APPENDIX F

ECOLOGICAL OVERVIEW AND USFWS 2008 ETC SPECIES LIST

- *Ecological Overview* Report
- U.S. Fish and Wildlife Service's 2008 Endangered, Threatened, and Candidate Species List

PRELIMINARY RESEARCH AND FIELD INVESTIGATIONS FOR POTENTIAL IMPACTS TO ECOLOGICAL ELEMENTS BY THE PROPOSED HARRODSBURG BYPASS MERCER COUNTY, KENTUCKY (KYTC PROJECT ITEM NUMBER 7-8344.00)

Prepared for:
QK4 Engineers
And
Kentucky Transportation Cabinet

Prepared by:
Eco-Tech Consultants, Inc.
Frankfort, Kentucky

September 2007

ETC ECOLOGICAL
Eco-Tech Consultants, Inc.

PRELIMINARY RESEARCH AND FIELD INVESTIGATIONS FOR POTENTIAL IMPACTS TO ECOLOGICAL ELEMENTS BY THE PROPOSED HARRODSBURG BYPASS MERCER COUNTY, KENTUCKY

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1.0 INTRODUCTION

1.1 Project Description

The Kentucky Transportation Cabinet (KYTC) proposes to construct the Harrodsburg Bypass in Mercer County, Kentucky (KYTC Project Item Number 7-8344.00). The proposed Harrodsburg Bypass is a new construction road just west of the Town of Harrodsburg on the Harrodsburg and Cornishville, United States Geographic Survey (USGS) Topographic Quadrangles (Appendix A, Figure 1). Eco-Tech Consultants, Incorporated (Eco-Tech) was retained by QK4 Engineers to conduct an environmental overview within the project study area.

The project study area is 2,342.5 acres (948 ha) extending south from KY 390 to just south of KY 152 and west of Moberly Road to east of Mount Pleasant Road and Carl Lay Lane, Mercer County, Kentucky. The proposed project encompasses the Salt River for approximately 4.2 river miles (6.8 km) (Appendix A, Figure 1).

The proposed Harrodsburg Bypass project is to extend and upgrade the existing highway by widening and reconstruction, constructing new roadway bed, access control of existing routes, and ultimately bypassing the town of Harrodsburg. Currently, this project is a Pre-Design Corridor Planning Study to determine and evaluate potential highway improvements and no specific alternatives are being considered at this time.

1.2 Purpose

The purpose of this study is to provide an overview evaluation of the biological resources in the immediate area of potential project impact (project study area). This overview evaluation is to assist KYTC and QK4 Engineers in the design of alternatives to minimize those impacts.

2.0 METHODS

Field investigations were conducted by biologists from Eco-Tech on July 12, 2007. Materials and literature supporting this investigation have been derived from a number of sources including USGS topographic maps, soil maps, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, USGS National Hydrography Dataset (NHD), and aerial photographs. Database records of rare plants, animals, and ecological communities were obtained from the Kentucky State Nature Preserves Commission (KSNPC). The USFWS Kentucky Field Office (KFO) was contacted for a list of federally protected species that could potentially be affected by the project. The Kentucky Department of Fish and Wildlife Resources (KDFWR) was contacted for information regarding federally or state listed species, managed natural areas, and unique, sensitive or critical wildlife habitat that could be affected by this project. Information concerning

significant aquatic resources (wild and scenic rivers, outstanding water resources, municipal water intakes, groundwater recharge areas, toxic pollutants, and water quality) was requested from the Kentucky Division of Water (KDOW). Kentucky Division of Forestry (KDOF) coordination was requested for identification of state and national champion trees, and/or state forests that may be impacted by the proposed project. Responses from these resource agencies are included in Appendix B.

Wetlands identified by secondary sources within the study area were field verified but not delineated. Delineations are conducted using the 1987 United States Army Corps of Engineers (USACE) Delineation Manual (Environmental Laboratory), which is the legally accepted system for identifying a wetland. This method requires positive evidence of three criteria: hydrophytic vegetation, hydric soils, and wetland hydrology, before an area can be termed a wetland. Areas must have all three criteria (in most cases) to be designated wetlands. The Soil Survey of Mercer County, Kentucky (Craddock 1979) was consulted for the mapped locations of listed hydric and potentially hydric soils.

All streams encompassed by the study area that are shown as permanent (blue line) or intermittent (dashed blue line) on the topographic maps and NHD maps were field evaluated. Deep-water aquatic habitats (rivers, ponds and lakes) were identified using the topographic maps, NWI maps, NHD maps, and aerial photographs and then field verified.

3.0 PHYSICAL CHARACTERISTICS

3.1 Climate

Mercer County, Kentucky has “hot summers” and “moderately cold winters” (Craddock 1979). Yearly precipitation averages 45.9 inches with 15.7 inches of the total average precipitation being snowfall. The average yearly temperature of Mercer County is approximately 55°F (U.S. Department of Commerce 2006). The growing season, defined as the number of days between the last temperature of 32° F in spring and the first in fall, of Mercer County averages 175 days (Craddock 1979).

3.2 Physiography, Topography and Geology

Physiographically, the proposed study area is located in the Inner Bluegrass and Hills of the Bluegrass subsections of the Bluegrass section of the Interior Low Plateau physiographic province (Jones 2005). Woods et al. 2002 described the Inner Bluegrass and Hills of the Bluegrass subsections using a numerical system based on the U. S. EPA 2002 Level IV Ecoregions of the Continental United States (USEPA 2002). The Inner Bluegrass Ecoregion (71l) is a region that is nearly level to rolling and contains extensive karst and intermittent streams. Ecoregion 71l is primarily underlain by Middle Ordovician Lexington Limestone (Woods et al. 2002). The southwest corner of the project area is located in the Hills of the Bluegrass Ecoregion (71k). The mostly forested Hills of the

Bluegrass is underlain by Upper Ordovician calcareous shale, siltstone, and limestone (Woods et al. 2002). Streams in these Ecoregions have moderate to low gradients, cobble or bedrock substrates, and low water quality due to agricultural and wastewater discharges, and residential runoff (Woods et al. 2002).

Reviews of topographic quadrangles of the area indicate elevations within the proposed study area range from 800 feet (244 meters) to 910 feet (277 meters).

3.3 Floral Community

Level IV Ecoregions 71l and 71k fall within the Western Mesophytic Forest/Oak-Hickory Forest region (Jones 2005). Increasing urban-suburban-industrial areas and agriculture have significantly decreased the acreage of forestland throughout the ecoregion. However, on drier sites forests are dominated by blue ash (*Fraxinus quadrangulata*) and oaks (*Quercus* spp.). In river drainages and gorges, the forests are dominated by oak-maple complexes and floodplain areas are dominated by sweetgum (*Liquidambar styraciflua*), pin oak (*Quercus palustris*), yellow poplar (*Liriodendron tulipifera*), box elder (*Acer negundo*), and hackberry (*Celtis laevigata*) (Woods et al. 2002).

3.4 Soils

Soils within Level IV Ecoregions 71l and 71k are deep, well-drained silt loams with high concentrations of calcium and phospate. Soils that dominate the Inner Bluegrass subsection include Maury, Hampshire, and Loradale, and the soils that dominate the Hills of the Bluegrass subsection include Eden, Nicholson, and Lowell (Jones 2005).

Based on soil mapping for Mercer County, the majority of the project study area is underlain with well drained soils occurring in the Faywood, Maury, and McAfee soil series (Craddock, 1979). The McAfee soil series is considered to have a severe erosion hazard. One hydric soil, Dunning silty clay loam, occurs within the project study area. This soil unit is located just south of the water treatment facility near KY 1989. Dunning silty clay loam is typically found on floodplains, in narrow valleys, and on upland depressions.

3.5 Watershed

The proposed study area lies entirely within the Salt River Basin (HUC 05140102) (Appendix A, Figure 2). The Salt River Basin drains about 4,150 sq. miles (10,748 sq. kilometers) of north-central Kentucky. The project study also entirely lies within the Salt River Harrodsburg (HUC 05140102010) sub-watershed. The Salt River Harrodsburg watershed encompasses 138 sq. miles (357 sq. kilometers) and 282 river miles (454 kilometers) within the Salt River Basin (Kentucky Division of Water [KDOW] 2001).

Stream quality within the watershed is often affected by industrial, suburban, and agricultural practices. Urban-industrial waste discharges high levels of metals (Woods et al 2002). Suburban wastewater treatment plants cause effluent-dominated streams. Agriculture practices contribute sediment, nutrients, pesticides, and pathogens (Woods et al 2002).

3.6 Land Use

Agricultural areas comprise the majority of Mercer County's land area (Craddock 1979). The eastern portion of the study area closest to the Town of Harrodsburg is a mix of industrial and residential lots. However, the central and western portion of the study area is almost entirely comprised of agricultural fields and pasture land with a scattering of rural residential lots. The only noticeable forested areas occur along streambanks. Rural residential/agricultural areas comprised 90% (2,097 ac/845 ha), industry comprised 5% (121 ac/49 ha) and the remaining 5% (124 ac/50 ha) was forested (Appendix A, Figure 3).

4.0 ECOLOGICAL IMPACTS

4.1 Aquatic Ecology

Jurisdictional waters, as defined by the USACE, are located within the proposed project corridor. This includes a section of the Salt River and it's associated Federal Environmental Management Agency (FEMA) 100-year floodplain. No aquatic macroinvertebrate, fishes, or water quality sampling was completed for this ecological overview.

Aquatic species in or near the study area are sensitive to increased turbidity and sediment and other adverse influences on water quality. KSNPC recommended an erosion control plan to be developed with stringent erosion control methods such as straw bales, silt fences, and erosion mats, and immediate seeding and mulching of disturbed areas. These measures should be placed in a staggered manner to provide several stages of sediment and erosion control. All measures should be monitored periodically to ensure they are functioning properly. Streams which may be impacted should surveyed by a qualified biologist prior to in-stream disturbance.

4.1.1 Wetlands and Ponds

Review of the Cornishville and Harrodsburg NWI maps revealed one forested wetland and several palustrine unconsolidated bottom (PUB) ponds within the study area. Although no jurisdictional delineations were conducted, field surveys determined the NWI mapped palustrine forested wetland (PFO1A) within the project study area did not possess wetland hydrology. Field surveys also identified two small depressional areas that may be wetlands. One area is located within the hydric soil unit, Dunning silty clay loam, just south

of the water treatment facility near KY 1989. The other area is located just south of KY 1989 and east of the Salt River (Appendix A, Figure 2). Nine ponds were field identified within the study area and all were farm ponds with no connectivity to jurisdictional waters. Not all portions within the study area were easily accessible and more wetlands and ponds may exist. A formal jurisdictional delineation needs to be conducted in order to accurately determine the number of wetlands and ponds throughout the study area (Appendix A, Figure 2).

