direction for a total of 12 travel lanes. Near KY 12th Street, the alignment separates into three routes for I-71, I-75 and a local C-D roadway.

In Alternative C/D, access into Covington from the interstate will be provided by the local C-D roadway; at KY 12th Street for northbound traffic and at KY 9th Street for southbound traffic. Direct access to I-71 from Covington will be provided at KY 9th Street with traffic to I-75 northbound using the C-D roadway through downtown Cincinnati and connecting at the Ezzard Charles merge. Access for southbound interstate traffic is located at KY 12th Street. Bullock Street will be extended north from Pike Street to KY 9th, 5th, and 4th streets and Jillian's Way will be extended north from Pike Street to KY 9th, 5th, 4th, and 3rd streets.

A U-turn before the KY 9th Street intersection will allow local southbound traffic to turn and travel northbound to KY 3rd, 4th, and 5th streets.

A new double deck bridge will be built just west of the existing Brent Spence Bridge to carry northbound and southbound I-75 (two lanes in each direction), two lanes for southbound I-71 and two lanes for southbound local traffic. The existing Brent Spence Bridge will be rehabilitated to carry two lanes for northbound I-71 and three lanes for northbound local traffic.

Alternative E

Alternative E utilizes the existing I-71/I-75 alignment from the southern project limits at the Dixie Highway Interchange north to the Kyles Lane Interchange. The Dixie Highway and Kyles Lane interchanges will be modified slightly to accommodate a C-D roadway, which will be constructed along both sides of I-71/I-75 between the two interchanges. North of the Kyles Lane Interchange, the alignment shifts to the west to accommodate additional I-71/I-75 travel lanes. Between Kyles Lane and KY 12th Street, six lanes will be provided in each direction for a total of 12 travel lanes. Near KY 12th Street, the northbound alignment separates into two routes; one for interstate traffic and one for a local C-D roadway. Near KY 9th Street, the interstate separates into I-71 and I- 75 only routes.

In Alternative E, there are two access points into Covington for both northbound and southbound traffic. In the northbound direction, access will be provided by the local C-D roadway at KY 12th Street and KY 5th Street. In the southbound direction, access will be provided by the local C-D roadway at KY 5th Street, and off of I-71 and I-75 at KY 9th Street. Bullock Street will be extended north from Pike Street to KY 5th and KY 9th streets. Jillian's Way will be extended north from Pike Street to KY 9th, 5th, and 4th streets and allow for access to the existing Brent Spence Bridge.

Access to the interstate system from Covington will be provided by local city streets. In the northbound direction, access to I-75 will be provided at KY 9th Street, access to I-71 will be provided at KY 5th Street. Access to I-75 northbound will also be provided at KY 4th by the local C-D roadway across the lower deck of the existing Brent Spence Bridge and through downtown Cincinnati before connecting just south of the Linn Street Bridge. In the southbound direction, access to I-75/I-71 will be provided at KY 5th Street and KY 12th Street.

A new double deck bridge will be built just west of the existing Brent Spence Bridge to carry northbound and southbound I-71 and I-75 traffic. On the upper deck, I-71 southbound will have three lanes and I-71 northbound will have two lanes. On the lower deck, I-75 will have three northbound and three southbound lanes. The existing Brent Spence Bridge will be rehabilitated to carry northbound and southbound local traffic with two lanes in each direction.

1.3.3 No Build Alternative

The No Build alternative would be limited to minor, short-term safety and maintenance improvements to the Brent Spence Bridge and I-75 corridor, which would maintain continuing operations. The No Build alternative does not meet the Purpose and Need

goals; however, this alternative will be carried forward as a baseline for evaluation of the feasible alternatives.

1.4 Ecological Study Summary

This report provides an ecological analysis of the portion of the Brent Spence Bridge Relocation/Rehabilitation Project located within the Commonwealth of Kentucky (Exhibit 1). An ecological survey of the area was conducted on October 9 to 12, 2006; November 29, 2006; July 30, 2009; August 26, 2009; and September 3, 2009. For purposes of this report, Project Corridor will refer to the entire 7.8-mile segment located in both Kentucky and Ohio. Study Area, survey area, or survey corridor refers to the 4.6-mile portion of the project only within Kentucky. The following sections provide the required ecological information following the Kentucky Transportation Cabinet/Division of Environmental Analysis, Ecological Study Format Guidance and Accountability Format (Rev. 6/05).

The following topics are discussed in the sections below:

- Correspondence with State and Federal Agencies
- Environmental Setting
- Methods
- Sampling Results
- Impacts and Suggested Mitigation Measures
- Short Term Versus Long Term Productivity
- Irreversible and Irretrievable Commitment of Resources
- Alternative Analysis and Recommendations

Tables, exhibits, photographs, and appendices, which include agency coordination letters, Routine Wetland Determination Forms, a Running Buffalo Clover Survey Report, and Rapid Bioassessment Protocol Habitat Forms, are also presented as part of this document.

2.0 CORRESPONDENCE WITH STATE AND FEDERAL AGENCIES

Both state and federal agencies were contacted regarding potential threatened/endangered species and their critical habitats, and other significant natural resources that may occur within the proposed route of the Brent Spence Bridge Replacement/Rehabilitation Project. The sections below summarize correspondence with the U.S. Fish and Wildlife Service (USFWS), Kentucky Department of Fish and Wildlife Resources (KDFWR), Kentucky State Nature Preserves Commission (KSNPC), Kentucky Division of Water (KDOW), Kentucky Division of Forestry (KDOF), and other agencies. Copies of correspondence letters with state/federal agencies are presented in Appendix II.

2.1 United States Fish and Wildlife Service

The USFWS – Reynoldsburg office stated in a letter dated August 16, 2006, that they will serve as the lead USFWS field office for this project (Appendix II). Two endangered species (E) and one candidate species (C) are identified in the correspondence letter as potentially occurring within the study area: Indiana bat (*Myotis sodalis*) (E), running buffalo clover (*Trifolium stoloniferum*) (E), and sheepnose mussel (*Plethobasus cyphyus*) (C).

Although not well defined, summer habitat requirements for the Indiana bat include: 1) live trees or snags with peeling or exfoliating bark, split trunks, branches or cavities, which may be used as maternity or roost areas; 2) live trees (such as shagbark hickory and oaks) which have exfoliating bark that may be used for roosting; and 3) stream corridors, riparian areas, and upland woodlots which provide forage sites. Should the proposed site contain trees or associated habitats exhibiting any of the previously mentioned characteristics, the USFWS recommends that the habitat and surrounding trees be saved wherever possible. If trees must be cut, further coordination with the USFWS is requested to determine if surveys are warranted.

Running buffalo clover can be found in partially shaded woodlots, mowed areas (lawns, parks, cemeteries), and along streams and trails within rich woods. It requires periodic disturbance and somewhat open habitat to successfully flourish, but cannot tolerate full-sun, full-shade, heavy invasive species growth, or severe disturbance. If suitable habitat is present, the USFWS recommends that a trained botanist conduct surveys in May or June when the plant is in flower.

The sheepnose mussel is primarily found in larger streams and rivers and typically occurs in shallow shoal habitats with moderate to swift currents over coarse sand and gravel. It is also found in mud, cobble, and boulder habitats. The USFWS recommends that if the project directly or indirectly impacts any of the habitat types described above, a survey be conducted to determine the presence or probable absence of sheepnose mussels.

2.2 Kentucky Department of Fish and Wildlife Resources

The KDFWR stated in a letter dated January 5, 2006, that they searched the Kentucky Fish and Wildlife Information System (KFWIS) for federal and state threatened and endangered species known to occur within close proximity to the study area (Appendix II). Since several state and federally listed mussels have historically occurred within this portion of the Ohio River, improvements may warrant mussel surveys and/or special conditions to minimize impacts to the aquatic ecosystem. Additionally, strict erosion control measures, such as silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches, should be developed and implemented prior to construction. Further KDFWR recommendations for portions of the project that impact streams include:

- Channel changes located within the study area should incorporate natural stream channel design.
- Development/excavation during low flow period to minimize disturbances.
- Proper placement of erosion control structures below highly disturbed areas to minimized entry of silt into area streams.
- Replanting of disturbed areas after construction, including stream banks, with native vegetation for soil stabilization and enhancement of fish and wildlife populations. Recommend a 100 foot forested buffer along each stream bank.
- Return all disturbed instream habitat to its original condition upon completion of construction in the area.
- Preservation of any tree canopy overhanging any streams within the study area.

2.3 Kentucky State Nature Preserves Commission

The KSNPC stated in a letter dated December 21, 2005, that it reviewed the Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the KSNPC occur near the study area. State and federal threatened/endangered species, compiled from all agency correspondence, that could be impacted by the proposed project are listed in Table 1.

A majority of the occurrences for aquatic organisms are from 1966 or earlier. The area of the proposed Ohio River crossing has been severely impacted by pollutants, and although river quality is improving, many if not all of these organisms apparently have been extirpated from the area.

Additionally, KSNPC mentioned the following species and their potential habitats: redback salamander (*Plethodon cinerus*, KSNPC Special Concern), Kirtland's snake (*Clonophis kirtlandii*, KSNPC Threatened), running buffalo clover (federally endangered, KSNPC Threatened), Savannah Sparrow (*Passerculus sandwichensis*, KSNPC special concern), and Barn Owl (*Tyto alba*, KSNPC special concern). Before demolition of existing structures, the KSNPC recommends it be determined that barn owls are not present.

2.4 Kentucky Division Of Water

The KDOW stated in a letter dated December 8, 2005, that no wild or scenic rivers and outstanding resource waters are located within the project boundary (Appendix II). In addition, no wells or springs were identified by KDOW (email correspondence from December 19, 2005, presented in Appendix II).

2.5 Kentucky Division Of Forestry

The KDOF stated in a letter dated December 16, 2005, that no state forests or champion trees are located in the study area (Appendix II). They recommend care be taken around existing trees that will remain after construction is complete. In order to protect trees, heavy equipment and construction traffic should be kept away from trees and outside the drip line to minimize wounding of trunk or surface roots and decrease soil compaction and tree stress. Stressed trees are vulnerable to insect and disease infestation. KDOF recommends planting additional trees once construction is complete.

2.6 Other Agencies

The U.S. Forest Service and U.S. National Park Service were not contacted regarding this project since there are no national forests or national parks within the study corridor.

3.0 ENVIRONMENTAL SETTING

The general environmental setting of the study corridor for the Brent Spence Bridge Replacement/Rehabilitation Project is presented below in terms of climate, physiography, topography, geology, soils, watershed, land use, and floral community.

3.1 Climate

The *Soil Survey of Boone, Campbell, and Kenton Counties, Kentucky* (USDA, 1989), states that the climate of Kenton County is temperate and humid with average temperatures for January at 33 °F and average temperatures for July at 76 °F. Annual average temperature is about 54 °F. Average rainfall is approximately 40 inches, with no regular wet or dry seasons. The growing season is approximately 186 days (measured by last freezing temperature in spring to first in fall).

3.2 Physiography

Kenton County is located in northern Kentucky within the east-central United States. Physiographically, it is situated within the Interior Low Plateau Province – Outer Bluegrass Section physiographic region (Kentucky Geologic Survey website; modified from Preston McGrain's, *The Geological Story of Kentucky*). The area is characterized by gently rolling lowland underlain by limestone and shales formed up to 450 to 500 million years ago. The outer bluegrass consists of deeper valleys, with little flat land. Bedrock in this area is mostly interbedded Ordovician limestones and shales which area easily eroded (Kentucky Geologic Survey website).

3.3 Topography

The topography in the study area ranges from steep hillsides to level terrain (Exhibit 1; Exhibit 3A-3D), and is characterized by a severely to moderately undulating terrain. In northern Kenton County, near the Ohio River, the terrain is generally characterized by a more gentle topography.

Beginning at Dixie Highway (the southern terminus of the study area) in Kentucky, existing site elevations along the I-71/I-75 corridor generally range between 850 and 900 feet above mean sea level (msl). Northward towards Covington and the Ohio River, the existing topography generally slopes downward to elevation 450 to 500 feet above msl at the river. From the Dixie Highway Interchange to the Kentucky 12th Street Interchange, the topography within the study area is relatively level along existing I-71/I-75, with moderately to steeply sloping hillsides and ridges adjacent to the interstate. From KY 12th Street to the Ohio River, the west side of the study area exhibits similar moderately to steeply sloping hillsides. The eastern side of the corridor is relatively level in comparison to the existing terrain along the western side of the corridor.

3.4 Geology

The study area has been affected by major glaciations occurring during the Pleistocene Epoch. These glacial advances caused profound drainage changes and were responsible for the deposition of a variety of soils lying beneath the Covington/Cincinnati area. Soils consist of gravely zone topped by granular outwash deposits. Near-surface soils contain alluvial sediments, deposited by the floodwaters of both the Ohio and Licking rivers. Human disturbance has also affected soil conditions within the study area by surface grading, placement of fill, construction of buildings, construction of marina and housing developments, demolition of structures, and roadway grading/construction.

In the vicinity of Dixie Highway there are Illinoian age glacial soils, sometimes capped with windblown loessian silts, overlying residual clays that provide a soil mantle of varying thickness on top of native bedrock. Near the Ohio River, there are valley basin sediments such as silty clays, sands, gravels, silty sands, and glacial and residual clays underlain by limestone and shale.

Ordovician bedrock underlies the study area and is composed of two major rock units. The Kope Formation is typically found from approximate elevations 510 to 690 feet. This formation is principally shale with relatively thin (four-inch to eight-inch thick) and well-spaced limestone interbeds. The overlying Maysville Formation is found from approximate elevations 690 to 800 feet above msl. It is composed of limestone and shale, at times of equal proportions, but with limestone often predominating, with thicker (eight-inch to 22-inch) and more closely packed beds. The rock beds are highly fossiliferous and calcareous. The limestone distribution within the Maysville Formation often provides a formidable resistance to excavation efforts due to hardness, thickness of layers, and close packing of layers at some elevations.

There are no mapped coal mines within the study area. In this Northern Kentucky region solutioned limestone, or karst, sometimes develops in areas where limestone is the predominant bedrock formation. This region is within an area with limited to moderate potential for karst.

3.5 Soils

According to the *Soil Survey for Boone, Campbell, and Kenton Counties, Kentucky* (USDA, 1989), the Eden-Cynthiana soil association and the Rossmoyne-Jessup soil association are located within the study area. The Eden-Cynthiana association is typified by dominantly steep to very steep soils that have a clayey subsoil on limestone and shale uplands. The Rossmoyne-Jessup association is typified by level to moderately steep soils that have loamy to clayey subsoil and are located on ridge tops and side slopes.

The soil types in the study area include Urban Land, Chagrin, Eden, Faywood, Negley, Huntington, Jessup, Lindside, and Rossmoyne series. Soil types within the study area are shown on Exhibit 4. The urban land consists of cuts and fills and is underlain by alluvium and outwash deposits. The Chagrin, Eden, Faywood series soils are formed of residual material weathered from calcareous shale and limestone and are generally silt clays with slow to moderately slow permeability. The Rossmoyne, Jessup, Huntington, Lindside, and Negley series soils are silt loams and silt clays formed in loess and in glacial till. The permeability is slow in the fragipan of Rossmoyne soils. The shrink/swell potential of these soils varies from moderate to high with increasing depths.

3.6 Watershed

The study area is located within the Licking River Watershed, hydrologic unit code (HUC) 05100101, and the Middle Ohio – Laughery Watershed (HUC 05090203), which drain a large portion of northeastern Kentucky (EPA Website). Three eleven-digit HUCs are located within the study area (USGS website). HUC 05090203040 is located from the Ohio River south to approximately Cedar Point Lane. HUC 05100101270 extends from the Cedar Point Lane ridge top to northeast of the Kyles Lane/I-75/I-71 intersection. HUC 05100101290 extends from northeast of the Kyles Lane intersection to the southern project terminus (USGS website).

Generally, water flows east across the study area into tributaries of Banklick Creek, which is a tributary to the Licking River, unnamed tributaries of the Licking River, or directly into the Ohio River. A majority of the original surface flow within the study area has been altered by the existing interstate, as well as the dense urban center of Covington, single-family residential and commercial development along the interstate.

3.7 Land Use

The study area totals approximately 1,033 acres within an urban landscape dominated by single-family residential, multifamily residential, commercial development, maintained grass areas, the I-75/I-71 transportation corridor, and institutional uses. These urban land uses comprise 70 percent of the acreage within the study area (725 acres). Non-urban land uses, such as the Ohio River, mixed-age woods, old-field, young woods, and wetland comprise 30 percent (308 acres). Table 2 identifies the land uses and acreages found within the study area, as well as approximate impacts per alternative.

Given that this project is primarily an expansion of an existing interstate within Kentucky, the largest land use impacted by the project is to transportation. The second largest impact is to maintained grass areas, which are primarily located within or adjacent to the interstate corridor. Natural habitats of mixed-age woods, young woods, old field, and wetland are less impacted.

3.8 Floral Community

The floral community of the study area is defined in *Deciduous Forests of Eastern North America* (Braun,1950) as part of the Western Mesophytic Forest Region. The Western Mesophytic Forest Region extends from the western escarpment of the Cumberland and Allegheny Plateaus in the east to the loess bluffs of the Mississippi River in the west. The region extends north from northern Alabama and Mississippi to the southern boundary of the Wisconsin glaciation in Ohio and Indiana to the southern boundary of the Illinoian glaciation farther west (Braun, 1950). The Western Mesophytic Forest Region is a mosaic pattern of climax vegetation types compared to the single climax types of the eastern Mixed Mesophytic Forest region.

The study area lies within the Bluegrass Section of the Western Mesophytic Forest Region. Representative tree species identified by Braun (1950) within nearby Campbell County, Kentucky, include: white oak (*Quercus alba*), Shumard oak (*Quercus shumardii schneckii*), chestnut oak (*Quercus muhlenbergii*), shagbark hickory (*Carya ovata*), white ash (*Fraxinus americana*), black walnut (*Juglans nigra*), sugar maple (*Acer saccharum*), pignut hickory (*Carya glabra*). Other common species in the Bluegrass Section include: tulip tree (*Liriodendron tulipifera*), beech (*Fagus grandifolia*), red oak (*Quercus rubra*), and American elm (*Ulmus americana*).

4.0 METHODS

The methods used to conduct the ecological study of the Brent Spence Bridge Replacement/Rehabilitation Project within the study area are presented below in terms of literature and office review, aquatic sampling methods, terrestrial sampling methods, wetland sampling methods, and state and federal threatened/endangered species sampling methods.

4.1 Literature and Office Review

As presented in Section 2.0, the following state and federal agencies were contacted regarding the proposed project: U.S. Fish and Wildlife Service (USFWS), Kentucky Department of Fish and Wildlife Resources (KDFWR), Kentucky State Nature Preserves Commission (KSNPC), Kentucky Division of Water (KDOW), and the Kentucky Division of Forestry (KDOF). Their comments are also presented in the aforementioned section.

Office reviews of the proposed corridor included, the U.S. Geological Survey (USGS) topographic quadrangle maps, geologic maps, physiographic maps, National Wetland Inventory (NWI) Maps, U.S. Department of Agriculture (USDA) Soil Survey Maps, and floral community maps.

4.2 Aquatic Sampling Methods

A delineation of open waters, such as streams and ponds, was made based on the presence/absence of an ordinary high water mark (OHWM), defined bed and bank features, and flow regimes. Streams were classified as Intermittent or Ephemeral stream types based on flow, substrate, and structure. The stream limits were mapped in the field and surveyed using a Trimble GeoXT global positioning system (GPS). Surveyed streams are shown on the Alternatives with Study Area Map with both aerial photograph and USGS Topographic map basemaps (Exhibit 2A-2D; Exhibit 3A-3D).

The physical characteristics of streams were documented along with a habitat assessment of each intermittent stream using the U.S. Environmental Protection Agency's (EPA) *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (RBP) (EPA, 1999). The *Methods for Assessing Biological Integrity of Surface Waters in Kentucky* (KDOW, 2002) developed by the KDOW was used to rank the RBP habitat score and assess the quality of the intermittent streams in terms of supporting its designated use.

Based on site conditions, existing land use, and approved scope of the ecological study, no fish, mussel, macroinvertebrate, or water quality sampling of streams was conducted. Man-made drainage ditches, including those lined with rip/rap and primarily located within the existing interstate right-of-way, were not evaluated as part of this survey.

4.3 Terrestrial Sampling Methods

The study area was walked and visually surveyed for plant and animal species. A qualitative floral survey, which recorded the plants observed within the study area, was also conducted as part of the assessment. Plant species not recognized in the field were collected and later identified using the *Manual of Vascular Plants, Second Edition* (Gleason and Cronquist, 1991). The presence of caves and/or rock shelters was investigated within the study area. During the pedestrian survey, cursory faunal investigations were performed which included observation of habitat, roadkills, scat, and tracks. No specific surveys for avifauna or bats were performed as part of this study, as determined within the scope of the project.

4.4 Wetland Sampling Methods

A wetland delineation of the study corridor was accomplished through documentation of the presence/absence of hydric soils, wetland hydrology and hydrophytic vegetation per the guidelines of the 1987 U.S. Army Corps of Engineers (USACE) Manual (Environmental Laboratory, 1987). Soil, hydrology and vegetation data were collected on Routine Wetland Determination Forms (Appendix III) for 21 points throughout the study area. The wetland boundaries were mapped in the field and surveyed using a Trimble GeoXT GPS. Surveyed data point locations and water/wetland boundaries are shown on the Alternatives with Study Area Map (Exhibit 2A-2D; Exhibit 3A-3D).

4.5 State and Federal Threatened/Endangered Species Sampling Methods

Based on the responses from state and federal agencies, the potential presence of habitat for state and federally threatened or endangered within the study area was assessed during this survey. The focus of the assessment was the federally-endangered Indiana bat and running buffalo clover. The general habitat types required for each species, as presented in Section 2.1, were used in the field to locate potential habitat areas for future study. The USFWS and the Kentucky Transportation Cabinet – Division of Environmental Analysis (KYTC-DEA) reviewed and conducted surveys for running buffalo clover between Pleasant Run Creek, located west of the Dixie Highway intersection, to the Ohio River. No other species-specific surveys were conducted as a part of this assessment.

Lake Sturgeon (*Acipenser fulvescens*), black buffalo (*Ictiobus niger*), and several large river mussel species were identified by the state/federal agencies (Table 2). The only suitable stream for these species within the study area is the Ohio River. No surveys of the Ohio River were conducted. A general review of Ohio River is presented in Section 5.1. Habitat for other terrestrial state-listed species were noted during the field survey and are addressed in the results section.

5.0 SAMPLING RESULTS

The results of the ecological assessment of the study area are presented below in terms of literature and office review, aquatic sampling, and terrestrial sampling.

5.1 Literature and Office Review Results

The United States Geologic Survey (USGS) topographic quadrangle (Covington, KY) maps the study area as gently to severely sloping down to the Ohio River (Exhibit 1). Recent aerial photographs indicate that a majority of the study area consists of residential, commercial, and institutional development along the existing I-75/I-71 corridor (Photographs 2 and 3). Few undisturbed natural areas remain within the study area.

Two features were identified during a review of the National Wetlands Inventory (NWI) map (Exhibit 5). Both are palustrine, unconsolidated bottom, permanently flooded impoundments (PUBHh). One was identified northwest of the Kyles Lane and I-75/I-71 intersection. The other is located approximately 0.8 mile west of the Dixie Highway and I-75/I-71 intersection. During the field investigation these features were identified as open water ponds and are discussed further in Section 5.2.5

The Ohio River is approximately 1,300 feet wide at the existing Brent Spence Bridge location (Photographs 4 and 5). The normal pool elevation of the Ohio River in the area of the bridge is about 455 feet above msl and the ordinary high water mark is approximately 468.5 feet above msl.

In the Northern Kentucky/Greater Cincinnati area, the Ohio River is used as a source of drinking water for over one million people in two states and is the site of increasingly intensive recreational use. Within the region, the Ohio River receives discharges from over 100 square miles of urban watershed, and other non-point sources associated with a major metropolitan area. The river's water quality and its suitability for contact recreation in particular, is subject to rapid changes, particularly during and after precipitation events (ORSANCO, 2002).

Common fish species in the Ohio River include black redhorse (*Moxostoma duquesnei*), bluegill (*Lepomis macrochirus*), smallmouth buffalo (*Ictiobus baubalus*), common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), emerald shiner (*Notropis atherinoides atherinoides*), flathead catfish (*Pylodictis olivaris*), gizzard-shad (*Dorsoma cepadianum*), golden redhorse (*Moxostoma erythrurum*), largemouth bass (*Micropterus salmoides salmoides*), logperch darter (*Percina caprodes*), longear sunfish (*Lepomis megalotis*), paddlefish (*Polyodon spathula*), and quillback (*Carpiodes cyprinus*) (taxonomic nomenclature from ODNR, 2006).

Common mussel species in the Ohio River include buttercup (*Ellipsaria lineolata*), elephant's ear (*Elliptio crassidens*), giant floater (*Anodoata grandis*), mucket (*Alasmidonta ligamentina*), pistolgrip (*Tritogonia verrucosa*), and three-ridge (*Amblema plicata*) (taxonomic nomenclature from Parmalee and Bogan, 1998).

5.2 Aquatic Sampling Results

The results of aquatic sampling are presented below in terms of: macroinvertebrates, fish, mussels, water quality, and existing surface water characteristics.

5.2.1 Macroinvertebrates

Based on the highly developed nature of the study area within headwater streams and the approved scope of the ecological study, no macroinvertebrate sampling of streams was conducted. Full colonization of macroinvertebrates is limited within the headwater habitats located in the study area.

5.2.2 Fishes

Based on the highly developed nature of the study area and marginal aquatic habitat within the headwater streams, no fish sampling of the streams was conducted. No fish surveys of the Ohio River at the proposed crossings were conducted as a part of this study.

5.2.3 Mussels

Mussels are unlikely to be located within the study area given the limited habitat within headwater streams. As such, no mussel sampling of the streams was conducted. No mussel surveys of the Ohio River at the proposed crossings were conducted as a part of this study.

5.2.4 Water Quality

Based on site conditions, existing land use, and approved scope of the ecological study, no water quality sampling of the streams was conducted.

5.2.5 Surface Water Characteristics

During the field assessment, physical characteristics were collected for 13 intermittent and 10 ephemeral streams (Table 3; Exhibit 2A-2D; Exhibit 3A-3D). A total of 9,525 linear feet of intermittent stream and 2,180 linear feet of ephemeral stream were delineated within the study area. *USEPA's Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (RBP) (1999) Habitat Assessment Form for each intermittent stream is presented in Appendix IV. Two open water ponds were also identified within the study area (Table 4; Exhibit 2A-2D; Exhibit 3A-3D). Each intermittent and ephemeral stream and the open water pond are discussed in more detail below (Photographs 6 through 23).

Intermittent Stream 1: Intermittent Stream 1 is located along the south side of I-75/I-71 and west of Kyles Lane (Exhibit 2B). The stream is not identified on the U.S. Geological Survey (USGS) topographic quadrangle map (Exhibit 3B). Intermittent Stream 1 is 1,225 linear feet within the study area and approximately six feet wide, with approximately one-foot bank heights. Substrate consists primarily of cobble and bedrock. The stream is partially shaded with sugar maple (*Acer saccharum*) and green ash (*Fraxinus pennsylvanica*) trees and contains a shrub understory of bush honeysuckle *(Lonicera spp.*). The RBP score for Intermittent Stream 1 rated 143, which equates to a classification of "average quality" (*Methods for Assessing Biological Integrity of Surface Waters in Kentucky*, 2008) (RBP 1). A culvert beneath I-75/I-71 feeds the upper portion of the stream. The stream flows through an established residential neighborhood before being piped beneath a daycare facility and road. It emerges further downstream and within an established residential neighborhood. Intermittent Stream 1 is a tributary to Intermittent Stream 2 which is a tributary to Banklick Creek, which drains to the Licking River, which is a tributary to the Ohio River.

Intermittent Stream 2: Intermittent Stream 2 is also located along the south side of I-75/I-71 and west of Kyles Lane (Exhibit 2B). The stream is identified on the USGS topographic quadrangle map as a dashed blue line intermittent stream (Exhibit 3B). Intermittent Stream 1 is a tributary to Intermittent Stream 2. The stream is 530 linear feet within the study area and approximately eight feet wide, with approximately one to two foot bank heights. Substrate consists primarily of cobble, boulders, and bedrock. The stream is partially exposed with a riparian corridor of box elder (*Acer negundo*), staghorn sumac (*Rhus typhina*), and bush honeysuckle. The RBP score for Intermittent Stream 2 rated 132, which equates to a classification of "poor quality" (RBP 2). A culvert beneath I-75/I-71 feeds Intermittent Stream 2. The stream flows into a pond situated southwest of the study area, and on into Banklick Creek, which is a tributary to the Licking River, which drains into the Ohio River.

Intermittent Stream 3: Intermittent Stream 3 is also located along the south side of I-75/I-71 and west of Kyles Lane (Exhibit 2B). The stream is not identified on the USGS topographic quadrangle map (Exhibit 3B). A culvert beneath I-75/I-71 feeds Intermittent Stream 3. The stream is 265 linear feet within the study area and approximately two to four feet wide. Bank heights range from one to six feet. Substrate consists primarily of silt/clay and cobble. The stream is fully shaded with a riparian corridor of box elder, tulip poplar (*Liriodendron tulipifera*), and bush honeysuckle. The RBP score for Intermittent

Stream 3 rated 107, which equates to a classification of "poor quality" (RBP 3). Intermittent Stream 3 is a tributary of Intermittent Stream 1, which is a tributary of Intermittent Stream 2, which is a tributary of Banklick Creek, which drains into the Licking River, a tributary of the Ohio River.

Intermittent Stream 4: Intermittent Stream 4 is located southeast of the I-75/I-71 and Kyles Lane intersection (Exhibit 2B). The stream is not identified on the USGS topographic quadrangle map (Exhibit 3B). A culvert beneath I-75/I-71 feeds Intermittent Stream 4. The stream is 2,375 linear feet within the study area and approximately two to 15 feet wide in the upper portion of the stream and four to six feet wide in the lower portion. Bank heights range from two to three feet. Substrate consists primarily of silt/clay, cobble, boulders, and bedrock. The stream is fully shaded with a riparian corridor of box elder, hackberry (*Celtis occidentalis*), sugar maple, slippery elm (*Ulmus rubra*), and bush honeysuckle. The RBP score for the upper portion (1,550 feet) of Intermittent Stream 4 rated 135, which equates to a classification of "poor quality." The RBP score for the lower portion (825) of Intermittent Stream 4 rated 158, which equates to a classification of "excellent quality" (RBP's 4 and 9). Intermittent Stream 4 appears to flow into a stormwater management system, once leaving the study area.

Intermittent Stream 5: Intermittent Stream 5 is located along the north side of I-75/I-71 and east of Kyles Lane (Exhibit 2B). The stream is not identified on the USGS topographic quadrangle map. The USGS topographic quadrangle map identifies a pond along the lower portion of this stream, however it was not confirmed in the field (Exhibits 3B and 5). This area is now a dry detention basin. A culvert feeds the upper portion of this stream from outside the study area. The stream is 960 linear feet within the study area and approximately one to five feet wide. Bank heights range from six inches to three feet. Substrate consists of silt/clay, gravel, and cobble. The stream is fully shaded in the wooded portions of the reach with a riparian corridor of sugar maple and bush honeysuckle. The RBP score for Intermittent Stream 5 rated 97 in the open portions of the reach and 95 in the wooded portions of the reach, which equates to a classification of "poor quality" (RBP's 5 and 6). Intermittent Stream 5 flows into a stormwater management system.

Intermittent Stream 6: Intermittent Stream 6 is located along the west side of I-75/I-71 (Exhibit 2C). The stream is not identified on the USGS topographic quadrangle map (Exhibit 3C). The stream is 685 linear feet within the study area and approximately four to eight feet wide. Bank heights range from one to two feet. Substrate consists of silt/clay, cobble, boulders, and bedrock. The stream is fully shaded with a riparian corridor of sugar maple, white oak (*Quercus alba*), and bush honeysuckle. The RBP score for Intermittent Stream 6 rated 152, which equates to a classification of "average quality" (RBP 7). Intermittent Stream 6 flows into Wetland 6 and then into a stormwater management system.

Intermittent Stream 7: Intermittent Stream 7 is located along the west side of I-75/I-71 (Exhibit 2C). The stream is not identified on the USGS topographic quadrangle map (Exhibit 3C). The stream is 660 linear feet within the study area and approximately six to 10 feet wide. Bank heights range from one to five feet. Substrate consists of silt/clay, gravel, cobble, boulders, and bedrock. The stream is fully shaded with a riparian corridor of sugar maple, box elder, and bush honeysuckle. The RBP score for Intermittent Stream 7 rated 127, which equates to a classification of "poor quality" (RBP 8). Intermittent Stream 7 flows into a stormwater management system.

Intermittent Stream 8: Intermittent Stream 8 is located along the east side of I-75/I-71 (Exhibit 2A). The stream is not identified on the USGS topographic quadrangle map (Exhibit 3A). The stream is 340 linear feet within the study area and approximately four to six feet wide. Bank heights range from one to three feet. Substrate consists of silt/clay, gravel, cobble, boulders, and bedrock. The stream is fully shaded with a riparian corridor of sugar maple, box elder, and bush honeysuckle. The RBP score for Intermittent Stream 8 rated 122, which equates to a classification of "poor quality" (RBP 10). Intermittent Stream 8 flows southeast out of the study area.

Intermittent Stream 9: Intermittent Stream 9 is located along the east side of I-75/I-71 (Exhibit 2A). The stream is a tributary to Intermittent Stream 8 and is not identified on the USGS topographic quadrangle map (Exhibit 3A). The stream is 70 linear feet within the study area and approximately two to four feet wide. Bank heights range from one and three feet. Substrate consists of silt/clay, gravel, cobble, and bedrock. The stream is fully shaded with a riparian corridor of sugar maple, box elder, and bush honeysuckle. The RBP score for Intermittent Stream 9 rated 141, which equates to a classification of "poor quality" (RBP 11). Intermittent Stream 9 flows northeast into Intermittent Stream 8.

Intermittent Stream 10: Intermittent Stream 10 is located west of Dixie Highway, along the north side of I-75/I-71 (Exhibit 2A). The stream is identified on the USGS topographic quadrangle map as a dashed blue line intermittent stream (Exhibit 3A). Intermittent Stream 10 is a tributary to Intermittent Stream 11. The stream is 850 linear feet within the study area and approximately eight to 12 feet wide, with approximately one to three foot bank heights. Substrate consists primarily of cobble, boulders, and bedrock. The stream is fully shaded with a riparian corridor of box elder, sugar maple, and bush honeysuckle. The RBP score for Intermittent Stream 10 rated 139, which equates to a classification of "poor quality" (RBP 12). A culvert beneath I-75/I-71 feeds Intermittent Stream 10. The stream flows northwest off the study area toward Intermittent Stream 11.

Intermittent Stream 11: Intermittent Stream 11 is located west of Dixie Highway, along both sides of I-75/I-71 (Exhibit 2A). The stream is identified on the USGS topographic quadrangle map as a dashed blue line intermittent stream (Exhibit 3A). The stream is 1,390 linear feet within the study area and approximately 12 to 16 feet wide, with approximately one to three foot bank heights. Substrate consists primarily of silt, cobble, boulders, and bedrock. The stream is fully shaded with a riparian corridor of box elder, Ohio buckeye, sugar maple, and bush honeysuckle. The RBP score for Intermittent Stream 11 rated 135, which equates to a classification of "poor quality" (RBP 13). A culvert beneath I-75/I-71 allows Intermittent Stream 11 to flow north through the study area. The stream flows northwest out of the study area toward Intermittent Stream 11.

Intermittent Stream 12: Intermittent Stream 12 is located west of Dixie Highway, along the north side of I-75/I-71 (Exhibit 2A). The stream is a tributary to Intermittent Stream 11 and is not identified on the USGS topographic quadrangle map (Exhibit 3A). The stream is 110 linear feet within the study area and approximately three to eight feet wide. Bank heights range from one to two feet. Substrate consists of silt/clay, gravel, cobble, and bedrock. The stream is fully shaded with a riparian corridor of sugar maple, Ohio buckeye, box elder, and bush honeysuckle. The RBP score for Intermittent Stream 12 rated 118, which equates to a classification of "poor quality" (RBP 14). Intermittent Stream 12 flows west along the interstate into Intermittent Stream 11.

Intermittent Stream 13: Intermittent Stream 13 is located west of Dixie Highway, along the north side of I-75/I-71 and (Exhibit 2A). The stream is a tributary to Intermittent Stream 11 and is not identified on the USGS topographic quadrangle map (Exhibit 3A). The stream is 65 linear feet within the study area and approximately four to eight feet wide. Bank heights range from one to three feet. Substrate consists of silt/clay, gravel, cobble, boulders, and bedrock. The stream is fully shaded with a riparian corridor of sugar maple, Ohio buckeye, persimmon, and bush honeysuckle. The RBP score for Intermittent Stream 13 rated 129, which equates to a classification of "poor quality" (RBP 15). Intermittent Stream 13 flows east into Intermittent Stream 11.

Ephemeral Stream 1: Ephemeral Stream 1 is located northeast of the I-75/I-71 and Kyles Lane intersection. It is 245 feet long within the study area and one to three feet wide with six inch to one foot bank heights. Substrate within this ephemeral stream consists of silt, gravel, and cobble. It is located within a wooded riparian corridor with a bush honeysuckle dominated understory. Ephemeral Stream 1 flows into a stormwater management system.

Ephemeral Stream 2: Ephemeral Stream 2 is a tributary to Intermittent 6. It is 315 feet long and one to four feet wide with one to three foot bank heights. Substrate within this ephemeral stream consists of silt, cobble, and boulder. It is located within a wooded riparian corridor with a bush honeysuckle dominated understory. Ephemeral Stream 2 flows through Wetland 6, and then into a stormwater management system.

Ephemeral Stream 3: Ephemeral Stream 3 is a tributary of Intermittent Stream 7. Ephemeral Stream 3 is 220 feet long and one to two feet wide with one to two foot bank heights. Substrate within this ephemeral stream consists of cobble and boulder. It is located within a wooded riparian corridor with a bush honeysuckle dominated understory. Ephemeral Stream 3 flows into Intermittent Stream 7, which drains into a stormwater management system.

Ephemeral Stream 4: Ephemeral Stream 4 is a tributary of Intermittent Stream 7. Ephemeral Stream 4 is 195 feet long and one to four feet wide with one to three foot bank heights. Substrate within this ephemeral stream consists of silt and cobble. It is located within a wooded riparian corridor with a bush honeysuckle dominated understory. Ephemeral Stream 4 flows into Intermittent Stream 7, which flows into a stormwater management system.

Ephemeral Stream 5: Ephemeral Stream 5 is a tributary of Intermittent Stream 10. Ephemeral Stream 5 is 80 feet long and one to two feet wide with six inch to one foot bank heights. Substrate within this ephemeral stream consists of silt and gravel. It is located within a scrub/shrub riparian corridor. Ephemeral Stream 5 flows into a stormwater management system which then drains into Intermittent Stream 10.

Ephemeral Stream 6: Ephemeral Stream 6 is a tributary of Intermittent Stream 10. Ephemeral Stream 6 is 160 feet long and two to five feet wide with six inch to one foot bank heights. Substrate within this ephemeral stream consists of silt, gravel, and bedrock. It is located within a scrub/shrub riparian corridor.

Ephemeral Stream 7: Ephemeral Stream 7 is 140 feet long and six to 12 inches wide with six inch bank heights. Substrate within this ephemeral stream consists of silt and

cobble. It is located within a scrub/shrub riparian corridor with a bush honeysuckle dominated understory. Ephemeral Stream 7 flows into a stormwater management system which likely drains into Intermittent Stream 11.

Ephemeral Stream 8: Ephemeral Stream 8 is a tributary of Intermittent Stream 11. Ephemeral Stream 8 is 350 feet long and one to three feet wide with one to three foot bank heights. Substrate within this ephemeral stream consists of silt, gravel, and cobble. It is located within a wooded riparian corridor with a bush honeysuckle dominated understory.

Ephemeral Stream 9: Ephemeral Stream 9 is a tributary of Intermittent Stream 11. Ephemeral Stream 9 is 130 feet long and two to four feet wide with one to three foot bank heights. Substrate within this ephemeral stream consists of silt, gravel, and cobble. It is located within a wooded riparian corridor with a bush honeysuckle dominated understory.

Ephemeral Stream 10: Ephemeral Stream 10 is a tributary of Intermittent Stream 11. Ephemeral Stream 10 is 345 feet long and three to five feet wide with one to two foot bank heights. Substrate within this ephemeral stream consists of silt, gravel, and cobble. It is located within a wooded riparian corridor with a bush honeysuckle dominated understory.

Open Water Pond 1: Open Water Pond 1 is located west of the I-75/I-71 and Kyles Lane intersection (Exhibit 2B) and is identified on the USGS topographic quadrangle map (Exhibit 3B) and NWI map (Exhibit 5). The NWI identified the pond as a palustrine, unconsolidated, bottom permanently flooded impoundment (PUBHh). The 0.69-acre pond is situated on two private residences. A narrow, vegetated wetland buffer surrounds the pond. The pond has no hydrologic connection to a surface water and appears to be isolated.

Open Water Pond 2: Open Water Pond 2 is located west of the I-75/I-71 and Dixie Highway intersection (Exhibit 2A) and is identified on the USGS topographic quadrangle map (Exhibit 3A) and NWI map (Exhibit 5). The NWI identified the pond as a palustrine, unconsolidated, bottom permanently flooded impoundment (PUBHh). The 0.18-acre pond is situated on a private residence. The pond has no hydrologic connection to a surface water and appears to be isolated.

5.3 Terrestrial Sampling Results

Results of the terrestrial pedestrian survey are presented in the sections below in terms of a floral survey, a faunal survey, terrestrial habitats, wetland sampling, and state and federal threatened/endangered species.

5.3.1 Floral Survey

During the field investigation, a floral survey of the natural areas within the study area was conducted. Table 5 presents a list of species observed during the field investigation and the habitats in which they were observed. In general, floral quality of the surveyed area is typical of an urban setting. It is apparent that the entire corridor has been historically cleared at some point. The mixed-age woods likely have not been cleared in the past 30 to 40 years. The young woods and old field habitats have likely been cleared within the past 20 years and five years, respectively. Understory species within the mixed-age woods is dominated by invasive species, such as bush honeysuckle (*Lonicera spp.*) and wintercreeper (*Euonymus fortunei*), which is indicative of a previously disturbed habitat.

Floral species observed during the survey are discussed by habitat type in Section 5.3.3 below.

5.3.2 Faunal Survey

During the field investigation, a qualitative faunal survey of the natural areas within the study area was conducted. Table 6 presents a list of species observed during the field investigation and the habitats in which they were observed. In general, faunal quality of the surveyed area is typical of an urban landscape with wildlife limited to common species adapted to life in highly disturbed settings.

Mammal species not observed during the survey (possibly due to nocturnal activity), but potentially occurring within the natural habitats include: Virginia opossum (*Didelphis virginiana*), shrews (*Blarina sp. and Cryptotis sp.*), eastern mole (*Scalopus aquaticus*), big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*), red bat (*Lasiurus borealis*), eastern cottontail (*Sylvilagus floridanus*), eastern chipmunk (*Tamias striatus*), fox squirrel (*Sciurus niger*), eastern woodrat (*Neotoma floridana*), eastern harvest mouse (*Reithrodontomys humulis*), voles (*Microtus sp.*), longtail weasel (*Mustela frenata*), striped skunk (*Mephitis mephitis*), eastern spotted skunk (*Spilogale putorious*), and white-tailed deer (*Odocoileus virginianus*).

Herpetofaunal species not observed during the survey, but potentially occurring within the natural habitats include: southern two-lined salamander *(Eurycea cirrigera)*, Jefferson salamander (*Ambystoma jeffersonianum*), dusky salamander (*Desmognathus fuscus*), eastern garter snake (*Thamnophis sirtalis*), rat snake (*Elaphe obsoleta*), ringneck snake (*Diadophis punctatus*), eastern box turtle (*Terrapene carolina*), American toad (*Bufo americanus*), and Fowler's Toad (*Bufo woodhousii fowleri*).

Avian species not observed during the survey, but potentially occurring within the natural habitats include: eastern bluebird (*Sialia sialis*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), wood warblers (*Parulidae*), scarlet tanager (*Piranga olivacea*), sparrows (*Emberizidae*), northern cardinal (*Cardinalis cardinalis*), American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), and hairy woodpecker (*Picoides villosus*).

5.3.3 Terrestrial Habitats

Key terrestrial habitats within the study area include mixed-age woods, young woods, and old field. Each habitat type is discussed further below along with general floral and faunal components.

Mixed-age woods: Mixed-age woods within the corridor total approximately 138 acres (13.4 percent) and consist primarily of trees with diameters-at-breast height (dbh) greater than 10 inches (Table 7; Exhibit 6A-6D; Photograph 24). These areas have a closed canopy and distinct understory vegetation. Based on the surrounding urban landscape, the mixed-age woods habitat has been primarily marginalized to undevelopable land along hillsides. Dominant tree species in the mixed-age woods include: hackberry, hickory (*Carya sp.*), sugar maple, silver maple (*Acer saccharinum*), black cherry (*Prunus serotina*), white oak, chestnut oak (*Quercus prinus*), chinkapin oak (*Quercus muehlenbergii*). Dominant understory species include bush honeysuckle and wintercreeper. Other understory species include grape (*Vitis sp.*), poison ivy

(*Toxicodendron radicans*), multiflora rose (*Rosa multiflora*), strawberry (*Fragaria virginica*), spicebush (*Lindera benzoin*), and ground ivy (*Glecoma hederacea*).

Mammal species potentially occurring in mixed-age woods include: Virginia opossum, shrews, eastern mole, big brown bats, little brown bats, red bat, eastern chipmunk, gray squirrel, fox squirrel, eastern woodrat, voles, raccoon, longtail weasels, striped skunk, eastern spotted skunk, and white-tailed deer.

Herpetofaunal species potentially occurring in mixed-age woods include: southern two-lined salamander, Jefferson salamander, dusky salamander, rat snake, ringneck snake, eastern box turtle, American toad, and Fowler's Toad.

Avian species likely occurring within the mixed-age woods habitat include: eastern bluebird, American robin, northern mockingbird, European starling, wood warblers, scarlet tanager, sparrows, black capped chickadee (*Poecile atricapillus*), northern cardinal, American kestrel, red-tailed hawk, great horned owl, and hairy woodpecker.

Young Woods: Young woods within the corridor total approximately 23 acres (2.2 percent) and consist of smaller diameters trees with a dbh of less than 10 inches (Table 7; Photograph 25). These areas either lack a closed canopy or possess a partially closed canopy. Tree species in this habitat are similar to those in the mixed-age woods habitat. Understory vegetation is less defined and consists primarily of bush honeysuckle, multiflora rose, black raspberry (*Rubus occidentalis*), and Japanese honeysuckle (*Lonicera japonica*). Mammal, herpetofaunal, and avian species likely occurring within the young woods habitat are similar to those within the mixed-age woods habitat.

Old Field: Old field habitat within the corridor totals approximately 40 acres (3.9 percent) and is dominated by herbaceous plants and small-diameter trees and shrubs (Table 7; Exhibit 6A-6D; Photograph 26). Old field species identified within the corridor include box elder (*Acer negundo*), red maple (*Acer rubrum*), eastern cottonwood (*Populus deltoides*), winged sumac (*Rhus copallinum*), black locust (*Robinia pseudoacacia*), tall fescue (*Festuca arundinacea*), red clover (*Trifolium pratense*), alsike clover (*Trifolium hybridum*), annual ragweed (*Ambrosia artemisiifolia*), bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and Queen Anne's Lace (*Daucus carota*).

Mammal species potentially occurring within old fields include: Virginia opossum, shrews, eastern mole, eastern cottontail, eastern chipmunk, gray squirrel, fox squirrel, eastern woodrat, eastern harvest mouse, voles, raccoon, longtail weasel, striped skunk, eastern spotted skunk, and white-tailed deer.

Herpetofaunal species potentially occurring within old fields include: ringneck snake, eastern box turtle, American toad, Fowler's Toad.

Avian species potentially occurring within old fields include: eastern bluebird, American robin, northern mockingbird, European starling, sparrows, American kestrel, American crow, mourning dove, and red-tailed hawk.

5.3.4 Wetland Sampling Results

During the field assessment, eight wetlands totaling 1.73 acres were delineated within the study area (Table 8; Exhibit 2A-2D; Exhibit 3A-3D; Photographs 27 through 34). Each

wetland is described below in terms of its size, Cowardin wetland classification as defined in the *Classification of Wetlands and Deepwater Habitats of the United States* (USFWS, 1979), biological significance, and apparent jurisdictional status (note that the U.S. Army Corps of Engineers has not conducted an official field verification). Routine Wetland Determination Forms are included in Appendix III.

Wetland 1: Wetland 1 is located along the west side of Intermittent Stream 2, southwest of the I-75/I-71 and Kyles Lane intersection (Exhibit 2B). It is 0.03 acre, and based on a lack of surface connection to a jurisdictional waterway, it appears to be isolated. The Cowardin wetland classification for this wetland is palustrine emergent marsh (PEM) and palustrine scrub/shrub (PSS) (USFWS, 1979). The wetland appears to be a former sediment basin for the adjacent residential development. Based on its size and location, it provides minimal wetland functions and is of low biological significance. Dominant species located in Wetland 1 include cottonwood, black willow (*Salix nigra*), narrow-leaved cattail (*Typha angustifolia*), and woolgrass (*Scirpus cyperinus*). These species are listed as facultative (FAC), facultative wetland (FACW), and obligate (OBL) on the *National List of Plant Species that Occur in Wetlands – Region 1* (Reed, 1988).

Wetlands 2, 3, and 4: Wetlands 2, 3, and 4 are located southeast of the I-75/I-71 and Kyles Lane intersection (Exhibit 2B). Wetlands 2, 3, and 4 are 0.02 acre, 0.90 acre, and 0.03 acre, respectively. Based on a surface connection to Intermittent Stream 4, it appears that these wetlands are jurisdictional. The Cowardin classification for these wetlands is palustrine emergent marsh (PEM) (USFWS, 1979). All three of these wetlands are located within two dry detention basins (Wetland 2 in an upper basin; Wetlands 3 and 4 in the lower basin), which have a restricting water control device that withholds water runoff from the interstate. Based on their size and location, Wetlands 2 and 4 provide minimal wetland functions and are of low biological significance. Wetland 3 is the largest wetland identified and provides flood storage functions. Dominant species located in these wetlands include soft rush (*Juncus effusus*), green bulrush (*Scirpus atrovirens*), jewel weed (*Impatiens cf capensis*), and broad-leaved cattail (*Typha latifolia*). These species are listed as FACW and OBL in Reed, 1988.

Wetland 5: Wetland 5 is located northeast of the I-75/I-71 and Kyles Lane intersection (Exhibit 2B). Wetland 5 is 0.14 acre and based on a lack of surface connection to a jurisdictional waterway, it appears to be isolated. The Cowardin classification this wetland is palustrine emergent marsh (PEM) (USFWS, 1979). Wetland 5 is located within a dry detention basin fed by an inlet culvert. Based on its size and location, Wetland 5 provides minimal wetland function and is of low biological significance. Dominant species located in this wetland includes broad-leaved cattail, sandbar willow (*Salix exigua*), white snakeroot (*Eupatorium rugosum*), swamp beggar ticks (*Bidens frondosa*), and Pennsylvania smartweed (*Polygonum pennsylvanica*). These species are listed as facultative upland (FACU), FACW, and OBL in Reed, 1988.

Wetland 6: Wetland 6 is located along the west side of I-75/I-71 along Intermittent Stream 6 (Exhibit 2C). Wetland 6 is 0.05 acre and based on a hydrologic connection to the intermittent stream, it appears to be jurisdictional. The Cowardin classification for this wetland is palustrine emergent marsh (PEM) (USFWS, 1979). Wetland 6 is located within a dry detention basin with a restricting water control outlet device that retains high water runoff from the interstate. The overflow enters a stormwater management system. Based on its size and location, Wetland 6 provides minimal wetland function and is of low biological significance. Dominant species located in this wetland includes broad-leaved

cattail, jewel weed, and rice cut grass (*Leersia oryzoides*). These species are listed as FACW and OBL in Reed, 1988.

Wetland 7: Wetland 7 is located along the west side of I-75/I-71 (Exhibit 2C). Wetland 7 is 0.16 acre and based on a lack of hydrologic connection to a jurisdictional waterway, it appears to be isolated. The Cowardin classification for this wetland is palustrine emergent marsh (PEM) (USFWS, 1979). Wetland 7 is a seep-driven wetland that was likely formed as a result of the hillside removal. Wetland 7 is located on a disturbed man-made hillside, provides minimal wetland function, and is of low biological significance. Dominant species located in this wetland includes narrow leaved cattail, soft rush, sedge (*Carex sp.*), and tall fescue (*Festuca arundinacea*). These species are listed as FACU, FACW, and OBL in Reed, 1988.

Wetland 8: Wetland 8 is located along the west side of I-75/I-71 (Exhibit 2C). Wetland 8 is 0.40 acre and based on a hydrologic connection to the drainage ways, it appears to be jurisdictional. The Cowardin classification for this wetland is palustrine emergent marsh (PEM) (USFWS, 1979). Wetland 8 is located within a dry detention basin with a restricting water control outlet device that retains high water runoff from the interstate. The overflow enters a stormwater management system. Wetland 8 is the second largest wetland identified and provides flood storage functions. Dominant species located in this wetland include broad-leaved cattail and giant ragweed (*Ambrosia trifida*). These species are listed as FACW and OBL in Reed, 1988.

5.3.5 State and Federal Threatened/Endangered Species Results

Results of the survey for potential state and federal species occurring within the study area are presented on Table 2. The survey of the study area was limited to potential habitat for the federally endangered Indiana bat and running buffalo clover. Potential habitat for these two species is identified on Exhibit 2A-2D and Exhibit 3A-3D.

Marginal potential habitat for state listed species was also noted during the survey. As presented in the state/federal agency correspondence, a majority of the Ohio River species listed in Table 2 have not been collected or identified within the Ohio River since 1966 and are believed to be extirpated. Habitat for Kirtland's snake is present in the study area, near wetlands and wood edges. Limited habitat for Savannah sparrow exists in old field areas within the study area. Redback salamander habitat is present in the study area within the mature and young woods; however, due to their small size, the woodlands are unlikely to support viable populations of this species. Limited northern leopard frog habitat exists within the open water pond and wetlands in the study area; however, the disturbed nature and setting of the created wetland offers only limited habitat. Barn owl habitat is not present within the study area. Although, limited young woods and old fields are present, they are small and fragmented and do not offer significant owl habitat.

Indiana bat and running buffalo clover habitats and survey results are discussed in the sections below.

Indiana Bat Habitat: Indiana bat habitat within the study area was organized into two categories: potential Indiana bat habitat and marginal Indiana bat habitat. Potential habitat consists of the mixed-age woods, which exhibit larger trees with characteristics most favorable for potential Indiana bat habitat. Approximately 137 acres of potential Indiana bat habitat were identified within the study area (Table 9). Marginal Indiana bat

habitat consists of single-family residential developments with scattered individual mature trees and young woods within the study area. These areas represent less favorable Indiana bat habitat. Approximately 187 acres of marginal Indiana bat habitat was identified within the study area (Table 9).

Running Buffalo Clover Habitat: Potential areas of running buffalo clover habitat identified in the study area consist of partially shaded woodlots, periodically mowed areas (lawns, parks, cemeteries), and partially shaded woods along streams and trails. Running buffalo clover requires periodic disturbance and somewhat open habitat to successfully flourish, but cannot tolerate full-sun, full-shade, severe disturbance, or areas dominated by aggressive non-native species. A majority of the potential woodlots were not considered potential running buffalo clover habitat due to understory dominance of bush honeysuckle and wintercreeper. Only one partially shaded woodlot was identified within the study area as possessing potential running buffalo clover habitat. This 10-acre woodlot is located along the west side of I-75/I-71 east of the Kyles Lane intersection and along Intermittent Stream 6 (Exhibit 2A-2D and Exhibit 3A-3D).

Kentucky Transportation Cabinet – Division of Environmental Analysis (KYTC-DEA) conducted a running buffalo clover survey between Rivard Drive and Pleasant Run Creek on June 4 and 9, 2009. The Biological Assessment report is presented in Appendix V. No running buffalo clover was identified during the survey and the assessment concludes that the project is not likely to adversely affect running buffalo clover. Included in the Biological Assessment is a letter from the U.S. Fish and Wildlife Service – Ohio Field Office (USFWS) which states that no running buffalo clover species were found during a 2006 survey between the Ohio River and Rivard Drive, and concludes that no further surveys should be required in this area. The survey limits were extended approximately 2,400 feet between Pleasant Run Creek and Beechwood Road. This area has not been reviewed by KYTC-DEA or the USFWS, but did not present suitable habitat during the 2009 ecological survey.

6.0 IMPACTS AND SUGGESTED MITIGATION MEASURES

Impacts and suggested mitigation measures are presented for significant ecological resources, aquatic ecosystems, streams, terrestrial ecosystem, wetlands, and state and federal threatened/endangered species.

6.1 Significant Ecological Resource Impacts

No significant ecological resources, such as wild or scenic rivers, state forests, champion trees, U.S. forests, or national parks, were identified within the study area during correspondence with state and federal agencies or during literature and office review. One city park (Goebel Park) was identified and is located east of I-75/I-71 and south of Fifth Street. A narrow portion of this park will be encroached by interstate widening. No impacts to significant ecological resources are anticipated from this project.

6.2 Aquatic Ecosystem Impacts

Cumulative and indirect impacts to the aquatic ecosystem include loss of headwater stream channels and potential for increased runoff and sediment flows to downstream channels and aquatic life. The project is located in an urban setting within an existing interstate corridor. As such, streams proposed for impact are highly disturbed and generally rate in the category of "low quality." The two open water ponds will not be

impacted by either alternative route (Table 4). Since aquatic impacts are to low quality headwater streams, impacts to macroinvertebrate will be limited and impacts to fish and mussels will be minimal due to general lack of habitat.

As part of the project, a new Ohio River bridge is proposed within each alternative. The bridge will be constructed using best management practices during placement of the piers to minimize impacts to aquatic life. During construction, additional best management practices will be used to ensure minimization of silt entering nearby headwater streams. Best management practices may include use of silt fences, staked straw bales, brush barriers, sediment basins, diversion ditches, and timing of construction to dry periods of the year. Based on final bridge design, specific surveys in the Ohio River for potential mussel populations may be required prior to construction.

6.3 Streams

Proposed stream impacts from each of the feasible alternatives within the study area are presented below. A specific alternative analysis for the project is provided in Section 9.0.

6.3.1 Impacts

Stream impacts are presented in Exhibit 2A-2D, Exhibit 3A-3D, and Table 3 for each of the feasible alternatives. Alternative C/D will impact ten intermittent streams totaling 2,830 linear feet and five ephemeral streams totaling 750 linear feet. Alternative E will impact ten intermittent streams totaling 2,825 linear feet and five ephemeral streams totaling 755 linear feet.

6.3.2 Suggested Mitigation Measures

Potential stream mitigation measures could include payment into the Kentucky Department of Fish and Wildlife Resources (KDFWR) In-lieu Fee Program or a stream restoration project within the watershed using natural channel design. The potentially impacted intermittent stream segments rated as "poor quality" should be mitigated at no more than a 1:1 ratio. The potentially impacted intermittent stream segments rated as "average quality" should be mitigated at no more than a 1.5:1 ratio.

6.4 Terrestrial Ecosystem

Proposed impacts to terrestrial ecosystems from each of the feasible alternatives within the study area are presented below. A specific alternative analysis for the project is provided in Section 9.0.

6.4.1 Impacts

Impacts to the floral and faunal communities within the study area will include mixed-age woods, young woods, and open field habitats (Table 7). Alternative C/D will impact approximately 28 acres of mixed-age woods, 10 acres of young woods, and 14 acres of old field. Alternative E will impact approximately 27 acres of mixed-age woods, 10 acres of young woods, and 14 acres of old field.

6.4.2 Suggested Mitigation Measures

Due to the limited nature of impacts to the terrestrial ecosystem, no mitigation is proposed at this time.

6.5 Wetlands

Proposed wetland impacts from each of the feasible alternatives within the study area are discussed below and summarized in Table 8. A specific alternative analysis for the project is provided in Section 9.0.

6.5.1 Impacts

The only proposed wetland impacts resulting from the project are to Wetland 3, Wetland 4, Wetland 6, and Wetland 8 (Exhibit 2A-2D). Wetland impacts are presented in Table 8 for each feasible alternative. All four impacted wetlands are jurisdictional (assumed status since U.S. Army Corps of Engineers (USACE) verification has not been conducted).

Alternative C/D and Alternative E will impact 1.38 acres of wetland. These impacts will result from road widening, as the wetlands are located along the existing I-71/I-75 corridor.

6.5.2 Suggested Mitigation Measures

The USACE requires mitigation for impacts greater than 0.1 acre of jurisdictional wetland. Potential wetland mitigation measures could be accomplished through purchase of wetland mitigation bank credits (if applicable) or creation of wetland within similar dry detention basins along the proposed corridor. The impacted wetlands are of low quality and should be mitigated at no more than a 1:1 or 2:1 ratio.

6.6 State and Federal Threatened/Endangered Species

6.6.1 Impacts

Areas of potential and marginal Indiana bat habitat and potential running buffalo clover will be impacted by the feasible alternatives (Table 9; Exhibit 2A-2D). Alternative C/D will impact approximately 28 acres of potential Indiana bat habitat, 28 acres of marginal Indiana bat habitat, and two acres of running buffalo clover habitat. Alternative E will impact approximately 28 acres of potential Indiana bat habitat, 27 acres of marginal Indiana bat habitat, and two acres of running buffalo clover habitat.

Kentucky Transportation Cabinet – DEA (KYTC-DEA) and USFWS have review the study area between the Ohio River and Pleasant Run Creek for running buffalo clover. No individuals were identified. Based on this review, the project is not likely to adversely impact this species and no further surveys should be required within this portion of the project.

Impacts to protected state species are limited to marginal habitat for Kirtland's snake, Savannah sparrow, Northern leopard frog, and redback salamander. However, these impacts are not considered significant due to the disturbed nature of the sites and the limited impact to the onsite natural areas. Assuming the highest potential impacts of any alternative, only 19 percent of on-site natural areas will be impacted by the proposed project. Thus, sufficient habitat is available for use by any potentially impacted state species.

6.6.2 Suggested Mitigation Measures

An Indiana bat survey may be required prior to construction within the areas identified as potential/marginal Indiana bat habitat. If no species are present then no mitigation efforts

are necessary. Another option for mitigation is payment into the Indiana Bat Conservation Fund. Creating or enhancing potential habitat for Indiana bat could be used as mitigation for impacts to potential habitat areas. No mitigation for state-listed species is proposed due to the minimal level of impact.

7.0 SHORT TERM USE VERSUS LONG TERM PRODUCTIVITY

Several short-term and long-term impacts to the aquatic and terrestrial ecosystem by the Brent Spence Bridge Replacement/Rehabilitation Project have been identified throughout this report. Implementing the No Build Alternative would result in no adverse impacts to the various habitat communities within the study area and the feasible alternatives will result in only minor impacts due to the majority of work being conducted within existing highway right-of-way. The feasible alternatives will eliminate some natural habitat and related flora and fauna within the areas directly disturbed by construction.

The elimination of natural habitat will affect both floral and faunal populations. Long-term impacts include the loss of vegetation communities and wildlife communities within the right-of-way of the interstate and any future development occurring along the I-71/I-75 corridor. Short-term impacts to faunal communities from the proposed project could include disturbance by construction activities and disruption of local movement patterns of animal species. Long-term impacts to animal communities may include the loss of local migration routes for some species, loss of nesting habitat for both bird and mammal populations, and the loss of general habitat for food and shelter for many species.

However, while the Brent Spence Bridge Replacement/Rehabilitation Project will result in short-term and long-term impacts to the terrestrial communities in the study area, the overall impacts to the ecosystem will be minor, since the impact areas have been disturbed by existing roadways and developments, do not exhibit rare or unique species or habitats, and are representative of habitats commonly found throughout the region. Thus, similar plant communities exist in the vicinity of the project and animal populations will generally be able to relocate and find suitable habitat in nearby areas.

Widening of the interstate associated with the feasible alternatives will impact the aquatic ecosystem and water quality within and near the study area, as well as the terrestrial communities that utilize these aquatic resources. Direct impacts such as stream channelization and culverting, as well as indirect impacts resulting from stormwater runoff from the construction site pose potential minor short-term threats to aquatic and terrestrial fauna. Short-term impacts may include increased sedimentation, turbidity, suspended solids, and increased water temperatures. These impacts may also lead to stream habitat degradation and decreased aquatic fauna. Mitigation measures and best management practices can be used to reduce the impacts to these aquatic resources.

The impacts resulting from the Brent Spence Bridge Replacement/Rehabilitation Project, if minimized properly through prevention and mitigation, should not reduce the long-term productivity of the aquatic ecosystems. There will be a long-term impact on terrestrial populations, from the loss of aquatic habitat due to road construction. The terrestrial fauna associated with these aquatic ecosystems can recuperate from minimal short-term impacts. If habitat degradation is not permanent, upstream and downstream movement of organisms

typically results in the re-colonization of a disturbed area. The long-term productivity should be comparable to conditions prior to construction activities.

The short-term and long-term impacts to the terrestrial ecosystem, and the long-term use of social, economic and environmental resources for this project, appear to be consistent with the maintenance and enhancement of long-term productivity for both the local area and the region.

8.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This study has identified several commitments of physical, human, natural, or financial resources which may be irreversible. First, the land used in construction for the proposed project may be considered an irreversible commitment of land resources during the time period for which the road is used. However, should a greater use develop for this land in the future, it could be converted to other uses, though this possibility is not envisioned at the present time. Second, the construction of the proposed project will require a substantial one-time commitment of both state and federal financial resources, which though not retrievable, will be offset in the future by increased travel capacity, safety, and efficiency, and decreased congestion and air pollution.

The proposed feasible alternatives for the Brent Spence Bridge Replacement/Rehabilitation Project will result in minor irreversible and irretrievable impacts to the terrestrial communities and habitats within the study area. Proper mitigation measures, which have been addressed, should minimize any adverse impacts to these resources.

Potential irreversible commitment of terrestrial and aquatic resources will include the permanent loss of habitat within the footprint of the highway and associated future development. The elimination of natural habitat will affect both floral and faunal populations. Long-term impacts include the loss of vegetation communities within the I-71/I-75 right-of-way and any future development occurring along the interstate. Short-term impacts to faunal communities from the proposed project could include the disturbance by construction activities and the disruption of local movement patterns of animal species. Long-term impacts to animal communities may include the loss of local migration routes for some species, loss of nesting habitat for both bird and mammal populations, and the loss of general habitat for food and shelter for many species.

However, while the Brent Spence Bridge Replacement/Rehabilitation Project will result in short-term and long-term impacts to the terrestrial and aquatic communities in the study area, the overall impacts to the ecosystem will be minor, since the impact areas have been highly disturbed by existing roadways and developments, do not exhibit rare or unique species or habitats, and are representative of habitats commonly found throughout the region. Thus, animal populations will generally be able to find and relocate to suitable habitat in nearby areas.

Potential irreversible commitment of aquatic resources from this project includes the loss of stream length resulting from stream filling or culverting, and the loss of wetland habitat which will impact the terrestrial communities using these aquatic resources. These activities can be mitigated through the implementation of mitigation strategies, which provide for comparable replacement of lost or impacted stream length and wetlands. Based on

previous experience with federal and state agencies, a greater than one-to-one replacement ratio may be required. On a functional level, stream mitigation could be accomplished though enhancements of the impacted stream at a nearby location. Overall, with the use of adequate mitigation strategies, there should be no substantial irreversible commitment of resources associated with the Brent Spence Bridge Replacement/Rehabilitation Project

9.0 ALTERNATIVE ANALYSIS AND RECOMMENDATIONS

An analysis of ecological impacts resulting from the feasible alternatives along with recommendations, is presented below. A general description of each feasible alternative route is discussed in Section 1.0 and presented on Exhibit 2A-2D and Exhibit 3A-3D. Tables 3, 4, and 7 through 9 describe impacts to streams, open water ponds, wetlands, endangered species habitat, and terrestrial habitats from each alternative route. Table 10 provides an ecological impact summary.

9.1 Alternative C/D

Alternative C/D will impact a total of 2,830 linear feet of intermittent stream, 750 linear feet of ephemeral stream, and 1.38 acre of wetland. Alternative C/D will impact 28 acres of potential Indiana bat habitat and 28 acres of marginal Indiana bat habitat. Two acres of potential running buffalo clover habitat were identified within the disturbance limits of Alternative C/D. However, based on a survey conducted in 2009, no individual running buffalo clover plants were identified in this area. Approximately 28 acres of mixed-age woods, 14 acres of old field, and 10 acres of young woods will be impacted by this feasible alternative.

9.2 Alternative E

Alternative E will impact a total of 2,825 linear feet of intermittent stream, 755 linear feet of ephemeral stream, and 1.38 acre of wetland. Alternative E will impact 28 acres of potential Indiana bat habitat and 27 acres of marginal Indiana bat habitat. Two acres of potential running buffalo clover habitat were identified within the disturbance limits of Alternative E. However, based on a survey conducted in 2009 no individual running buffalo clover plants were identified in this area. Approximately 27 acres of mixed-age woods, 14 acres of old field, and 10 acres of young woods will be impacted by this feasible alternative.

9.3 Summary and Recommendations

Both Alternative C/D and Alternative E proposed in this analysis are generally similar in that they are both road widening options (Exhibit 2A-2D; Exhibit 3A-3D). Neither alternative provides a significantly greater ecological impact than the other (Table 10). However, Alternative E provides the minimal impact to the overall ecological community. This alternative has less intermittent stream impact, less marginal Indiana bat habitat impact, and less mixed-age woods impact. Ephemeral stream, wetland, potential Indiana bat habitat, young woods, and old field impacts are comparable to Alternative C/D.

10.0 SUMMARY

The Brent Spence Bridge Replacement/Rehabilitation Project is intended to improve the operational characteristics within the I-71/I-75 corridor for both local and through traffic. In

the Greater Cincinnati/Northern Kentucky region, the I-71/I-75 corridor suffers from congestion and safety related issues as a result of inadequate capacity to accommodate current traffic demand. The purpose of this project is to:

- improve traffic flow and level of service;
- improve safety;
- correct geometric deficiencies, and
- enhance connections to key regional and national transportation corridors.

This report provides an ecological analysis of the portion of the Brent Spence Bridge Relocation/Rehabilitation Project located within the Commonwealth of Kentucky following the Kentucky Transportation Cabinet/Division of Environmental Analysis, Ecological Study Format Guidance and Accountability Format. The methods and results used to conduct the ecological study include literature and office review, aquatic sampling, terrestrial sampling, wetland sampling, and state and federal threatened/endangered species habitat assessment. The two feasible alternatives proposed in this analysis are generally similar in that they are both road widening options with similar limits of disturbance. However, Alternative E provides the overall smallest impact to the ecological community.

Potential stream mitigation measures could include payment into the Kentucky Department of Fish and Wildlife Resources (KDFWR) In-lieu Fee Program or a stream restoration project within the watershed using natural channel design. Potential wetland mitigation measures for small impacts could be accomplished through purchase of wetland mitigation bank credits (if available) or creation of wetland within similar dry detention basins along the proposed corridor. Creating or enhancing potential habitat for Indiana bat or payment to the Indiana Bat Conservation Fund could be used as mitigation for impacts to potential Indiana bat habitat areas.

11.0 REFERENCES

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TABLES

Table 1: Summary of State and Federal Threatened/Endangered Species
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Scientific Name	Common Name	Federal Status	KSNPC Status	General Habitat Type	Potential Habitat Within Study Area
Acipenser fulvescens	Lake Sturgeon	N	E	Large rivers	Ohio River Only
Clonophis kirtlandii	Kirtland's Snake	N	T	Moist meadows, edges, and open woods	Yes
Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	N	S	Running waters of large streams and rivers	Ohio River Only
Cumberlandia monodonta	Spectaclecase	N	E	Medium to large rivers	Ohio River Only
Cyprogenia stegaria	Fanshell	E	E	Medium to large rivers	Ohio River Only
Epioblasma obliquata obliquata	Catspaw	E	E	Medium to large rivers	Ohio River Only
Epioblasma torulosa rangiana	Northern Riffleshell	E	E	Small to moderate size rivers	Ohio River Only
Epioblasma triquetra	Snuffbox	N	E	Medium to large rivers	Ohio River Only
Fusconaia subrotunda	Longsolid	N	S	Large rivers and medium to large streams	Ohio River Only
Ictiobus niger	Black Buffalo	N	S	Medium to large rivers	Ohio River Only
Lampsilis abrupta	Pink Mucket	E	E	Large rivers	Ohio River Only
Lampsilis ovata	Pocketbook	N	E	Large rivers and medium to large streams	Ohio River Only
Lasmigona compressa	Creek Heelsplitter	N	E	Small to medium rivers	No
Myotis sodalis	Indiana Bat	E	E	Dead or live trees with exfoliating bark; split tree trunks	Yes
Obovaria retusa	Ring Pink	E	E	Large rivers	Ohio River Only
Passerculus sandwichensis	Savannah Sparrow	N	S	Fields, prairies,and grassy dunes	Yes
Plethobasus cooperianus	Orangefoot Pimpleback	E	E	Large rivers	Ohio River Only
Plethobasus cyphyus	Sheepnose	C	E	Large rivers	Ohio River Only
Plethodon cinereus	Redback Salamander	N	S	Deciduous and mixed forest woodlands beneath logs and rocks	Yes
Pleurobema clava	Clubshell	E	E	Moderately large rivers	Ohio River Only
Pleurobema plenum	Rough Pigtoe	E	E	Medium to large rivers	Ohio River Only
Pleurobema rubrum	Pyramid Pigtoe	N	E	Medium to large rivers	Ohio River Only
Quadrula cylindrica cylindrica	Rabbitsfoot	N	T	Small to large rivers	Ohio River Only
Rana pipiens	Northern Leopard Frog	N	S	Natural and man-made ponds (breeding); moist grassland and meadows	Yes
Simpsonaias ambigua	Salamander Mussel	N	T	Small streams in swift current	No
Sitta canadensis	Red-Breasted Nuthatch	N	E	Coniferous forests; mixed coniferous/deciduous woodlands	No
Trifolium stoloniferum	Running Buffalo Clover	E	E	Old trails, grazed bottomlands, streambanks; filtered to partial light	Yes*
Tyto alba	Barn Owl	N	S	Open and partly open country often around human habitation	No

* Surveys Conducted in 2006 and 2009

US Fish & Wildlife Service Status:
N = None
C = Candidate
T = Threatened
E = Endangered

KY State Nature Preserves Commission Status:
N = None
E = Endangered
T = Threatened
S = Special Concern
H = Historic
X = Extirpated

Table 2: Land Use Within Study Area
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Land Use	Acreage within Study Area	Impact Acreage	
		Alternative C/D	Alternative E
Single Family Residential	210	19	19
Commercial	168	21	20
Ohio River	105	*	*
Maintained Grass	144	87	86
Mixed-Age Woods	138	28	27
Transportation	123	110	110
Commercial/Single Family Residential	48	8	7
Old Field	40	14	14
Multi-Family Residential	23	0.46	0.44
Young Woods	23	10	10
Institutional	9	**	**
Wetland	1.73	1.38	1.38
Total	**1,033**	**298.84**	**294.82**

*Portions of the Ohio River will be impacted by construction of the bridge piers, but is not quantified in this table as bridge design has not been completed.