4.1.2 Streams

Streams were located and field-verified using the Cornishville and Harrodsburg USGS quadrangle maps. Nine intermittent and/or perennial streams were identified from mapping conventions within the proposed project corridor. These streams include the Salt River with seven unnamed tributaries, and Town Creek. However, field verification only identified five intermittent and perennial streams within the study area (Appendix A, Figure 2). These rivers and streams include the Salt River and three unnamed tributaries and Town Creek. Although ephemeral streams may also be considered jurisdictional, their evaluation did not fall within the scope of this overview. All streams are located or partially located within the study area and may be impacted by the proposed road construction associated with this project.

In compliance with the Fish and Wildlife Coordination Act, the USFWS was notified of the proposed Harrodsburg Bypass study area with regards to wetlands and other jurisdictional waters. Subsequently, they recommend developing future plans for the study area to avoid impacting wetlands and streams. It is also recommended that the U.S. Army Corps of Engineers (USACE) should be notified to assist with determining if wetlands or other jurisdictional waters are present or if a permit is required. If soil disturbances are required, Best Management Practices such as silt barriers should be established when working adjacent to all streams to prevent runoff of sedimentation. The USFWS requests having an inspector on-site during all construction activities to ensure work areas are stabilized.

The KDOW Water Quality Branch provided stream and fish data for the Mercer County area and indicated there are no Outstanding State Resource Waters or Wild Rivers within the study area. The KDOW also provided ecological data on macroinvertebrates and fish samplings sites along the Salt River. The sampling sites scored either fair or poor in macroinvertebrate and fish quality. (Appendix B).

The contractor will be required by the KDOW to prepare a plan to control non-point source pollution and to effectively implement the erosion and control program. Rigid application of the KYTC's Specific Specifications for Road and Bridge Construction and the

Federal Highway Administration's (FHWA) Best Management Practices for Erosion and Sediment Control should be used to alleviate most sedimentation problems.

4.1.3 Regulatory Issues

Since neither alternatives nor detailed plans have been developed for this project a final permitting strategy cannot be determined until an improvement footprint has been finalized and construction impacts are firmly quantified. The USACE, Louisville Regulatory District, Louisville, Kentucky, is the agency responsible for regulating waters, waterways, and wetlands ("Waters of the United States"). If jurisdictional impacts can be limited in size, consideration should be given to the use of Nationwide Permit (NWP) No. 14 (Linear Transportation Projects). The use of NWP No. 14 is limited to crossings that result in a filled area of no more than 0.5 acre of "Waters of the United States". The permittee must notify the District Engineer in accordance with General Condition 27 if the work involves discharges of dredged or fill material into wetlands and/or results in the loss of greater than 1/10 acre of waters of the United States. This permit does not authorize stream channelization, and the authorized activities must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality of any stream in accordance with General Conditions 9 and 21. This nationwide permit only authorizes activities with minimal adverse effects on the aquatic environment. The USACE may exert discretionary authority and require an Individual Permit it avoidance and minimization have not been adequately addressed, or it appropriate mitigation is inadequate.

In addition to any permits issued by the USACE, a Section 401 Water Quality Certification (WQC) is required in each state for construction activities which may result in a discharge into "Waters of the United States" or for which a federal permit or license is required. A Floodplain Construction Permit will also be required if construction includes impacting an area within a 100-year floodplain of any stream in the state. The WQC and Floodplain Construction Permit are both administered through the KDOW.

KDOW also requires a Groundwater Protection Plan for all construction activities. Any area disturbed due to construction should be managed for stream siltation from stormwater runoff. Construction sites greater than five acres will require the filing of a Notice of Intent to be covered under the Kentucky Pollution Discharge Elimination System's (KPDES) General Stormwater Permit. This permit requires the creation of an Erosion Control Plan.

4.2 Terrestrial Ecology and Threatened & Endangered Species

The Kentucky Division of Forestry (KDOF) indicated there are no current state forests or champion trees located within the study area (Appendix B). KDOF recommended protection of trees that will remain after completion of the proposed construction. Heavy equipment should not come into contact with the base of trees to prevent harm to the trunk

and surface roots. Construction traffic should also stay away from the driplines of trees. This will reduce the amount of soil compaction around trees that are to remain. Soil compaction leads to a reduction in the amount of available water for the trees, which can lead to increased stress. Stressed trees are more susceptible to disease and insect infestation. KDOF also recommends that additional trees be planted after construction. Any proposed planting should be selected according to trees already existing within the site.

The USFWS provides a list of endangered, threatened, and candidate species for Mercer County (Appendix B). The USFWS lists five aquatic federally endangered mussel species that all have historic occurrences and one candidate species in Mercer County (Table 1). The USFWS was notified of the proposed project. The USFWS typically expresses concern over erosion and sedimentation control, stream bank stabilization, and maintaining water quality for highway projects during and post-construction. Recommendations are made to reduce impacts to aquatic resources and endangered species and habitat. If recommendations cannot be followed, it was suggested that surveys be conducted for the federally listed species in the project vicinity.

Table 1. USFWS Database Results for the Mercer County Environmental Overview.

Status[a]	Scientific Name	Common Name
E(h)	*Cyprogenia stegaria*	Fanshell
E(h)	*Obovaria retusa*	Ring pink
E(h)	*Epioblasma torulosa rangiana*	Northern riffleshell
E(h)	*Pleurobema clava*	Clubshell
E(h)	*Pleurobema plenum*	Rough pigtoe
C	*Lesquerella globosa*	Globe bladderpod

a. U.S. Fish & Wildlife Service Status: E= Endangered, C= Candidate, h=Historic

Coordination of this project with the KDFWR in Frankfort, Kentucky, indicated no federally endangered species within the study area (Appendix B). However, KDFWR did list state endangered and threatened species for Mercer County (Table 2).

Table 2. KDFWR Database Results for the Mercer County Environmental Overview.

KY Status[a]	Scientific Name	Common Name
S	*Thryomanes bewickii*	Bewick's wren
S	*Cryptobranchus alleganiensis alleganiensis*	Eastern hellbender
T	*Myotis leibii*	Eastern small-footed myotis
T	*Chondestes grammacus*	Lark sparrow
S	*Rana pipiens*	Northern leopard frog

a. KSNPC Status: S= Special Concern, T=Threatened

KSNPC reviewed their Natural Heritage Program Database to determine if any endangered, threatened, or special concern plants and animals or exceptional communities monitored by the KSNPC occurred within or near the project area (Appendix B). KSNPC applied three buffers to analyze the project area:

1. 1-mile for all records
2. 5-mile for aquatic records and federally listed species
3. 10-mile for monitored mammals and birds

Four records were found within the 1-mile buffer. Within the 5-mile buffer, one federally listed species was identified. Twelve records for mammals and birds were found within the 10-mile buffer (Table 3).

Table 3. KSNPC NHPD Results for the Mercer County Environmental Overview.

Buffer Distance (mi)	Status[a]	Scientific Name	Common Name	Water Body/Habitat
1	-	*Arabis hirsuta*	Western Hairy Rockcress	Salt River
1	C	*Lesquerella globosa*	Globe Bladderpod	Salt River
1	-	*Malvastrum hispidum*	Hispid Falsemallow	Salt River
1	-	*Dolichonyx oryzivorus*	Bobolink	Salt River
5	C	*Lesquerella globosa*	Globe Bladderpod	Salt River
10	-	*Dolichonyx oryzivorus*	Bobolink	Salt River
10	-	*Accipiter striatus*	Sharp-shinned Hawk	Kentucky River/Big Eddy
10	SOMC	*Myotis leibii*	Eastern Small-footed Myotis	Kentucky River/Big Eddy
10	SOMC	*Aimophila aestivalis*	Bachman's Sparrow	Chaplin River
10	-	*Chondestes grammacus*	Lark Sparrow	Chaplin River
10	-	*Passerculus sandwichensis*	Savannah Sparrow	Mocks Branch
10	SOMC	*Thryomanes bewickii*	Bewick's Wren	Chaplin River
10	-	*Tyto alba*	Barn Owl	Spears Creek and Mocks Branch
10	LE	*Myotis grisescens*	Gray Myotis	Dix River/Herrington Lake
10	-	*Nycticeius humeralis*	Evening Bat	Dix River/Herrington Lake

a. USESA – U.S. Fish & Wildlife Service Status: LE= Listed Endangered, C= Candidate, SOMC = Species of Management Concern

4.2.1 Karst Areas

According to the Kentucky Division of Water (KDOW) Groundwater Branch, the study area is composed of soluble rocks of the Clays Ferry Formation on hilltops and Lexington Limestones in the valley. These karst aquifers are groundwater recharge areas comprising most of the surface terrain of the study area. KDOW reported the following observations of the study area (Appendix B):

- Groundwater tracer tests conducted on Humane Spring, which is just east of the study area, but whose basin is within the northeastern portion of the study area.

- Groundwater tracer tests also conducted on Votah Spring, which lies north of the study area, but whose basin may also be within the study area.
- No spring or wellhead protection areas occur within the study area.
- Additional karst springs may exist within the study area especially along Salt River and Town Creek.
- "Limited karst groundwater basin development" exists throughout the study area in alluvial deposits and on the Clay Ferry Formation. These will be small springs formed along fractures or lineaments.

4.2.2 Special Designation Lands

No state nature preserves or wildlife management areas are present within the project corridor. No state or national parks and forests are located in the corridor.

5.0 SUMMARY AND CONCLUSIONS

Jurisdictional wetlands and streams are present within the corridor. This project will likely require permits from the USACE for all stream alterations/crossings or filling of any jurisdictional wetlands required for the completion of the proposed project.

Five (5) federally endangered species and one (1) candidate species are known to occur within Mercer County. One (1) listed endangered species and three (3) KSNPC species of special concern/federal species of management concern occurs within ten miles of the study area.

It should be noted that this report is a preliminary ecological overview. More intensive field surveys will be required in order to assess the potential ecological impacts by this project when build alternatives are designed based on the findings of this preliminary research and field investigation.

LITERATURE CITED

Craddock, William. 1979. Soil Survey of Boyle and Mercer Counties, Kentucky. United States Department of Agriculture, Soil Conservation Service, and Forest Service Washington, D.C. In cooperation with the Environmental Protection and Kentucky Agricultural Experiment Station.

Jones, R.L. 2005. Plant Life of Kentucky. An Illustrated Guide to the Vascular Flora. The University Press of Kentucky, Lexington. 834pp.