**Less than 0.1 acre impacted.

Table 3: Streams Within Study Area
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Stream*	Length within Study Area (feet)	Quality	Impact Length (feet)		Type of Impact	Stream Order	Drainage Area (acres)
			Alternative C/D	Alternative E			
Intermittent 1	1,225	Average	110	110	ditch	2	25
Intermittent 2	530	Poor	40	40	culvert	2	100
Intermittent 3	265	Poor	40	35	ditch	1	10
Intermittent 4	1,550	Poor	1,550	1,550	ditch	2	60
	825	Excellent	50	50	ditch	2	
Intermittent 5	960	Poor	500	500	ditch	2	20
Intermittent 6	685	Average	145	145	ditch	1	30
Intermittent 7	660	Poor	195	195	culvert	2	30
Intermittent 8	340	Poor	0	0	--	2	--
Intermittent 9	70	Poor	0	0	--	1	--
Intermittent 10	850	Poor	0	0	--	1	--
Intermittent 11	1,390	Poor	190	190	culvert	2	350
Intermittent 12	110	Poor	10	10	ditch	1	25
Intermittent 13	65	Poor	0	0	--	1	--
Total	**9,525**		**2,830**	**2,825**			
Ephemeral 1	245	--	105	105	culvert	1	<10
Ephemeral 2	315	--	165	165	ditch	1	<10
Ephemeral 3	220	--	55	55	ditch	1	<10
Ephemeral 4	195	--	0	0	--	1	--
Ephemeral 5	80	--	0	0	--	1	--
Ephemeral 6	160	--	0	0	--	1	--
Ephemeral 7	140	--	80	85	ditch	1	<10
Ephemeral 8	350	--	0	0	--	1	--
Ephemeral 9	130	--	0	0	--	1	--
Ephemeral 10	345	--	345	345	ditch	1	<10
Total	**2,180**		**750**	**755**			

*Streams have not been verified by the U.S. Army Corps of Engineers.

Table 4: Open Water Ponds Within Study Area
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Open Water	Jurisdictional Status*	Acreage within Study Area	Impact Acreage	
			Alternative D	Alternative E
1	Isolated	0.69	0	0
2	Isolated	0.18	0	0
Total		**0.87**	**0.00**	**0.00**

* Open Waters have been delineated and surveyed, but have not been verified by the U.S. Army Corps of Engineers.

Table 5: Floral Species Within Study Area
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Scientific Name	Common Name	Habitat
Acer negundo	Box Elder	Old Field
Acer rubrum	Red Maple	Old Field
Acer saccharinum	Silver Maple	Mixed-Age Woods
Acer saccharum	Sugar Maple	Mixed-Age Woods
Ageratina altissima	White Snake Root	Old Field/Mixed-Age Woods
Ailanthus altissma	Tree of Heaven	Old Field
Ambrosia artemisiifolia	Annual Ragweed	Old Field
Asimina triloba	Common Paw Paw	Mixed-Age Woods
Aster cf. pilosus	White Heath Aster	Old Field
Aster novae-angliae	New England Aster	Old Field
Bidens frondosa	Devil's Beggar Ticks	Old Field/Wetlands
Boehmeria cylindrica	Small-spike False Nettle	Mixed-Age Woods
Brassica rapa	Field Mustard	Old Field
Carya ovata	Shagbark Hickory	Old Field
Carya sp.	Hickory	Mixed-Age Woods
Carex sp.	Sedge	Wetlands
Celtis occidentalis	Common Hackberry	Mixed-Age Woods
Cirsium arvense	Canada Thistle	Old Field
Cirsium vulgare	Bull Thistle	Old Field
Coronilla varia	Crown Vetch	Old Field
Cyperus esculentus	Chufa	Old Field/Wetlands
Daucus carota	Queen Anne's Lace	Old Field
Dipsacus sylvestris	Teasel	Old Field
Echinochloa crusgalli	Barnyard Grass	Wetlands
Euonymus fortunei	Winter Creeper	Mixed-Age Woods
Eupatorium perfoliatum	Common Boneset	Wetlands
Fagus grandifolia	American Beech	Mixed-Age Woods
Festuca arundinacea	Tall Fescue	Old Field
Fragaria virginiana	Virginia Strawberry	Mixed-Age Woods
Glecoma hederacea	Ground Ivy	Mixed-Age Woods
Impatiens capensis	Jewelweed	Mixed-Age Woods
Juniperus virginiana	Eastern Red Cedar	Old Field/Young Woods
Junucus effusus	Soft Rush	Wetlands
Leersia oryzoides	Rice Cut Grass	Wetlands
Lindera benzoin	Northern Spicebush	Mixed-Age Woods
Liriodendron tulipifera	Tulip Poplar	Mixed-Age Woods

Scientific Name	Common Name	Habitat
Lonicera tatarica	Bush Honeysuckle	Mixed-Age Woods
Morus rubra	Red Mulberry	Mixed-Age Woods
Parthenocissus quinquefolia	Virginia Creeper	Mixed-Age Woods
Pilea pumila	Canada Clearweed	Mixed-Age Woods/Wetlands
Polygonum hydropiper	Marshpepper Smartweed	Wetlands
Polygonum pensylvanicum	Pennysylvania Smartweed	Wetlands
Polygonum persicaria	Lady's Thumb	Mixed-Age Woods/Wetlands
Populus deltoides	Eastern Cottonwood	Old Field/Mixed-Age Woods
Prunus serotina	Black Cherry	Mixed-Age Woods
Quercus alba	White Oak	Mixed-Age Woods
Quercus muhlenbergii	Chinkapin Oak	Mixed-Age Woods
Quercus prinus	Chestnut Oak	Mixed-Age Woods
Rhus copallinum	Winged Sumac	Old Field
Rhus typhina	Staghorn Sumac	Old Field/Young Woods
Robinia pseudoacacia	Black Locust	Old Field
Rosa multiflora	Multiflora Rose	Mixed-Age Woods
Rubus occidentalis	Black Raspberry	Young Woods
Rumex crispus	Curly Dock	Wetlands
Salix exigua	Sandbar Willow	Old Field/Wetlands
Salix nigra	Black Willow	Wetlands
Scirpus atrovirens	Green Bulrush	Wetlands
Scirpus cyperinus	Wool Grass	Wetlands
Scirpus validus	Soft Stem Bulrush	Wetlands
Setaria faberi	Japanese Bristle Grass	Old Field
Setaria glauca	Yellow Bristle Grass	Old Field
Solidago canadensis	Canada Goldenrod	Old Field
Toxicodendron radicans	Poison Ivy	Mixed-Age Woods
Tridens flava	Purple Top Grass	Old Field
Trifolium hybridum	Alsike Clover	Old Field
Trifolium pratense	Red Clover	Old Field
Trifolium repens	White Clover	Old Field
Typha angustifolia	Narrow Leaved Cattail	Wetlands
Typha latifolia	Broad Leaved Cattail	Wetlands
Ulmus rubra	Slippery Elm	Mixed-Age Woods
Verbesina alternifolia	Wingstem	Mixed-Age Woods
Vitis sp.	Grape Vine	Mixed-Age Woods

Table 6: Faunal Species Within Study Area
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Scientific Name	Common Name	Habitat
Corvus Brachyrhynchos	American Crow	Old Field
Odocoileus virginianus	White-Tail Deer	Mixed-Age Woods
Picoides pubescens	Downy Woodpecker	Mixed-Age Woods
Poecile atricapillus	Black Capped Chickadee	Mixed-Age Woods
Procyon lotor	Raccoon	Mixed-Age Woods
Sciurvs carolinensis	Grey Squirrel	Mixed-Age Woods
Zenaida macroura	Morning Dove	Old Field

Table 7: Terrestrial Habitat Impacts Within Study Area
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Habitat Type	Acreage within Study Area	Impact Acreage	
		Alternative C/D	Alternative E
Mixed-Age Woods	138	28	27
Young Woods	23	10	10
Old Field	40	14	14

* Wetlands have been delineated and surveyed, but have not been verified by the U.S. Army Corps of Engineers.

Table 8: Wetlands Within Study Area
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Wetland	Jurisdictional Status*	Acreage within Study Area	Impact Acreage	
			Alternative C/D	Alternative E
1	Isolated	0.03	0	0
2	Jurisdictional	0.02	0	0
3	Jurisdictional	0.90	0.90	0.90
4	Jurisdictional	0.03	0.03	0.03
5	Isolated	0.14	0	0
6	Jurisdictional	0.05	0.05	0.05
7	Isolated	0.16	0	0
8	Jurisdictional	0.40	0.40	0.40
Total		**1.73**	**1.38**	**1.38**
Total Isolated		0.33	0	0
Total Jurisdictional		1.40	1.38	1.38

* Wetlands have been delineated and surveyed, but have not been verified by the U.S. Army Corps of Engineers.

Table 9: Federal Threatened/Endangered Species Habitat Within Study Area
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Federal Threatened/Endangered Species Habitat Type	Acreage within Study Area	Impact Acreage	
		Alternative C/D	Alternative E
Marginal Indiana Bat Habitat	187	28	28
Potential Indiana Bat Habitat	137	28	27
Running Buffalo Clover Habitat*	10	2	2

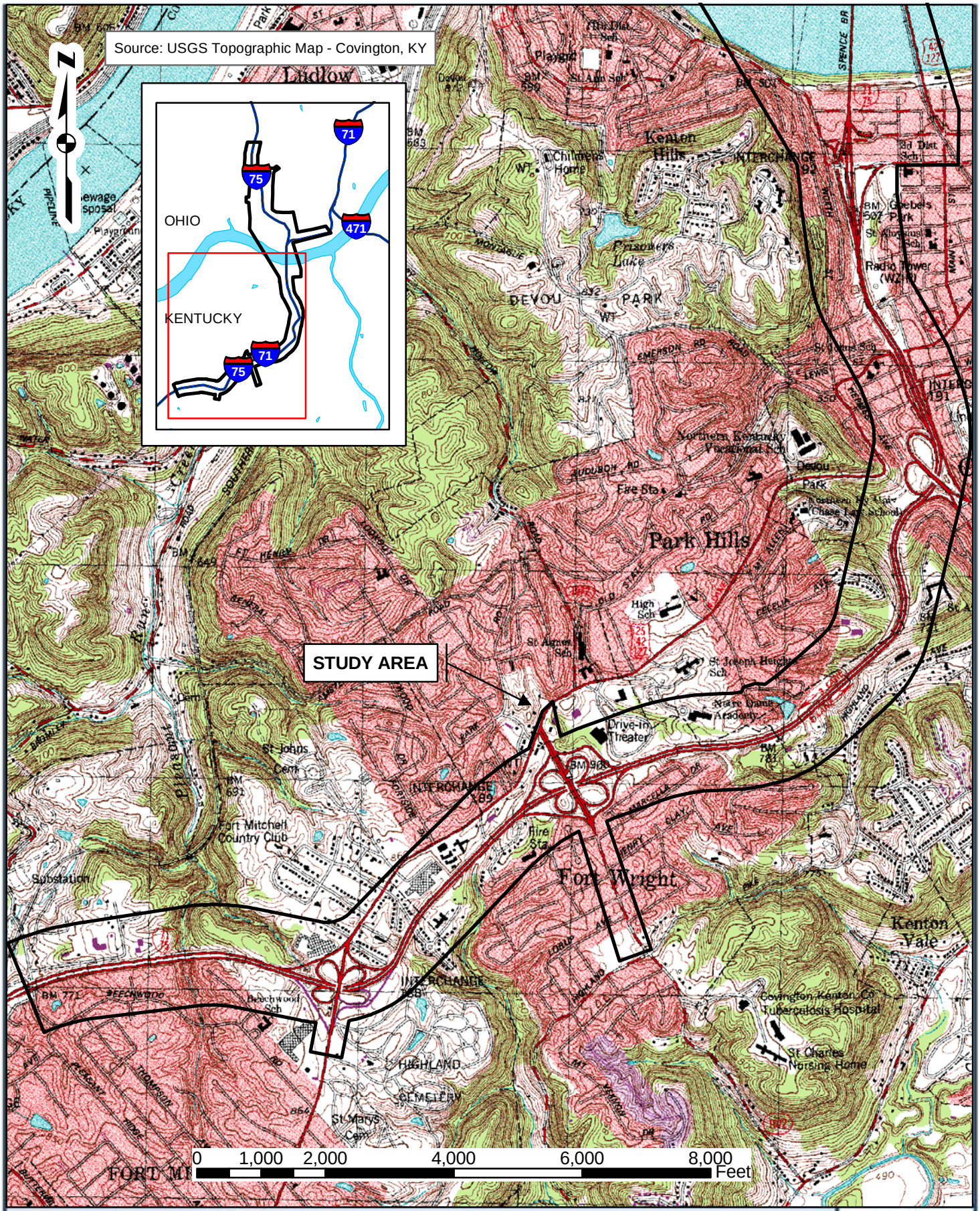
*Running Buffalo Clover surveys conducted in 2006 and 2009; no individual plants were observed.

Table 10: Ecological Impact Summary
Brent Spence Bridge Replacement/Rehabilitation Project
Kenton County, Kentucky

Alternative	Intermittent Stream Length (ft)	Ephemeral Stream Length (ft)	Wetland (acres)	Open Water (acres)	Potential/Marginal Indiana Bat Habtiat (acres)	Running Buffalo Clover Habitat (acres)	Mixed-Age Woods (acres)	Young Woods (acres)	Old Field (acres)
Alternative C/D	2,830	750	1.38	0	28/28	2*	28	10	14
Alternative E	2,825	755	1.38	0	28/27	2*	27	10	14

*Running Buffalo Clover surveys conducted in 2006 and 2009; no individual plants were observed.

EXHIBITS



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Federal Highway Administration

Kentucky

USGS TOPOGRAPHIC MAP
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT
1

INT 13
INT 11
INT 10
EPH 9
DP 21
EPH 6
RBP 15
RBP 12
INT 12
EPH 10
RBP 14
EPH 5
DP 20
INT 8
RBP 10
EPH 7
RBP 11
INT 9
RBP 13
INT 11
EPH 8
OW 2
MATCHLINE 2B
DIXIE HIGHWAY

Legend

- Study Area
- Alternative C/D Disturbance Limits
- Alternative E Disturbance Limits
- Data Point
- RBP Point

0 250 500 1,000 1,500 2,000 Feet

N

OHIO

KENTUCKY

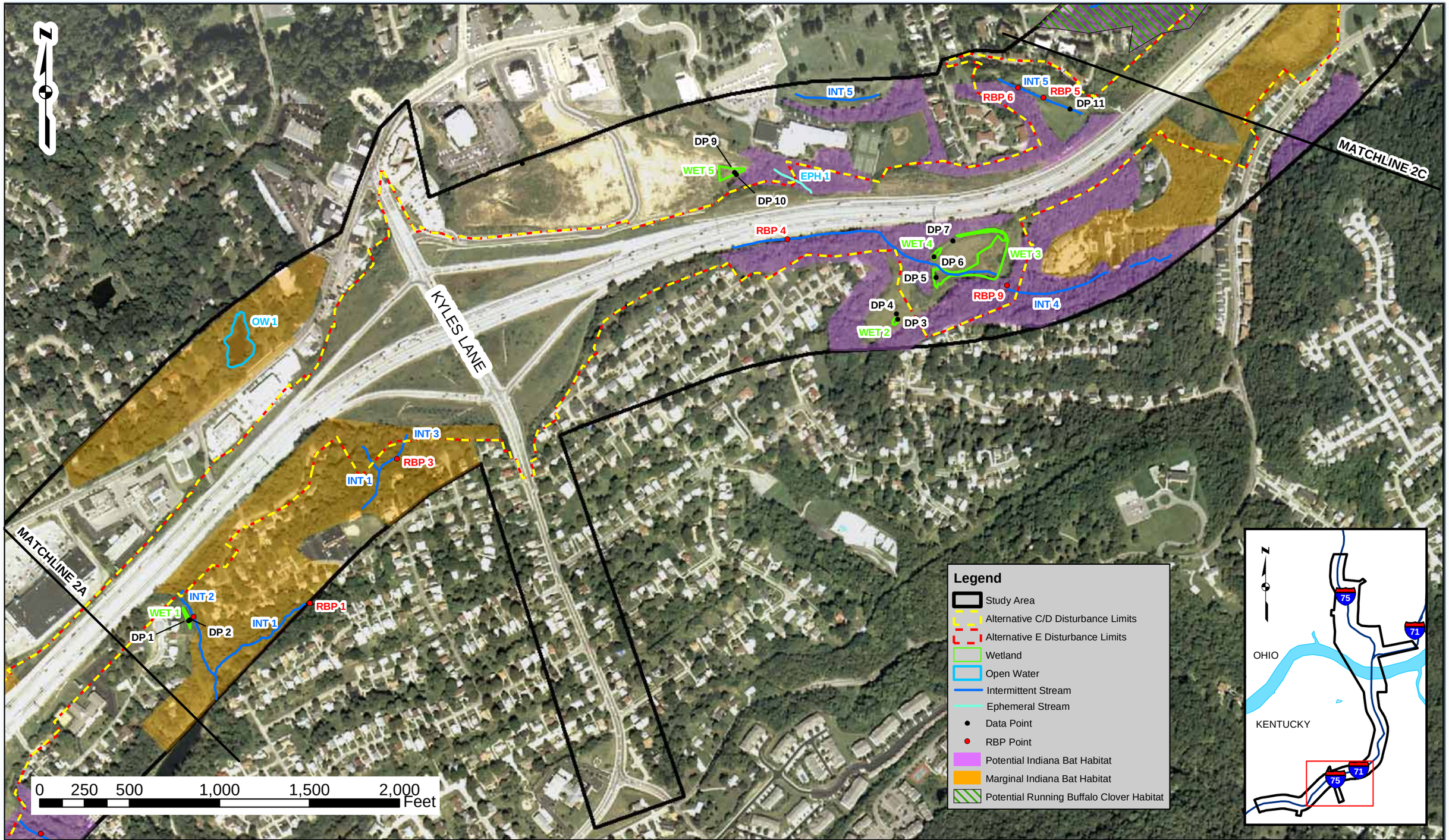
75 71 75 71

U.S. Department of Transportation
Federal Highway Administration

Kentucky

ALTERNATIVES WITH STUDY AREA MAP (AERIAL PHOTOGRAPH)
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT
2A



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Kentucky

ALTERNATIVES WITH STUDY AREA MAP (AERIAL PHOTOGRAPH)
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT

2B

INT 6
RBP 7
EPH 2
DP 14
DP 13
WET 6
DP 15
EPH 4
RBP 8
EPH 3
INT 7
WET7
DP 16
DP 17
WET 8
DP 19
DP 18
MATCHLINE 2B
MATCHLINE 2D

Legend

- Study Area
- Alternative C/D Disturbance Limits
- Alternative E Disturbance Limits
- Wetland
- Open Water
- Intermittent Stream
- Ephemeral Stream
- Data Point
- RBP Point
- Potential Indiana Bat Habitat
- Marginal Indiana Bat Habitat
- Potential Running Buffalo Clover Habitat

0 250 500 1,000 1,500 2,000 Feet

N

75 71 OHIO KENTUCKY 71 75

U.S. Department of Transportation
Federal Highway Administration

Kentucky

ALTERNATIVES WITH STUDY AREA MAP (AERIAL PHOTOGRAPH)
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT
2C

MATCHLINE 2C

N

OHIO

KENTUCKY

75

71

75

71

Legend

- Study Area
- Alternative C/D Disturbance Limits
- Alternative E Disturbance Limits
- Wetland
- Open Water
- Intermittent Stream
- Ephemeral Stream
- Data Point
- RBP Point
- Potential Indiana Bat Habitat
- Marginal Indiana Bat Habitat
- Potential Running Buffalo Clover Habitat

0 250 500 1,000 1,500 2,000 Feet

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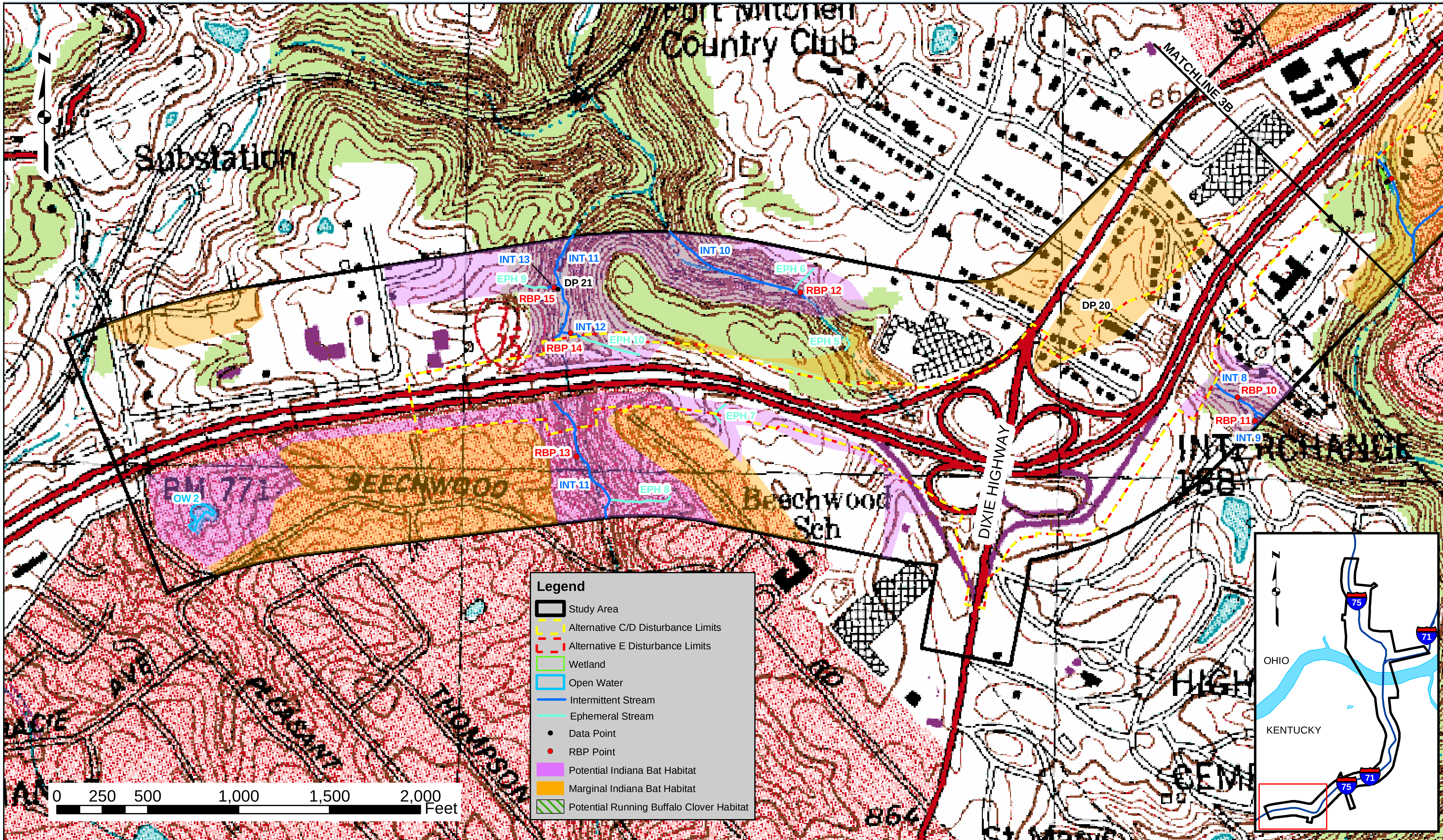
ALTERNATIVES WITH STUDY AREA MAP (AERIAL PHOTOGRAPH)
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT

2D



Fort Mitchell Country Club
Substation
MATCHLINE 3B
INT 13
INT 11
INT 10
EPH 9
DP 21
EPH 6
RBP 12
RBP 15
INT 12
EPH 10
EPH 5
RBP 14
DP 20
INT 8
RBP 10
RBP 11
INT 9
EPH 7
RBP 13
INT 11
EPH 8
OW 2
BEECHWOOD
Beechwood Sch
DIXIE HIGHWAY
INTERCHANGE
PLEASANT
THOMPSON
RD
AVE
St Marys
0 250 500 1,000 1,500 2,000 Feet
Legend
Study Area
Alternative C/D Disturbance Limits
Alternative E Disturbance Limits
Wetland
Open Water
Intermittent Stream
Ephemeral Stream
Data Point
RBP Point
Potential Indiana Bat Habitat
Marginal Indiana Bat Habitat
Potential Running Buffalo Clover Habitat
OHIO
KENTUCKY
75
71

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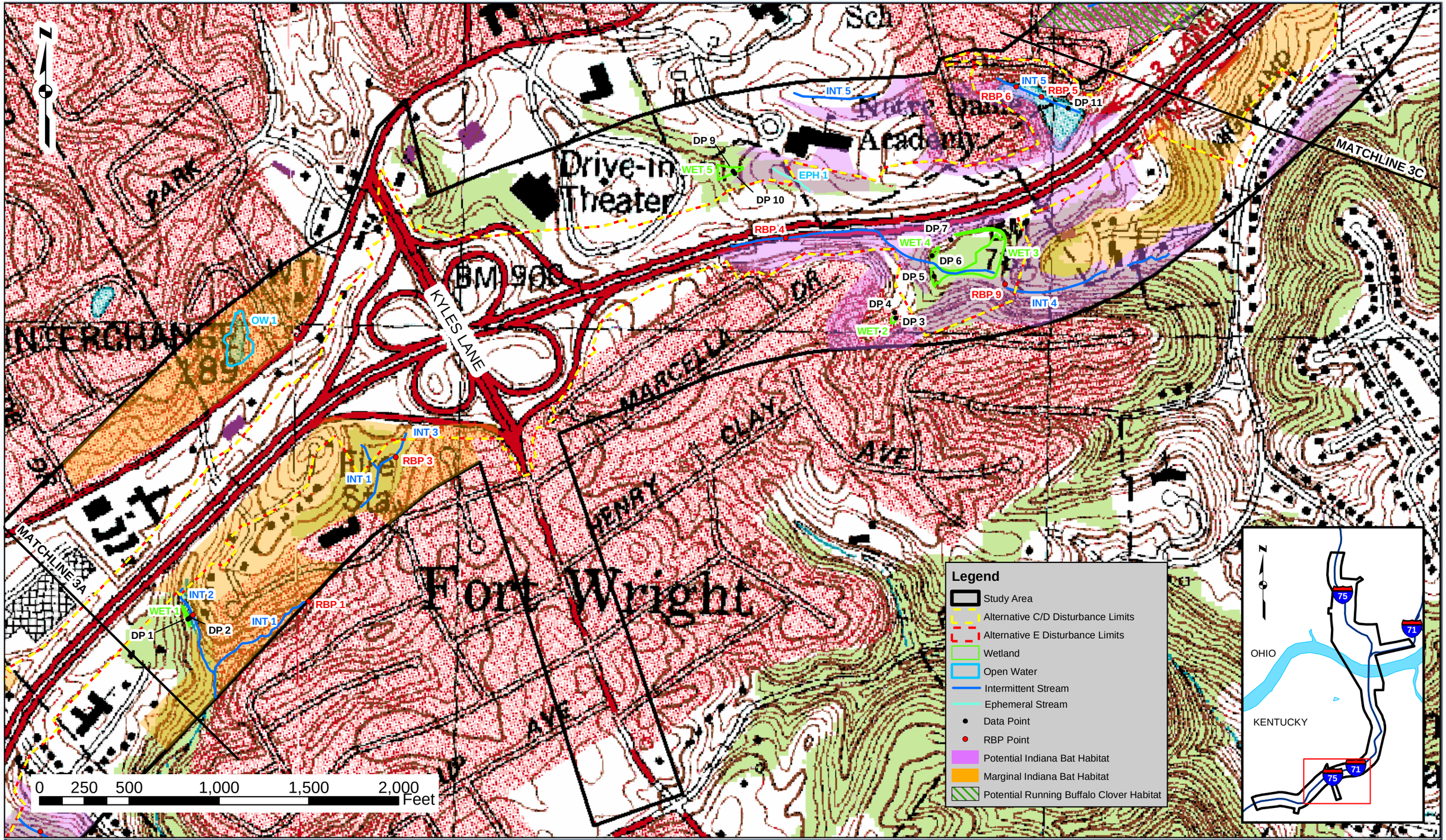
Kentucky

ALTERNATIVES WITH STUDY AREA MAP (USGS TOPOGRAPHIC MAP)
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT
3A



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ALTERNATIVES WITH STUDY AREA MAP (USGS TOPOGRAPHIC MAP)
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
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EXHIBIT

3B

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ALTERNATIVES WITH STUDY AREA MAP (USGS TOPOGRAPHIC MAP)
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT
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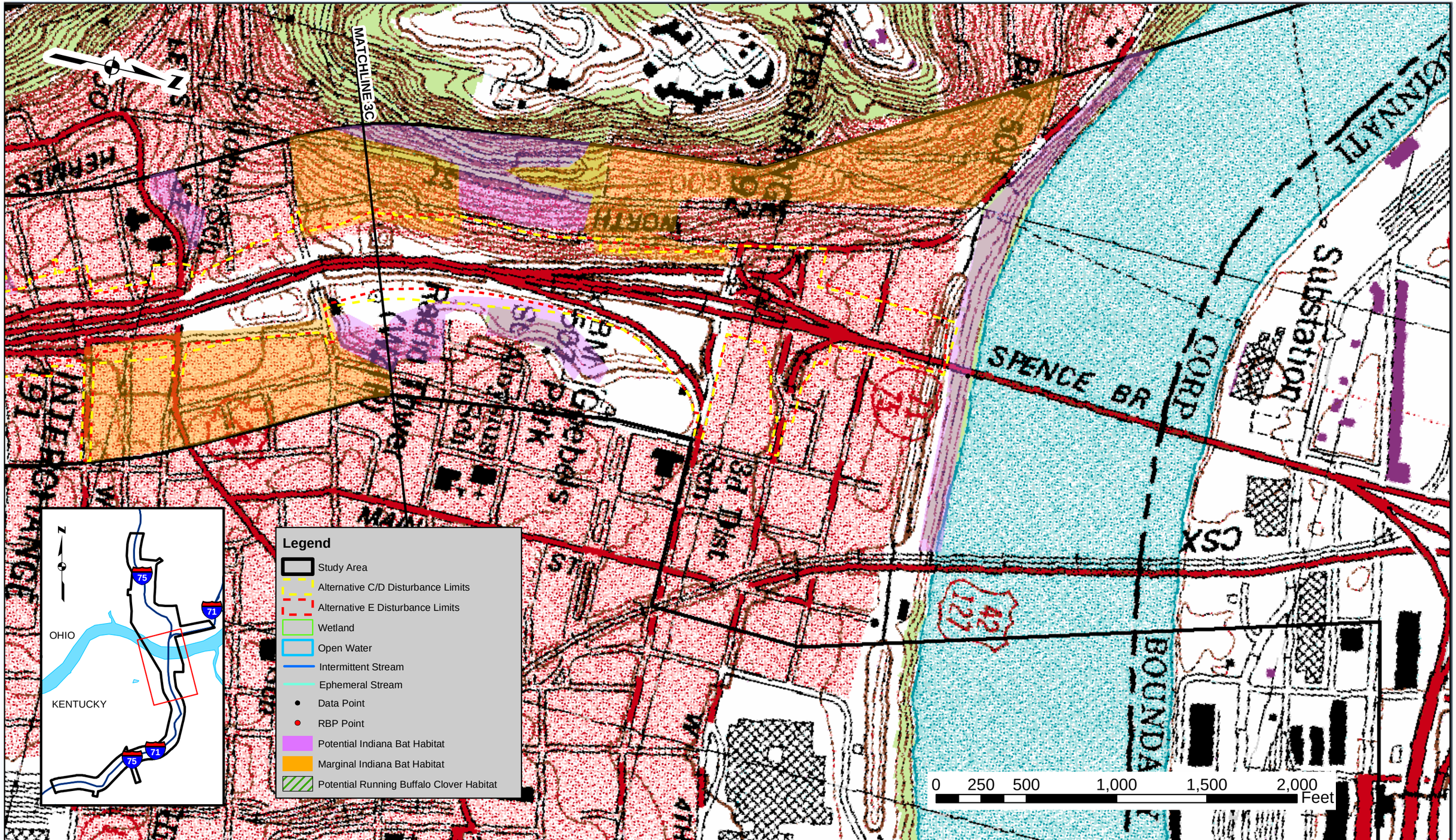

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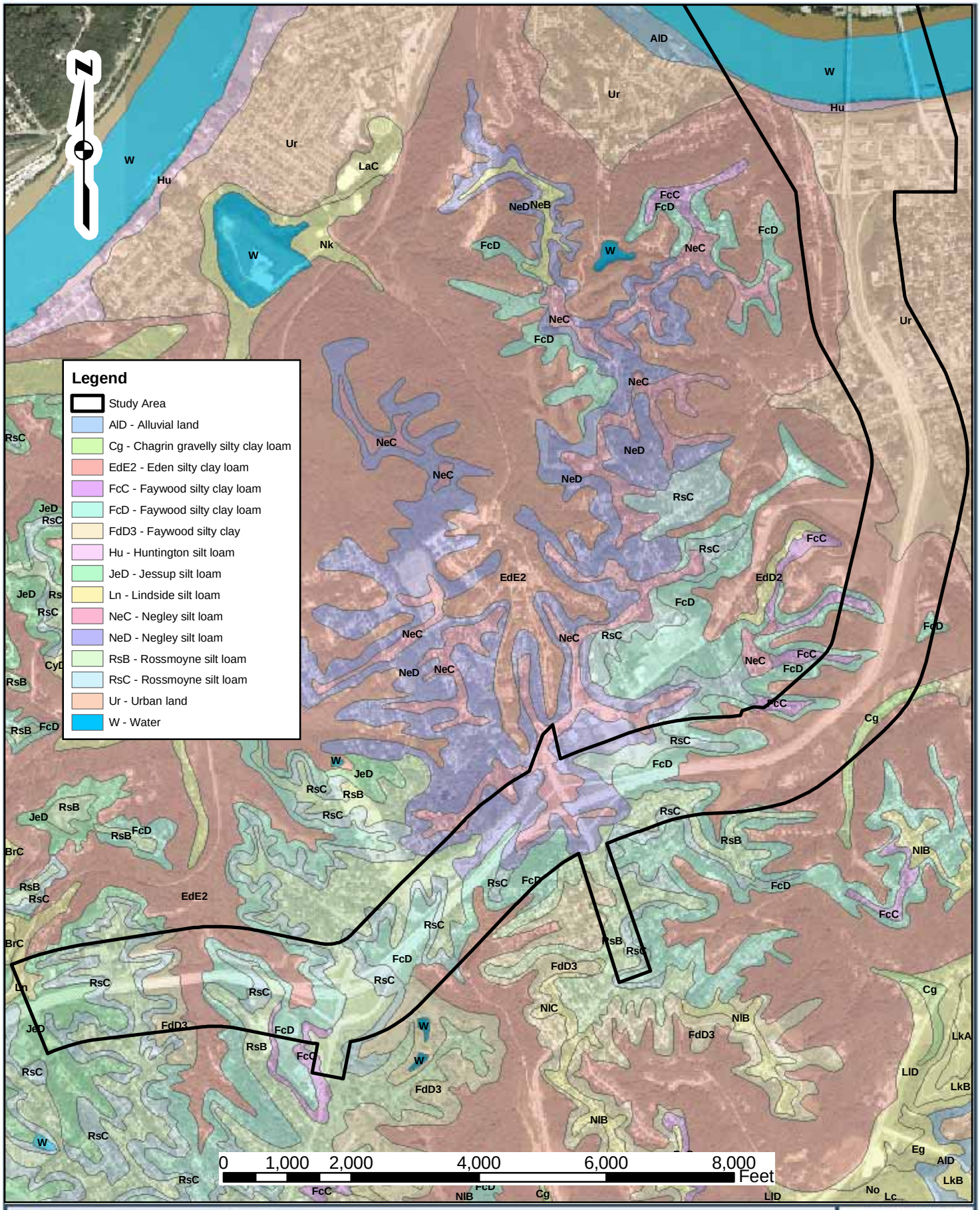
ALTERNATIVES WITH STUDY AREA MAP (USGS TOPOGRAPHIC MAP)
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT

3D



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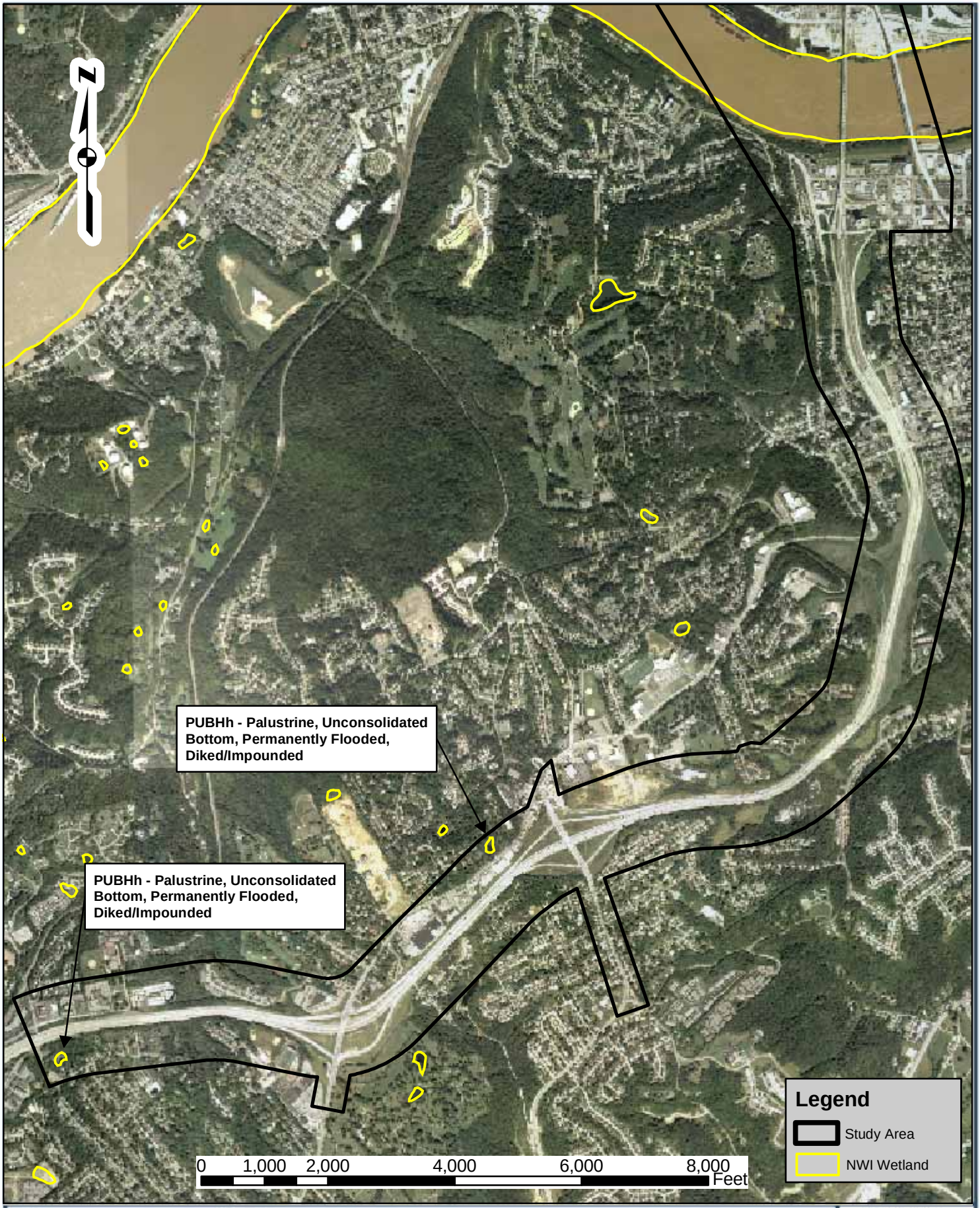
SOIL SURVEY MAP
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT
4



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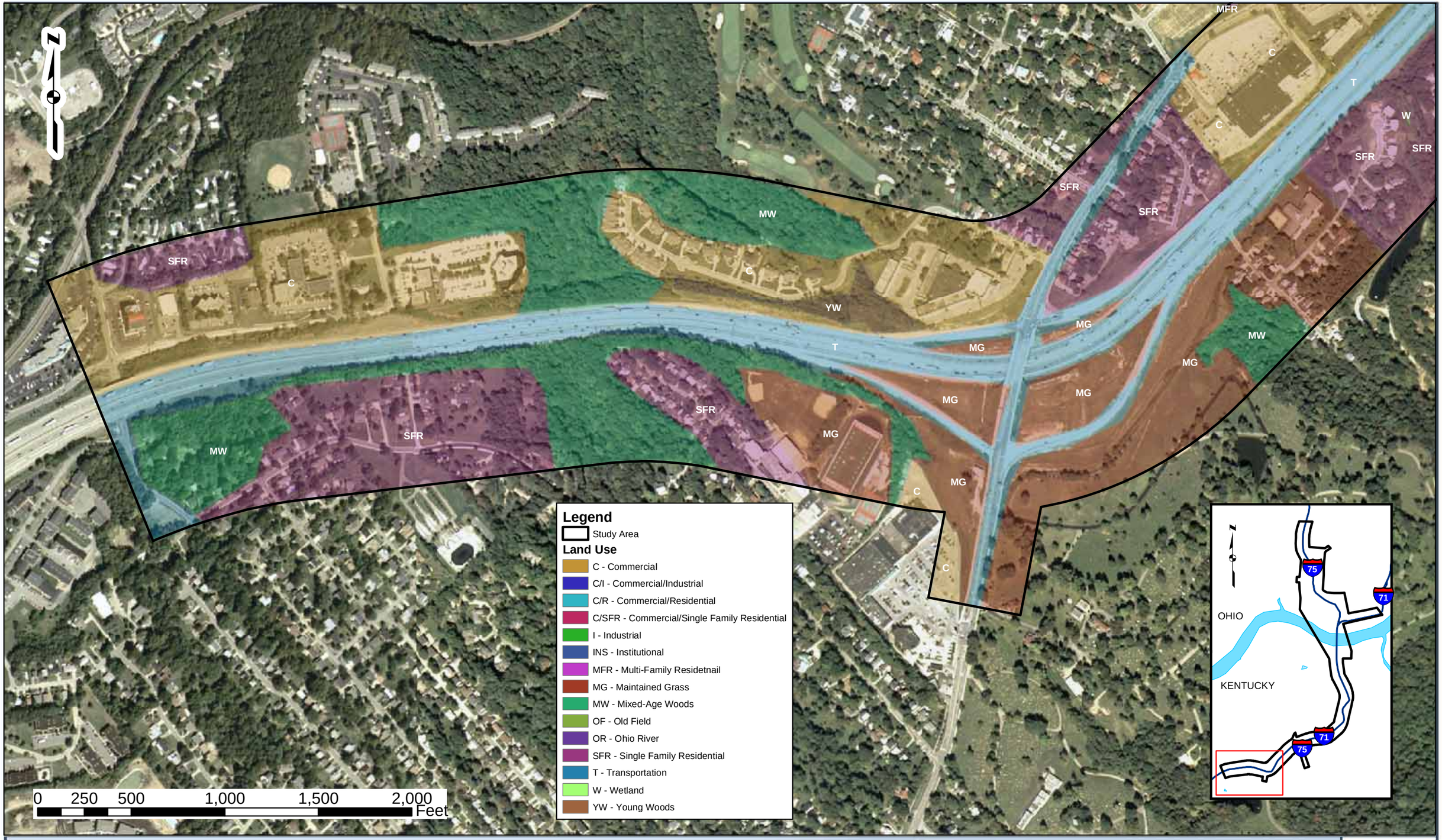
NATIONAL WETLANDS INVENTORY MAP
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT
5



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LAND USE MAP
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT

6A

MATCHLINE 6C

MATCHLINE 6A

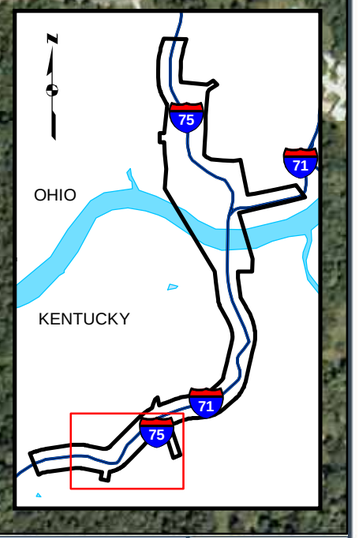
0 250 500 1,000 1,500 2,000 Feet

Legend

Study Area

Land Use

- C - Commercial
- C/I - Commercial/Industrial
- C/R - Commercial/Residential
- C/SFR - Commercial/Single Family Residential
- I - Industrial
- INS - Institutional
- MFR - Multi-Family Residetnail
- MG - Maintained Grass
- MW - Mixed-Age Woods
- OF - Old Field
- OR - Ohio River
- SFR - Single Family Residential
- T - Transportation
- W - Wetland
- YW - Young Woods



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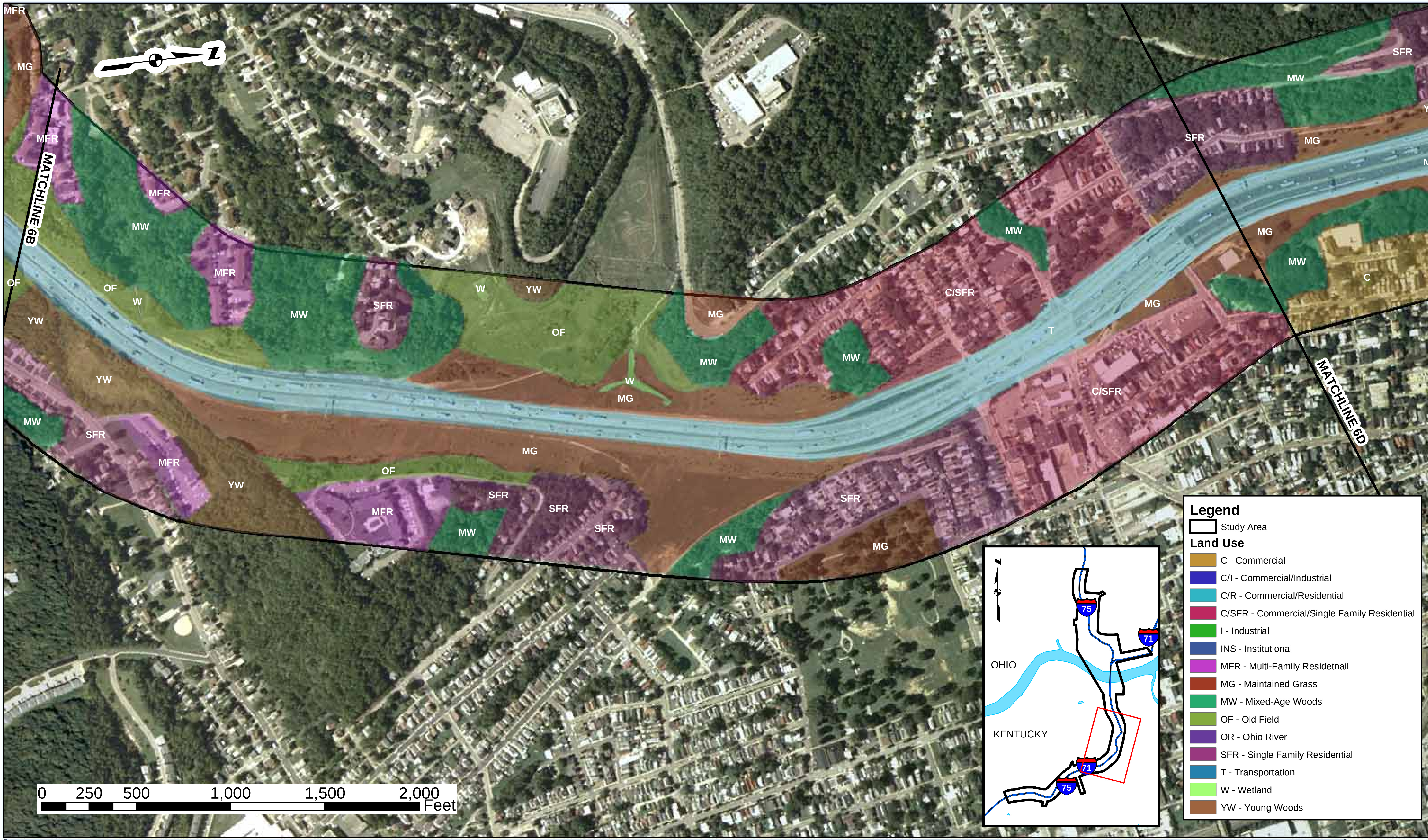
LAND USE MAP
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT

6B


MATCHLINE 6B
MATCHLINE 6D
MFR
MG
MW
OF
W
YW
SFR
MG
C/SFR
T
C
0 250 500 1,000 1,500 2,000
Feet
OHIO
KENTUCKY
75
71
Legend
Study Area
Land Use
C - Commercial
C/I - Commercial/Industrial
C/R - Commercial/Residential
C/SFR - Commercial/Single Family Residential
I - Industrial
INS - Institutional
MFR - Multi-Family Residetnail
MG - Maintained Grass
MW - Mixed-Age Woods
OF - Old Field
OR - Ohio River
SFR - Single Family Residential
T - Transportation
W - Wetland
YW - Young Woods

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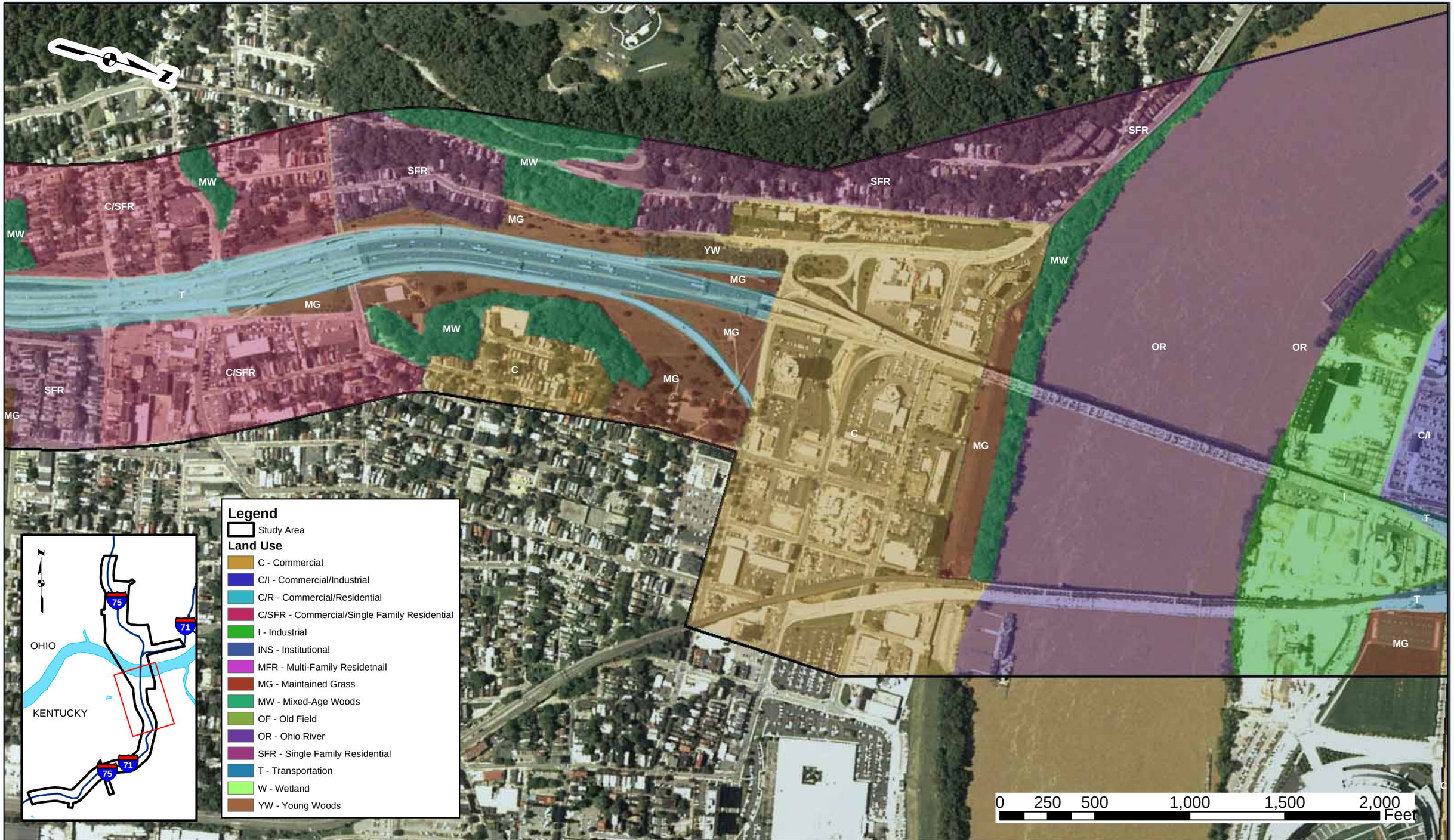
Federal Highway Administration
Kentucky

LAND USE MAP
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT
6C



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Kentucky

LAND USE MAP
BRENT SPENCE BRIDGE
REPLACEMENT/REHABILITATION PROJECT
LEVEL ONE ECOLOGICAL SURVEY REPORT

EXHIBIT

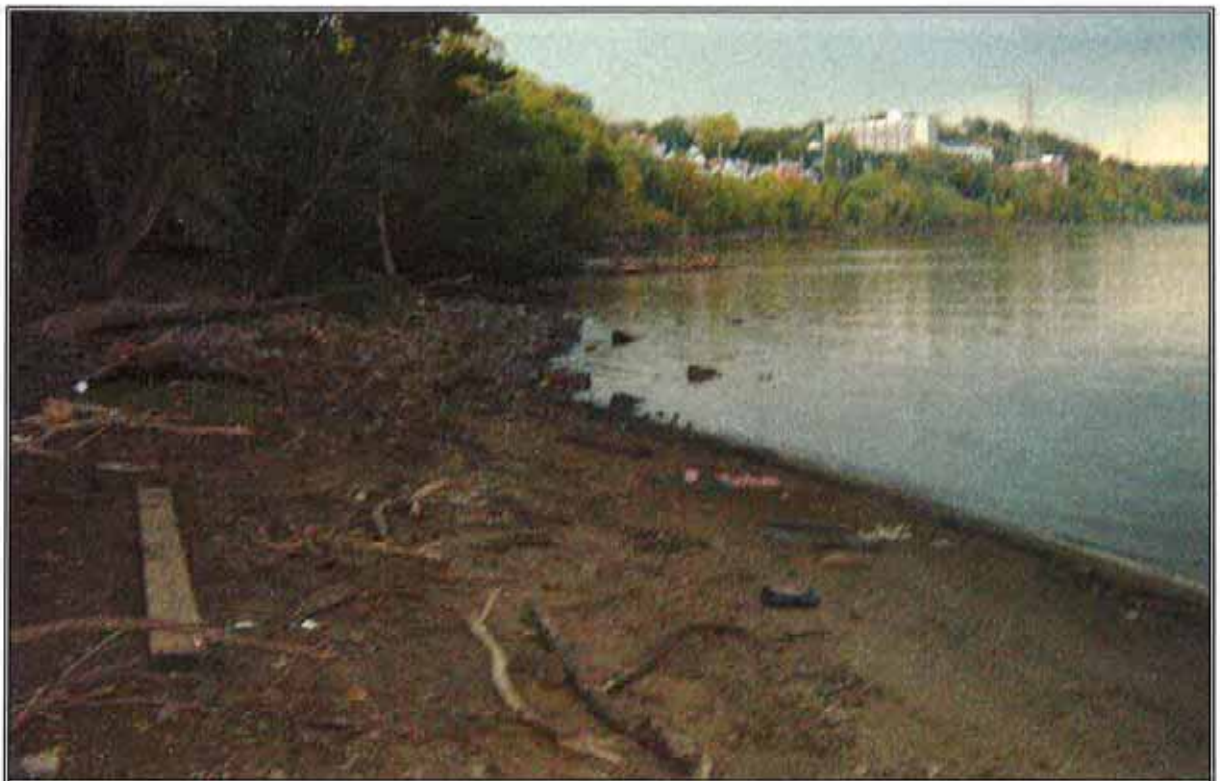
6D

PHOTOGRAPHS

Photograph 1: General view of I-75/I-71 study area from near the Kyles Lane overpass looking northeast. Brent Spence Bridge Replacement and Rehabilitation Project. November 29, 2006.

Photograph 2: Typical maintained grass area located within the project corridor. Brent Spence Bridge Replacement and Rehabilitation Project. October 9, 2006.

Photograph 3: Typical single-family residential development within project corridor. Brent Spence Bridge Replacement and Rehabilitation Project. October 10, 2006.



Photograph 4: Kentucky bank of Ohio River beneath existing Brent Spence Bridge (looking downstream). Brent Spence Bridge Replacement and Rehabilitation Project. October 11, 2006.

Photograph 5: Ohio River and existing Brent Spence Bridge (view from Ohio). Brent Spence Bridge Replacement and Rehabilitation Project. October 11, 2006.

Photograph 6: Open Water Pond 1. Brent Spence Bridge Replacement and Rehabilitation Project. October 9, 2006.

Photograph 7: Open Water Pond 2. Brent Spence Bridge Replacement and Rehabilitation Project. September 3, 2009.

Photograph 8: Intermittent Stream 1 (looking upstream from Intermittent Stream 2 confluence). Brent Spence Bridge Replacement and Rehabilitation Project. October 9, 2006.

Photograph 9: Intermittent Stream 2 (looking upstream from Intermittent Stream 1 confluence). Brent Spence Bridge Replacement and Rehabilitation Project. October 9, 2006.

Photograph 10: Intermittent Stream 3 (looking upstream). Brent Spence Bridge Replacement and Rehabilitation Project. October 9, 2006.

Photograph 11: Upper portion of Intermittent Stream 4 (looking upstream) with interstate right of frame. This area is to be impacted by road widening. Brent Spence Bridge Replacement and Rehabilitation Project. October 10, 2006.

Photograph 12: Lower portion of Intermittent Stream 4 (looking downstream). Brent Spence Bridge Replacement and Rehabilitation Project. October 12, 2006.

Photograph 13: Intermittent Stream 5 (looking upstream). Note that the steam is located in the woods and a maintained grass area. Brent Spence Bridge Replacement and Rehabilitation Project. October 11, 2006.

Photograph 14: Intermittent Stream 6 (looking upstream). Brent Spence Bridge Replacement and Rehabilitation Project. October 12, 2006.

Photograph 15: Intermittent Stream 7 (looking upstream). Brent Spence Bridge Replacement and Rehabilitation Project. October 12, 2006.

Photograph 16: Intermittent Stream 8 (looking downstream). Brent Spence Bridge Replacement and Rehabilitation Project. July 30, 2009.

Photograph 17: Intermittent Stream 9 (looking downstream toward Intermittent Stream 8). Brent Spence Bridge Replacement and Rehabilitation Project. July 30, 2009.

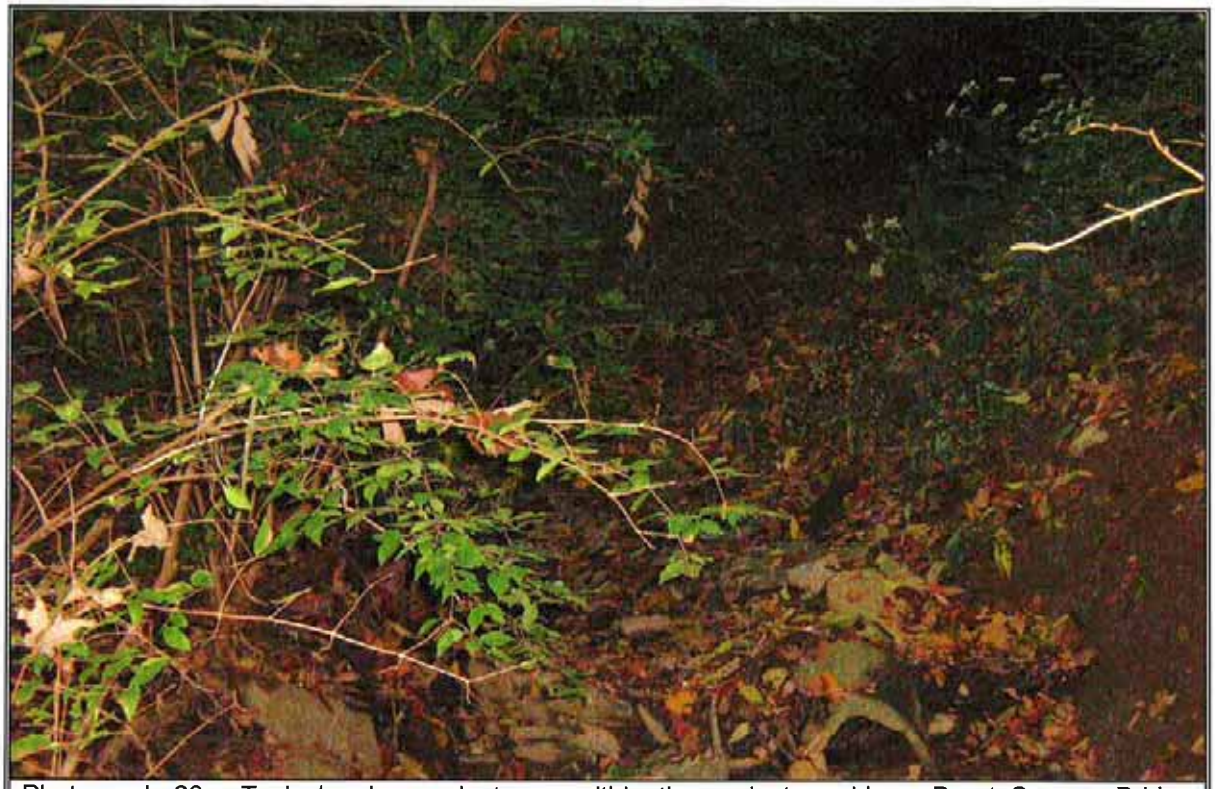
Photograph 18: Intermittent Stream 10 (looking downstream from culvert). Brent Spence Bridge Replacement and Rehabilitation Project. July 30, 2009.

Photograph 19: Intermittent Stream 11 (looking downstream). Brent Spence Bridge Replacement and Rehabilitation Project. August 26, 2009.

Photograph 20: Intermittent Stream 12 (looking upstream toward I-71/I-75). Brent Spence Bridge Replacement and Rehabilitation Project. September 3, 2009.

Photograph 21: Intermittent Stream 13 (looking upstream). Brent Spence Bridge Replacement and Rehabilitation Project. September 3, 2009.

Photograph 22: Typical ephemeral stream within the project corridor. Brent Spence Bridge Replacement and Rehabilitation Project. August 26, 2009.



Photograph 23: Typical ephemeral stream within the project corridor. Brent Spence Bridge Replacement and Rehabilitation Project. October 12, 2006.

Photograph 24: Typical mixed age woods vegetation within the survey area. Brent Spence Bridge Replacement and Rehabilitation Project. November 29, 2006.

Photograph 25: Typical young woods vegetation within the survey area. Brent Spence Bridge Replacement and Rehabilitation Project. November 29, 2006.

Photograph 26: Typical old field habitat within the survey area. Brent Spence Bridge Replacement and Rehabilitation Project. October 11, 2006.

Photograph 27: Wetland 1 consisting of emergent and young sapling vegetation. Brent Spence Bridge Replacement and Rehabilitation Project. October 9, 2006.

Photograph 28: Wetland 2 consisting of emergent vegetation. Brent Spence Bridge Replacement and Rehabilitation Project. October 10, 2006.

Photograph 29: Wetland 3 consisting of emergent vegetation within a detention basin along Intermittent Stream 4. Brent Spence Bridge Replacement and Rehabilitation Project. October 10, 2006.

Photograph 30: Wetland 4 consisting of emergent vegetation along Intermittent Stream 4. Brent Spence Bridge Replacement and Rehabilitation Project. October 10, 2006.

Photograph 31: Wetland 5 consisting of emergent vegetation within a detention basin. Brent Spence Bridge Replacement and Rehabilitation Project. October 11, 2006.

Photograph 32: Wetland 6 consisting of emergent vegetation within a detention basin below Intermittent Stream 6 and along I-75/I-71. Brent Spence Bridge Replacement and Rehabilitation Project. October 12, 2006.

Photograph 33: Wetland 7 consisting of emergent vegetation along a hillside slope. Brent Spence Bridge Replacement and Rehabilitation Project. November 29, 2006.

Photograph 34: Wetland 8 consisting of emergent vegetation along I-75/I-71. Note detention structure typically found in the wetland basins. Brent Spence Bridge Replacement and Rehabilitation Project. October 12, 2006.

APPENDIX I – CRITICAL CROSS SECTION EXHIBITS

Ohio River

STATION 1
STATION 2
STATION 3
STATION 4
STATION 5
STATION 6
STATION 7
STATION 8
STATION 9
STATION 12
STATION 13
STATION 14
STATION 11
STATION 10

75
71

LEGEND

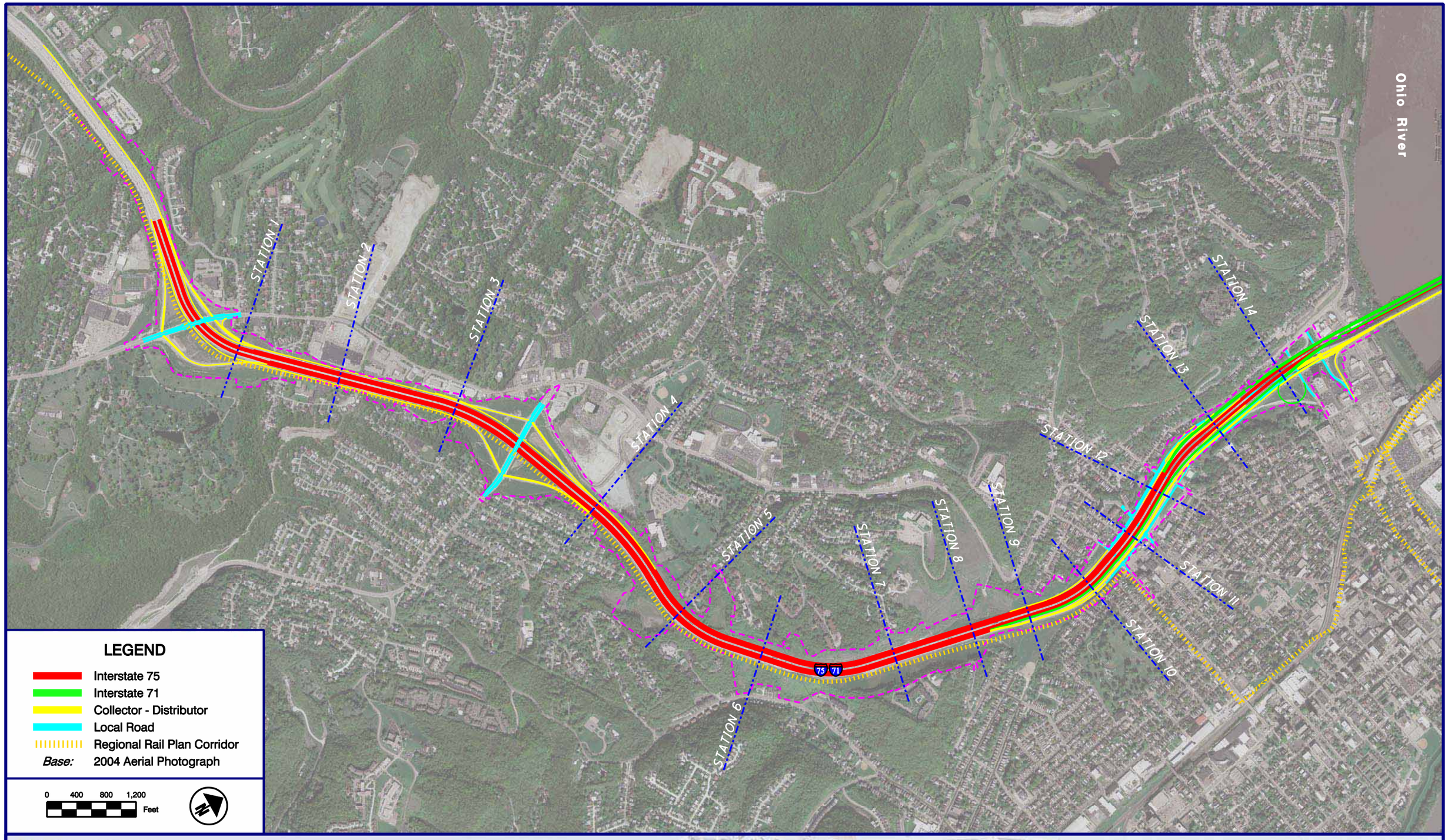
- Interstate 75
- Interstate 71
- Collector - Distributor
- Local Road
- Regional Rail Plan Corridor
- *Base:* 2004 Aerial Photograph

0 400 800 1,200 Feet

U.S. Department of Transportation
Federal Highway Administration

CRITICAL CROSS SECTIONS PLAN ALTERNATIVE C/D (KENTUCKY)

Prepared by:
PB PARSONS BRINCKERHOFF



LEGEND

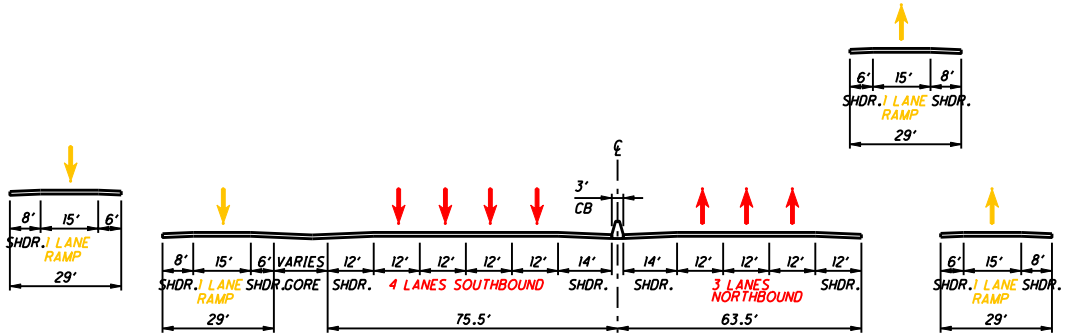
- Interstate 75
- Interstate 71
- Collector - Distributor
- Local Road
- Regional Rail Plan Corridor
- *Base:* 2004 Aerial Photograph

0 400 800 1,200 Feet

U.S. Department of Transportation
Federal Highway Administration

CRITICAL CROSS SECTIONS PLAN ALTERNATIVE E (KENTUCKY)

Prepared by:
PB PARSONS BRINCKERHOFF



ALTERNATIVES C/D & E

NOTE:
DESIGN CRITERIA FOR SHOULDER AND ROADWAY WIDTHS BASED ON:

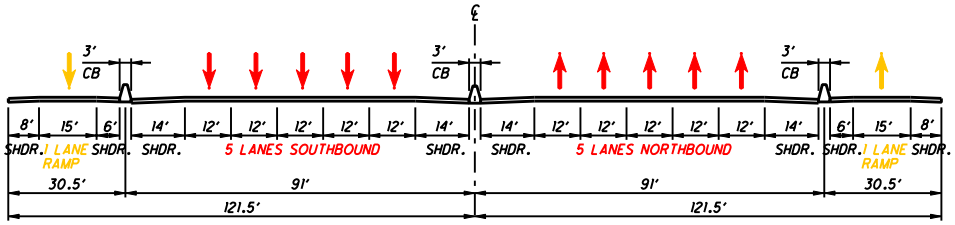
OHIO
ODOT LOCATION AND DESIGN MANUAL, VOL. 1

KENTUCKY
KYTC HIGHWAY DESIGN MANUAL
AASHTO ROADSIDE DESIGN GUIDE
AASHTO "GREEN BOOK" (A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS)

U.S. Department of Transportation
Federal Highway Administration

CRITICAL PROPOSED CROSS SECTIONS
STATION 1

Prepared by:
PARSONS BRINCKERHOFF



ALTERNATIVES C/D & E

NOTE:
DESIGN CRITERIA FOR SHOULDER AND ROADWAY WIDTHS BASED ON:

OHIO
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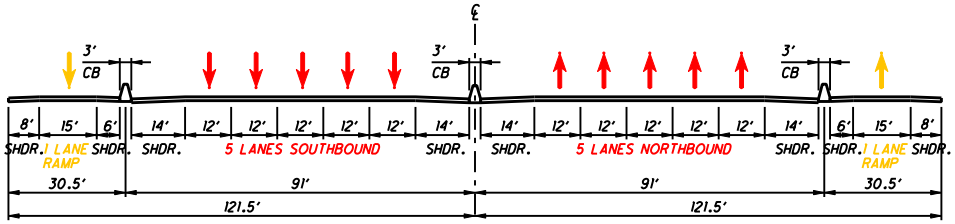
CRITICAL PROPOSED CROSS SECTIONS
STATION 2

Prepared by:
PARSONS BRINCKERHOFF



ALTERNATIVES C/D & E

NOTE:
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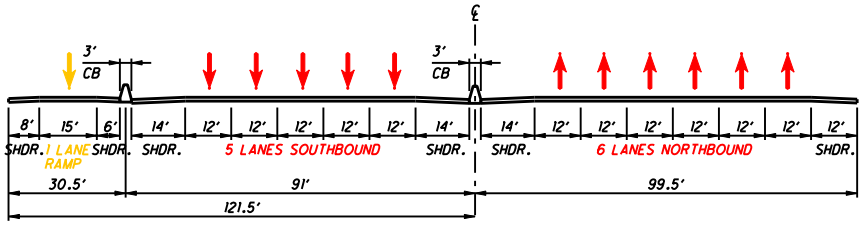
CRITICAL PROPOSED CROSS SECTIONS
STATION 3