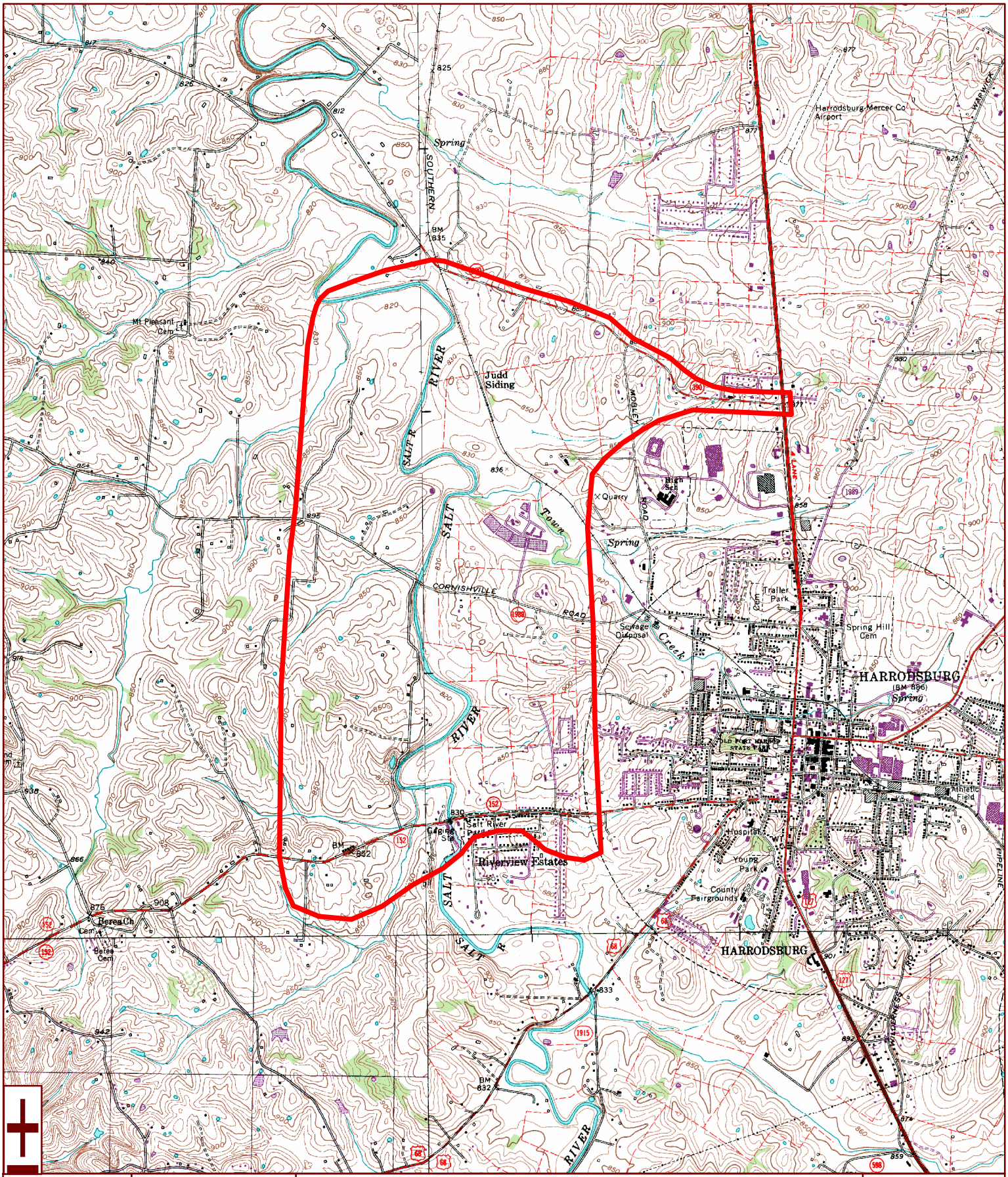
KDOW (Kentucky Division of Water. 2001. Salt River Basins Assessment Reports. Frankfort, KY.

Woods, A.J., Omernik, J.M., Martin, W.H., Pond, G.J., Andrews, W.M., Call, S.M, Comstock, J.A., and Taylor, D.D. 2002. Ecoregions of Kentucky (color poster with map, descriptive text, summary tables, and photographs): Reston, VA., U.S. Geological Survey (map scale 1:1,000,000).

USDC (U.S. Department of Commerce). 2006. Local Climatological Data. National Climatic Data Center. Station of record: Bluegrass Airport, Lexington, KY.

USEPA (U.S. Environmental Protection Agency). 2002. Level III Ecoregions of the Continental United States (revision of Omernik, 1987). Corvallis, Oregon, U.S. Environmental Protection Agency-National Health and Environmental Effects Research Laboratory, Map M-1, various scales.

APPENDIX A.
FIGURES



Project Area

COUNTY:	Mercer
STATE:	Kentucky
	1:35,000

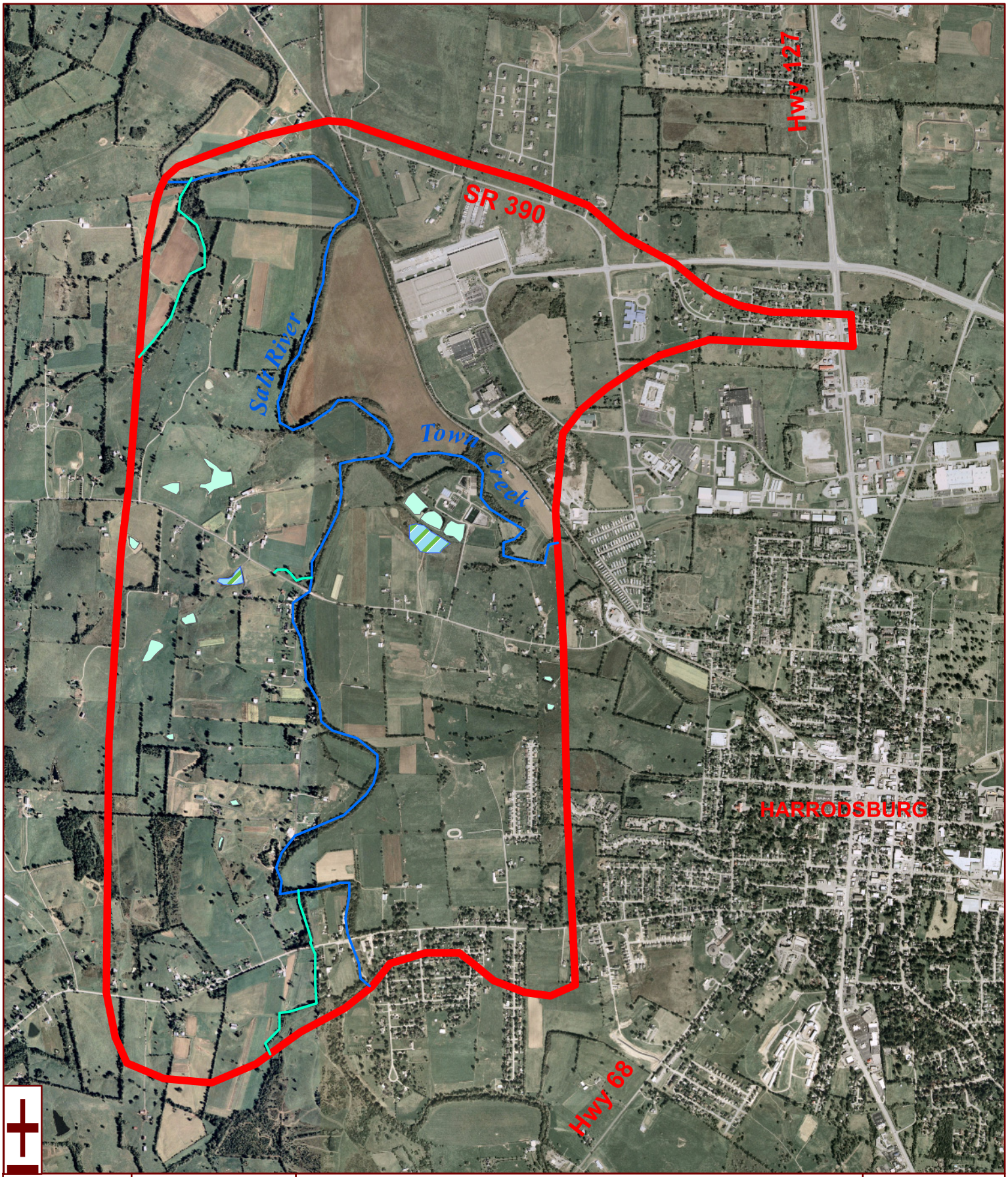
Figure 1. PROJECT LOCATION MAP

Harrodsburg Bypass

(KYTC Project Item Number 7-8344.00)

USGS Harrodsburg and Cornishville, Kentucky Quadrangles

ETC ECOLOGICAL
Eco-Tech Consultants, Inc.
1003 E Main St
Frankfort, KY 40601
502-695-8060



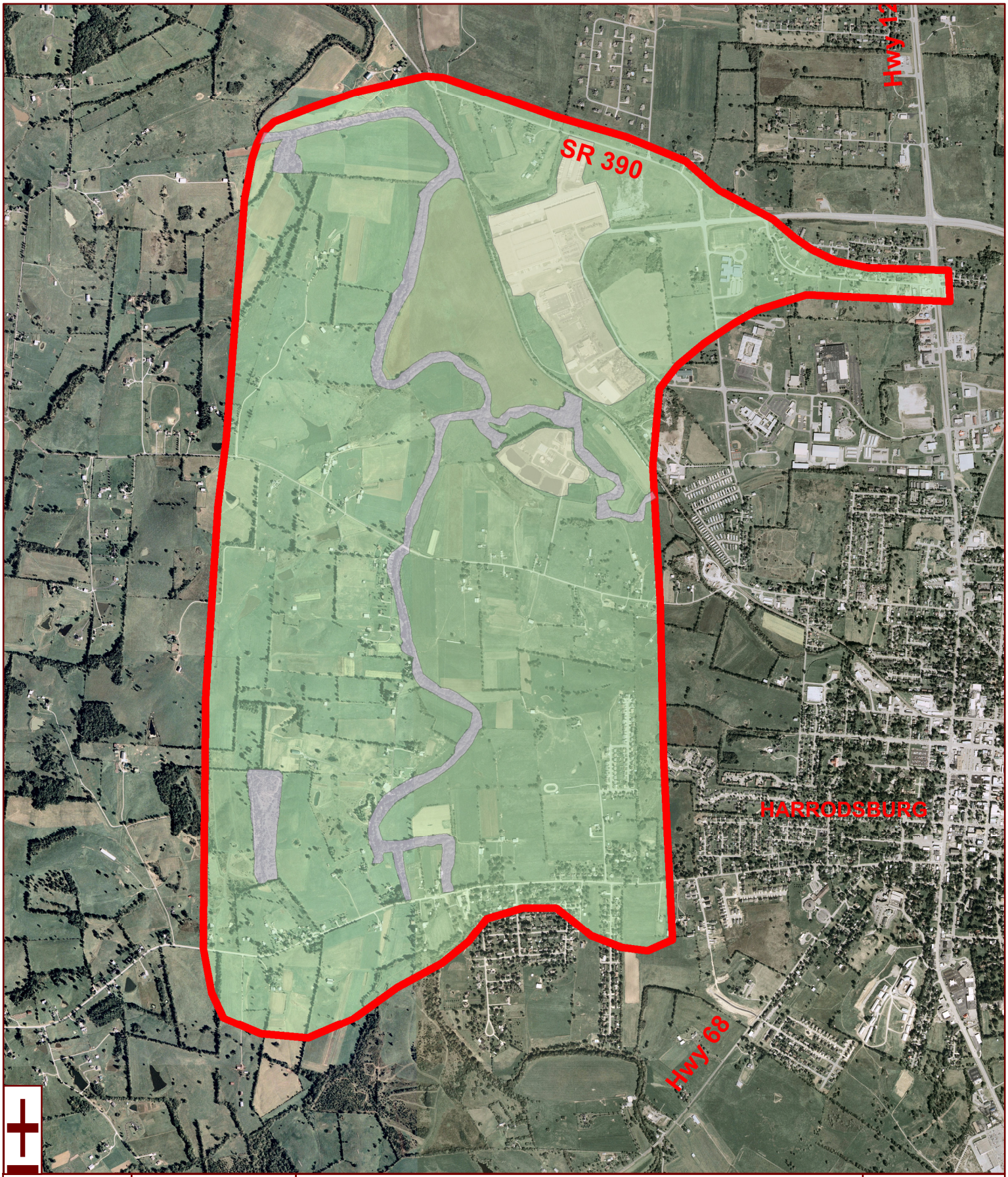
Project Area
Ponds
Wetlands
Streams
intermittent
perennial