Prepared by:
PARSONS BRINCKERHOFF



ALTERNATIVES C/D & E

NOTE:
DESIGN CRITERIA FOR SHOULDER AND ROADWAY WIDTHS BASED ON:

OHIO
ODOT LOCATION AND DESIGN MANUAL, VOL. 1

KENTUCKY
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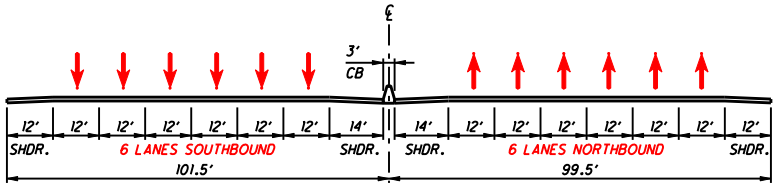
Federal Highway Administration

CRITICAL PROPOSED CROSS SECTIONS
STATION 4

Prepared by:
PARSONS BRINCKERHOFF



ALTERNATIVES C/D & E

NOTE:
DESIGN CRITERIA FOR SHOULDER AND ROADWAY WIDTHS BASED ON:

OHIO
ODOT LOCATION AND DESIGN MANUAL, VOL. 1

KENTUCKY
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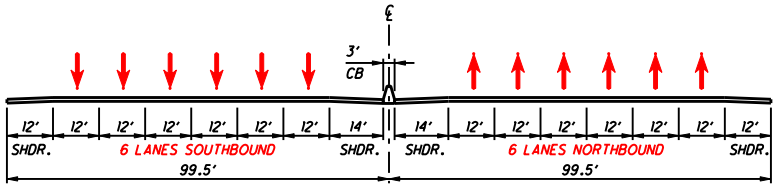
CRITICAL PROPOSED CROSS SECTIONS
STATION 5

Prepared by:
PARSONS BRINCKERHOFF



ALTERNATIVES C/D & E

NOTE:
DESIGN CRITERIA FOR SHOULDER AND ROADWAY WIDTHS BASED ON:

OHIO
ODOT LOCATION AND DESIGN MANUAL, VOL. 1

KENTUCKY
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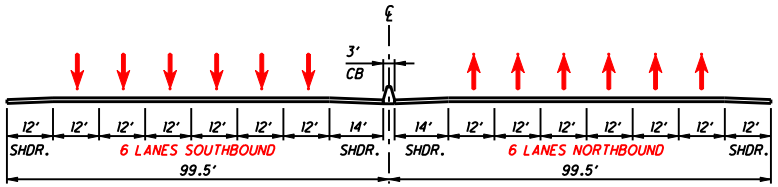
AASHTO "GREEN BOOK" (A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS)

U.S. Department of Transportation
Federal Highway Administration

CRITICAL PROPOSED CROSS SECTIONS
STATION 6

Prepared by:
PARSONS BRINCKERHOFF



ALTERNATIVES C/D & E

NOTE:
DESIGN CRITERIA FOR SHOULDER AND ROADWAY WIDTHS BASED ON:

OHIO
ODOT LOCATION AND DESIGN MANUAL, VOL. 1

KENTUCKY
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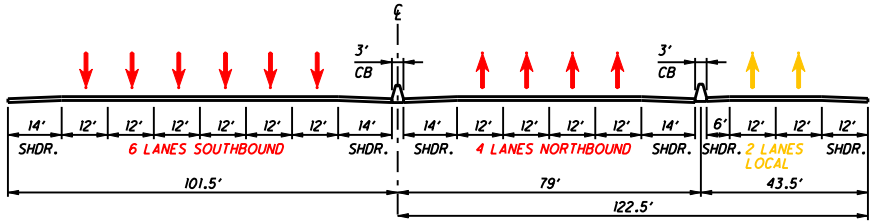
U.S. Department of Transportation
Federal Highway Administration

CRITICAL PROPOSED CROSS SECTIONS
STATION 7

Prepared by:
PARSONS BRINCKERHOFF



ALTERNATIVES C/D & E

NOTE:
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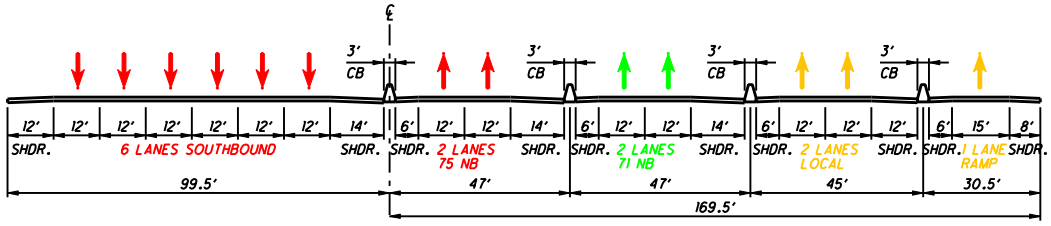
U.S. Department of Transportation
Federal Highway Administration

CRITICAL PROPOSED CROSS SECTIONS
STATION 8

Prepared by:
PARSONS BRINCKERHOFF



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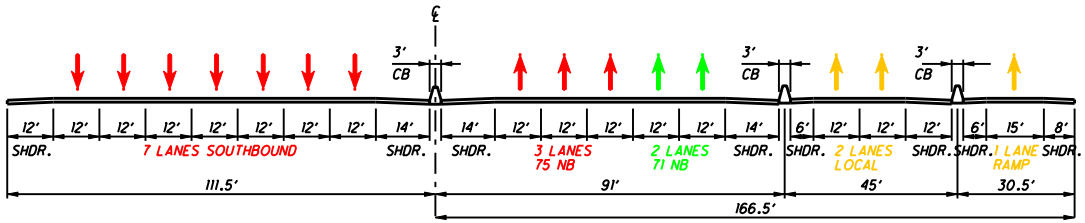

ALTERNATIVE E

NOTE:
DESIGN CRITERIA FOR SHOULDER AND ROADWAY WIDTHS BASED ON:

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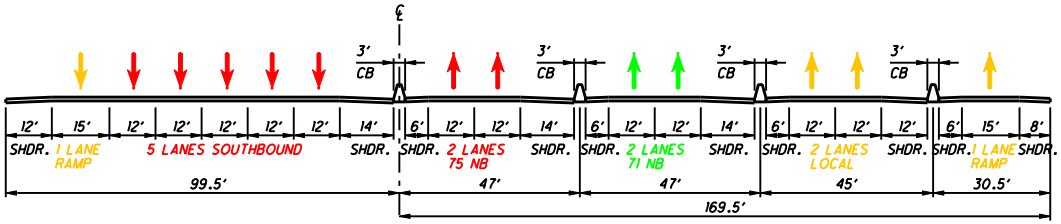
U.S. Department of Transportation
Federal Highway Administration

CRITICAL PROPOSED CROSS SECTIONS
STATION 9

Prepared by:
PARSONS BRINCKERHOFF



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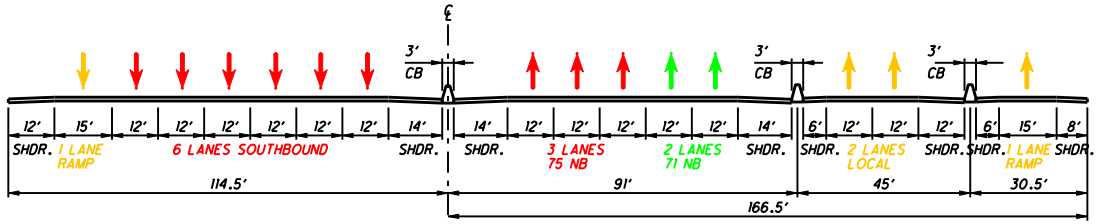

ALTERNATIVE E

NOTE:
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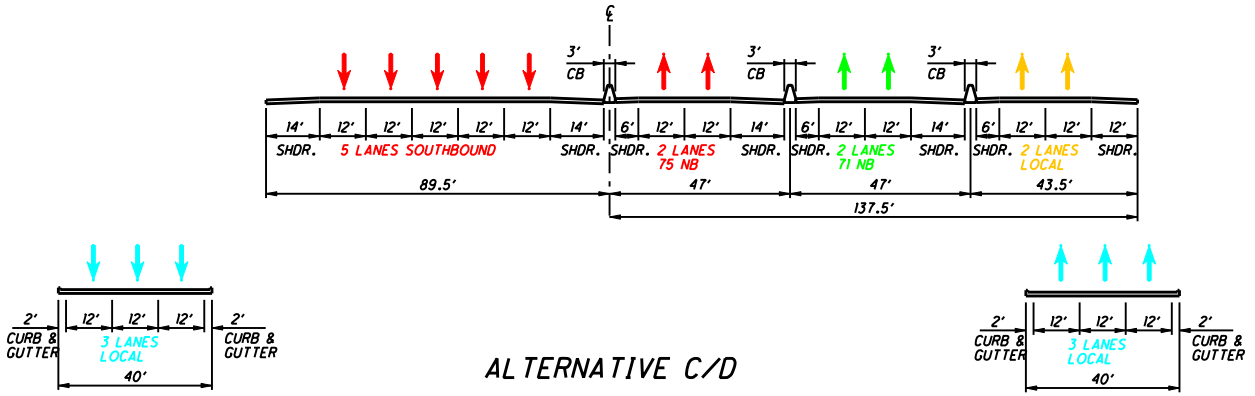
U.S. Department of Transportation
Federal Highway Administration

CRITICAL PROPOSED CROSS SECTIONS
STATION 10

Prepared by:
PARSONS BRINCKERHOFF



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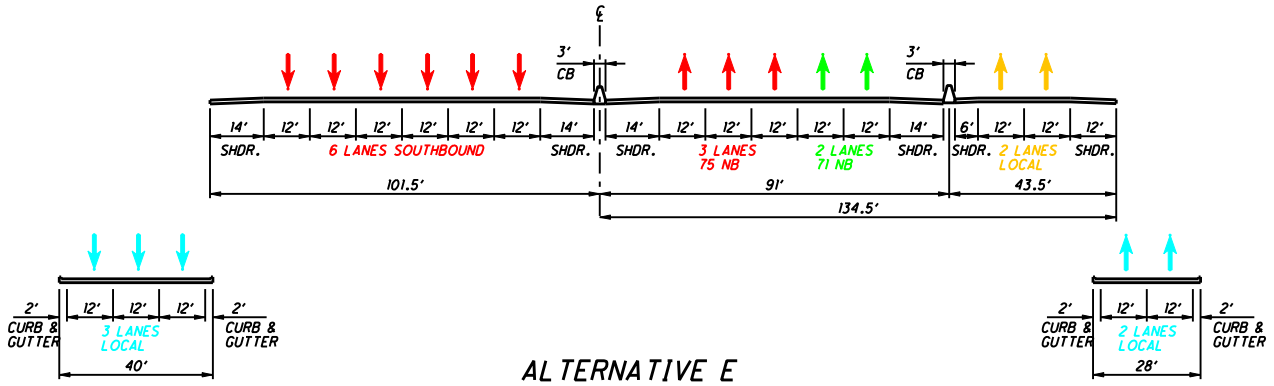

ALTERNATIVE E

NOTE:
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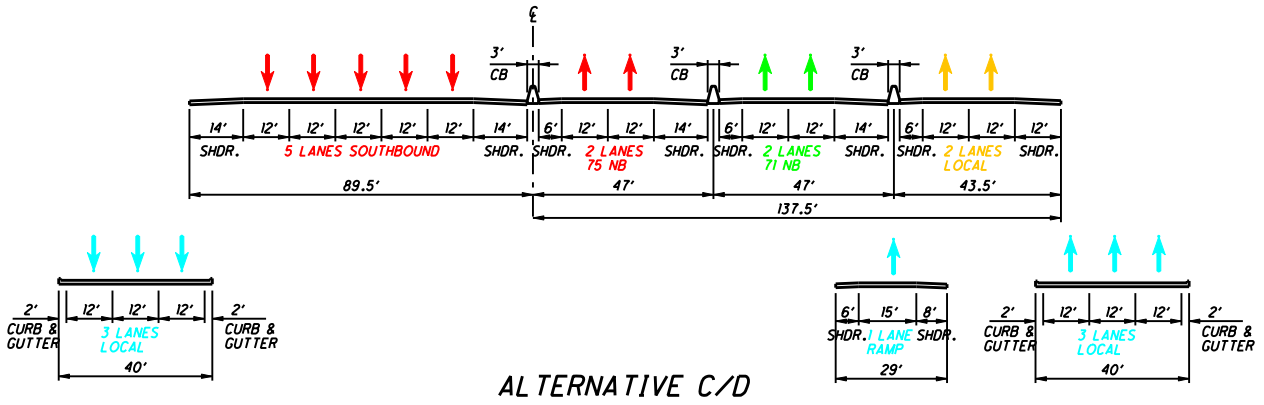

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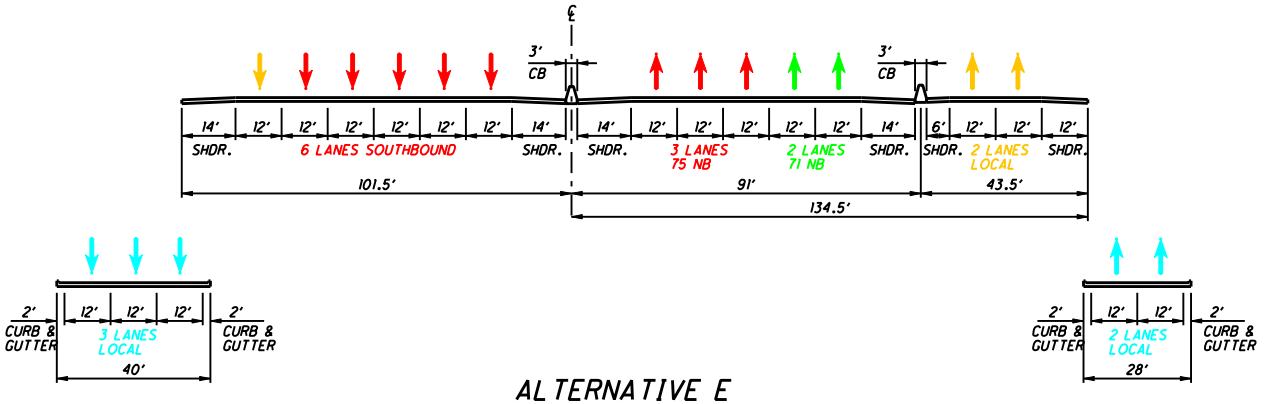

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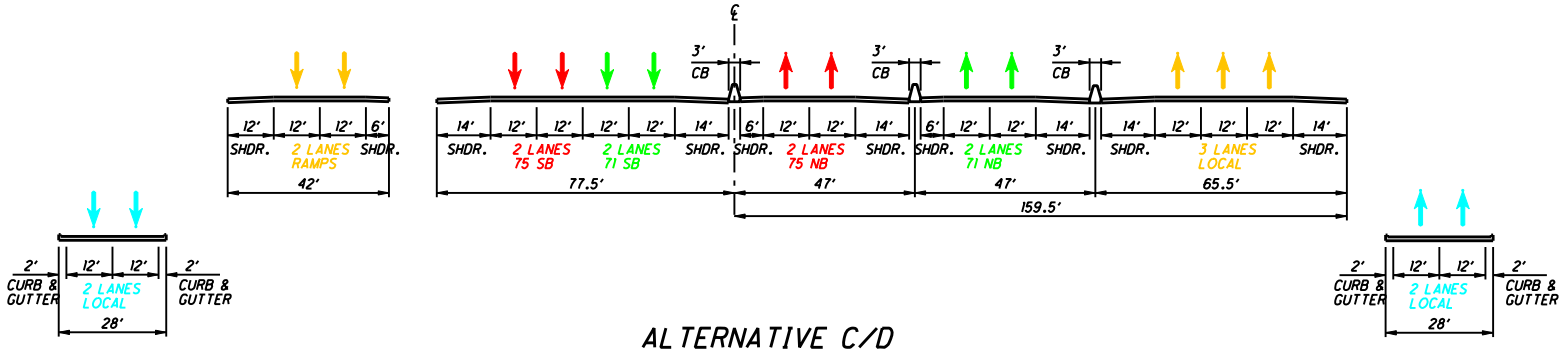

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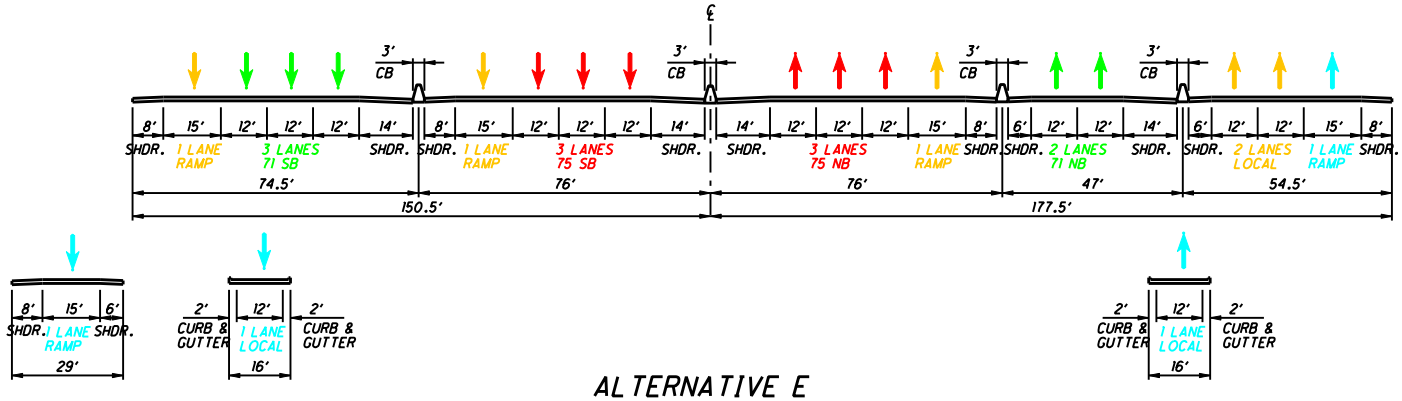

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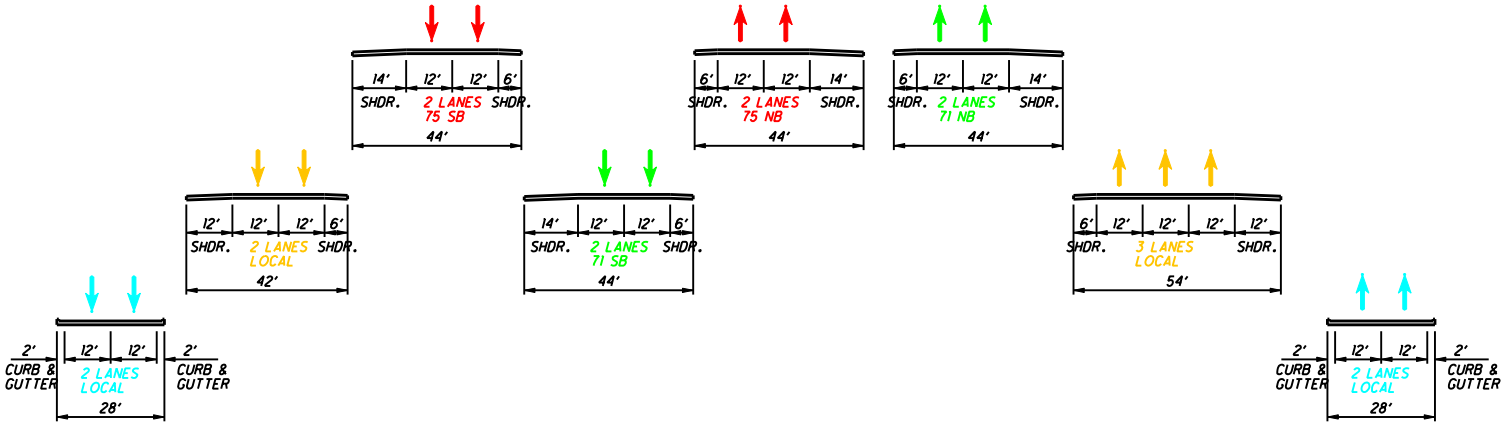
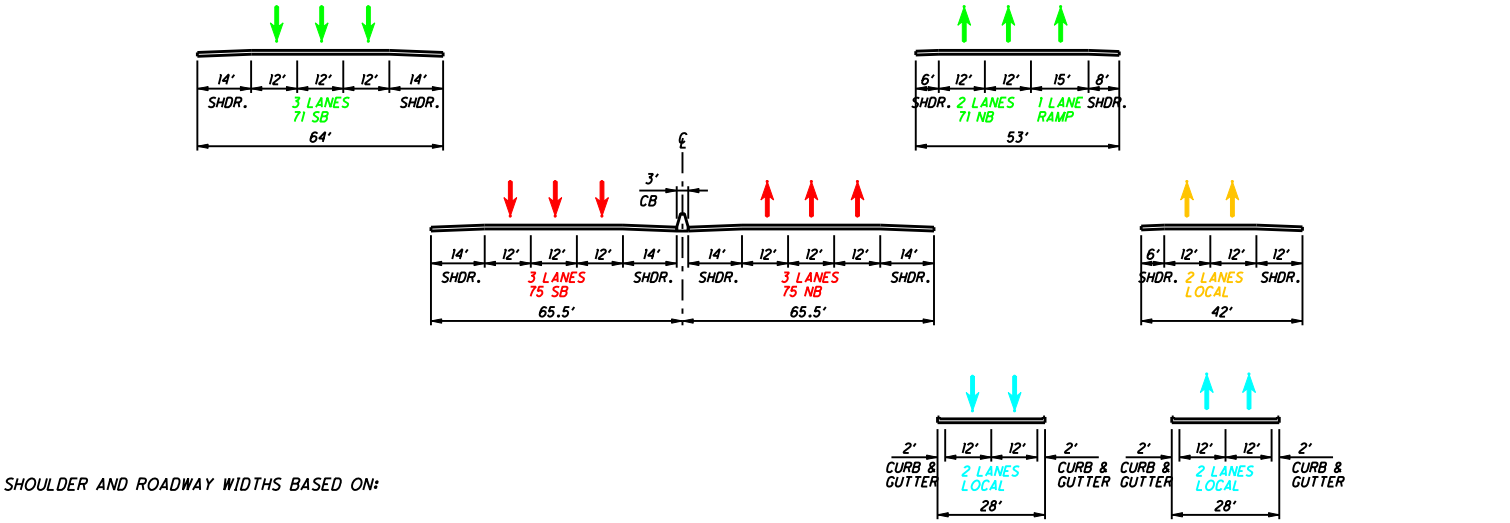
U.S. Department of Transportation
Federal Highway Administration

CRITICAL PROPOSED CROSS SECTIONS
STATION 13

Prepared by:
PARSONS BRINCKERHOFF



ALTERNATIVE C/D



ALTERNATIVE E

NOTE:
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KENTUCKY
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U.S. Department of Transportation
Federal Highway Administration

CRITICAL PROPOSED CROSS SECTIONS
STATION 14

Prepared by:
PARSONS BRINCKERHOFF

APPENDIX II – CORRESPONDENCE WITH STATE/FEDERAL AGENCIES

1. Response Letter from the U.S. Fish and Wildlife Service dated August 16, 2006
2. Response Letter from the Kentucky Department of Fish and Wildlife Resources dated January 5, 2006
3. Response Letter from the Kentucky State Nature Preserves Commission dated December 21, 2005
4. Response Letter from the Kentucky Division of Water dated December 8, 2005
5. Response Email from the Kentucky Division of Water – Wellhead Protection Program dated December 19, 2005
6. Response Letter from the Kentucky Division of Forestry dated December 16, 2005

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6950 Americana Parkway, Suite H
Reynoldsburg, Ohio 43068-4127

(614) 469-6923/Fax: (614) 469-6919

FILE COPY

August 16, 2006

TAILS: 31420-2006-TA-0837

Dennis A. Decker
Federal Highway Administration
Ohio Division Office
200 North High Street
Columbus, OH 43215

Dear Mr. Decker:

This is in response to your August 2, 2006 letter requesting our participation in the environmental review process for the Brent Spence Bridge Replacement/Rehabilitation project on I-75 between Covington, Kentucky and Cincinnati, Ohio. We understand that this project is in the preliminary development process and at this time you are initiating an Environmental Impact Statement (EIS). We accept the invitation to participate in this process and will serve as the lead FWS Field Office on this project.

Your red flag summary includes the federally listed species that may occur in the project area and that should be addressed during the planning process. Below we have provided you standard information on each of these species.

ENDANGERED SPECIES COMMENTS:
The proposed project lies within the range of the **Indiana bat** *(Myotis sodalis)*, a Federally-listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. Summer habitat requirements for the species are not well defined but the following are considered important:

1. Dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas.

2. Live trees (such as shagbark hickory and oaks) which have exfoliating bark.

3. Stream corridors, riparian areas, and upland woodlots which provide forage sites.

The Service recommends that project designs maintain as many trees and forested habitat shrub/scrub habitat as possible along all property lines and along edges of developed areas by minimizing footprint of graded areas, roads, and staging areas to the maximum extent practicable. Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above, we recommend that the habitat and surrounding trees be saved wherever possible. If the trees must be cut, further coordination with this office is requested to determine if surveys are

warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The proposed project lies within the range of the **running buffalo clover** (*Trifolium stoloniferum*), a Federally-listed endangered species. This species can be found in partially shaded woodlots, mowed areas (lawns, parks, cemeteries), and along streams and trails. Running buffalo clover requires periodic disturbance and a somewhat open habitat to successfully flourish, but cannot tolerate full-sun, full-shade, or severe disturbance. If suitable habitat is present, we recommend that surveys for this species be conducted by a trained botanist in May or June when the plant is in flower.

The proposed project lies within the range of the **sheepnose mussel** *(Plethobasus cyphyus)*, a Federal candidate species. The sheepnose is primarily known from larger streams and rivers. It typically occurs in shallow shoal habitats with moderate to swift currents over coarse sand and gravel. Habitats with sheepnose may also have mud, cobble, and boulders. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of sheepnose mussels in the vicinity of the proposed site.

This technical assistance letter is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C.661 et seq.), the Endangered Species Act of 1973, as amended, and is consistent with the intent of the National Environmental Policy Act of 1969, and the U.S. Fish and Wildlife Service's Mitigation Policy. Please note that consultation under section 7 of the ESA may be warranted for this project if suitable habitat for listed species may be impacted by this project. This letter provides technical assistance only and does not serve as a completed section 7 consultation document.

If you have any questions regarding our response or if you need additional information, please contact Sarena Selbo at extension 17.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

6.1
8.3
17.17

KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES
COMMERCE CABINET

Ernie Fletcher
Governor

#1 Sportsman's Lane
Frankfort, Kentucky 40601
Phone (502) 564-3400
1-800-858-1549
Fax (502) 564-0506
fw.ky.gov

George Ward
Secretary

Dr. Jonathan W. Gassett
Commissioner

January 5, 2006

Jeff Brown
Environmental Planner
Parsons Brinkerhoff Quade & Douglas, Inc.
312 Elm Street, Suite 2500
Cincinnati, OH 45202

RE: Threatened/endangered species, critical habitat review, and potential environmental impacts associated with the proposed improvements to I-75 and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky Region.

Dear Mr. Brown:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) have received your request for the above-referenced information. The Kentucky Fish and Wildlife Information System (KFWIS) indicate that federal and state threatened and endangered species are known to occur within close proximity to the project area (see attached list). Please be aware that our database system is a dynamic one that only represents our current knowledge of the various species distributions.

Due to the fact that this project is in the early stages of planning and it is unknown the measures that will be taken to improve the traffic flow and level of service for the Greater Cincinnati/Northern Kentucky area we recommend that the Ohio Department of Transportation and the Kentucky Transportation Cabinet keep the various resource agencies informed on the ongoing status of the project. Several state and federally listed mussels have historically occurred within this portion of the Ohio River. Proposed improvements may warrant mussel surveys and/or special conditions to minimize impacts to the aquatic ecosystem. Continued communication between the state transportation agencies and the state and federal resource agencies will insure that goals are met with minimal impacts to natural resources.

To minimize indirect impacts to state and federal threatened/endangered mussels located within the Ohio River strict erosion control measures should be developed and implemented prior to construction to minimize siltation into waterways located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed

KDFWR recommends that you contact the appropriate US Army Corps of Engineers office and the Kentucky Division of Water prior to any work within the waterways or wetland habitats of Kentucky. Additionally, KDFWR recommends the following for the portions of the project that impact streams:

- Channel changes located within the project area should incorporate natural stream channel design.

- Development/excavation during low flow period to minimize disturbances.
- Proper placement of erosion control structures below highly disturbed areas to minimize entry of silt into area streams.
- Replanting of disturbed areas after construction, including stream banks, with native vegetation for soil stabilization and enhancement of fish and wildlife populations. We recommend a 100 foot forested buffer along each stream bank.
- Return all disturbed instream habitat to its original condition upon completion of construction in the area.
- Preservation of any tree canopy overhanging any streams within the project area.

I hope this information proves helpful to you. If you have any questions or require additional information, please call me at (800) 852-0942 Extension 366.

Sincerely,

Doug Dawson

Doug Dawson
Wildlife Biologist III

Cc: Environmental Section File

93
61
17.1.7

December 21, 2005

Jeff Brown
Parsons, Brinkerhoff, Quade, and Douglas, Inc.
312 Elm Street, Suite 2500
Cincinnati, OH 45202

Data Request **06-039**

Dear Mr. Brown:

This letter is in response to your data request of December 9, 2005 for the Brent Spence Bridge Study Area (Kenton County) project. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Kentucky State Nature Preserves Commission occur near the project area on the Covington USGS Quadrangle, as shown on the map you provided to us. Please see the attached reports for more information, which reflect analysis of the project area with three buffers applied:

1-mile for all records – 28 records
5-mile for aquatic records – 28 records
5-mile for federally listed species – 16 records
10-mile for mammals and birds – 6 records

Plethodon cinereus (Redback salamander, KSNPC Special Concern) is found only in Boone, Kenton and Owen Counties in Kentucky. This is a woodland species that occurs in deciduous and mixed forest types. Adults are found under logs, rocks, bark, moss and debris.

Kirtland's snake (*Clonophis kirtlandii*, KSNPC Threatened, federal species of management concern) is known historically from the area but has not been observed in recent years. The species may persist in relict populations in minimally to moderately disturbed areas, mostly along stream drainages, but also in higher spots relatively far from streams. These snakes are regularly encountered in residential areas, mostly in grassy strips in floodplains, vacant lots, and similar sites where they find refuge beneath debris and in crayfish burrows. Disturbance, most notably heavy construction, in these habitats can potentially impact populations of the species.

Trifolium stoloniferum (Running buffalo clover, federally endangered, KSNPC threatened) has been observed in this area in the past. This plant grows in mesic soils that receive filtered light. It is recommended that a thorough search be conducted by a qualified biologist in the months of May through July. The optimal time to search is in May, during its flowering period. Areas to search include stream banks, bars, and terraces, footpaths, dirt roads, and grazed bottomlands.

Passerculus sandwichensis (Savannah Sparrow, KSNPC special concern) can be found in sparsely vegetated grasslands such as pastures.

Tyto alba (Barn Owl, KSNPC special concern) can be found in hollow trees, old buildings, barns, silos and other abandoned structures. Before demolition of existing structures, it should be determined that these birds are not present.

Please note that the vast majority of occurrences for aquatic organisms are from 1966 or earlier. This segment of the river has been severely impacted by pollutants. Although river quality is improving many if not all of these organisms apparently have been extirpated from the area.

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request. The license agreement states "Data and data products received from the Kentucky State Nature Preserves Commission, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Kentucky State Nature Preserves Commission." The exact location of plants, animals, and natural communities, if released by the Kentucky State Nature Preserves Commission, may not be released in any document or correspondence. These products are provided on a temporary basis for the express project (described above) of the requester, and may not be redistributed, resold or copied without the written permission of the Kentucky State Nature Preserves Commission's Data Manager (801 Schenkel Lane, Frankfort, KY, 40601. Phone: (502) 573-2886).

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed, and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

If you have any questions or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Sara Hines
Data Manager

SLD/SGH

Enclosures: Data Report and Interpretation Key

State/Federal Threatened/Endangered Species that could be impacted by the proposed project.

Scientific Name	Common Name	Federal Status	KSNPC Status
Acipenser fulvescens	LAKE STURGEON	N	E
Clonophis kirtlandii	KIRTLAND'S SNAKE	N	T
Cryptobranchus alleganiensis alleganiensis	EASTERN HELLBENDER	N	S
Cumberlandia monodonta	SPECTACLECASE	N	E
Cyprogenia stegaria	FANSHELL	LE	E
Epioblasma obliquata obliquata	CATSPAW	LE	E
Epioblasma torulosa rangiana	NORTHERN RIFFLESHELL	LE	E
Epioblasma triquetra	SNUFFBOX	N	E
Fusconaia subrotunda	LONGSOLID	N	S
Ictiobus niger	BLACK BUFFALO	N	S
Lampsilis abrupta	PINK MUCKET	LE	E
Lampsilis ovata	POCKETBOOK	N	E
Lasmigona compressa	CREEK HEELSPLITTER	N	E
Obovaria retusa	RING PINK	LE	E
Plethobasus cooperianus	ORANGEFOOT PIMPLEBACK	LE	E
Plethobasus cyphyus	SHEEPNOSE	N	E
Plethodon cinereus	REDBACK SALAMANDER	N	S
Pleurobema clava	CLUBSHELL	LE	E
Pleurobema plenum	ROUGH PIGTOE	LE	E
Pleurobema rubrum	PYRAMID PIGTOE	N	E
Quadrula cylindrica cylindrica	RABBITSFOOT	N	T
Rana pipiens	NORTHERN LEOPARD FROG	N	S
Simpsonaias ambigua	SALAMANDER MUSSEL	N	T
Sitta canadensis	RED-BREASTED NUTHATCH	N	E

US Fish & Wildlife Service Status:

N = None
C = Candidate
LT = Listed as Threatened
LE = Listed as Endangered

KY State Nature Preserves Commission Status

N = None
E = Endangered
T = Threatened
S = Special Concern
H = Historic
X = Extirpated

6.1
8.3
17.1.7

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

Ernie Fletcher
Governor

Division of Water
14 Reilly Road
Frankfort, Kentucky 40601-1190
www.kentucky.gov

LaJuana S. Wilcher
Secretary

December 8, 2005

Mr. Jeff Brown
Environmental Planner
Parsons Brinckerhoff Quade & Douglas, Inc.
312 Elm Street, Suite 2500
Cincinnati, Ohio 45202

Dear Mr. Brown,

We are in receipt of your request for information on wild rivers and outstanding state resource in waters in the vicinity of the Brent Spruce Bridge Project and can report that there are none in the identified project boundary.

Thank you for the opportunity to comment.

Sincerely,

Tom C. VanArsdall

Tom C. Van Arsdall, Manager
Water Quality Branch

6.1
8.3
17.1.7

Brown, R. Jeffrey

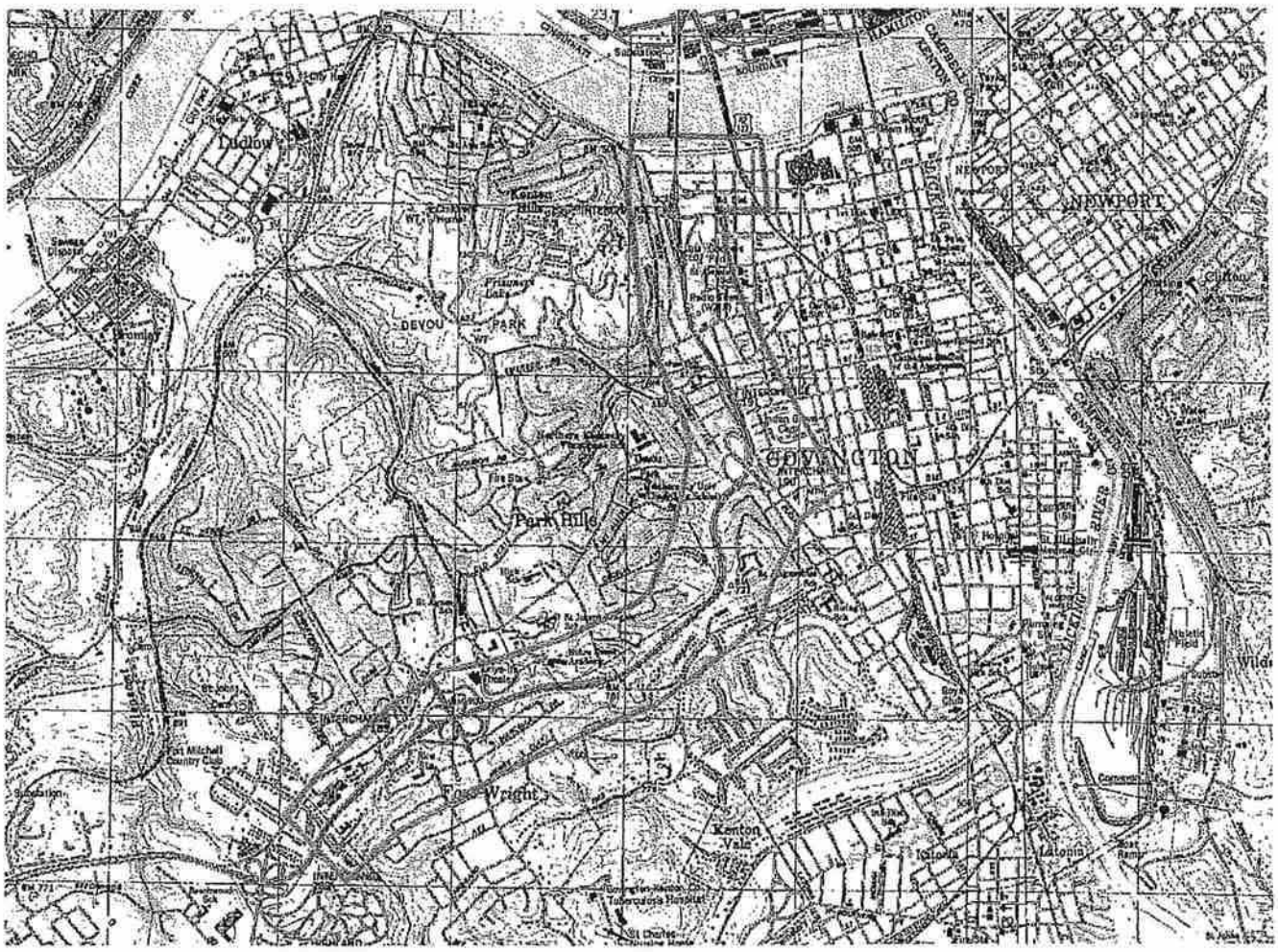
From: McKinney, Bruce (EPPC DEP DOW) [Bruce.McKinney@ky.gov]
Sent: Monday, December 19, 2005 9:09 AM
To: Brown, R. Jeffrey
Subject: Brent Spence Bridge Project

Jeff,

There are no wells or springs in the area that was outlined on the map. If you need anything else just let me know.