Mercer
COUNTY:
Kentucky
STATE:
1:24,000

Figure 2. POTENTIAL JWD MAP

Harrodsburg Bypass
(KYTC Project Item Number 7-8344.00)
2004 NAIP DOQQ

ETC ECOLOGICAL
Eco-Tech Consultants, Inc.
1003 E Main St
Frankfort, KY 40601
502-695-8060



Project Area
Rural Residential/ Agricultural
Forested
Industrial

Mercer
COUNTY:
Kentucky
STATE:
1:24,000

Figure 3. LAND USE MAP

Harrodsburg Bypass
(KYTC Project Item Number 7-8344.00)
2004 NAIP DOQQ

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APPENDIX B.
AGENCY COORDINATION

Ernie Fletcher
Governor

Teresa J. Hill
Secretary
Environmental and Public
Protection Cabinet

Donald S. Dott, Jr.
Director

Commonwealth of Kentucky
Kentucky State Nature Preserves Commission
801 Schenkel Lane
Frankfort, Kentucky 40601-1403
502-573-2886 Voice
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September 6, 2007

Layna Thrush
Eco-Tech Consultants, Inc.
102 West Court Avenue
Jeffersonville, IN 47130

Data Request **08-006**

Dear Ms. Thrush:

This letter is in response to your data request of July 10, 2007 for the Proposed Harrodsburg Bypass 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 Harrodsburg and Cornishville USGS Quadrangles, as shown on the map provided. Please see the attached reports for more information, which reflect analysis of the project area with three buffers applied:

1-mile for all records – 4 records
5-mile for aquatic records – no records
5-mile for federally listed species – 1 record
10-mile for mammals and birds – 12 records

The site is located within a karst landscape characterized by numerous sinkholes, underground conduits, or caves. Construction disturbance or release of pollutants within the specified area could easily cause contamination of groundwater. Caves are often associated with sensitive ecosystems and may provide habitat for a number of rare or endangered species. Cave organisms are heavily dependent on water quality, and steps should be taken to avoid introducing contaminants into the water system.

Lesquerella globosa (Globe Bladderpod, federal candidate, KSNPC Endangered) has been found in the area in the past. This plant has recently been designated as a candidate for listing by the United States Fish and Wildlife Service. The plant is found on calcareous rocks and barrens, and wooded cliff edges. Surveys for this species should be conducted prior to disturbance of the site.

Myotis grisescens (Gray myotis, federally listed endangered, KSNPC threatened) and *Myotis leibii* (Eastern small-footed myotis, federal species of management concern, KSNPC threatened) have been known to occur within ten miles of the study area. A thorough survey for this species should be conducted by a qualified biologist if suitable habitat will be disturbed. The survey should include a search for potential roost and winter sites, and a mistnetting census at numerous points within the proposed corridor, particularly in preferred summer habitat. Summer foraging habitats include upland forests, bottomland forests and riparian corridors. Suitable roost and winter sites include sandstone and limestone caves, rockhouses, clifflines, auger holes, and abandoned mines. In order to avoid impacts to bats, bottomland forests and riparian corridors, particularly near caves, should not be disturbed.

Nycticeius humeralis (Evening Bat, KSNPC special concern) occurs within your search area. Summer habitats include bottomland forests, swamps, and riparian corridors. In order to avoid impacts to bats, a thorough survey should be conducted. The survey should include a search for potential roost and winter sites, and a mistnetting census at numerous points within the proposed corridor, particularly in preferred summer habitat.

Accipiter striatus (Sharp-shinned Hawk, KSNPC special concern) can be found in a variety of habitats from semi-open farmland to woodland openings and borders. This species typically nests in areas of extensive forest, especially areas with some evergreen trees.

Aimophila aestivalis (Bachman's Sparrow, KSNPC Endangered, federal species of management concern) is associated with open pine woods with scattered bushes or understory, brushy or overgrown hillsides, overgrown fields, and grassy orchards.

Dolichonyx oryzivorus (Bobolink, KSNPC special concern) is generally associated with tall grass areas, flooded meadows, prairies, grain and hay fields.

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

Thyromanes bewickii (Bewick's Wren, KSNPC special concern, federal species of management concern) can be found in brushy areas, thickets, scrub in open country, open and riparian woodlands, and in country towns and farms.

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.

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

Standard Occurrence Report

KSNPC Monitored Elements within a 1-mile radius of the Proposed Harrodsburg Bypass Project (Mercer Co.)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Vascular Plants																		
PDBRA060U0*001	*Arabis hirsuta*	Western Hairy Rockcress	G5	S1S2	T			Y	1989-06-EARLY	M	E	Mercer	Perryville Danville	374326N	0845308W	05140102010 - Salt River Harrodsburg) 05140103110 - Chaplin River (Fairview - Perryville)	SAVANNA REMNANT ON US 68 TO PERRYVILLE.	Dry rocky woods.
PDBRA1N0N0*024	*Lesquerella globosa*	Globe Bladderpod	G2	S1	E	C		Y	1916-05-13	G	H	Mercer Jessamine Garrard Boyle	Harrodsburg Danville Bryantsville Wilmore	374557N	0844525W	05100205210 - Shaker Creek 05100205205 - Mocks Branch 05100205140 - Kentucky River/Big Eddy 05140102010 - Salt River Harrodsburg) 05100205170 - Dix River/Herrington Lake	BURGIN, DRY BANKS.	Calcareous rocks and barrens, wooded cliff edges.
PDMAL0S060*002	*Malvastrum hispidum*	Hispid Falsemallow	G3G5	S2?	T					G	F	Mercer Garrard Boyle Jessamine	Harrodsburg Bryantsville Wilmore Danville	374557N	0844525W	05100205140 - Kentucky River/Big Eddy 05140102010 - Salt River Harrodsburg) 05100205210 - Shaker Creek 05100205205 - Mocks Branch 05100205170 - Dix River/Herrington Lake	BURGIN.	Dry open non-wooded areas such as prairies, both limestone and sandstone, glades, edges of bluffs, and barrens, sometimes open alluvial ground in valleys and along gravel bars (Steyermark 1963 in part); in KY, old fields.
Breeding Birds																		
ABPBXA9010*017	*Dolichonyx oryzivorus*	Bobolink	G5	S2S3B	S			Y	2007-05-28	S	E			374816N	0845400W		Dorman Farm, on S side of KY 390, ca 0.65 air mi WNW of Salt River bridge.	

Standard Occurrence Report
KSNPC Federally Listed Elements within a 5-mile radius of the Proposed Harrodsburg Bypass Project (Mercer Co.)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Vascular Plants																		
PDBRA1N0N0*024	*Lesquerella globosa*	Globe Bladderpod	G2	S1	E	C		Y	1916-05-13	G	H	Mercer Jessamine Garrard Boyle	Harrodsburg Danville Bryantsville Wilmore	374557N	0844525W	05100205210 - Shaker Creek 05100205205 - Mocks Branch 05100205140 - Kentucky River/Big Eddy 05140102010 - Salt River Harrodsburg) 05100205170 - Dix River/Herrington Lake	BURGIN, DRY BANKS.	Calcareous rocks and barrens, wooded cliff edges.

Standard Occurrence Report
KSNPC Monitored Birds and Mammals within a 10-mile radius of the Proposed Harrodsburg Bypass Project (Mercer Co.)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Breeding Birds																		
ABNKC12020*047	*Accipiter striatus*	Sharp-shinned Hawk	G5	S3B,S4N	S			Y	1988-	G	E	Jessamine Garrard	Wilmore	374845N	0843922W	05100205140 - Kentucky River/Big Eddy 05100205130 - Jessamine Creek	CE Block of quadrangle.	Forest and open woodland, coniferous, mixed, or deciduous, primarily in conif. In more northern and mountainous portion of range (B83COM01NA). Migrates through various habitats, mainly along ridges, lakeshores, & coastlines (B83NAT01NA).
ABPBX91050*033	*Aimophila aestivalis*	Bachman's Sparrow	G3	S1B	E	SOMC		Y	1948-06-09	G	X	Washington	Ashbrook Cardwell Mackville	374630N	0850160W	05140103110 - Chaplin River (Fairview - Perryville) 05140103120 - Glens Creek 05140103100 - Beech Fork (Willisburg)	Just over the Mercer Co line in Washington Co.	Open pine woods with scattered bushes or understory, brushy or overgrown hillsides, overgrown fields with thickets and brambles, grassy orchards.
ABPBX96010*022	*Chondestes grammacus*	Lark Sparrow	G5	S2S3B	T			Y	1994-07	M	E	Mercer	Cornishville	374551N	0845552W	05140103110 - Chaplin River (Fairview - Perryville)	Along Johnson Road, w/in 1.0 rd mi N and S of Johnson Creek.	Open situations with scattered bushes and trees, prairie, forest edge, cultivated areas, orchards, fields with bushy borders, and savanna (B83COM01NA).
ABPBXA9010*003	*Dolichonyx oryzivorus*	Bobolink	G5	S2S3B	S			Y	1994-07	M	E	Boyle	Danville Junction City	373840N	0845047W	05140102010 - Salt River Harrodsburg) 05100205205 - Mocks Branch	Along Locklin Lane, w/in ca 1.5 mi N of US 150 (003A) and along Caldwell Lane, w/in 2.0 mi S of US 150 (003B).	Tall grass areas, flooded meadows, prairie, deep cultivated grains, alfalfa and clover fields. In migration and winter also in rice fields, marshes, and open woody areas. (B83COM01NA).