Bruce McKinney
Wellhead Protection Program

Brent Spence Bridge



0.9 0 0.9 1.8 Miles

Wellhead Protection Areas

Generalized Area

- **GW Wells**
- **GW Springs**

N

W E

S

6.1
9.3
17.1.7

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET

Ernie Fletcher
Governor

Department for Natural Resources
Division of Forestry
627 Comanche Trail
Frankfort, Kentucky 40601
www.kentucky.gov

LaJuana S. Wilcher
Secretary

Leah W. MacSwords
Director

December 16, 2005

Jeff Brown
Environmental Planner
Parsons Brinckerhoff Quade & Douglas, Inc.
312 Elm Street, Suite 2500
Cincinnati, OH 45202

Dear Mr. Brown:

This letter serves as an environmental assessment of the I-75 road-widening project being initiated in Kenton County. There are currently no state forests or champion trees located in the project study area. However, special care should be taken around existing trees that will remain after the construction is complete. Heavy equipment should be kept away from the base of the tree to prevent wounding of the trunk or surface roots. Construction traffic should be routed away from the dripline of the tree to lessen the severity of soil compaction. Compacted soil reduces the amount of water available to the tree, and this lack of water can cause added stress. Stressed trees are vulnerable to insect and disease infestation.

After completion of the project, consider planting additional trees in the landscape. Trees selected should be matched to the site. I have enclosed a publication entitled "Selecting and Planting Trees," which will assist in determining the correct species for the correct site conditions.

If you need further assistance, please contact Sarah C. Gracey, State Urban Forester, at 502-564-4496.

Sincerely,

Leah MacSwords,
Director

LM:DLO
Enclosure

APPENDIX III
ROUTINE WETLAND DETERMINATION FORMS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/9/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No
(If needed, explain on reverse.)		

Community ID:
Transect ID:
Plot ID: DP-1

Location: Wetland 1- Constructed basin downslope from apartments

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Populus deltoides**	shrub	FAC	9.		
2. *Salix nigra**	shrub	FACW+	10.		
3. *Typha angustifolia**	herb	OBL	11.		
4. *Scirpus cyperinus**	herb	FACW+	12.		
5. *Festuca arundinacea*	herb	FACU	13.		
6. *Aster pilosus*	herb	UPL	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
- ____ Inundated
- ____ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-1

SOILS

Map Unit Name
(Series and Phase): Eden silty clay loam, 20-35% slopes, eroded Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-1	A	10 YR 4/2	none	silt loam
1-6	B1	2.5 Y 6/2	few fine faint 10 YR 5/8	silty clay loam
6-14	B2	10 YR 4/3	few fine faint 10 YR 4/4	silt

Hydric Soil Indicators:

____ Histosol	____ Concretions
____ Histic Epipedon	____ High Organic Content in Surface Layer in Sandy Soils
____ Sulfidic Odor	____ Organic Streaking in Sandy Soils
____ Aquic Moisture Regime	____ Listed on Local Hydric Soils List
____ Reducing Conditions	____ Listed on National Hydric Soils List
X Gleyed or Low-Chroma Colors	____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	[Yes] No (Circle)		(Circle)
Wetland Hydrology Present?	[Yes] No		
Hydric Soils Present?	[Yes] No	Is this Sampling Point Within a Wetland?	[Yes] No

Remarks: Due to the presence of all three wetland criteria, this data point is located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/9/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-2

Location: Berm adjacent to Wetland 1

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Acer negundo**	shrub	FAC+	9. *Coronilla varia*	herb	UPL
2. *Populus deltoides**	shrub	FAC	10.		
3. *Robinia pseudoacacia**	shrub	FACU-	11.		
4. *Lonicera tatarica**	shrub	FACU	12.		
5. *Aster pilosus**	herb	UPL	13.		
6. *Dipsacus sylvestris**	herb	NI	14.		
7. *Solidago canadensis**	herb	FACU	15.		
8. *Daucus carota*	herb	UPL	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 33%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	N/A	(in.)
Depth to Free Water in Pit:	N/A	(in.)
Depth to Saturated Soil:	N/A	(in.)

Wetland Hydrology Indicators

Primary Indicators
- ____ Inundated
- ____ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-2

SOILS

Map Unit Name
(Series and Phase): Eden silty clay loam, 20-35% slopes, eroded Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-9	A	10 YR 5/3	common medium distinct 10YR 4/4	silty clay loam w/ gravel
9-14	B	gravel	none	gravel/shovel refusal

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
____ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has not been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes [No] (Circle)
Wetland Hydrology Present? Yes [No]
Hydric Soils Present? Yes [No]

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of all three wetland criteria, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Brent Spence Bridge Replacement/Rehabilitation Project	Date:	10/10/2006
Applicant/Owner:	Kentucky Transportation Cabinet	County:	Kenton
Investigator:	Neil Guthals & Matt Blake, Redwing Ecological Services	State:	Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No
(If needed, explain on reverse.)		

Community ID: _____
Transect ID: _____
Plot ID: DP-3

Location: Wetland 2 - Cattail marsh

VEGETATION

Plant Species (*Indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Typha latifolia**	herb	OBL	9.		
2. *Juncus effusus**	herb	FACW+	10.		
3. *Scirpus atrovirens**	herb	OBL	11.		
4. *Festuca arundinacea**	herb	FACU	12.		
5. *Polygonum hydropiper*	herb	OBL	13.		
6. *Echinochloa crusgalli*	herb	FACU	14.		
7. *Polygonum pensylvanicum*	herb	FACW	15.		
8. *Polygonum persicaria*	herb	FACW	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 75%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)

Depth to Free Water in Pit: 8 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators

Primary Indicators
- _____ Inundated
- X Saturated in Upper 12 Inches
- _____ Water Marks
- _____ Drift Lines
- _____ Sediment Deposits
- _____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- _____ Oxidized Root Channels in Upper 12 inches
- _____ Water-Stained Leaves
- _____ Local Soil Survey Data
- X FAC-Neutral Test
- _____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-3

SOILS

Map Unit Name
(Series and Phase): Eden silty clay loam, 20-35% slopes, eroded Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs Field Observations Confirm Mapped Type? [Yes] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-2	A	2.5Y 4/2	none	silty clay loam
2-10	B1	10 YR 5/3	few fine faint 10YR 5/6 common medium distinct10YR 5/1	silty clay loam
10-16	B2	10 YR 4/4	few fine faint 10YR 5/6 common medium distinct10YR 5/1	sandy clay loam

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
____ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
X Other (Explain in Remarks)

Remarks: The hydric soil criterion has been met due to likely surface innundation of long duration during the growing season. The soils in this area have been disturbed and the soil strata do not exhibit natural conditions. Based on observations of vegetation and hydrology, we are considering this soil hydric.

WETLAND DETERMINATION

			(Circle)
Hydrophytic Vegetation Present?	[Yes]	No	(Circle)
Wetland Hydrology Present?	[Yes]	No	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? [Yes] No

Remarks: Due to the presence of all three wetland criteria, this data point is located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/10/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-4

Location: Upland adjacent to Wetlands 2, 3, and 4

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Festuca arundinacea**	herb	FACU	9.		
2. *Solidago canadensis**	herb	FACU	10.		
3. *Acer negundo**	shrub	FAC+	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 33%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
__X__ No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
____ Inundated
____ Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
____ Oxidized Root Channels in Upper 12 inches
____ Water-Stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-4

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-3	A1	10YR 6/3	none	silt loam
3-14	A2	10YR 4/3	common medium distinct 2.5Y 5/1 common medium distinct 2.5Y 5/6	silty clay loam

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
____ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has not been met.
The soils in this area have been disturbed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	[No]	(Circle)
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	Yes	[No]	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of all three wetland criteria, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/10/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-5

Location: Wetland 3

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Impatiens cf. capensis**	herb	FACW	9.		
2. *Typha latifolia**	herb	OBL	10.		
3. *Juncus effusus**	herb	FACW+	11.		
4. *Dipsacus sylvestris*	herb	NI	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
__X__ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0-2 (in.)
Depth to Free Water in Pit: 8 (in.)
Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators

Primary Indicators
__X__ Inundated
__X__ Saturated in Upper 12 Inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
__X__ FAC-Neutral Test
_____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-5 |

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
2-0	0	10YR 2/1	none	organic
0-16	A	GLEY 1 3/N	none	silty clay loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

			(Circle)
Hydrophytic Vegetation Present?	[Yes]	No	(Circle)
Wetland Hydrology Present?	[Yes]	No	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? [Yes] No

Remarks: Due to the presence of all three wetland criteria, this data point is located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/10/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-6

Location: Wetland 4

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Scirpus atrovirens**	herb	OBL	9. *Aster sp.*	herb	
2. *Festuca arundinacea**	herb	FACU	10.		
3. *Impatiens cf. capensis**	herb	FACW	11.		
4. *Salix nigra**	shrub	FACW+	12.		
5. *Coronilla varia**	herb	UPL	13.		
6. *Typha latifolia*	herb	OBL	14.		
7. *Populus deltoides*	shrub	FAC	15.		
8. *Eupatorium perfoliatum*	herb	FACW+	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 60%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators

Primary Indicators
- ____ Inundated
- X Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-6

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-4	A	10YR 5/4	none	sand w/mg masses
4-14	B	10YR 5/1	many medium distinct 10YR 4/6	sandy loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.
Fragments of rock and concrete were observed in the soil.

WETLAND DETERMINATION

			(Circle)
Hydrophytic Vegetation Present?	[Yes]	No	(Circle)
Wetland Hydrology Present?	[Yes]	No	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? [Yes] No

Remarks: Due to the presence of all three wetland criteria, this data point is located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/10/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-7

Location: Upland adjacent to Wetlands 3 and 4

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Festuca arundinacea**	herb	FACU	9.		
2. *Echinochloa crusgalli*	herb	FACU	10.		
3. *Cyperus esculentus*	herb	FACW	11.		
4. *Bidens frondosa*	herb	FACW	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 0%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
____ Inundated
____ Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
____ Oxidized Root Channels in Upper 12 inches
____ Water-Stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-7 |

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-5	A	10YR 4/3	none	silty clay loam
5-9	B1	10YR 5/2	few fine distinct 10YR 6/8	clay loam w/ gravel
9-14	B2	N/A	N/A	shovel refusal gravel

Hydric Soil Indicators:

- ____ Histosol
- ____ Histic Epipedon
- ____ Sulfidic Odor
- ____ Aquic Moisture Regime
- ____ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ____ Concretions
- ____ High Organic Content in Surface Layer in Sandy Soils
- ____ Organic Streaking in Sandy Soils
- ____ Listed on Local Hydric Soils List
- ____ Listed on National Hydric Soils List
- ____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	[No]	(Circle)
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of hydrophytic vegetation and wetland hydrology, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/10/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No
(If needed, explain on reverse.)		

Community ID:
Transect ID:
Plot ID: DP-8

Location: Willow stand at edge of open field

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Salix exigua**	tree	OBL	9.		
2. *Ageratina altissima**	herb	FACU-	10.		
3. *Solidago canadensis**	herb	FACU	11.		
4. *Populus deltoides**	shrub	FAC	12.		
5. *Aster novae-angliae*	herb	FACW-	13.		
6. *Acer negundo*	shrub	FAC+	14.		
7. *Aster pilosus*	herb	UPL	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 50%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
- ____ Inundated
- ____ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-8 |

SOILS

Map Unit Name (Series and Phase): Negley silt loam, 12-20% slopes | Drainage Class: Well drained

Taxonomy (Subgroup): Ultic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-3	A	10YR 6/6	none	sand
3-8	B1	10YR 4/4	common medium distinct 10YR 5/8	sandy loam
8-16	B2	10YR 4/4	common medium distinct 10YR 4/6	sandy clay loam

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
____ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has not been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes [No] (Circle)
Wetland Hydrology Present? Yes [No]
Hydric Soils Present? Yes [No]

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of all three wetland criteria, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/11/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No
(If needed, explain on reverse.)		

Community ID:
Transect ID:
Plot ID: DP-9

Location: Wetland 5 - Detention basiin

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Typha latifolia**	herb	OBL	9. *Aster novae-angliae*	herb	FACW-
2. *Ageratina altissima**	herb	FACU-	10. *Cyperus sp.*	herb	
3. *Salix exigua**	tree	OBL	11.		
4. *Solidago canadensis**	herb	FACU	12.		
5. *Bidens frondosa**	herb	FACW	13.		
6. *Polygonum pensylvanicum**	herb	FACW	14.		
7. *Aster cf pilosus**	herb	UPL	15.		
8. *Juncus effusus*	herb	FACW+	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 57%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: 14 (in.)
Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators

Primary Indicators
_____ Inundated
X Saturated in Upper 12 Inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
X FAC-Neutral Test
_____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-9 |

SOILS

Map Unit Name (Series and Phase): Faywood silty clay loam, 12-20% slopes | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-3	A1	10YR 4/3	few fine faint 10YR 5/6	sandy loam
3-6	A2	10YR 5/3	common medium distinct 10YR 5/8 common medium distinct 10YR 4/6	sand
6-12	B1	10YR 5/3	common medium distinct 10YR 5/8 many medium distinct 5YR 4/4	sandy clay loam
12-14	B2	GLEY 1 5/10Y	none	clay

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- X Other (Explain in Remarks)

Remarks: The hydric soil criterion has been met due to likely surface innundation of long duration during the growing season. Soils have been disturbed with creation of retention basin. Soils show evidence of a fluctuating water table near the surface, and are likely developing hydric soil characteristics.

WETLAND DETERMINATION

			(Circle)
Hydrophytic Vegetation Present?	[Yes]	No	(Circle)
Wetland Hydrology Present?	[Yes]	No	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? [Yes] No

Remarks: Due to the presence of all three wetland criteria, this data point is located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Brent Spence Bridge Replacement/Rehabilitation Project	Date:	10/11/2006
Applicant/Owner:	Kentucky Transportation Cabinet	County:	Kenton
Investigator:	Neil Guthals & Matt Blake, Redwing Ecological Services	State:	Kentucky

Do Normal Circumstances exist on the site?	Yes	No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes	No	Transect ID:	
Is the area a potential Problem Area?	Yes	No	Plot ID:	DP-10
(If needed, explain on reverse.)				

Location: Upland adjacent to Wetland 5

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Aster cf pilosus**	herb	UPL	9.		
2. *Festuca arundinacea**	herb	FACU	10.		
3. *Solidago canadensis**	herb	FACU	11.		
4. *Populus deltoides**	shrub	FAC	12.		
5. *Aster novae-angliae*	herb	FACW-	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 25%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

____ Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)

Depth to Free Water in Pit: N/A (in.)

Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
- ____ Inundated
- ____ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-10 |

SOILS

Map Unit Name (Series and Phase): Faywood silty clay loam, 12-20% slopes | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-4	A	10YR 4/2	none	loam
4-14	B	GLEY 1 5/N	none	clay

Hydric Soil Indicators:

- ____ Histosol
- ____ Histic Epipedon
- ____ Sulfidic Odor
- ____ Aquic Moisture Regime
- ____ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ____ Concretions
- ____ High Organic Content in Surface Layer in Sandy Soils
- ____ Organic Streaking in Sandy Soils
- ____ Listed on Local Hydric Soils List
- ____ Listed on National Hydric Soils List
- ____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	[No]	(Circle)
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of hydrophytic vegetation and wetland hydrology, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/11/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-11

Location: Along Intermittent 5

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Leersia oryzoides**	herb	OBL	9.		
2. *Typha latifolia**	herb	OBL	10.		
3. *Polygonum hydropiper**	herb	OBL	11.		
4. *Polygonum pensylvanicum*	herb	FACW	12.		
5. *Scirpus atrovirens*	herb	OBL	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
_____ Inundated
_____ Saturated in Upper 12 Inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
X FAC-Neutral Test
_____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-11 |

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-4	A	10YR 5/3	none	silty clay loam
4-6	B1	10YR 4/3	none	sand/gravel
6-14	B2	10YR 5/3	few fine faint 10YR 5/6 many medium distinct 5YR 4/3	clay loam

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
____ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has not been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	[Yes]	No	(Circle)
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	Yes	[No]	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of wetland hydrology and hydric soils, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/11/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-12

Location: Along Ohio River under Brent Spence Bridge

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Acer saccharinum**	tree	FACW	9.		
2. *Populus deltoides**	tree	FAC	10.		
3. *Salix nigra**	shrub	FACW+	11.		
4. *Acer saccharinum**	shrub	FACW	12.		
5. *Populus deltoides**	shrub	FAC	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
_____ Inundated
_____ Saturated in Upper 12 Inches
_____ Water Marks
_____ Drift Lines
X Sediment Deposits
_____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
X FAC-Neutral Test
_____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met, as sediment deposits appear to be a function of Ohio River flooding and do not represent wetland hydrology conditions.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-12

SOILS

Map Unit Name (Series and Phase): Huntington silt loam (0-4% slopes, occasionally flooded) Drainage Class: Well drained

Taxonomy (Subgroup): Fluventic Hapludalfs Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-1	A1	10YR 5/4	none	sand
1-5	A2	10YR 3/2	none	silt loam
5-7	B1	10YR 4/3	none	sand
7-14	B2	10YR 4/2	none	silt loam

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
____ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has not been met.

WETLAND DETERMINATION

			(Circle)
Hydrophytic Vegetation Present?	[Yes]	No	
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	Yes	[No]	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of wetland hydrology and hydric soils, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Brent Spence Bridge Replacement/Rehabilitation Project	Date:	10/12/2006
Applicant/Owner:	Kentucky Transportation Cabinet	County:	Kenton
Investigator:	Neil Guthals & Matt Blake, Redwing Ecological Services	State:	Kentucky

Do Normal Circumstances exist on the site?	Yes	No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes	No	Transect ID:	
Is the area a potential Problem Area?	Yes	No	Plot ID:	DP-13
(If needed, explain on reverse.)			Location:	Wetland 6 - Downstream of Intermittent 6

VEGETATION

Plant Species (*Indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Impatiens cf. capensis**	herb	FACW	9.		
2. *Typha latifolia**	herb	OBL	10.		
3. *Leersia oryzoides**	herb	OBL	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
- _____ Stream, Lake, or Tide Gauge
- _____ Aerial Photographs
- _____ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water:	2	(in.)
Depth to Free Water in Pit:	N/A	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators

Primary Indicators
- X Inundated
- X Saturated in Upper 12 Inches
- _____ Water Marks
- _____ Drift Lines
- _____ Sediment Deposits
- _____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- _____ Oxidized Root Channels in Upper 12 inches
- _____ Water-Stained Leaves
- _____ Local Soil Survey Data
- _____ FAC-Neutral Test
- _____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-13

SOILS

Map Unit Name
(Series and Phase): Eden silty clay loam, 20-35% slopes, eroded Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-3	A	10YR 4/2	none	silt loam
3-14	B	10YR 4/1	none	silty clay loam

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
__X__ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? [Yes] No (Circle)
Wetland Hydrology Present? [Yes] No
Hydric Soils Present? [Yes] No

Is this Sampling Point Within a Wetland? [Yes] No (Circle)

Remarks: Due to the presence of all three wetland criteria, this data point is located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/12/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-14

Location: Upland adjacent to Wetland 6

VEGETATION

Plant Species (*Indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Festuca arundinacea**	herb	FACU	9.		
2. *Dipsacus sylvestris**	herb	NI	10.		
3. *Trifolium pratense**	herb	FACU-	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 0%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
____ Inundated
____ Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
____ Oxidized Root Channels in Upper 12 inches
____ Water-Stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-14 |

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-4	A1	10YR 4/3	none	silty clay loam
4-8	A2	10YR 5/3	10YR 5/1	silty clay loam
8-12	B	10YR 5/1	10YR 5/3	silty clay loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

			(Circle)
Hydrophytic Vegetation Present?	Yes	[No]	
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of hydrophytic vegetation and wetland hydrology, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/12/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No
(If needed, explain on reverse.)		

Community ID:
Transect ID:
Plot ID: DP-15

Location: Woods adjacent to Intermittent 7

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Pilea pumila**	herb	FACW	9.		
2. *Lonicera tatarica**	shrub	FACU	10.		
3. *Ageratina altissima**	herb	FACU-	11.		
4. *Acer negundo**	shrub	FAC+	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 50%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
__X__ No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
_____ Inundated
_____ Saturated in Upper 12 Inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-15

SOILS

Map Unit Name
(Series and Phase): Eden silty clay loam, 20-35% slopes, eroded Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-4	A	10YR 4/2	none	silt loam
4-14	B	10YR 4/2	none	silty clay loam

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
____ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has not been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	[No]	(Circle)
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	Yes	[No]	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of all three wetland criteria, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/12/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area? (If needed, explain on reverse.)	Yes	No

Community ID:
Transect ID:
Plot ID: DP-16

Location: Wetland 7 - Seep along hillside

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Juncus effusus**	herb	FACW+	9.		
2. *Typha angustifolia**	herb	OBL	10.		
3. *Festuca arundinacea**	herb	FACU	11.		
4. *Carex sp.**	herb	FACW/OBL	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 75%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water: <1 (in.)
Depth to Free Water in Pit: 12 (in.)
Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators

Primary Indicators
- X Inundated
- X Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- X Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has been met.
Other: Sulfidic odor

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-16

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-1	A1	10YR 5/4	none	silt loam
1-2	A2	GLEY 2 5/10B	none	silt loam
2-14	B	5Y 6/1	common medium distinct 5Y 7/8	clay

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
X Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

			(Circle)
Hydrophytic Vegetation Present?	[Yes]	No	(Circle)
Wetland Hydrology Present?	[Yes]	No	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? [Yes] No

Remarks: Due to the presence of all three wetland criteria, this data point is located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/12/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No
(If needed, explain on reverse.)		

Community ID:
Transect ID:
Plot ID: DP-17

Location: Upland adjacent to Wetland 7

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Festuca arundinacea**	herb	FACU	9.		
2. *Dipsacus sylvestris**	herb	NI	10.		
3. *Solidago canadensis**	herb	FACU	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 0%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
____ Inundated
____ Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
____ Oxidized Root Channels in Upper 12 inches
____ Water-Stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-17 |

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-1	A	10YR 4/2	none	silt loam
1-14	B	10YR 4/2	common medium distinct 10YR 5/1 few find distinct 10YR 5/8	silt loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	[No]	(Circle)
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of hydrophytic vegetation and wetland hydrology, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/12/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No
(If needed, explain on reverse.)		

Community ID:
Transect ID:
Plot ID: DP-18

Location: Wetland 8 - Detention basin next to interstate

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Typha angustifolia**	herb	OBL	9.		
2. *Ambrosia trifida**	herb	FAC	10.		
3. *Convolvulus sepium*	herb	FAC-	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators

Primary Indicators
____ Inundated
X Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
____ Oxidized Root Channels in Upper 12 inches
____ Water-Stained Leaves
____ Local Soil Survey Data
X FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project Plot ID: DP-18

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-2	A1	10YR 4/2	none	silt loam
2-12	A2	10YR 5/2	common medium distinct 10YR 5/1	silty clay loam
12-14	B	GLEY 2 5/5B	none	clay

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
__X__ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	[Yes]	No	(Circle)
Wetland Hydrology Present?	[Yes]	No	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? [Yes] No (Circle)

Remarks: Due to the presence of all three wetland criteria, this data point is located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 10/12/2006
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-19

Location: Upland adjacent to Wetland 8

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Festuca arundinacea**	herb	FACU	9.		
2. *Trifolium pratense**	herb	FACU-	10.		
3. *Rumex crispus**	herb	FACU	11.		
4. *Setaria glauca**	herb	FAC	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 25%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
__X__ No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
_____ Inundated
_____ Saturated in Upper 12 Inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-19 |

SOILS

Map Unit Name
(Series and Phase): Eden silty clay loam, 20-35% slopes, eroded | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-5	A	10YR 4/2	none	silt loam
5-14	B	10YR 5/1 and 10YR 5/4	none	silty clay loam

Hydric Soil Indicators:

- ____ Histosol
- ____ Histic Epipedon
- ____ Sulfidic Odor
- ____ Aquic Moisture Regime
- ____ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ____ Concretions
- ____ High Organic Content in Surface Layer in Sandy Soils
- ____ Organic Streaking in Sandy Soils
- ____ Listed on Local Hydric Soils List
- ____ Listed on National Hydric Soils List
- ____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	[No]	(Circle)
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	[Yes]	No	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of hydrophytic vegetation and wetland hydrology, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals & Matt Blake, Redwing Ecological Services

Date: 7/30/2009
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No
(If needed, explain on reverse.)		

Community ID:
Transect ID:
Plot ID: DP-20

Location: North Side of I-71/75 and east of Dixie Highway

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Salix exigua*	tree	OBL	9.		
2. *Fraxinus pennsylvanica*	tree	FACW	10.		
3. *Acer saccharinum*	tree	FACW	11.		
4. *Lonicera maackii*	shrub	FACU	12.		
5. *Solidago canadensis*	herb	FACU	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 60%

Remarks: The hydrophytic vegetation criterion has been met.

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
__X__ No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
_____ Inundated
_____ Saturated in Upper 12 Inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-20 |

SOILS

Map Unit Name (Series and Phase): Faywood silty clay loam, 12-20% slopes | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? [Yes] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-2	A1	10YR 4/2	none	silt loam
2-8	A2	10YR 4/3	common medium distinct 10YR 5/8 fine medium distinct 10YR 5/4	silty clay loam
8+	B			concrete

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
____ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has not been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	[Yes]	No	(Circle)
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	Yes	[No]	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of wetland hydrology and hydric soils, this data point is not located within a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project
Applicant/Owner: Kentucky Transportation Cabinet
Investigator: Neil Guthals Redwing Ecological Services

Date: 9/3/2009
County: Kenton
State: Kentucky

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

(If needed, explain on reverse.)

Community ID:
Transect ID:
Plot ID: DP-21

Location: Upland adjacent to Intermittent Stream 13

VEGETATION

Plant Species (*indicates dominant)	Stratum	Indicator	Plant Species (*indicates dominant)	Stratum	Indicator
1. *Acer saccharum*	tree	FACU-	9.		
2. *Aesculus glabra*	tree	FACU+	10.		
3. *Diospyros vrginiana*	tree	FAC-	11.		
4. *Lonicera maackii*	herb	FACU	12.		
5. *Lindera benzoin*	herb	FACW-	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 20%

Remarks: The hydrophytic vegetation criterion has not been met.

HYDROLOGY

____ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
__X__ No Recorded Data Available

Field Observations:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators
____ Inundated
____ Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required)
____ Oxidized Root Channels in Upper 12 inches
____ Water-Stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks: The wetland hydrology criterion has not been met.

DATA FORM - CONTINUED
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Brent Spence Bridge Replacement/Rehabilitation Project | Plot ID: DP-21 |

SOILS

Map Unit Name (Series and Phase): Eden silty clay loam, 20-35% slopes, eroded | Drainage Class: Well drained

Taxonomy (Subgroup): Typic Hapludalfs | Field Observations Confirm Mapped Type? Yes [No]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Structure, Concretions, etc.
0-6	A	10YR 4/2	none	silt loam
6-12	B	10YR 5/3	none	silty clay loam

Hydric Soil Indicators:

____ Histosol
____ Histic Epipedon
____ Sulfidic Odor
____ Aquic Moisture Regime
____ Reducing Conditions
____ Gleyed or Low-Chroma Colors
____ Concretions
____ High Organic Content in Surface Layer in Sandy Soils
____ Organic Streaking in Sandy Soils
____ Listed on Local Hydric Soils List
____ Listed on National Hydric Soils List
____ Other (Explain in Remarks)

Remarks: The hydric soils criterion has not been met.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	[No]	(Circle)
Wetland Hydrology Present?	Yes	[No]	
Hydric Soils Present?	Yes	[No]	

Is this Sampling Point Within a Wetland? Yes [No] (Circle)

Remarks: Due to the absence of all three wetland criteria, this data point is not located within a wetland.

APPENDIX IV
RBP HABITAT ASSESSMENT FORMS

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 1	LOCATION: Brent Spence Bridge
STATION #: RBP #1 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.05° LONG: -84.54°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 10/9/07 TIME: 2:30 [ ] AM [X] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	Intermittent Showers
[Clear/Sunny]	[Clear/Sunny]

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 75 °F ____ °C

Rainfall in the past 24 hours 0 in.

20 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	6	ft
Range of Depth	0-10	in
Average Velocity	_____	ft/s
Discharge	_____	cfs
Est. Reach Length	_____	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments

Island Waterfalls

[Other] culvert upstream

Stream Flow:

Dry Pooled Low [Normal]

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]

Grasses Herbaceous

Number of strata: 2

Dom. Tree/Shrub Taxa

sugar maple

bush honeysuckle

green ash

Canopy Cover:

Fully Exposed (0-25%)

Partially Exposed (25-50%)

[Partially Shaded (50-75%)]

Fully Shaded (75-100%)

Channel Alterations:

Dredging

Channelization

(Full Partial)

Substrate Est. P.C	Riffle 60 %	Run ____ %	Pool 40 %
Silt/Clay (<0.06 mm)			
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)			
Cobble (64 - 256 mm)	X		X
Boulders (>256 mm)			
Bedrock	X		X

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. **Epifaunal Substrate/ Available Cover** **17**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat; well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. **Embeddedness** **10**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. **Velocity/Depth Regime** **8**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition **15**	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status **18**	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration **16**	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends) **19**	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 6	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 6	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 5	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 5	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **143** **NOTES/COMMENTS:** Average

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 2	LOCATION: Brent Spence Bridge
STATION #: RBP #2 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.05° LONG: -84.54°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 10/9/06 TIME: 3:30 [ ] AM [X] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	Intermittent Showers
[Clear/Sunny]	[Clear/Sunny]

Has there been a heavy rain in the last 7 days? Yes [No]

Air Temperature 75 °F ____ °C

Rainfall in the past 24 hours 0 in.

10 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	8	ft
Range of Depth	0 - 1.5	ft
Average Velocity	_____	ft/s
Discharge	_____	cfs
Est. Reach Length	_____	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments

Island Waterfalls

[Other] culvert crossing interstate

Stream Flow:

Dry Pooled Low [Normal]

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]

[Grasses] [Herbaceous]

Number of strata: 4

Dom. Tree/Shrub Taxa

bush honeysuckle

box elder

staghorn sumac

Canopy Cover:

Fully Exposed (0-25%)

[Partially Exposed (25-50%)]

Partially Shaded (50-75%)

Fully Shaded (75-100%)

Channel Alterations:

Dredging

[Channelization]

(Full [Partial])

Substrate Est. P.C	Riffle 80 %	Run ____ %	Pool 20 %
Silt/Clay (<0.06 mm)			
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)			
Cobble (64 - 256 mm)	X		X
Boulders (>256 mm)	X		X
Bedrock	X		X

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover **15**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat: well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. Embeddedness **11**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. Velocity/Depth Regime **8**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
14	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
16	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
13	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
19	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 9	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 8	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 6	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 3	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 2	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **132** **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 3	LOCATION: Brent Spence Bridge
STATION #: RBP #3 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.06° LONG: -84.54°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 10/9/06 TIME: 4:30 [ ] AM [X] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	Intermittent Showers
[Clear/Sunny]	[Clear/Sunny]

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 75 °F _____ °C

Rainfall in the past 24 hours 0 in.

10 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	2-4	ft
Range of Depth	0-1	ft
Average Velocity		ft/s
Discharge		cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments
Island Waterfalls
[Other] culvert upstream

Stream Flow:

Dry Pooled [Low] Normal
High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]
Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]
Grasses Herbaceous

Number of strata: 2

Dom. Tree/Shrub Taxa

bush honeysuckle
box elder
tulip poplar

Canopy Cover:

Fully Exposed (0-25%)
Partially Exposed (25-50%)
Partially Shaded (50-75%)
[Fully Shaded (75-100%)]

Channel Alterations:

Dredging
Channelization
(Full Partial)

Substrate Est. P.C	Riffle 60 %	Run 10 %	Pool 30 %
Silt/Clay (<0.06 mm)	X	X	X
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)			
Cobble (64 - 256 mm)	X	X	
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover	40-70% mix of stable habitat: well-suited for full coloinization potential	20-40% mix of stable habitat; habitat availability less than desirable	Less than 20% stable habitat; lack of habitat is obvious
3	16 - 20	11 - 15	6 - 10	0 - 5
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment
7	16 - 20	11 - 15	6 - 10	0 - 5
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m).	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep)
8	16 - 20	11 - 15	6 - 10	0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
11	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
13	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
20	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
19	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 1	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 1	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 1	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 4	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 9	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: 107 **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 4 (upstream)	LOCATION: Brent Spence Bridge
STATION #: RBP #4 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.06° LONG: -84.53°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 10/10/06 TIME: 3:30 [ ] AM [X] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	Intermittent Showers
[Clear/Sunny]	[Clear/Sunny]

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 75 °F ____ °C

Rainfall in the past 24 hours 0 in.

90 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	2-15	ft
Range of Depth	0-2	ft
Average Velocity	_____	ft/s
Discharge	_____	cfs
Est. Reach Length	_____	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments

Island Waterfalls

Other

Stream Flow:

Dry Pooled [Low] Normal

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]

Grasses Herbaceous

Number of strata: 2

Dom. Tree/Shrub Taxa

bush honeysuckle

sugar maple

slippery elm

Canopy Cover:

Fully Exposed (0-25%)

Partially Exposed (25-50%)

Partially Shaded (50-75%)

[Fully Shaded (75-100%)]

Channel Alterations:

Dredging

[Channelization]

(Full [Partial])

Substrate Est. P.C	Riffle 90 %	Run ____ %	Pool 10 %
Silt/Clay (<0.06 mm)	X		X
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)			
Cobble (64 - 256 mm)	X		X
Boulders (>256 mm)	X		
Bedrock			

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. **Epifaunal Substrate/ Available Cover** **16**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat: well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. **Embeddedness** **14**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. **Velocity/Depth Regime** **7**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
16	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
17	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
11	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
20	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 7	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 7	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 4	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 4	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 2	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **135** **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 5 (open field)	LOCATION: Brent Spence Bridge
STATION #: RBP #5 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.06° LONG: -84.53°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 10/11/06 TIME: 12:00 [ ] AM [X] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.

TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
[Intermittent Showers]	[Intermittent Showers]
Clear/Sunny	Clear/Sunny

Has there been a heavy rain in the last 7 days? Yes [No]

Air Temperature 65 °F ____ °C

Rainfall in the past 24 hours 0.5 in.

100 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	1-5	ft
Range of Depth	0.5 - 3	ft
Average Velocity	_____	ft/s
Discharge	_____	cfs
Est. Reach Length	_____	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments

Island Waterfalls

[Other] multiple culverts

Stream Flow:

Dry Pooled [Low] Normal

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type:

Trees [Shrubs]

[Grasses] [Herbaceous]

Number of strata: 3

Dom. Tree/Shrub Taxa

sandbar willow

eastern cottonwood

Canopy Cover:

[Fully Exposed (0-25%)]

Partially Exposed (25-50%)

Partially Shaded (50-75%)

Fully Shaded (75-100%)

Channel Alterations:

[Dredging]

[Channelization]

(Full Partial)

Substrate Est. P.C	Riffle 70 %	Run _____ %	Pool 30 %
Silt/Clay (<0.06 mm)	X		X
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)	X		X
Cobble (64 - 256 mm)	X		
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover	40-70% mix of stable habitat: well-suited for full coloinization potential	20-40% mix of stable habitat; habitat availability less than desirable	Less than 20% stable habitat; lack of habitat is obvious
6	16 - 20	11 - 15	6 - 10	0 - 5
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment
9	16 - 20	11 - 15	6 - 10	0 - 5
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m).	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep)
6	16 - 20	11 - 15	6 - 10	0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
12				
	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
14				
	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
8				
	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
16				
	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 8	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 5	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 5	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 0	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 0	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: 97 **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 5 (woods)	LOCATION: Brent Spence Bridge
STATION #: RBP #6 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.06° LONG: -84.53°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: TIME: AM PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER: Now: Heavy Rain; Steady Rain; [Intermittent Showers]; Clear/Sunny
Past 24 Hours: Heavy Rain; Steady Rain; [Intermittent Showers]; Clear/Sunny

Has there been a heavy rain in the last 7 days? Yes [No]
Air Temperature 65 °F ____ °C
Rainfall in the past 24 hours 0.5 in.
100 % Cloud Cover

P-Chem: Temp (°C) ____ D.O. (mg/l) ____ % Saturation ____ pH (S.U.) ____ Cond. ____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	1-5	ft
Range of Depth	0.5 - 3	ft
Average Velocity	____	ft/s
Discharge	____	cfs
Est. Reach Length	____	ft

LOCAL WATERSHED FEATURES:
Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures
Dams; Bridge Abutments; Island; Waterfalls; [Other] culvert

Stream Flow:
Dry; Pooled; [Low]; Normal; High; Very Rapid or Torrential

Stream Type:
Perennial; [Intermittent]; Ephemeral; Seep

Riparian Vegetation
Dominate Type: [Trees] [Shrubs] Grasses Herbaceous
Number of strata: 2

Dom. Tree/Shrub Taxa
bush honeysuckle
sugar maple

Canopy Cover:
Fully Exposed (0-25%)
Partially Exposed (25-50%)
Partially Shaded (50-75%)
[Fully Shaded (75-100%)]

Channel Alterations:
Dredging
[Channelization]
(Full [Partial])

Substrate Est. P.C	Riffle 50 %	Run ____ %	Pool 50 %
Silt/Clay (<0.06 mm)	X		X
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)	X		X
Cobble (64 - 256 mm)	X		X
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. **Epifaunal Substrate/ Available Cover** **12**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat: well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. **Embeddedness** **6**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. **Velocity/Depth Regime** **6**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
3	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
3	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
14	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
13	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 4	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 4	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 5	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 5	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: 95 **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 6	LOCATION: Brent Spence Bridge
STATION #: RBP #7 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.06° LONG: -84.52°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 10/12/06 TIME: 8:30 [X] AM [ ] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	[Intermittent Showers]
[Clear/Sunny]	Clear/Sunny

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 40 °F ____ °C

Rainfall in the past 24 hours 0.5 in.

10 % Cloud Cover

P-Chem: Temp (°C) ____ D.O. (mg/l) ____ % Saturation ____ pH (S.U.) ____ Cond. ____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	4 - 8	ft
Range of Depth	0.5 - 2	ft
Average Velocity	____	ft/s
Discharge	____	cfs
Est. Reach Length	____	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures: Dams, Bridge Abutments, Island, Waterfalls, Other

Stream Flow: [Dry] Pooled Low Normal High Very Rapid or Torrential

Stream Type: Perennial [Intermittent] Ephemeral Seep

Riparian Vegetation

Dominate Type: [Trees] [Shrubs] Grasses Herbaceous

Number of strata: 2

Dom. Tree/Shrub Taxa: bush honeysuckle, sugar maple, white oak

Canopy Cover: Fully Exposed (0-25%), Partially Exposed (25-50%), Partially Shaded (50-75%), [Fully Shaded (75-100%)]

Channel Alterations: Dredging, Channelization (Full Partial)

Substrate Est. P.C	Riffle 80 %	Run ____ %	Pool 20 %
Silt/Clay (<0.06 mm)	X		X
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)			
Cobble (64 - 256 mm)	X		X
Boulders (>256 mm)	X		
Bedrock	X		

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover **16**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover	40-70% mix of stable habitat: well-suited for full coloinization potential	20-40% mix of stable habitat; habitat availability less than desirable	Less than 20% stable habitat; lack of habitat is obvious
	16 - 20	11 - 15	6 - 10	0 - 5
2. Embeddedness **13**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment
	16 - 20	11 - 15	6 - 10	0 - 5
3. Velocity/Depth Regime **8**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m).	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep)
	16 - 20	11 - 15	6 - 10	0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
18	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
1	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
20	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
20	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 9	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 9	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **152** **NOTES/COMMENTS:** Average

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 7	LOCATION: Brent Spence Bridge
STATION #: RBP #8 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.07° LONG: -84.52°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 10/12/06 TIME: 10:00 [X] AM [ ] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	[Intermittent Showers]
[Clear/Sunny]	Clear/Sunny

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 45 °F ____ °C

Rainfall in the past 24 hours 0.5 in.

10 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	6 - 10	ft
Range of Depth	1 - 5	ft
Average Velocity		ft/s
Discharge		cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments

Island Waterfalls

Other

Stream Flow:

Dry Pooled [Low] Normal

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type: [Trees] [Shrubs] Grasses Herbaceous

Number of strata: 2

Dom. Tree/Shrub Taxa

bush honeysuckle

sugar maple

box elder

Canopy Cover:

Fully Exposed (0-25%)

Partially Exposed (25-50%)

Partially Shaded (50-75%)

[Fully Shaded (75-100%)]

Channel Alterations:

Dredging

Channelization

(Full Partial)

Substrate Est. P.C	Riffle 60 %	Run 30 %	Pool 10 %
Silt/Clay (<0.06 mm)	X	X	X
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)	X	X	
Cobble (64 - 256 mm)	X	X	
Boulders (>256 mm)	X		
Bedrock	X		

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover **15**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat: well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. Embeddedness **13**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. Velocity/Depth Regime **8**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
14				
	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
12				
	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
18				
	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
17				
	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 1	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 1	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 4	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 4	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: 127 **NOTES/COMMENTS:** Poor Quality

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 4 (downstream)	LOCATION: Brent Spence Bridge
STATION #: RBP #9 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.06° LONG: -84.53°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 10/12/06 TIME: 11:00 [X] AM [ ] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	[Intermittent Showers]
[Clear/Sunny]	Clear/Sunny

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 50 °F ____ °C

Rainfall in the past 24 hours 0.5 in.

60 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	4 - 6	ft
Range of Depth	0.5 - 3	ft
Average Velocity		ft/s
Discharge		cfs
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments

Island Waterfalls

[Other] culverts

Stream Flow:

Dry Pooled Low [Normal]

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]

Grasses Herbaceous

Number of strata: 2

Dom. Tree/Shrub Taxa

bush honeysuckle

hackberry

box elder

Canopy Cover:

Fully Exposed (0-25%)

Partially Exposed (25-50%)

Partially Shaded (50-75%)

[Fully Shaded (75-100%)]

Channel Alterations:

Dredging

Channelization

(Full Partial)

Substrate Est. P.C	Riffle 70 %	Run ____ %	Pool 30 %
Silt/Clay (<0.06 mm)	X		X
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)			
Cobble (64 - 256 mm)	X		X
Boulders (>256 mm)	X		X
Bedrock	X		

Habitat Parameter	Condition Category			
	Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover **19**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat: well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. Embeddedness **20**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. Velocity/Depth Regime **9**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
19	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
18	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
14	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
19	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 8	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 5	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 5	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 4	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **158** **NOTES/COMMENTS:** Excellent

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 8	LOCATION: Brent Spence Bridge
STATION #: RBP #10 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.05° LONG: 84.55°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 7/30/09 TIME: 2:15 [ ] AM [X] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
[Steady Rain]	Steady Rain
Intermittent Showers	[Intermittent Showers]
Clear/Sunny	Clear/Sunny

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 80 °F ____ °C

Rainfall in the past 24 hours 0.1 in.

100 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	8-12	ft
Range of Depth	3-12	in
Average Velocity		ft/s
Discharge		cfs
Est. Reach Length	200	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments
Island Waterfalls
[Other] culverts

Stream Flow:

Dry Pooled [Low] Normal
High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]
Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]
[Grasses] [Herbaceous]

Number of strata: 4

Dom. Tree/Shrub Taxa

bush honeysuckle
hackberry
box elder
black locust

Canopy Cover:

Fully Exposed (0-25%)
Partially Exposed (25-50%)
Partially Shaded (50-75%)
[Fully Shaded (75-100%)]

Channel Alterations:

Dredging
[Channelization]
(Full [Partial])

Substrate Est. P.C	Riffle ____ %	Run 90 %	Pool 10 %
Silt/Clay (<0.06 mm)		X	X
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)		X	X
Cobble (64 - 256 mm)		X	X
Boulders (>256 mm)		X	
Bedrock		X	X

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover **19**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat: well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. Embeddedness **18**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. Velocity/Depth Regime **2**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
18	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
8	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
3	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 9	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 9	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 7	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 7	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 8	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **122** **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 9	LOCATION: Brent Spence Bridge
STATION #: RBP #11 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.05° LONG: 84.55°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 7/30/09 TIME: 2:15 [ ] AM [X] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
[Steady Rain]	Steady Rain
Intermittent Showers	[Intermittent Showers]
Clear/Sunny	Clear/Sunny

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 80 °F ____ °C

Rainfall in the past 24 hours 0.1 in.

100 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	2-4	ft
Range of Depth	1-3	in
Average Velocity	_____	ft/s
Discharge	_____	cfs
Est. Reach Length	100	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments

Island Waterfalls

[Other] culverts

Stream Flow:

Dry Pooled Low [Normal]

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]

[Grasses] [Herbaceous]

Number of strata: 4

Dom. Tree/Shrub Taxa

bush honeysuckle

hackberry

box elder

black locust

Canopy Cover:

Fully Exposed (0-25%)

Partially Exposed (25-50%)

Partially Shaded (50-75%)

[Fully Shaded (75-100%)]

Channel Alterations:

Dredging

[Channelization]

(Full [Partial])

Substrate Est. P.C	Riffle ____ %	Run 90 %	Pool 10 %
Silt/Clay (<0.06 mm)		X	X
Sand (0.06 - 2 mm)			
Gravel (2-64 mm)		X	X
Cobble (64 - 256 mm)		X	X
Boulders (>256 mm)		X	
Bedrock		X	X

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover **13**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat; well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. Embeddedness **16**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. Velocity/Depth Regime **5**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition **18**	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status **16**	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration **12**	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends) **13**	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 9	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 9	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 7	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 7	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 8	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **141** **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 10	LOCATION: Brent Spence Bridge
STATION #: RBP #12 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.05° LONG: 84.56°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 7/30/09 TIME: 3:00 [ ] AM [X] PM	INVESTIGATORS: N. Guthals, M. Blake, Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
[Intermittent Showers]	[Intermittent Showers]
Clear/Sunny	Clear/Sunny

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 80 °F ____ °C

Rainfall in the past 24 hours 0.1 in.

60 % Cloud Cover

P-Chem: Temp (°C) ____ D.O. (mg/l) ____ % Saturation ____ pH (S.U.) ____ Cond. ____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	8-12	ft
Range of Depth	6-12	in
Average Velocity	____	ft/s
Discharge	____	cfs
Est. Reach Length	____	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments

Island Waterfalls

Other culverts

Stream Flow:

Dry Pooled Low [Normal]

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]

[Grasses] [Herbaceous]

Number of strata: 4

Dom. Tree/Shrub Taxa

sugar maple

bush honeysuckle

Ohio Buckeye

American Elm

Canopy Cover:

Fully Exposed (0-25%)

Partially Exposed (25-50%)

Partially Shaded (50-75%)

[Fully Shaded (75-100%)]

Channel Alterations:

Dredging

Channelization

(Full Partial)

Substrate Est. P.C	Riffle 10 %	Run 80 %	Pool 10 %
Silt/Clay (<0.06 mm)		X	X
Sand (0.06 - 2 mm)	X	X	X
Gravel (2-64 mm)	X	X	X
Cobble (64 - 256 mm)	X	X	X
Boulders (>256 mm)	X	X	X
Bedrock	X	X	X

Habitat Parameter	Condition Category			
	Excellent	Good	Fair	Poor
1. **Epifaunal Substrate/ Available Cover** **15**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat; well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. **Embeddedness** **12**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. **Velocity/Depth Regime** **6**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
15	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
13	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
16	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
8	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 8	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **139** **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 11	LOCATION: Brent Spence Bridge
STATION #: RBP #13 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.05° LONG: 84.56°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 8/26/09 TIME: 10:00 [ ] AM [X] PM	INVESTIGATORS: N. Guthals Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	Intermittent Showers
[Clear/Sunny]	[Clear/Sunny]

Has there been a heavy rain in the last 7 days? [Yes] No

Air Temperature 80 °F ____ °C

Rainfall in the past 24 hours 0 in.

10 % Cloud Cover

P-Chem: Temp (°C) _____ D.O. (mg/l) _____ % Saturation _____ pH (S.U.) _____ Cond. _____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	12-16	ft
Range of Depth	3-12	in
Average Velocity		ft/s
Discharge		cfs
Est. Reach Length	200	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams Bridge Abutments
Island Waterfalls
Other culverts

Stream Flow:

Dry Pooled Low [Normal]
High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]
Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]
[Grasses] [Herbaceous]

Number of strata: 4

Dom. Tree/Shrub Taxa

sugar maple
bush honeysuckle
Ohio Buckeye
American Elm

Canopy Cover:

Fully Exposed (0-25%)
Partially Exposed (25-50%)
Partially Shaded (50-75%)
[Fully Shaded (75-100%)]

Channel Alterations:

Dredging
Channelization
(Full Partial)

Substrate Est. P.C	Riffle 10 %	Run 75 %	Pool 15 %
Silt/Clay (<0.06 mm)		X	X
Sand (0.06 - 2 mm)	X	X	X
Gravel (2-64 mm)	X	X	X
Cobble (64 - 256 mm)	X	X	X
Boulders (>256 mm)	X	X	
Bedrock	X	X	X

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover **13**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat: well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. Embeddedness **12**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. Velocity/Depth Regime **6**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
15	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
15	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
13	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
11	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 7	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 7	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 8	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **135** **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 12	LOCATION: Brent Spence Bridge
STATION #: RBP #14 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.05° LONG: 84.56°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 9/3/09 TIME: 2:30 [ ] AM [X] PM	INVESTIGATORS: N. Guthals Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	Intermittent Showers
[Clear/Sunny]	[Clear/Sunny]

Has there been a heavy rain in the last 7 days? Yes [No]

Air Temperature 75 °F ____ °C

Rainfall in the past 24 hours 0 in.

25 % Cloud Cover

P-Chem: Temp (°C) ____ D.O. (mg/l) ____ % Saturation ____ pH (S.U.) ____ Cond. ____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	3-8	ft
Range of Depth	1	in
Average Velocity	____	ft/s
Discharge	____	cfs
Est. Reach Length	150	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams	Bridge Abutments
Island	Waterfalls
Other	culverts

Stream Flow:

Dry Pooled Low [Normal]

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]

[Grasses] [Herbaceous]

Number of strata: 4

Dom. Tree/Shrub Taxa

sugar maple

bush honeysuckle

Ohio Buckeye

American Elm

Canopy Cover:

Fully Exposed (0-25%)

Partially Exposed (25-50%)

Partially Shaded (50-75%)

[Fully Shaded (75-100%)]

Channel Alterations:

Dredging

[Channelization]

([Full] Partial)

Substrate Est. P.C	Riffle 10 %	Run 80 %	Pool 10 %
Silt/Clay (<0.06 mm)		X	X
Sand (0.06 - 2 mm)	X	X	X
Gravel (2-64 mm)	X	X	X
Cobble (64 - 256 mm)	X	X	X
Boulders (>256 mm)	X	X	X
Bedrock	X	X	X

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover **15**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat: well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. Embeddedness **12**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. Velocity/Depth Regime **5**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
10	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
12	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
8	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 7	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 7	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 8	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: 118 **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

High Gradient Stream Data Sheet

STREAM NAME: Intermittent Stream 13	LOCATION: Brent Spence Bridge
STATION #: RBP #15 MILE:	BASIN/WATERSHED: Licking River
LAT: 39.05° LONG: 84.56°	COUNTY: Kenton USGS 7.5 TOPO: Covington
DATE: 9/3/09 TIME: 3:00 [ ] AM [X] PM	INVESTIGATORS: N. Guthals Redwing Ecological Services, Inc.
TYPE SAMPLE: P-CHEM Macroinvertebrate FISH BACT.	

WEATHER:

Now	Past 24 Hours
Heavy Rain	Heavy Rain
Steady Rain	Steady Rain
Intermittent Showers	Intermittent Showers
[Clear/Sunny]	[Clear/Sunny]

Has there been a heavy rain in the last 7 days? Yes [No]

Air Temperature 80 °F ____ °C

Rainfall in the past 24 hours 0 in.

10 % Cloud Cover

P-Chem: Temp (°C) ____ D.O. (mg/l) ____ % Saturation ____ pH (S.U.) ____ Cond. ____ Grab

INSTREAM WATERSHED FEATURES:

Stream Width	4-8	ft
Range of Depth	1-2	in
Average Velocity	____	ft/s
Discharge	____	cfs
Est. Reach Length	75	ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

Surface Mining	Construction	[Forest]
Deep Mining	Commercial	Pasture/Grazing
Oil Wells	Industrial	Silviculture
Land Disposal	Row Crops	[Urban Runoff/Storm Sewers]

Hydraulic Structures

Dams	Bridge Abutments
Island	Waterfalls
Other	culverts

Stream Flow:

Dry Pooled Low [Normal]

High Very Rapid or Torrential

Stream Type:

Perennial [Intermittent]

Ephemeral Seep

Riparian Vegetation

Dominate Type:

[Trees] [Shrubs]

[Grasses] [Herbaceous]

Number of strata: 4

Dom. Tree/Shrub Taxa

sugar maple

bush honeysuckle

Ohio Buckeye

American Elm

Canopy Cover:

Fully Exposed (0-25%)

Partially Exposed (25-50%)

Partially Shaded (50-75%)

[Fully Shaded (75-100%)]

Channel Alterations:

Dredging

[Channelization]

(Full [Partial])

Substrate Est. P.C	Riffle 10 %	Run 80 %	Pool 10 %
Silt/Clay (<0.06 mm)		X	X
Sand (0.06 - 2 mm)	X	X	X
Gravel (2-64 mm)	X	X	X
Cobble (64 - 256 mm)	X	X	X
Boulders (>256 mm)	X	X	X
Bedrock	X	X	X

Habitat Parameter	Condition Category: Excellent	Good	Fair	Poor
1. Epifaunal Substrate/ Available Cover **13**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover. 16 - 20	40-70% mix of stable habitat: well-suited for full coloinization potential. 11 - 15	20-40% mix of stable habitat; habitat availability less than desirable. 6 - 10	Less than 20% stable habitat; lack of habitat is obvious. 0 - 5
2. Embeddedness **15**	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. 16 - 20	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment. 11 - 15	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment. 6 - 10	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. 0 - 5
3. Velocity/Depth Regime **5**	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/x, deep is >0.5 m). 16 - 20	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes). 11 - 15	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low). 6 - 10	Dominated by 1 velocity/depth regime (usually slow-deep). 0 - 5

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of bottom affected by deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected. Sediment deposits at obstructions, constrictions, and bends.	Heavy deposits of fine material, increased bar development; more than 80% of bottom changing frequently.
15	16 - 20	11 - 15	6 - 10	0 - 5
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel is exposed.	Water fills 25-50% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
10	16 - 20	11 - 15	6 - 10	0 - 5
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, evidence of past channelization (> past 20 years) may be present.	Channelization may be extensive; shoring structures on both banks and 40-80% stream reach channelized.	Brush shored with gabion or cement; over 80% of reach channelized and disrupted.
11	16 - 20	11 - 15	6 - 10	0 - 5
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of ditance between riffles divided by width of the stream <7:1.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; ditance between riffles divided by the width of the stream is a ratio of >25.
10	16 - 20	11 - 15	6 - 10	0 - 5
8. Bank Stability	Stable; evidence of erosion of bank failure absent or minimal. Little potential for future problem.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank has areas of erosion.	Moderately unstable; 30-60% of bank has areas of erosion; high erosion potential during floods.	Unstable; eroded areas frequent; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB) 8	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 8	9 - 10	6 - 8	3 - 5	0 - 2
9. Vegetative Protection	More than 90% of streambank surfaces and immediate riparian zone covered by native vegetation.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants not well-represented; disruption evident.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil.	Less than 50% of the streambank surfaces covered by vegettaion disruption of streambank vegetation is very high.
SCORE (LB) 7	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 7	9 - 10	6 - 8	3 - 5	0 - 2
10. Riparian Vegetative Zone Width	Width of riparian zone >18 meters; human activities have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB) 10	9 - 10	6 - 8	3 - 5	0 - 2
SCORE (RB) 10	9 - 10	6 - 8	3 - 5	0 - 2

Total Score: **129** **NOTES/COMMENTS:** Poor

Bluegrass Bioregion (High Gradient Assessments) - Headwater Streams (<5.0 mi^2)

Excellent:	156 and above
Average:	142-155
Poor:	0-141

Reference: Kentucky Division of Water, 2008. "Methods for Assessing Biological Integrity of Surface Waters in Kentucky."

APPENDIX V
KYTC-DEA BIOLOGICAL ASSESSMENT

Biological Assessment

I-71/75 Extension From Rivard Drive to
Pleasant Run Creek
Kenton County, Kentucky
Covington Quadrangle
KYTC Item Number: 06-0017.00

Prepared by:

Lance Watt
Kentucky Transportation Cabinet
Division of Environmental Analysis
200 Mero Street
Frankfort, KY 40622
(502) 564-7250 x 3306

19 October 2009

PROJECT DESCRIPTION:

The action proposed is to replace the bridge and approaches on I-71/I-75 over the Ohio River in Kenton County, Kentucky; KYTC Item # 06-0017.00. The project area is located along an approximately 11.7 kilometer (7.3 mile) segment of I-71/I-75 within the Commonwealth of Kentucky and the State of Ohio. The study area is 7.9 square kilometers (3.07 square miles) in size. The purpose of the project is to improve traffic flow and level of service, improve safety, correct geometric deficiencies, and maintain links in key mobility, trade, and national defense transportation corridors. Opened in 1963, the Brent Spence Bridge was originally designed for 80,000 vehicles per day. Currently, 150,000 vehicles per day use the Brent Spence Bridge, with truck traffic accounting for 20% of the traffic volume. Traffic volumes are projected to increase to 200,000 vehicles per day by 2035. In 1985, lane widths on the bridge were reduced from 12 feet to 11 feet and the shoulders removed to facilitate an additional travel lane. In a bridge inspection in 2005, the bridge received a sufficiency rating of 64 on a 100 point scale, classifying the bridge as functionally obsolete because the design features are not consistent with it operational characteristics; however, the bridge structure itself is considered in fair physical condition and is not necessarily of concern. The northern limit of the project is 1500 feet north of the midpoint of the Western Hills Viaduct Interchange on I-75 in Cincinnati, Ohio. The original southern terminus was described as approximately 2800 feet south of the midpoint of the Kyles Lane (KY-1072) Interchange on I-71/I-75 in Covington, Kentucky where Rivard Drive (CS-9044) goes underneath the interstate.

On 26 May 2009, the KYTC district 6 environmental coordinator informed DEA that the southern terminus had been expanded from Rivard Drive to approximately 2300 feet west of the midpoint of the I-71/I-75 and Dixie Highway (US-25) interchange in Fort Wright, Kentucky, to approximately Pleasant Run Creek to accommodate projected traffic congestion. A final design plan has not been chosen at this time, although projected alternative paths keep the roadway within existing right of way. On northbound I-71/75 a through lane will be added from Dixie Highway to Kyles Lane; an auxiliary lane will also be added from Dixie Highway to Kyles Lane. On southbound I-71/75 a through lane will be added from Kyles Lane to Dixie Highway; an auxiliary lane will also be added from Kyles Lane to Dixie Highway. Current lanes are 12 feet wide with 11 foot shoulders; projected lanes will adhere to current interstate standards. Due to the uncertain path of the project, a study area of potential impacts was established 750 feet on both sides of the existing roadway. The purpose of the project is to improve traffic flow and level of service, reduce congestion, and improve safety. Maps of the extended section are included.

IDENTIFICATION OF LISTED SPECIES:

The United States Fish and Wildlife Service, Kentucky Field Office, (USFWS) has determined that the following federally threatened and endangered species are known from, or have the potential to occur, in Kenton County:

Myotis sodalis, Indiana bat (endangered: Potential)
Cyprogenia stegaria, fanshell mussel (endangered: known)
Epioblasma torulosa, Northern riffleshell mussel (endangered: known)
Epioblasma obliquata obliquata, purple catspaw pearlymussel (endangered: known)
Lampsilis abrupta, pink mucket mussel (endangered: known)
Obovaria retusa, ring pink mussel (endangered: known)
Plethobasus cooperianus, orangefoot pimpleback mussel (endangered: known)
Plethobasus cyphus, sheepnose mussel (candidate: potential)
Pleurobema clava, clubshell mussel (endangered: known)
Pleurobema plenum, rough pigtoe mussel (endangered: known)
Trifolium stoloniferum, running buffalo clover (endangered: known)

Copies of the Kentucky State Nature Preserves Commission list for Kenton County and the Kentucky Department of Fish and Wildlife Resources list for Kenton County have also been included.

On a letter dated 19 June 2009 from the Ohio Field Office for the United States Fish and Wildlife Service (HAM-71/75-0.00/0.22, PID 75119), stated that further field studies for running buffalo clover are not needed within the project area as described. This project area was from the original conceptual alternatives study (CAS), extending from the Western Hills Viaduct in Ohio to Rivard Drive. A copy of this letter has been included. Surveys and effects determinations for Indiana bat and listed mussels were not coordinated at that time, nor have they been coordinated since then. As final alternatives and plans are developed USFWS will be contacted for coordination of effects determination on these species. It is our full intention to be in compliance with Section 7 of the Endangered Species Act of 1973, as amended.

As noted in the project description, the southern terminus for the project has been extended. As such, further ecological work is required for the extended section. A habitat assessment for all listed species was conducted on 4 June 2009 by KYTC Division of Environmental Analysis (DEA) Subject Matter Expert (SME) for Ecology, Lance Watt. Potential habitat for running buffalo clover and Indiana bat were discovered during survey efforts. No suitable habitat for listed mussels exists in the extended area. Only one small perennial stream existed in the extended area (Pleasant Run Creek), which had a substrate type of bedrock with scattered boulders; in addition, a fine silt layer covered everything. The remaining streams were intermittent or ephemeral and did not represent the correct size or flow regime to support mussels. Under an agreement between the Kentucky Transportation Cabinet and the Federal Highway Administration, a "No Effect

Finding" form was completed for the listed mussel species in the extended area by DEA personnel on 14 October 2009.

No caves or karst features were discovered that would constitute winter roosting habitat for Indiana bat, however, summer roosting habitat in the form of snags, trees with cracks and/or sloughing bark, and live trees with loose bark did exist within the project corridor. Pleasant Run Creek and its tributaries and an unnamed stream on the eastern reach of the project are potential foraging corridors for Indiana bat. KYTC will address the potential summer roosting and foraging habitat at a later date as plans further develop and coordinate with USFWS.

This biological assessment addresses running buffalo clover (*T. stoloniferum*) for the extended section of the Brent Spence Bridge replacement and I-71/75 widening project (KYTC # 06-0017.00) from Rivard Drive to Pleasant Run Creek. As noted earlier, the remainder of the project has been previously assessed for running buffalo clover.

Environmental Setting:

Kenton County is situated in the Interior Plateau physiographic region of Kentucky, more specifically the Outer Bluegrass ecoregion of Kentucky (Woods et al. 2002). The Outer Bluegrass is described as rolling to hilly, containing sinkholes, springs, entrenched rivers, and intermittent and perennial streams. Discontinuous glacial outwash and leached, pre-Wisconsinian till deposits occur in the north. Natural soil fertility is relatively high (Weisenberger et al. 1989). Pastureland and cropland are widespread, with dissected areas remaining wooded. Upland streams have moderate to high gradients and cobble, boulder, or bedrock substrates. Concentrations of suspended sediment and nutrients can be high (Woods et al. 2002).

A majority of Kenton County is deeply dissected upland. The north-central part of the county is characterized by flat-topped ridges with elevations ranging from 800-900 feet (245-275 meters) above sea level. The Ohio River forms the northern boundary and the Licking River forms the eastern boundary; Boone County lies to the west and Grant and Pendleton Counties lie to the south.

The project is underlain geologically by the Bull Fork Formation, Grant Lake Limestone, the Fairview Formation, the Kope Formation, and artificial fill. All formations, except artificial fill, are Upper Ordovician in age. The Bull Fork formation consists of interbedded limestone and shale, with limestone comprising greater than 50% of the formation. The Grant Lake Limestone is exclusively coquinoid limestone. The Fairview Formation consists of interbedded shale and limestone, with each comprising approximately 50% of the mixture. The Kope formation occurs in the northeast corner of the project and consists of interbedded shale and limestone, with shale comprising 75% of the formation and limestone only 25%. The streams occur in the Fairview Formation.

This project broadly lies in the Rossmoyne-Jessup soil associations. Much of these soil associations have been converted to urban use. In recent years, farming has declined. Many farmers are now working part-time on the farm and full time on jobs in nearby cities or industrial areas (Weisenberger et al. 1989).The Rossmoyne-Jessup association is nearly level to moderately steep soils that have a loamy to clayey subsoil, located on ridge tops and side slopes of the glaciated uplands.

The Rossmoyne soils are nearly level to sloping, occupying the major part of the ridgetops. They are moderately well drained and are deep to rock. They have a silt loam surface layer over a dominantly yellowish-brown silty clay loam subsoil that is mottled in the lower part. They are moderately deep to a slowly permeable fragipan and about 2 feet thick (Weisenberger et al. 1989).

Jessup soils are well drained and deep. They have a silt loam surface layer and a dominantly yellowish-brown subsoil. The subsoil is silty clay loam in the upper part and silty clay in the lower part. Permeability is slow in the lower part. The Rossmoyne and Jessup soils are underlain by clayey till (Weisenberger et al. 1989).

The project occurs on Rossmoyne silt loam (0-6% slopes and 6-12% slopes), Faywood silty clay loam (6-12% slopes and 12-20% slopes), Faywood silty clay 12-20% slopes, severely eroded), Eden silty clay loam soil (20-35% slopes, eroded), and Negley silt loam (6-12% slopes). The soil survey for the county lists the steeper upland topsoil as poor with a rating of "very limited" for agriculture and structural development. Soils have moderate to severe erosion potential under cultivated farming pressures. The stream valleys occur within the Eden silty clay loam (20-35% slopes, eroded).

The landscape within the project area is urban interstate property or urban collector roads, consisting of scattered sub-divisions, light commerce, a school, and a country club. Wooded areas exist primarily along streambanks and steep slopes, as well as scattered trees in the residential properties. Residential properties have manicured lawns. The maintained right of way for Interstate 71/75 is primarily asphalt, concrete, and Type I grass seed mix.

Three streams will be impacted by this project, including one perennial blue-line stream (Pleasant Run Creek), an unnamed intermittent stream that is a tributary to Pleasant Run Creek, and an unnamed ephemeral stream on the east side of the project. All streams had forested riparian buffers.

Forested tracts were largely near streams or on hillsides too steep to farm or construct upon. The forests were mixed age, largely early to middle successional species including box elder (*Acer negundo*), black walnut (*Juglans nigra*), hackberry (*Celtis occidentalis*), sugar maple (*Acer saccharum*), green ash (*Fraxinus pennsylvanicum*), and Ohio buckeye (*Aesculus glabra*). Some understory species include Virginia creeper (*Parthenocissus*

quinquefolia), Amur honeysuckle (*Lonicera maackii*), spicebush (*Lindera benzoin*), and redbud (*Cercis candidensis*), and American elm (*Ulmus americana*).

Species Description:

Running buffalo clover:

Running buffalo clover (RBC: *Trifolium stoloniferum* Muhl. ex. A. Eaton) is one of only two clovers native to Kentucky (Campbell et al. 1988). RBC is a perennial herb, flowering in May and early June and fruiting through July. RBC is unique among clovers because it does not contain root nodules to fix nitrogen back into the soil (Morris et al. 2002). The clover originates out of a central rosette then grows on stolons or "runners," giving RBC its characteristic name (Brooks 1983, USFWS 2007).

Historically, RBC was believed to have thrived throughout the mid-western United States from West Virginia through Kansas (USFWS 1989). Experts believed the clover was extinct due to habitat destruction and lack of soil disturbance from bison *(Bison bison)*, such as trampling and grazing (Bartgis 1985, Campbell et al. 1988, Cusick 1989) until two small patches were discovered in 1985 in West Virginia (Bartgis 1985). Subsequent searches throughout the historical home-range yielded more populations in West Virginia, as well as in Kentucky (Campbell et al. 1988), Indiana (Homoya et al. 1989), Ohio (Cusick 1989) and Missouri (Taylor et al. 1994). In 1987, the U.S. Fish and Wildlife Service listed RBC as an endangered species (USFWS 1987). One thought concerning declining numbers of clover is that extra competition from succession impedes running buffalo clover growth. USFWS (2007) states that perhaps the most critical biological constraint and need to the recovery of RBC is its dependence on disturbance which limits competition from other plants and prevents successional changes in the landscape. Reclassification of RBC to threatened status can be considered when its life history is better understood and 30 secure, self-sustaining populations are known to exist into perpetuity (USFWS 1989).

Original habitat for RBC may have been open woods or savannah, although speculation exists about the vegetational landscape of the Bluegrass during the time of Native American occupation prior to European inhabitance (Jakle 1968, Denevan 1992). Descriptions of the Bluegrass ranged from open canebrakes to rich woods with a cane-dominated understory. In these descriptions, a white-flowered clover is mentioned as a major constituent of the herbaceous layer which Campbell et al. (1988) strongly suggest that this clover was RBC. The clover was not only common in the expanses of bluegrass savanna but also associated with bison roads, Native American paths, and seasonally flooded stream terraces. At the time of European settlement, RBC is thought to have been dependent on the once-common bison, or other large ungulates, such as elk (*Cervus elaphus*) and deer (*Odocoileus virginianus*), for seed scarification and dispersal, soil enrichment, and for the maintenance of its moderately disturbed habitat along large game trails (Jacobs and Bartgis 1987; Campbell et al. 1988, Cusick 1989; Homoya et al. 1989). Campbell (1985) also found a strong correlation between the appearance of cane with the

appearance of clover in early pioneer writings, with clover occupying disturbed areas in and around the cane fields.

In Kentucky, RBC is broadly associated with the Inner and Outer Bluegrass physiographic regions. It is most often found in regions underlain with limestone or other calcareous bedrock, but not exclusively, with many occurrences in alluvial soils from calcareous parent material (Hattenhach 1996, USFWS 2007). RBC occurs in mesic habitats with partial to filtered sunlight, where there is a prolonged pattern of moderate, periodic disturbance, such as mowing, trampling, or grazing. Characteristic habitat for RBC in Kentucky is occasionally flooded terraces of small to mid-sized tributaries, but it has been reported from a variety of habitats, including historic properties, mesic woodlands, savannahs, floodplains, stream banks, sandbars (especially where old trails cross or parallel intermittent streams), grazed woodlots, mowed paths (cemeteries, lawns, and parks), old logging roads, jeep trails, skidder trails, mowed wildlife openings within mature forests, and steep ravines (KSNPC 2001, USFWS 2007). Over three-quarters of the present populations in the state are associated with mixed mesophytic riparian corridors, of which a majority are open forests with filtered light and alluvial soils (Campbell et al. 1988, Cusick 1989, Homoya et al.1989, KSNPC 1996; Madarish and Schuler 2002; USFWS 2007). Critical habitat is not currently designated for RBC (USFWS 2007).

KSNPC (1996) states that changes in agricultural practices during the twentieth century in central Kentucky may have been detrimental to RBC, a finding supported by USFWS (2007) which has preliminary evidence suggesting that continual cattle grazing appears to limit RBC growth and development. In addition, Ford et al. (2003) found that white-tailed deer may not significantly contribute to RBC recovery because of their limited ability to create disturbance and distribute seeds, somewhat contradictory to RBC recovery in early successional forests at Blue Grass Army Depot that have recently had cattle excluded (USFWS 2007).

Pavlovich (1994) proposed that novel disturbances which mimic natural disturbance regimes may expand or replace realized niche spaces for disturbance dependent plant species, a practice that shows promise for the future. In Ohio, semi-regular mowing regimes have maintained clover populations in lawn-type habitats, such as parks and cemeteries (Becus and Klein 2003, USFWS 2004). Madarish and Schuler (2002) discovered that controlling the intensity of surface disturbance will help sustain populations of RBC in silviculturally managed forests, with moderate disturbances from logging machinery being most beneficial, although results may be delayed.
RBC displays a cyclic nature of appearance and disappearance, with a high probability of small populations blinking in and out making detection of small populations difficult. Due to the clonal nature of RBC, genetic variation within populations is low, however genetic variation between populations is higher (USFWS 1995, Vincent and Hickey 1996, Hickey et al. 2001). Protection of several small populations across the landscape will help ensure viability of the species range-wide.

Survey Methods:

Prior to an on-site visit, aerial photographs, topographic maps (Covington quadrangle), geologic maps, and soil survey maps were examined using ARCGIS 9.2. Aerial photography (digital ortho-images) was examined for the presence of forest-edge, streambanks, and historic areas. Geologic maps were examined for the occurrence of limestone or alluvium which may contain calcareous parent material. Soil survey maps were examined for soil type, properties, uses, and slope. Areas that exhibited limestone-based parent material and forested cover were marked on a map for further field investigation. Proper shade and disturbance regime were evaluated during field investigation.

The existing roadway and proposed project corridor were walked by Division of Environmental Analysis biologists on 4 June 2009 and 9 June 2009. The corridor was examined for possible habitat for *T. stoloniferum*, with special consideration given to areas with moderate disturbance (including deer trails and scoured areas) and dappled shade. When proper habitat was identified, a survey for individuals of *T. stoloniferum* was conducted. Approximately 12 man hours were spent conducting the field portion of the biological assessment.

Survey Results:

Roads and commercial areas were not considered habitat due to the fact that these structures are largely paved and have impermeable surfaces. Residential properties and the golf course had manicured lawns that appeared regularly mowed, and were not considered habitat. This frequent level of disturbance (mowing) would be detrimental to running buffalo clover.