Standard Occurrence Report

KSNPC Monitored Birds and Mammals within a 10-mile radius of the Proposed Harrodsburg Bypass Project (Mercer Co.)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
ABPBXA9010*017	*Dolichonyx oryzivorus*	Bobolink	G5	S2S3B	S			Y	2007-05-28	S	E			374816N	0845400W		Dorman Farm, on S side of KY 390, ca 0.65 air mi WNW of Salt River bridge.	
ABPBX99010*005	*Passerculus sandwichensis*	Savannah Sparrow	G5	S2S3B, S2S3N	S			Y	1991-summer	S	E	Boyle	Danville	373944N	0844845W	05100205205 - Mocks Branch	Along Blue Grass Road, ca. 1.1 rd mi N of jct. US 150, 0.1 mi after 90 degree left turn.	Open areas, especially grasslands, tundra, meadows, bogs, farmlands, grassy areas with scattered bushes, and marshes, including salt marshes in the Beldingi and Rostratus Groups (subtropical and temperate zones) (B83COM01NA).
ABPBG07010*044	*Thryomanes bewickii*	Bewick's Wren	G5	S3B	S	SOMC		Y	1990-06-10	S	E	Mercer	Mackville	374128N	0850025W	05140103110 - Chaplin River (Fairview - Perryville)	Antioch Church, at jct Fallis Run Road and Mackville Road.	Brushy areas, thickets and scrub in open country, open and riparian woodland, and chaparral, more commonly in arid regions but locally also in humid areas (subtropical and temperate zones) (B83COM01NA). Found in country towns and farms.
ABNSA01010*005	*Tyto alba*	Barn Owl	G5	S3	S			Y	1991	M	E	Boyle	Danville	373906N	0844656W	05100205200 - Spears Creek and Mocks Branch 05100205190 - Clarks Run	Danville, along Maple Avenue.	Open and partly open country in a wide variety of situations, often around human habitation (B83COM01NA). In northern winter often roosts in dense conifers; also roosts in nest boxes, if available (A85MAR01NA).
ABNSA01010*020	*Tyto alba*	Barn Owl	G5	S3	S			Y	1990	G	E	Jessamine Garrard	Wilmore Little Hickman	374848N	0843847W	05100205140 - Kentucky River/Big Eddy 05100205130 - Jessamine Creek	CE block of quad.	

Standard Occurrence Report
KSNPC Monitored Birds and Mammals within a 10-mile radius of the Proposed Harrodsburg Bypass Project (Mercer Co.)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
SENSITIVE ELEMENTS: Locational information for sensitive plants, animals, and natural communities, if released by the Kentucky State Nature Preserves Commission, may not be released in any document or correspondence. Please refer to the Data License Agreement for a full description of rights and restrictions.																		
Extant in Kentucky																		
Mammals																		
AMACC01040*025	*Myotis grisescens*	Gray Myotis	G3	S2	T	LE		Y	1989-07-07	S	H?	Garrard	Wilmore	CONTACT KSNPC	CONTACT KSNPC	05100205170 - Dix River/Herrington Lake	SENSITIVE ELEMENT-CONTACT KSNPC	Gray bats use primarily caves throughout the year, although they move from one cave to another seasonally. Males and young of the year use different caves in summer than females.
AMACC01130*043	*Myotis leibii*	Eastern Small-footed Myotis	G3	S2	T	SOMC		Y	1970s	S	H	Mercer	Wilmore	CONTACT KSNPC	CONTACT KSNPC	05100205140 - Kentucky River/Big Eddy	SENSITIVE ELEMENT-CONTACT KSNPC	Lieb's bats use a variety of habitats. They occur in caves, mines, protected sites along clifflines, abandoned buildings, and are occasionally found roosting under rocks on the ground or on the floors of caves. Summer habitat is currently unknown, but may be similar sites.
AMACC06010*009	*Nycticeius humeralis*	Evening Bat	G5	S3	S				1982-08-20	S	F	Garrard	Wilmore	CONTACT KSNPC	CONTACT KSNPC	05100205170 - Dix River/Herrington Lake	SENSITIVE ELEMENT-CONTACT KSNPC	The evening bat is a colonial species that roosts in trees and houses. It apparently migrates southward in winter.

Data Key for Element and Occurrence Reports (v. 9.05)
Kentucky State Nature Preserves Commission
Natural Heritage Program Data Services

Many of the data fields on the enclosed report are easily understood. Other fields, however, use abbreviations and formats that are not always self-explanatory. A key to these fields follows. Your report may contain some or all of the following data fields.

BEARING:	Bearing in degrees from a center point to an occurrence's latitude and longitude. This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U, and Q precision occurrence records.
BESTSOURCE:	Best available reference to the occurrence: literature citation, collector, collection number, museum or herbarium code, etc.
COMMENTS:	Additional information about the occurrence including identification, taxonomy, or date of occurrence.
DIRECTIONS:	Directions to an occurrence. This field is masked for sensitive occurrences; contact KSNPC in these cases.
DISTANCE:	Distance from a center point to an occurrence's latitude and longitude. Units coded as M (miles), K (kilometers), and F (feet). This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U, and Q precision occurrence records.
ELCODE:	Element (species) code.
EOCODE:	Element (species) code, occurrence number (last three digits), and state.
EODATA:	Occurrence population data: date of observation, number of individuals, health, size of colony, flowering data, etc.
EORANK:	Judgement of occurrence quality: A = excellent, B = good, C = marginal, D = poor, E = verified extant but quality not judged, O = obscure (not found at reported site but more searching needed), H = historically known from site but no known observation or collection since 1975, X = extirpated from site.
FIRSTOBS:	Year of first known observation or collection.
GENDESC:	Description of an occurrence's habitat.
GRANK:	Estimate of element abundance on a global scale: G1 = extremely rare, G2 = rare, G3 = uncommon, G4 = common, G5 = very common, GH = historically known and expected to be rediscovered, GU = uncertain, GX = extinct. Subspecies and variety abundances are coded with a 'T' suffix; the 'G' portion of the rank then refers to the entire species.
HABITAT:	General description of the element's habitat across its range.
IDENT:	Whether the identification has been checked by a reliable individual and is believed to be correctly identified: Y = identification confirmed and believed correct, N = No, identification determined to be wrong despite reports to the contrary, ? = Whether identification is correct or not is confusing or disputed, blank or U = unknown whether identification correct or not, assumed correct.
KSNPC:	Kentucky State Nature Preserves Commission status: N or blank = none, E = endangered, T = threatened, S = special concern, H = historic, X = extirpated.
LASTOBS:	Year(-month-date) of most recent known observation or collection.
LAT:	Latitude. This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U and Q precision occurrences.
LONG:	Longitude. This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U and Q precision occurrences.
PREC:	See PRECISION.
PRECISION:	Precision of the latitude, longitude, directions, and plotted location: S = location accurate to within three seconds of latitude-longitude, M = location accurate to within one minute of latitude-longitude, G = precision within about 8 km or 5 miles, or to place name precision only, Q = element known from the quadrangle but site-specific locations are not recorded by KSNPC because the species may be relatively frequent on the

	quadrangle or is known to frequently move, U or blank = accuracy of location unknown or not specified. The accuracy of an occurrence's location is designated by the precision code assigned to the record. Only 'S' precision occurrence records are reliably mapped at or near their precise locations. While an attempt is made to map 'M' precision occurrences as accurately as possible, the plotted locations, lat, long, directions, bearing, and distance data fields may or may not be correct. 'G' and 'Q' precision occurrence locations are very unreliable and only should be used to indicate the possibility that the species is in the area.
SPROT:	See KSNPC.
SRANK:	Estimate of element abundance in Kentucky: S1 = extremely rare, S2 = rare, S3 = uncommon, S4 = many occurrences, S5 = very common, SA = accidental in state, SE = exotic, SH = historically known in state, SN = migratory or nonbreeding, SR = reported but without persuasive documentation, SRF = reported falsely in literature, SU = uncertain, SX = extirpated.
USESA:	U.S. Fish and Wildlife Service status: N or blank = none, LT = listed as threatened, LE = listed as endangered, C=Candidate.
OTHER STATUS:	SOMC = Designated by the U.S. Fish and Wildlife Service as a Species of Management Concern.
WATERBODY:	Name of the 11-digit Hydrologic Unit Code EPA Waterbody in which the occurrence is plotted.
WATERSHED:	See WATERBODY.

Layna Thrush

From: Lee Droppelman
Sent: Monday, July 23, 2007 9:59 PM
To: Layna Thrush
Subject: Fw: Project Item Number 7-8344.00
Attachments: image002.gif

Sent from my Verizon Wireless BlackBerry

-----Original Message-----
From: "Ray, Joe (EPPC DEP DOW)" <Joe.Ray@ky.gov>

Date: Thu, 19 Jul 2007 13:03:40
To:<ldroppelman@ecotechinc.com>
Cc:"Shuttleworth, John (EPPC DEP DOW)" <John.Shuttleworth@ky.gov>
Subject: Project Item Number 7-8344.00

Please forward to:

Layna Thrush
Project Scientist
Echo-Tech Consultants
1003 East Main Street
Frankfort, KY 40601

RE: REQUEST FOR STANDARD OCCURRENCE REPORT FOR THE PROPOSED HARRODSBURG BYPASS PROJECT, MERCER COUNTY, KENTUCKY (KYTC Project Item Number 7-8344.00)

The project area is composed of soluble rocks of the Clays Ferry Formation on the hilltops, down through the Lexington Limestones, including the Tanglewood Limestone Member in local valleys. These soluble rocks develop karst groundwater drainage, both in local and regional scale. These local karst basins comprise the "karst aquifers" of the area. Below is a clip from the Harrodsburg Karst Atlas Sheet (Currens and others, 2003, Mapped Karst Groundwater Basins in the Harrodsburg 30 x 60 Minute Quadrangle, Map and Chart 58, Series XII), which basically matches the area of your Figure 1. The white portions of the map depict areas of "potential karst groundwater basin development". Humane Spring (9000-0527) is shown with groundwater tracer tests depicted with red lines and an arrowhead. The estimated basin boundary is illustrated with green dashes. Part of the outlined project area incorporates the northern fringe of this karst basin, but excludes the spring itself (in the past, Humane Spring has been contaminated by trichloroethene (TCE) from the Hallmack Facility and hydrocarbons from the adjacent Mercer County Garage). Also, a fragment of the basin of Votah Spring (9000-1203) lies just to the north, and is illustrated with green dashed lines and part of a red flow line. The project area may include part of the southern fringe of this karst basin.