Upon conducting a field survey, limited habitat existed for running buffalo clover along the project footprint. None of the properties encountered were historic in nature, nor any of the trees large enough to be considered pre-settlement. Scouring on the banks and floodplain of Pleasant Run Creek, as well as game trails, provide the needed disturbance for running buffalo clover. Scattered 25-50 year old box elder, hackberry, green ash, and sugar maple trees were the dominant canopy species. The understory was largely overgrown with Amur honeysuckle, winter creeper, Virginia creeper, and saplings, creating a dense shade. Dappled shade was present, see attached pictures, which is required for the species along Pleasant Run Creek as well as the unnamed streams. The underlying geology could provide suitable edaphic conditions for running buffalo clover.

Effects Determination:

The landscape surrounding the project area is largely urban and suburban, with many residential, commercial, institutional, and right of way properties that were not considered suitable habitat for running buffalo clover. The forested areas that occur are not old growth, nor are any old growth or state champion trees known for the project corridor. Marginal habitat exists along partially shaded perennial, ephemeral and intermittent stream drainages which exhibited evidence of scouring for disturbance. Game trails were also present along streams and through forested tracts as a source of disturbance. Upon surveying these potentially suitable areas, zero individuals of running buffalo clover were discovered by KYTC biologists. Due to a lack of finding any individuals of *T. stoloniferum* during field surveys, marginal habitat present, and the limited amount of running buffalo clover habitat affected by the project, KYTC feels that this project is "**Not Likely To Adversely Affect**" running buffalo clover (*T. stoloniferum*).

Indirect effects to running buffalo clover are not anticipated by constructing this project. Running buffalo clover is largely a static species, however scouring events from flooding and deer/game can help the species move large distances in a short amount of time. The potential habitat that is present for running buffalo clover is considered marginal. Currently, the whole of Pleasant Run Creek and the ephemeral drain are contained in culverts underneath the existing interstate. Construction of this project will not appreciably change the disturbance regimes or shade regimes present in this urban/suburban area. As such, KYTC believes any indirect effects created by this project are discountable.

Cumulative effects are not expected to cause detrimental damage to running buffalo clover. The project proposes to expand an existing interstate, most likely within the existing right of way. Existing land that can be built upon, largely already has construction. Those lands that remain are either too steep or have highly erodable soils. As such, they are the remaining forested tracts in an urban environment. There is no reason to suspect that additional development or clearing of trees would occur within the project corridor, thus maintaining a partially shaded, disturbed habitat for running buffalo clover.

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Project photographs

Deer trail through forested lot.

Disturbed mudflat near intermittent creek.

Power line cut through overgrown forest.

Disturbed forested riparian strip.

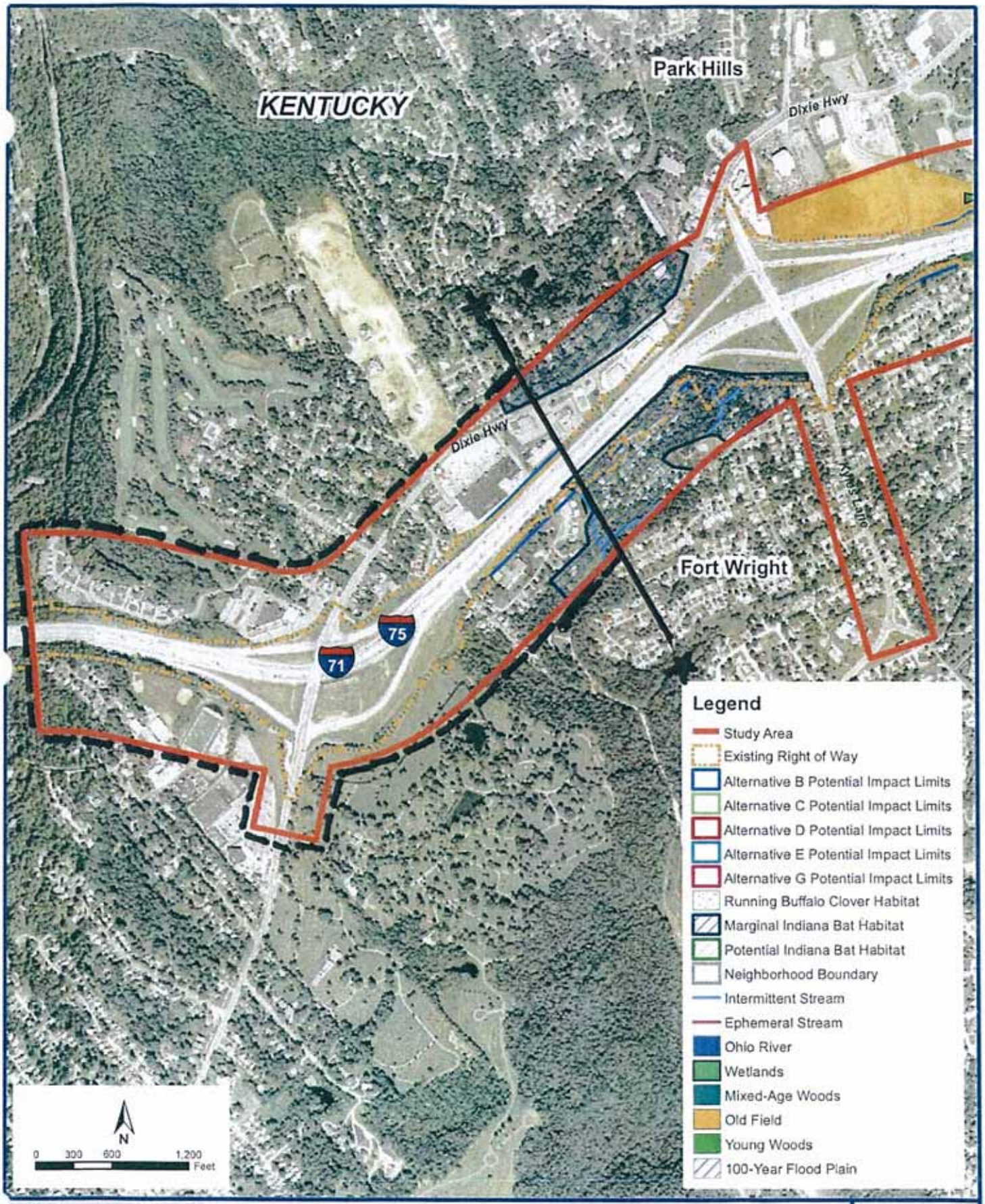
Open riparian forest with deer trail.

Unnamed intermittent drainage.

Typical neighborhood within study area.

Rivard Drive at Dixie Highway (US-25).

Exhibits: Project maps

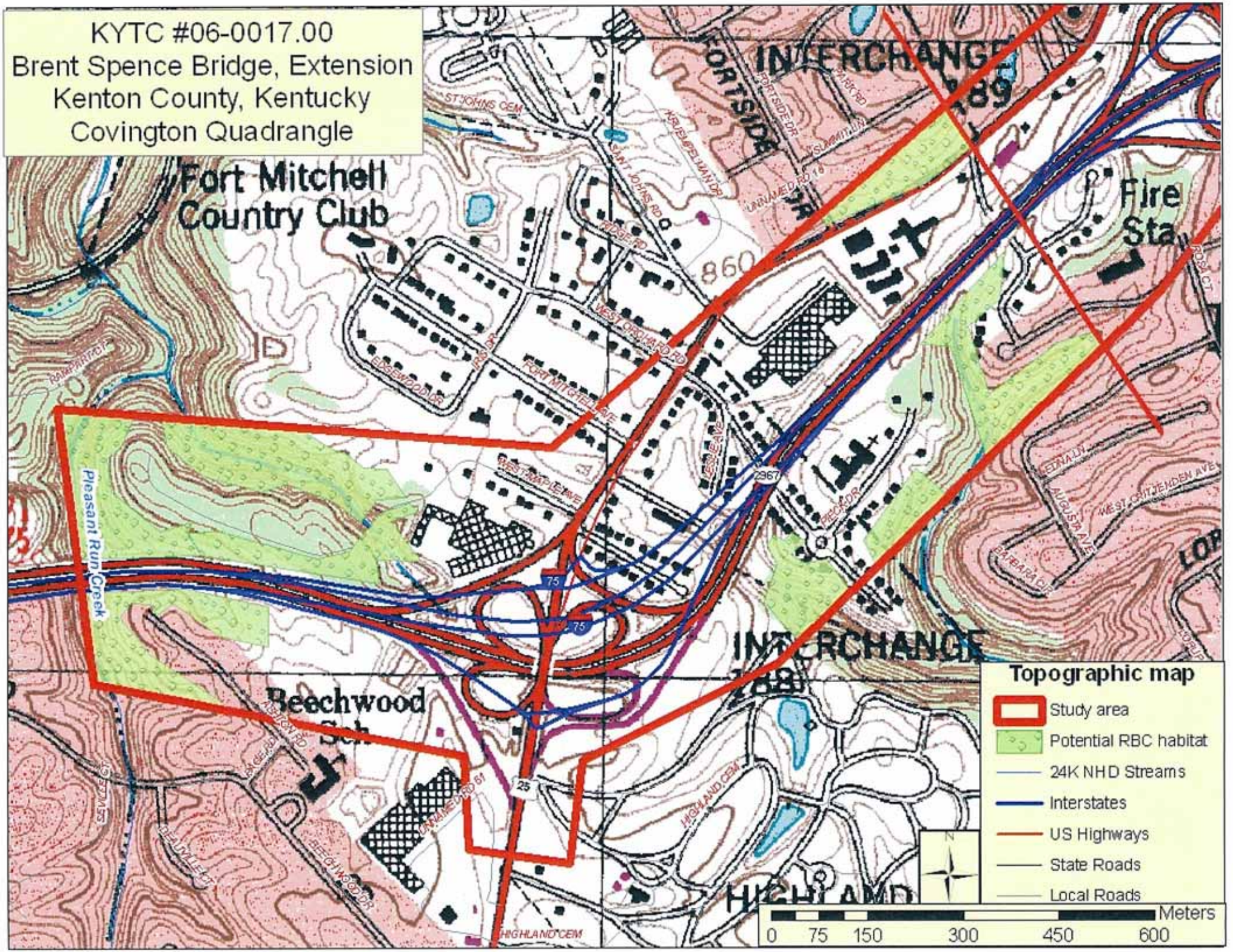


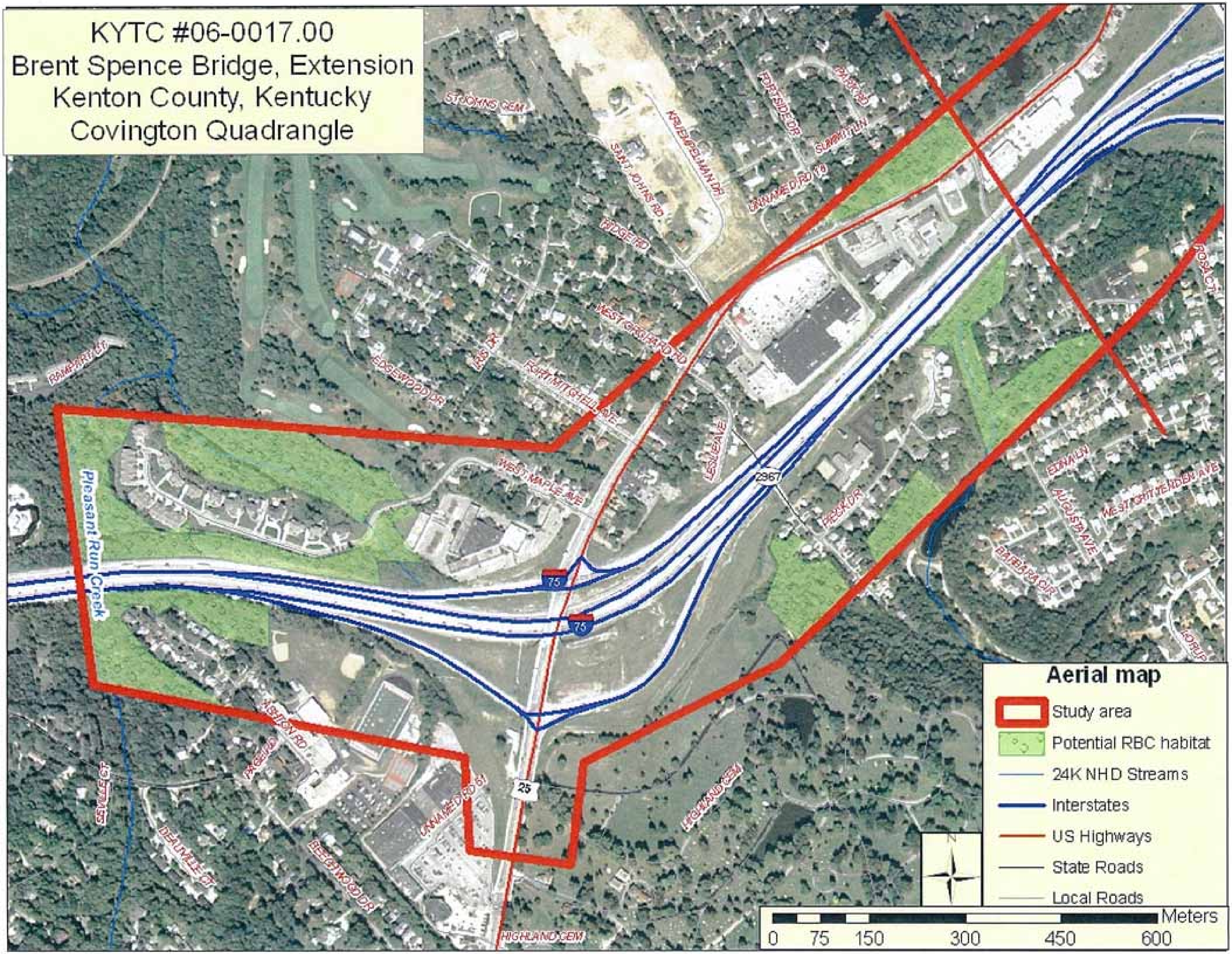
U.S. Department of Transportation
Federal Highway Administration

ECOLOGICAL RESOURCES (KENTUCKY)

EXHIBIT 15A

Prepared by:
PARSONS BRINCKERHOFF


KYTC #06-0017.00
Brent Spence Bridge, Extension
Kenton County, Kentucky
Covington Quadrangle
Fort Mitchell Country Club
Pleasant Run Creek
Beechwood
INTERCHANGE
INTERCHANGE
Topographic map
Study area
Potential RBC habitat
24K NHD Streams
Interstates
US Highways
State Roads
Local Roads
N
Meters
0 75 150 300 450 600


KYTC #06-0017.00
Brent Spence Bridge, Extension
Kenton County, Kentucky
Covington Quadrangle
Pleasant Run Creek
75
75
25
2967
Aerial map
Study area
Potential RBC habitat
24K NHD Streams
Interstates
US Highways
State Roads
Local Roads
Meters
0 75 150 300 450 600
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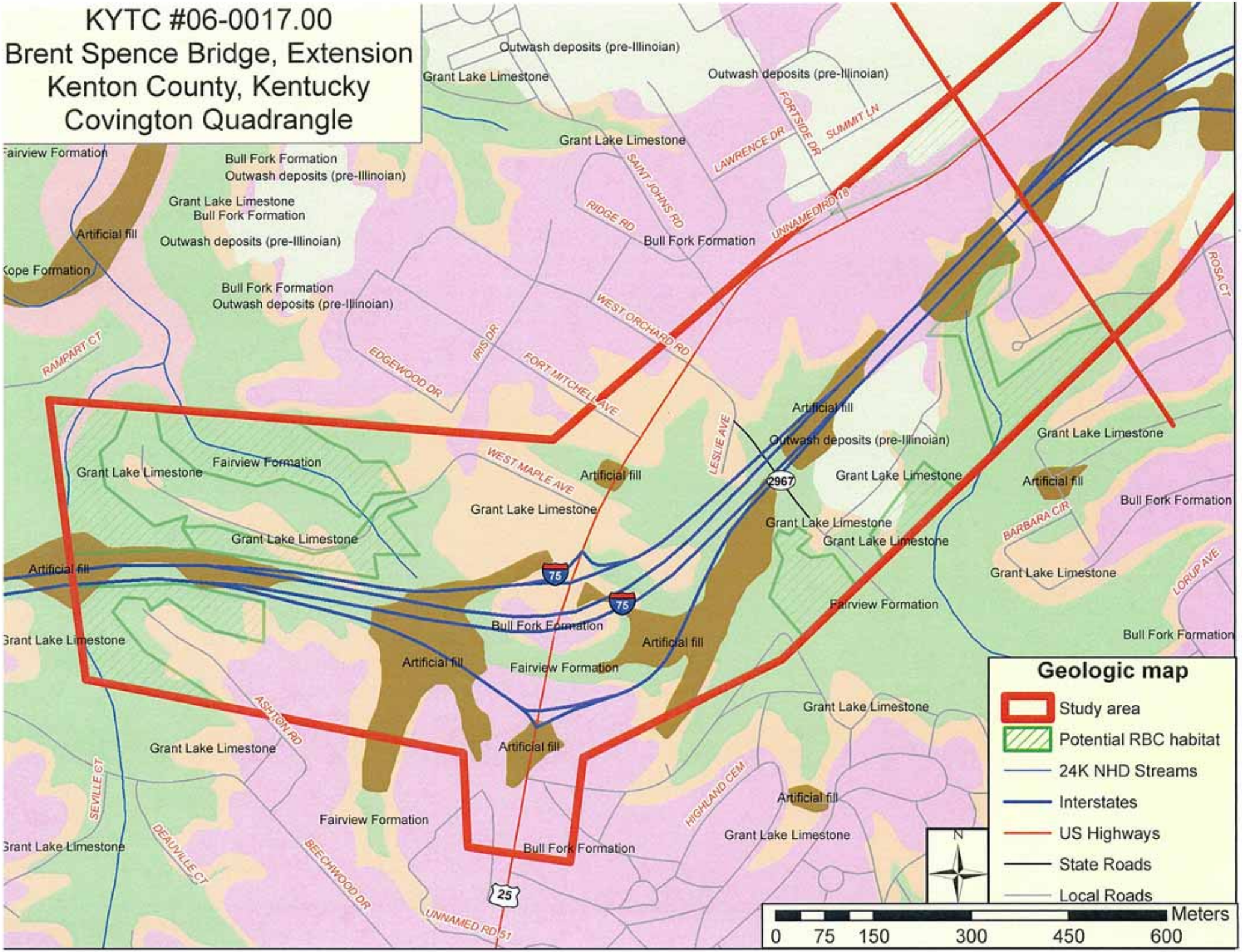
KYTC #06-0017.00
Brent Spence Bridge, Extension
Kenton County, Kentucky
Covington Quadrangle
Outwash deposits (pre-Illinoian)
Grant Lake Limestone
Fairview Formation
Bull Fork Formation
Artificial fill
Kope Formation
FORTSIDE DR
SUMMIT LN
LAWRENCE DR
SAINT JOHNS RD
RIDGE RD
UNNAMED RD 18
WEST ORCHARD RD
IRIS DR
EDGEWOOD DR
FORT MITCHELL AVE
RAMPART CT
ROSA CT
LESLIE AVE
WEST MAPLE AVE
2967
BARBARA CIR
LORUP AVE
75
ASHTON RD
SEVILLE CT
DEAUVILLE CT
BEECHWOOD DR
UNNAMED RD 51
HIGHLAND CEM
25
Geologic map
Study area
Potential RBC habitat
24K NHD Streams
Interstates
US Highways
State Roads
Local Roads
N
Meters
0 75 150 300 450 600

Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

June 19, 2009

TAILS: 31420-2009-TA-0605 (PID 75119)

Timothy M. Hill
Office of Environmental Services
Ohio Department of Transportation
P.O. Box 899
Columbus, OH 43216-0899

Attn: Keith Smith (District 8)
Donald Rostofer

RE: **HAM-71/75-0.00/0.22 (PID 75119)**
Conceptual Alternatives Study

Dear Mr. Hill,

This is in response to your May 1, 2009 letter received in our office on May 5, 2009, requesting our review and comments on the Conceptual Alternatives Analysis for the Brent Spence Bridge Replacement/Rehabilitation Project (HAM-71/75-0.00/0.22, PID 75119) in Hamilton County, Ohio and Kenton County, Kentucky. We appreciate the opportunity to provide comments throughout the project development process. This project proposes to improve capacity and safety and correct design deficiencies along I-71, I-75, and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky region. In a letter from our office to Dennis Decker at the Federal Highway Administration (FHWA) dated August 16, 2006, the U.S. Fish & Wildlife Service (Service) Ohio Field Office (formerly the Reynoldsburg Ohio Field Office) agreed to participate in the environmental review process and to serve as the lead Service Field Office for this project. In that same letter, we provided general species and habitat surveying information and recommendations for federally listed Threatened (T), Endangered (E), and Candidate (C) Species in Ohio: Indiana bat (*Myotis sodalis*) (E); running buffalo clover (*Trifolium stoloniferum*) (E); and sheepnose mussel (*Plethobasus cyphyus*) (C).

As the lead office for the Service on this project review, we have coordinated with the Frankfort Kentucky Field Office (FKFO) and incorporate their comments below. Please note that, due to an oversight, the FKFO had not received a copy of this Conceptual Alternatives Study from the Ohio Department of Transportation (ODOT) or the Kentucky Transportation Cabinet (KYTC). Please ensure that the Kentucky Field Office is provided with all relevant environmental review documents in the future so that we can more efficiently coordinate our comments. These documents should be sent to:

J. C. Watts Federal Building
330 West Broadway, Suite 265
Frankfort, KY 40601
Attn: Phil DeGarmo, Wildlife Biologist/Transportation Liaison

It is our understanding that the Conceptual Alternatives Study (CAS) has resulted in the recommended elimination of all previous alternatives, except Alternatives C, D, and E. ODOT and KYTC, working as partners on this project, are recommending that some hybrid form of Alternatives C and D, as well as a revised Alternative E be carried forward for consideration in a study of feasible alternatives. It was also recommended in the CAS that some design elements of Alternative G be incorporated into both of these re-worked alternatives (the C/D hybrid alternative and Alternative E). Both of these alternatives will involve the construction of a new bridge approximately 120 feet west of the existing Brent Spence Bridge and rehabilitation of the existing bridge to carry 4 to 5 lanes of traffic.

WATER RESOURCES COMMENTS: Several aquatic resources will be impacted by this project, including the Ohio River, three streams (two intermittent and one ephemeral), and three wetlands (2 jurisdictional and one isolated, totaling 0.59 acres). All the streams and wetlands are located in Kenton County, Kentucky. The Service recommends that culverts placed in streams and wetlands be placed to allow free movement of aquatic fauna. Also, on projects that include plans to use riprap for channel protection, we recommend using native vegetation to control erosion, or, at a minimum, using native vegetation in combination with rock. To summarize, we recommend the use of natural channel design techniques where applicable.

The greatest impacts to aquatic resources will affect the Ohio River. The new bridge structure will require the placement of two piers in the river, approximately 35 feet closer to the river banks than the piers of the existing bridge. We understand that ODOT and KYTC are coordinating with the U.S. Coast Guard to determine placement of these piers.

For all aquatic resources, we recommend that existing riparian habitat zones be maintained to the maximum extent possible and that in-water work be avoided from April 15 to June 15 to reduce impacts to spawning fish. In addition, all temporary and permanent impacts to the Ohio River should be appropriately mitigated.

ENDANGERED SPECIES COMMENTS: Land use in the project area is primarily urban and suburban, composed of mainly commercial, industrial, residential, institutional, and right-of-way properties. There is no farmland in the Ohio project area. The wooded areas in Ohio include shrub/scrub growth along the interstate and narrow stands of young trees and shrubs along the Ohio River. The Kentucky project area is also primarily urban and suburban but does contain some farmland, parks, and golf courses, including some mixed-age wooded areas that appear to have not been cleared for 30-40 years. The CAS states that potential habitat areas for the Indiana bat and running buffalo clover were not identified in Ohio during a 2006 survey. However, the Kentucky project area contains one area with potential habitat for running buffalo clover and 10 woodlots that include potential habitat for the Indiana bat. The running buffalo clover habitat was surveyed in 2006, and no individuals of the species were found. Therefore, no further surveys should be required for running buffalo clover within the overall project area described in the CAS. If trees will be cleared within the potential Indiana bat habitat areas in Kentucky, further coordination with the Frankfort Kentucky Field Office will be required to determine whether cutting date restrictions, emergence counts, or mist-net surveys will be needed.

Several federally listed mussel species could potentially occur within the project area. Eight Federally Endangered Species are listed for Kenton County in Kentucky: purple catspaw pearly mussel (*Epioblasma o. obliquata*); clubshell (*Pleurobema clava*); fanshell (*Cyprogenia stegaria*); northern riffleshell (*Epioblasma torulosa rangiana*); orangefoot pimpleback (*Plethobasus cooperianus*); pink mucket (*Lampsilis abrupta*); ring pink (*Obovaria retusa*); and rough pigtoe (*Pleurobema plenum*). In addition, two mussel species, Federal Candidate sheepnose (*Plethobasus cyphyus*) and Federal Species of Concern snuffbox (*Epioblasma triquetra*), are also listed for both Kenton County, Kentucky and Hamilton County, Ohio. Please note that although consultation with the Service on Candidate Species

and Species of Concern is not required, the sheepnose and snuffbox mussels may become officially proposed as Federally Endangered Species under the ESA during this project's development process. Once such a proposal has been published in the Federal Register, conferencing with the Service may be required under section 7 of the ESA.

Several of the mussel species documented in the above paragraph could occur in the Ohio River at the project site. Therefore, surveys would be needed to determine whether one or more of these species is present. The Service recommends that one transect survey be conducted under the proposed alternative sites and under the existing bridge, if any in-water work will be required for the rehabilitation of that structure. With the results of such surveys, the Service will be able to provide direction as to whether a) additional surveys will be needed for the preferred alternative, b) formal consultation will be necessary, or c) concurrence can be provided for a *may affect not likely to adversely affect* determination without additional survey work.

The CAS indicates that ODOT and KYTC have coordinated with both the Ohio and Kentucky Departments of Natural Resources and the Kentucky Department of Fish & Wildlife Resources. We encourage and support continued coordination with those agencies regarding impacts to state listed species.

GENERAL COMMENTS AND CONCLUSION: In addition to the proposed work discussed above, we understand that 52 individual utilities will be impacted by this project, 45 below ground and 7 above ground. If the relocation of these utilities will require additional clearing or will impact other resources, further coordination with the Service should occur. Also, please coordinate with our office if additional impacts within or outside the project area will occur in association with staging and/or borrow and waste activities not discussed in this study.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act, of 1973, as amended, and are consistent with the intent of the National Environmental Policy Act of 1969, and the U.S. Fish and Wildlife Service's Mitigation Policy. At this time, the FHWA has not provided effects determinations for federally listed mussel species and the Indiana bat. The Service would like to clarify that, once a preferred alternative is approved, additional informal consultation will be necessary and formal consultation may be necessary if adverse effects to the aforementioned listed species will occur. Specific measures to avoid and minimize impacts to listed species may also be necessary pending our review of the specific level and type of impacts associated with the preferred alternative.

If you have questions, or if we may be of further assistance in this matter, please contact Karen Hallberg at extension 23 in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: USFWS, Frankfort Kentucky Field Office
ODNR, DOW, SCEA Unit, Columbus, OH
Ohio Regulatory Transportation Office, Columbus, OH (with all attachments)

Kentucky State Agency Species Lists

search kentucky.gov

Species Information

Federal Threatened, Endangered, and Candidate Species observations for selected counties

Linked life history provided courtesy of NatureServe Explorer.
Records may include both recent and historical observations.
US Status Definitions Kentucky Status Definitions

List Federal Threatened, Endangered, and Candidate Species observations in 1 selected county.
Selected county is: Kenton.

Scientific Name and Life History	Common Name and Pictures	Class	County	US Status	KY Status	WAP	Reference
Cyprogenia stegaria	Fanshell	Bivalvia	Kenton	LE	E	Yes	Reference
Epioblasma obliquata obliquata	Catspaw	Bivalvia	Kenton	LE	E	Yes	Reference
Epioblasma torulosa rangiana	Northern Riffleshell	Bivalvia	Kenton	LE	E	Yes	Reference
Falco peregrinus	Peregrine Falcon	Aves	Kenton	PS:LE	E	Yes	Reference
Lampsilis abrupta	Pink Mucket	Bivalvia	Kenton	LE	E	Yes	Reference
Obovaria retusa	Ring Pink	Bivalvia	Kenton	LE	E	Yes	Reference
Plethobasus cooperianus	Orangefoot Pimpleback	Bivalvia	Kenton	LE	E	Yes	Reference
Pleurobema clava	Clubshell	Bivalvia	Kenton	LE, XN	E	Yes	Reference
Pleurobema plenum	Rough Pigtoe	Bivalvia	Kenton	LE	E	Yes	Reference

Report of
Endangered, Threatened, and Special Concern Plants, Animals, and Natural Communities for Kenton County, Kentucky

Kentucky State Nature Preserves Commission
801 Schenkel Lane
Frankfort, KY 40601
(502) 573-2886 (phone)
(502) 573-2355 (fax)

www.naturepreserves.ky.gov

Kentucky State Nature Preserves Commission
Key for County List Report

Within a county, elements are arranged first by taxonomic complexity (plants first, natural communities last), and second by scientific name. A key to status, ranks, and count data fields follows.

STATUS

KSNPC: Kentucky State Nature Preserves Commission status:

N or blank = none E = endangered T = threatened S = special concern H = historic X = extirpated

USFSA: U.S. Fish and Wildlife Service status:

blank = none C = candidate LT = listed as threatened LE = listed as endangered

SOMC = Species of Management Concern

RANKS

GRANK: Estimate of element abundance on a global scale:

G1 = Critically imperiled
G2 = Imperiled
G3 = Vulnerable
G4 = Apparently secure
G5 = Secure
GH = Historic, possibly extinct
GX = Presumed extinct

GU = Unrankable
G#? = Inexact rank (e.g. G2?)
G#Q = Questionable taxonomy
G#T# = Infraspecific taxa (Subspecies and variety abundances are coded with a 'T' suffix; the 'G' portion of the rank then refers to the entire species)
GNR = Unranked
GNA = Not applicable

SRANK: Estimate of element abundance in Kentucky:

S1 = Critically imperiled
S2 = Imperiled
S3 = Vulnerable
S4 = Apparently secure
S5 = Secure
SH = Historic, possibly extirpated
SX = Presumed extirpated

SU = Unrankable
S#? = Inexact rank (e.g. G2?)
S#Q = Questionable taxonomy
S#T# = Infraspecific taxa
SNR = Unranked
SNA = Not applicable

Migratory species may have separate ranks for different population segments (e.g. S1B, S2N, S4M):
S#B = Rank of breeding population
S#N = Rank of non-breeding population
S#M = Rank of transient population

COUNT DATA FIELDS

OF OCCURRENCES: Number of occurrences of a particular element from a county. Column headings are as follows:

E - currently reported from the county
H - reported from the county but not seen for at least 20 years
F - reported from county & cannot be relocated but for which further inventory is needed
X - known to have extirpated from the county
U - reported from a county but cannot be mapped to a quadrangle or exact location.

The data from which the county report is generated is continually updated. The date on which the report was created is in the report footer. Contact KSNPC for a current copy of the report.

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed, and new species of plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments.

KSNPC appreciates the submission of any endangered species data for Kentucky from field observations. For information on data reporting or other data services provided by KSNPC, please contact the Data Manager at:

Kentucky State Nature Preserves Commission
801 Schenkel Lane
Frankfort, KY 40601
(502) 573-2886 (phone)
(502) 573-2355 (fax)
email: naturepreserves@ky.gov
internet: www.naturepreserves.ky.gov

County	Taxonomic Group	Scientific name	Common name	Statuses	Ranks	# of Occurrences E	H	F	X	U
Kenton	Vascular Plants	*Oenothera triloba*	Stemless Evening-primrose	T /	G4 / S1S2	0	1	0	0	0
Kenton	Vascular Plants	*Philadelphus inodorus*	Mock Orange	T /	G4G5 / S1S2	1	0	0	0	0
Kenton	Vascular Plants	*Trifolium stoloniferum*	Running Buffalo Clover	T / LE	G3 / S2S3	1	0	1	2	0
Kenton	Aquatic Snails	*Leptoxis praerosa*	Onyx Rocksnail	S / SOMC	G5 / S3S4	1	0	0	1	0
Kenton	Aquatic Snails	*Lioplax sulculosa*	Furrowed Lioplax	S /	G5 / S3S4	0	1	0	0	0
Kenton	Freshwater Mussels	*Alasmidonta marginata*	Elktoe	T / SOMC	G4 / S2	2	0	0	0	0
Kenton	Freshwater Mussels	*Cumberlandia monodonta*	Spectaclecase	E / C	G3 / S1	0	0	0	2	0
Kenton	Freshwater Mussels	*Cyprogenia stegaria*	Fanshell	E / LE	G1Q / S1	4	1	0	1	0
Kenton	Freshwater Mussels	*Epioblasma obliquata obliquata*	Catspaw	E / LE	G1T1 / S1	0	0	0	1	0
Kenton	Freshwater Mussels	*Epioblasma torulosa rangiana*	Northern Riffleshell	E / LE	G2T2 / S1	0	0	0	1	0
Kenton	Freshwater Mussels	*Epioblasma triquetra*	Snuffbox	E / SOMC	G3 / S1	0	0	0	1	0
Kenton	Freshwater Mussels	*Fusconaia subrotunda*	Longsolid	S /	G3 / S3	1	0	0	2	0
Kenton	Freshwater Mussels	*Hemistena lata*	Cracking Pearlymussel	X / LE	G1 / SX	0	0	0	1	0
Kenton	Freshwater Mussels	*Lampsilis abrupta*	Pink Mucket	E / LE	G2 / S1	0	1	0	1	0
Kenton	Freshwater Mussels	*Lampsilis ovata*	Pocketbook	E /	G5 / S1	0	0	0	2	0
Kenton	Freshwater Mussels	*Lasmigona compressa*	Creek Heelsplitter	E /	G5 / S1	0	0	0	1	0
Kenton	Freshwater Mussels	*Leptodea leptodon*	Scaleshell	X / LE	G1G2 / SX	0	0	0	1	0
Kenton	Freshwater Mussels	*Obovaria retusa*	Ring Pink	E / LE	G1 / S1	0	0	0	1	0
Kenton	Freshwater Mussels	*Plethobasus cooperianus*	Orangefoot Pimpleback	E / LE	G1 / S1	0	0	0	1	0
Kenton	Freshwater Mussels	*Plethobasus cyphyus*	Sheepnose	E / C	G3 / S1	0	0	0	2	0
Kenton	Freshwater Mussels	*Pleurobema clava*	Clubshell	E / LE	G2 / S1	0	1	0	2	0
Kenton	Freshwater Mussels	*Pleurobema plenum*	Rough Pigtoe	E / LE	G1 / S1	0	0	0	1	0
Kenton	Freshwater Mussels	*Pleurobema rubrum*	Pyramid Pigtoe	E / SOMC	G2G3 / S1	0	0	0	1	0
Kenton	Freshwater Mussels	*Quadrula cylindrica cylindrica*	Rabbitsfoot	T / SOMC	G3G4T3 / S2	0	0	0	1	0
Kenton	Freshwater Mussels	*Quadrula fragosa*	Winged Mapleleaf	X / LE	G1 / SX	0	0	0	1	0
Kenton	Freshwater Mussels	*Simpsonaias ambigua*	Salamander Mussel	T / SOMC	G3 / S2S3	2	0	0	1	0
Kenton	Freshwater Mussels	*Villosa fabalis*	Rayed Bean	X / C	G2 / SX	0	0	0	1	0
Kenton	Insects	*Dryobius sexnotatus*	Sixbanded Longhorn Beetle	T / SOMC	GNR / S1	0	0	1	0	0
Kenton	Fishes	*Acipenser fulvescens*	Lake Sturgeon	E / SOMC	G3G4 / S1	0	1	0	0	0

County	Taxonomic Group	Scientific name	Common name	Statuses	Ranks	# of Occurrences E	H	F	X	U
Kenton	Fishes	*Atractosteus spatula*	Alligator Gar	E / SOMC	G3G4 / S1	0	1	0	0	0
Kenton	Amphibians	*Cryptobranchus alleganiensis alleganiensis*	Eastern Hellbender	S / SOMC	G3G4T3T4 / S3	2	0	0	1	0
Kenton	Amphibians	*Plethodon cinereus*	Redback Salamander	S /	G5 / S3	9	4	0	0	0
Kenton	Amphibians	*Rana pipiens*	Northern Leopard Frog	S /	G5 / S3	0	3	0	0	0
Kenton	Reptiles	*Clonophis kirtlandii*	Kirtland's Snake	T / SOMC	G2 / S2	0	1	0	0	0
Kenton	Breeding Birds	*Aimophila aestivalis*	Bachman's Sparrow	E / SOMC	G3 / S1B	0	0	0	1	0
Kenton	Breeding Birds	*Pooecetes gramineus*	Vesper Sparrow	E /	G5 / S1B	0	0	0	0	1
Kenton	Breeding Birds	*Thryomanes bewickii*	Bewick's Wren	S / SOMC	G5 / S3B	1	0	0	0	0
Kenton	Breeding Birds	*Tyto alba*	Barn Owl	S /	G5 / S3	1	0	0	0	0
Kenton County Total:						**25**	**15**	**2**	**31**	**1**