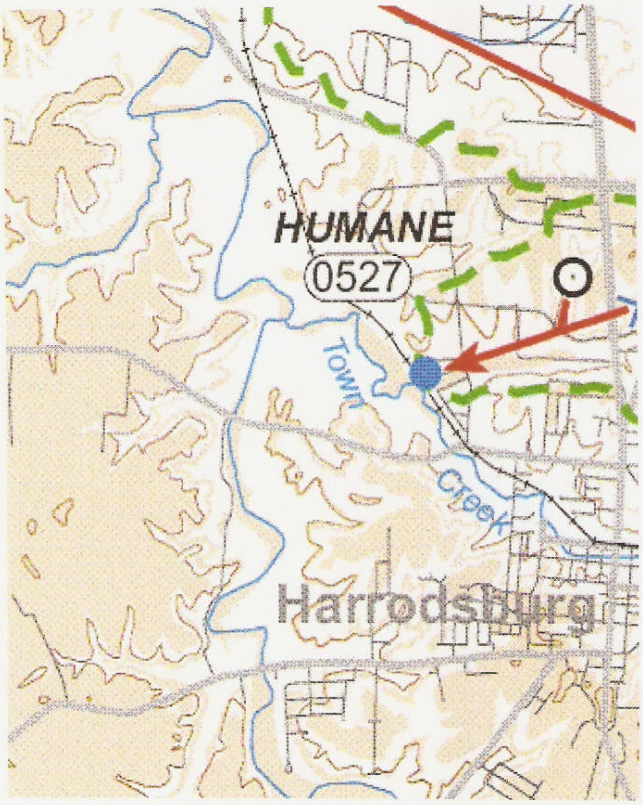
Otherwise, no additional karst data are available for the project area. However, additional karst springs will exist within the boundary. For example, a sinking stream is shown on the 1:24,000 topographic map, just northeast of the confluence of Salt River and Town Creek. This sinking stream will resurface as a spring or springs along Salt River or Town Creek. The watershed of this unmapped spring may be affected by runoff from the project area. Likewise, additional small springs will exist along the Salt River.

The light brown in this map indicates areas of "limited karst groundwater basin development", in alluvial deposits and on the Clays Ferry Formation. Although the Clays Ferry inter-bedded limestone and shale does not produce large springs, small karst-spring basins do develop in this formation, especially along fractures or lineaments.

Consequently, no springs are recorded within the delineated project area, although some springs exist that remain un-inventoried. Also, no domestic water wells are recorded for the area, but some older wells may exist.

As usual, a Groundwater Protection Plan (401 KAR 5:037) is required for highway construction activities. Stormwater runoff from disturbed areas must be managed to reduce siltation of the waters of the Commonwealth. Please reply if you have any questions or comments. Thank you.

Joseph A. Ray, P.G.
Groundwater Branch
Division of Water
14 Reilly Road
Frankfort, KY 40601
(502) 564-3410 ext. 644
FAX (502) 564-9899
<mailto:joe.ray@ky.gov> joe.ray@ky.gov


HUMANE
0527
Town
Creek
Harrodsburg

Layna Thrush

From: Olszowy, Diana (EPPC DNR DOF) [Diana.Olszowy@ky.gov]
Sent: Thursday, July 26, 2007 2:12 PM
To: Layna Thrush
Subject: KYTC Project Item #7-8322.00
Attachments: selecting and planting trees.pdf

This e-mail serves as a standard occurrence report for the proposed Harrodsburg Bypass project being initiated in Mercer 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.

Diana Olszowy
Kentucky Division of Forestry
diana.olszowy@ky.gov

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

August 6, 2007

Layna Thrush
Eco-Tech Consultants
1003 East Main Street
Frankfort, KY 40601

RE: Harrodsburg Bypass Project
KYTC Item No. 7-8344.00
Harrodsburg, Mercer County, Kentucky

Dear Ms. Thrush:

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 indicates that no federal/state threatened and/or endangered fish and wildlife species are known to occur within close proximity to the project area. Please be aware that our database system is a dynamic one that only represents our current knowledge of the various species distributions.

It appears that the proposed project has the potential to impact wetland habitats. KDFWR recommends that you look at the appropriate US Department of Interior National Wetland Inventory Map (NWI) and the appropriate county soil surveys to determine where the proposed project may impact wetlands. Additionally, field verification may be needed to determine the extent and quality of wetland habitats within the project area. Any planning should include measures designed to eliminate and/or reduce impacts to wetland habitats. If impacts cannot be avoided, mitigation should be properly designed and proposed to offset the losses. KDFWR will recommend, at a minimum, a 2:1 mitigation ratio for any permanent loss or degradation of wetland habitats.

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.
- If culverts are used, the culvert should be designed to allow the passage of aquatic organisms.
- Culverts should be designed so that degradation upstream and downstream of the culvert does not occur.
- To compensate for unavoidable impacts to streams, we recommend that possible stream mitigation sites be identified on-site or within the Upper Salt River drainage. Restoration of those sites should incorporated natural stream channel design along with the restoration of its associated riparian areas.
- 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.

ERNIE FLETCHER
GOVERNOR

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

TERESA J. HILL
SECRETARY

17 July 2007

Ms. Layna Thrush
Eco-Tech Consultants
1003 East Main St.
Frankfort, KY 40601

Subject: Proposed US 127 Bypass Project, Mercer County, KY

Dear Ms.Thrush,

The proposed US 127 bypass project in MercerCounty, KY does not influence any Wild Rivers, Outstanding State Resource Waters or known Exceptional Waters. After review of our database, I found ecological data for three Salt River stations within the project area. Enclosed please find these reports. If there are any questions please feel free to call (502-564-3410) or email (john.brumley@ky.gov) me.

Sincerely,

John F. Brumley
Ecological Support Section
Water Quality Branch
Division of Water
14 Reilly Rd.
Frankfort, KY 40601
(502) 564-3410

Macroinvertebrates Sample Results Data

Station ID: DOW12017002 **Ecoregion:** INTERIOR PLATEAU
Basin: SALT **Stream Name:** SALT RIVER
County: MERCER **Map Name:** CORNISHVILLE
Catchment Area: 43 **River Mile:** 130.2 **Stream Order:** 4
Lat Dec: 37.7603 **Long Dec:** -84.8772
Location: TEWMEY LANE

Collection Date: *8/31/1989*

RepNum: *1* ***Collection Method:*** *MULTI-HABITAT* ***Program:*** *INT*
ID By: *S. CALL* ***Collector:*** *S. CALL*

Final ID	*Individuals*
Dugesia sp	24
Ferrissia rivularis	1
Elimia semicarinata	45
Sphaerium fabale	2
Sphaerium simile	1
Heptagenia sp	1
Stenacron interpunctatum	17
Stenonema femoratum	5
Tricorythodes sp	1
Baetis intercalaris	37
Procloeon sp	1
Argia sp	1
Enallagma divagans	2
Ischnura posita	1
Nasiaeschna pentacantha	2
Ranatra nigra	1
Belostoma flumineum	2
Rheumatobates rileyi	1
Trepobates subnitidus	1
Hydroptila sp	1
Cheumatopsyche sp	225
Chimarra sp	1
Peltodytes duodecimpunctatus	1
Cyphon sp	3
Tropisternus blatchleyi blatchleyi	1
Hydroporus blanchardi	3
Dubiraphia vittata	6
Stenelmis crenata	16
Stenelmis sexlineata	3
Stenelmis sp(larvae)	25
Anopheles sp	2
Glyptotendipes sp	2
Omisus sp (Epler)	2
Polypedilum flavum	9
Stenochironomus sp	1
Thienemannimyia gp	8
Lirceus fontinalis	15
Orconectes rusticus	17

Genus Richness:	*35*	***Species Richness:***	*38*
Genus EPT Index:	*9*	***Species EPT Index:***	*9*
Hilsenhoff Biotic Index (HBI):	*5.651*	***Percent EPT:***	*59.34*
Modified Percent EPT:	*13.14*	***Family Richness:***	*24*
Percent Ephemeroptera:	*12.73*	***Family EPT Richness:***	*6*
Percent Chironomidae:	*4.517*	***Family HBI (FBI):***	*5.41*
Percent Oligochaetes:		***Average Tolerance Value:***	*6.69*
Percent Clingers:	*63.44*	***Percent Dominant Five:***	*73.1*
Total No of Individuals (TNI):	*487*	***Percent Nutrient Tolerant:***	*80.49*

56.77
Fair

Collection Date: *10/10/1995*

RepNum: *1* ***Collection Method:*** *MULTI-HABITAT* ***Program:*** *INT*

ID By: *S. CALL, M. VOGEL* ***Collector:*** *S. CALL ET AL.*

Final ID	***Individuals***
Dugesia sp	6
Ferrissia rivularis	4
Elimia semicarinata	200
Helisoma anceps anceps	1
Pisidium sp	1
Sphaerium fabale	2
Sphaerium simile	3
Eclipidrilus sp	3
Branchiura sowerbyi	4
Erpobdella punctata	1
Paraleptophlebia sp	3
Stenacron interpunctatum	82
Stenonema femoratum	6
Caenis latipennis	4
Acerpenna pygmaea	2
Baetis intercalaris	2
Callibaetis sp	1
Argia moesta	14
Argia tibialis	4
Enallagma divagans	3
Ischnura sp	2
Calopteryx maculata	3
Mesovelia mulsanti	2
Sialis sp	1
Cheumatopsyche sp	158
Chimarra sp	8
Psephenus herricki	48
Dubiraphia vittata	23
Stenelmis sexlineata	38
Stenelmis sp(larvae)	83
Anopheles sp	1
Dicranota sp	1
Corynoneura sp	2
Glyptotendipes sp	3
Orthocladius sp	1
Polypedilum flavum	2
Brachydeutera sp	1
Crangonyx sp	1
Lirceus fontinalis	62
Orconectes rusticus	10

Genus Richness:	*37*	*Species Richness:*	*40*
Genus EPT Index:	*9*	*Species EPT Index:*	*9*
Hilsenhoff Biotic Index (HBI):	*5.58*	*Percent EPT:*	*33.41*
Modified Percent EPT:	*13.57*	*Family Richness:*	*27*
Percent Ephemeroptera:	*12.56*	*Family EPT Richness:*	*6*
Percent Chironomidae:	*1.005*	*Family HBI (FBI):*	*5.41*
Percent Oligochaetes:	*1.01*	*Average Tolerance Value:*	*6.47*
Percent Clingers:	*56.65*	*Percent Dominant Five:*	*73.49*
Total No of Individuals (TNI):	*796*	*Percent Nutrient Tolerant:*	*85.80*

56.38
Fair

Station ID: DOW12017004 **Ecoregion:** INTERIOR PLATEAU
Basin: SALT **Stream Name:** SALT RIVER
County: MERCER **Map Name:** CORNISHVILLE
Catchment Area: 61 **River Mile:** 125.3 **Stream Order:** 4
Lat Dec: 37.8 **Long Dec:** -84.8833
Location: DOWNSTREAM OF CONFLUENCE WITH TOWN CREEK

Collection Date: *10/10/1995*

RepNum: *1* ***Collection Method:*** *MULTI-HABITAT* ***Program:*** *INT*
ID By: *S. CALL, M. VOGEL* ***Collector:*** *S. CALL ET AL.*

Final ID	*Individuals*
Dugesia sp	9
Ferrissia rivularis	33
Physella sp	1
Helisoma anceps anceps	1
Pisidium sp	1
Corbicula fluminea	11
UIWCS sp	1
Isonychia sp	1
Stenacron interpunctatum	30
Stenonema femoratum	19
Caenis latipennis	8
Baetis intercalaris	12
Argia sedula	1
Argia tibialis	35
Enallagma divagans	41
Calopteryx maculata	4
Nasiaeschna pentacantha	7
Neoplea striola	1
Belostoma lutarium	1
Corydalus cornutus	3
Cheumatopsyche sp	300
Chimarra sp	7
Dubiraphia vittata	18
Stenelmis sexlineata	43
Stenelmis sp(larvae)	68
Tipula sp	1
Chironomus decorus gp	2
Glyptotendipes meridionalis	6
Nanocladius sp	1
Polypedilum flavum	3
Polypedilum illinoense	2
Rheotanytarsus sp	1
Thienemanniella sp	1
Simulium vittatum	10
Hyalella azteca	11

Lirceus fontinalis	4
Orconectes rusticus	8

Genus Richness:	*34*	***Species Richness:***	*37*
Genus EPT Index:	*7*	***Species EPT Index:***	*7*
Hilsenhoff Biotic Index (HBI):	*6.601*	***Percent EPT:***	*53.39*
Modified Percent EPT:	*10.91*	***Family Richness:***	*26*
Percent Ephemeroptera:	*9.915*	***Family EPT Richness:***	*6*
Percent Chironomidae:	*2.266*	***Family HBI (FBI):***	*5.85*
Percent Oligochaetes:	*0.14*	***Average Tolerance Value:***	*6.94*
Percent Clingers:	*71.38*	***Percent Dominant Five:***	*68.98*
Total No of Individuals (TNI):	*706*	***Percent Nutrient Tolerant:***	*67.56*

54.77
Fair

Station ID: DOW12017005 **Ecoregion:** INTERIOR PLATEAU
Basin: SALT **Stream Name:** SALT RIVER
County: MERCER **Map Name:** HARRODSBURG
Catchment Area: 51 **River Mile:** 128.5 **Stream Order:** 4
Lat Dec: 37.7797 **Long Dec:** -84.8711
Location: BELOW CONFLUENCE WITH TOWN CREEK

Collection Date: *10/10/1995*

RepNum: *1* ***Collection Method:*** *MULTI-HABITAT* ***Program:*** *INT*
ID By: *S. CALL, M. VOGEL* ***Collector:*** *S. CALL ET AL.*

Final ID	***Individuals***
Dugesia sp	5
Unid. Planariid sp	1
Ferrissia rivularis	34
Physella sp	2
Elimia semicarinata	45
Corbicula fluminea	5
Nais communis	1
Ilylodrilus templetoni	2
Limnodrilus hoffmeisteri	9
UIWCS sp	36
Helobdella stagnalis	1
Stenonema femoratum	3
Caenis latipennis	33
Argia sedula	2
Argia tibialis	10
Enallagma civile	4
Enallagma divagans	70
Enallagma signatum	3
Calopteryx maculata	2
Nannothemis bella	1
Neoplea striola	1
Trepobates sp	1
Cheumatopsyche sp	3
Peltodytes duodecimpunctatus	1
Peltodytes lengi	4
Berosus sp(larvae)	2
Stenelmis sp(larvae)	9
Chironomus decorus gp	95
Chironomus sp	5
Clinotanypus sp	1
Dicrotendipes simpsoni	4
Glyptotendipes sp	6
Goeldichironomus holoprasinus	9

Polypedilum illinoense	3
Lirceus fontinalis	5
Orconectes rusticus	4

Genus Richness:	*31*	***Species Richness:***	*36*
Genus EPT Index:	*3*	***Species EPT Index:***	*3*
Hilsenhoff Biotic Index (HBI):	*7.65*	***Percent EPT:***	*9.241*
Modified Percent EPT:	*8.53*	***Family Richness:***	*21*
Percent Ephemeroptera:	*8.53*	***Family EPT Richness:***	*3*
Percent Chironomidae:	*29.14*	***Family HBI (FBI):***	*7.25*
Percent Oligochaetes:	*11.61*	***Average Tolerance Value:***	*8.03*
Percent Clingers:	*4.265*	***Percent Dominant Five:***	*66.35*
Total No of Individuals (TNI):	*422*	***Percent Nutrient Tolerant:***	*51.18*

27.22

Poor

Diatoms Sample Results Data

Station ID: DOW12017002 **Ecoregion:** INTERIOR PLATEAU
Basin: SALT **Stream Name:** SALT RIVER
County: MERCER **Map Name:** CORNISHVILLE
Catchment Area: 43 **River Mile:** 130.2 **Stream Order:** 4
Lat Dec: 37.7603 **Long Dec:** -84.8772
Location: TEWMEY LANE

Collection Date: *8/31/1989*

RepNum: *1* ***Substrate:*** *N* ***Program:*** *INT*
ID By: *L. METZMEIER* ***Collector:*** *L. METZMEIER*

Diatom Final ID	*Individuals*
Achnanthes pinnata	1
Achnanthidium minutissimum	3
Amphora perpusilla	6
Aulacoseira granulata	0
Caloneis bacillum	2
Cocconeis pediculus	3
Cocconeis placentula var. euglypta	12
Cyclotella atomus	5
Cyclotella pseudostelligera	0
Cymbella minuta	0
Diadesmis confervacea	0
Diatoma vulgare	0
Fistulifera pelliculosa	1
Gomphonema angustatum	8
Gomphonema parvulum	9
Gyrosigma spencerii var. curvula	0
Luticola mutica	0
Melosira varians	3
Navicula capitatoradiata	0
Navicula gregaria	0
Navicula hustedtii	0
Navicula menisculus var. upsaliensis	0
Navicula minima	316
Navicula radiosa var. tenella	69
Navicula secreta var. apiculata	0
Navicula subminuscula	12
Navicula symmetrica	1
Navicula tripunctata	1
Navicula viridula var. rostellata	0
Nitzschia amphibia	10
Nitzschia angustata var. acuta	1
Nitzschia dissipata	12
Nitzschia frustulum	0
Nitzschia palea	2
Nitzschia perminuta	1
Nitzschia sp.	3
Planothidium lanceolata	2
Rhoicosphenia curvata	15

Taxa Richness (TR):	*38*	***Diversity (H):***	*0.659*
Total No of Individuals (TNI):	*498*	***Percent Sensitive Individuals:***	*11.44*
Generic Richness:	*19*	***Pollution Tolerance Index (PTI):***	*1.413*
Cymbella Group Richness (CGR):	*1*	***%Dominant Taxon:***	*63.454*
Division Richness:	*1*	***%Cymbella/Achnanthes Complex:***	*1.2048*
Fragillaria Group Richness (FGR):		***%Navicula+Nitschia+Surirella :***	*86.145*

24,34902
Poor

Collection Date: *10/10/1995*

RepNum: *1* ***Substrate:*** *N* ***Program:*** *INT*

ID By: *L. METZMEIER* ***Collector:*** *S. CALL*

Diatom Final ID	***Individuals***
Achnanthidium minutissimum	5
Amphora ovalis var. pediculus	3
Amphora perpusilla	36
Aulacoseira granulata	5
Caloneis bacillum	1
Cocconeis pediculus	1
Cocconeis placentula var. euglypta	9
Cyclotella atomus	2
Cyclotella meneghiniana	10
Cyclotella pseudostelligera	4
Cyclotella stelligera	1
Diadesmis confervacea	9
Fragilaria vaucheriae	0
Gomphonema abbreviatum	10
Gomphonema angustatum	0
Gomphonema augur	0
Gomphonema clevei	17
Gomphonema parvulum	4
Gyrosigma scalproides	2
Luticola mutica	0
Melosira varians	1
Navicula arvensis	0
Navicula contenta var. biceps	0
Navicula cryptocephala	1
Navicula cryptocephala var. veneta	1
Navicula lanceolata	2
Navicula menisculus var. upsaliensis	6
Navicula minima	172
Navicula radiosa var. tenella	8
Navicula schroeteri var. escambia	3
Navicula seminulum	25
Navicula subminuscula	6
Navicula tripunctata var. schizonemoides	0
Nitzschia agnita	0
Nitzschia amphibia	99
Nitzschia capitellata	1
Nitzschia dissipata	7
Nitzschia frustulum	1
Nitzschia gracilis	1
Nitzschia inconspicua	2
Nitzschia palea	11
Nitzschia sp.1	0
Planothidium lanceolata	8
Planothidium lanceolata var. dubia	3

Rhoicosphenia curvata	16
Sellaphora pupula	2
Sellaphora pupula f. rostrata	1
Staurosira construens var. venter	1
Stephanodiscus subtilis	2
Synedra acus	1
Thalassiosira weissflogii	0

Taxa Richness (TR):	*51*	***Diversity (H):***	*1.076*
Total No of Individuals (TNI):	*500*	***Percent Sensitive Individuals:***	*26.6*
Generic Richness:	*21*	***Pollution Tolerance Index (PTI):***	*1.602*
Cymbella Group Richness (CGR):		***%Dominant Taxon:***	*34.4*
Division Richness:	*1*	***%Cymbella/Achnanthes Complex:***	*3.2*
Fragillaria Group Richness (FGR):	*3*	***%Navicula+Nitschia+Surirella :***	*71.6*

39.70057
Fair

Station ID: DOW12017004 **Ecoregion:** INTERIOR PLATEAU
Basin: SALT **Stream Name:** SALT RIVER
County: MERCER **Map Name:** CORNISHVILLE
Catchment Area: 61 **River Mile:** 125.3 **Stream Order:** 4
Lat Dec: 37.8 **Long Dec:** -84.8833
Location: DOWNSTREAM OF CONFLUENCE WITH TOWN CREEK

Collection Date: *10/10/1995*

RepNum: *1* ***Substrate:*** *N* ***Program:*** *INT*
ID By: *L. METZMEIER* ***Collector:*** *S. CALL*

Diatom Final ID	***Individuals***
Achnanthes lapponica var. ninckei	3
Achnanthidium minutissimum	3
Amphipleura pellucida	0
Amphora ovalis var. pediculus	7
Amphora perpusilla	31
Amphora submontana	1
Caloneis bacillum	1
Cocconeis pediculus	0
Cocconeis placentula var. euglypta	4
Cyclotella meneghiniana	2
Cymbella minuta	0
Cymbella tumida	2
Cymbella turgidula	0
Diadesmis confervacea	0
Diploneis puella	0
Fistulifera pelliculosa	3
Fragilaria vaucheriae	2
Frustulia rhomboides var. amphipleuroides	0
Gomphonema gracile	1
Gomphonema parvulum	2
Gyrosigma scalproides	0
Luticola mutica	9
Melosira varians	5
Navicula accomoda	0
Navicula capitatoradiata	1
Navicula cryptocephala	0
Navicula cryptocephala var. exilis	3
Navicula cryptocephala var. veneta	5
Navicula hustedtii	24
Navicula lanceolata	1
Navicula menisculus var. upsaliensis	0

Navicula minima	118
Navicula radiosa	0
Navicula radiosa var. tenella	23
Navicula schroeteri var. escambia	14
Navicula secreta var. apiculata	7
Navicula seminulum	20
Navicula tenelloides	18
Navicula tripunctata	0
Navicula tripunctata var. schizonemoides	7
Navicula viridula var. rostellata	15
Nitzschia amphibia	8
Nitzschia capitellata	1
Nitzschia chasei	2
Nitzschia coarctata	0
Nitzschia constricta	4
Nitzschia dissipata	101
Nitzschia hungarica	0
Nitzschia linearis	0
Nitzschia palea	13
Nitzschia perminuta	1
Nitzschia recta	0
Nitzschia sociabilis	14
Nitzschia sp.1	2
Nitzschia tropica	1
Pinnularia microstauron	0
Planothidium lanceolata	0
Planothidium lanceolata var. dubia	1
Reimeria sinuata	0
Rhoicosphenia curvata	15
Staurosira construens var. venter	1
Surirella angustata	0
Surirella linearis var. helvetica	0
Surirella ovata	3
Thalassiosira weissflogii	0
Tryblionella victoriae	2

Taxa Richness (TR):	*66*	***Diversity (H):***	*1.213*
Total No of Individuals (TNI):	*501*	***Percent Sensitive Individuals:***	*47.5*
Generic Richness:	*27*	***Pollution Tolerance Index (PTI):***	*2.139*
Cymbella Group Richness (CGR):	*4*	***%Dominant Taxon:***	*23.553*
Division Richness:	*1*	***%Cymbella/Achnanthes Complex:***	*1.7964*
Fragillaria Group Richness (FGR):	*2*	***%Navicula+Nitschia+Surirella :***	*83.832*

45,4894

Fair

Station ID: DOW12017005 **Ecoregion:** INTERIOR PLATEAU
Basin: SALT **Stream Name:** SALT RIVER
County: MERCER **Map Name:** HARRODSBURG
Catchment Area: 51 **River Mile:** 128.5 **Stream Order:** 4
Lat Dec: 37.7797 **Long Dec:** -84.8711
Location: BELOW CONFLUENCE WITH TOWN CREEK

Collection Date: *10/10/1995*

RepNum: *1* ***Substrate:*** *N* ***Program:*** *INT*
ID By: *L. METZMEIER* ***Collector:*** *S. CALL*

Diatom Final ID	***Individuals***
Achnanthidium minutissimum	5
Amphora ovalis var. pediculus	3
Amphora perpusilla	1

Amphora submontana	1
Caloneis bacillum	0
Cocconeis pediculus	1
Cocconeis placentula var. euglypta	11
Craticula cuspidata	0
Cyclotella atomus	3
Cyclotella meneghiniana	2
Cylindrotheca gracilis	1
Cymbella minuta	0
Diadesmis confervacea	17
Diploneis puella	0
Fallacia pygmaea	1
Fistulifera pelliculosa	22
Gomphonema affine	1
Gomphonema angustatum	2
Gomphonema augur	1
Gomphonema gracile	0
Gomphonema parvulum	18
Gyrosigma spencerii var. curvula	0
Luticola mutica	5
Melosira varians	3
Navicula cryptocephala	4
Navicula cryptocephala var. veneta	8
Navicula hustedtii	16
Navicula lanceolata	3
Navicula menisculus var. upsaliensis	0
Navicula minima	125
Navicula secreta var. apiculata	1
Navicula seminulum	33
Navicula subminuscula	74
Navicula symmetrica	0
Navicula tripunctata	1
Navicula tripunctata var. schizonemoides	4
Navicula viridula var. linearis	0
Navicula viridula var. rostellata	8
Nitzschia acicularis	1
Nitzschia agnita	2
Nitzschia amphibia	40
Nitzschia constricta	2
Nitzschia dissipata	0
Nitzschia linearis	0
Nitzschia palea	53
Nitzschia perminuta	2
Nitzschia recta	2
Nitzschia sp.1	1
Nitzschia tropica	1
Pinnularia microstauron	1
Planothidium lanceolata	1
Planothidium lanceolata var. dubia	2
Rhoicosphenia curvata	7
Sellaphora pupula	4
Staurosira construens var. venter	5
Surirella angustata	0
Surirella ovata	0

Synedra ulna	0
Thalassiosira weissflogii	1
Tryblionella levidensis	0

Taxa Richness (TR):	*60*	***Diversity (H):***	*1.183*
Total No of Individuals (TNI):	*500*	***Percent Sensitive Individuals:***	*14.4*
Generic Richness:	*27*	***Pollution Tolerance Index (PTI):***	*1.434*
Cymbella Group Richness (CGR):	*1*	***%Dominant Taxon:***	*25*
Division Richness:	*1*	***%Cymbella/Achnanthes Complex:***	*1.6*
Fragillaria Group Richness (FGR):	*2*	***%Navicula+Nitschia+Surirella :***	*86*

38.34365

Poor

Fishes Sample Results Data

Station ID: DOW12017002
Basin: SALT
County: MERCER
Catchment Area: 43
Lat Dec: 37.7603
Location: TEWMEY LANE

Ecoregion: INTERIOR PLATEAU
Stream Name: SALT RIVER
Map Name: CORNISHVILLE
River Mile: 130.2
Long Dec: -84.8772

Stream Order: 4

Collection Date: *8/31/1989*

RepNum: *1*
ID By: *SMATHERS*
Duration:

Collection Method: *SEINE*
Collector: *CALL, COLTEN, COHN*
Program: *INT*

Fish Final ID	*Individuals*
Campostoma anomalum	2
Luxilus chrysocephalus	32
Lythrurus fasciolaris	35
Pimephales notatus	15
Cottus carolinae	8
Lepomis macrochirus	24
Lepomis megalotis	2
Etheostoma blennioides	6
Etheostoma flabellare	13
Etheostoma nigrum	9

Native Species Richness: *10*
Darter + Madtom + Sculpin: *4*
Water Column Richness: *2*
Intolerant Richness: *1*
Top Carnivore Richness:
Simple Lithophil Richness: *2*
Minnow Richness: *4*
Headwater Richness: *2*
Darter Richness: *3*

Taxa Richness (TR): *10*
Total No of Individuals (TNI): *146*
Percent Omnivores: *10.27*
Percent Insectivores excluding Tolerants: *50.00*
Percent Tolerants: *48.63*
Percent Pioneers: *56.16*
Percent Facultative Headwater: *85.61*

34
Fair

Collection Date: *10/10/1995*

RepNum: *1*
ID By: *SMATHERS*
Duration:

Collection Method: *SEINE*
Collector: *MILLS, ROTH, BESHOAR*
Program: *INT*

Fish Final ID	*Individuals*
Campostoma anomalum	3
Hybopsis amblops	2
Luxilus chrysocephalus	42
Lythrurus fasciolaris	70
Notropis boops	1
Pimephales notatus	34
Cottus carolinae	9
Lepomis humilis	2
Lepomis macrochirus	1
Lepomis megalotis	2
Micropterus punctulatus	4
Micropterus salmoides	1
Etheostoma blennioides	5
Etheostoma flabellare	4
Etheostoma nigrum	5

Native Species Richness:	15	*Taxa Richness (TR):*	15
Darter + Madtom + Sculpin:	4	*Total No of Individuals (TNI):*	185
Water Column Richness:	6	*Percent Omnivores:*	18.37
Intolerant Richness:	2	*Percent Insectivores excluding Tolerants:*	54.05
Top Carnivore Richness:	2	*Percent Tolerants:*	42.16
Simple Lithophil Richness:	4	*Percent Pioneers:*	46.48
Minnow Richness:	6	*Percent Facultative Headwater:*	92.97
Headwater Richness:	2		
Darter Richness:	3		

43
Fair

Station ID:	DOW12017004	**Ecoregion:**	INTERIOR PLATEAU
Basin:	SALT	**Stream Name:**	SALT RIVER
County:	MERCER	**Map Name:**	CORNISHVILLE
Catchment Area:	61	**River Mile:**	125.3
Lat Dec:	37.8	**Long Dec:**	-84.8833
Location:	DOWNSTREAM OF CONFLUENCE WITH TOWN CREEK		

Stream Order: 4

Collection Date:	*10/10/1995*		
RepNum:	*1*	*Collection Method:*	*SEINE*
ID By:	*SMATHERS*	*Collector:*	*MILLS, BESHOAR, BRUMLEY*
Duration:		*Program:*	*INT*

Fish Final ID	*Individuals*
Campostoma anomalum	9
Luxilus chrysocephalus	6
Lythrurus fasciolaris	116
Pimephales notatus	9
Semotilus atromaculatus	2
Gambusia affinis	3
Cottus carolinae	2
Lepomis macrochirus	14
Lepomis megalotis	24
Etheostoma blennioides	8
Etheostoma flabellare	5

Native Species Richness:	11	*Taxa Richness (TR):*	11
Darter + Madtom + Sculpin:	3	*Total No of Individuals (TNI):*	198
Water Column Richness:	2	*Percent Omnivores:*	5.555
Intolerant Richness:	1	*Percent Insectivores excluding Tolerants:*	78.28
Top Carnivore Richness:		*Percent Tolerants:*	17.17
Simple Lithophil Richness:	2	*Percent Pioneers:*	27.77
Minnow Richness:	5	*Percent Facultative Headwater:*	95.45
Headwater Richness:	2		
Darter Richness:	2		

39
Fair

Station ID:	DOW12017005	**Ecoregion:**	INTERIOR PLATEAU
Basin:	SALT	**Stream Name:**	SALT RIVER
County:	MERCER	**Map Name:**	HARRODSBURG
Catchment Area:	51	**River Mile:**	128.5
Lat Dec:	37.7797	**Long Dec:**	-84.8711
Location:	BELOW CONFLUENCE WITH TOWN CREEK		

Stream Order: 4

Collection Date:	*10/10/1995*		
RepNum:	*1*	*Collection Method:*	*SEINE*
ID By:	*SMATHERS*	*Collector:*	*MILLS, COLTEN, BESHOAR*
Duration:		*Program:*	*INT*

Fish Final ID	*Individuals*
Campostoma anomalum	2
Luxilus chrysocephalus	3
Pimephales notatus	3

Gambusia affinis	2
Cottus carolinae	1
Lepomis cyanellus	2
Lepomis macrochirus	14
Lepomis megalotis	61
Micropterus salmoides	2
Etheostoma blennioides	3
Etheostoma flabellare	2

Native Species Richness: *11*
Darter + Madtom + Sculpin: *3*
Water Column Richness: *1*
Intolerant Richness: *1*
Top Carnivore Richness: *1*
Simple Lithophil Richness: *2*
Minnow Richness: *3*
Headwater Richness: *2*
Darter Richness: *2*

Taxa Richness (TR): *11*
Total No of Individuals (TNI): *95*
Percent Omnivores: *3.157*
Percent Insectivores excluding Tolerants: *70.53*
Percent Tolerants: *27.36*
Percent Pioneers: *87.36*
Percent Facultative Headwater: *96.84*

31
Fair

Chemistry Sample Results Data

Station ID: DOW12017002
Basin: SALT
County: MERCER
Catchment Area: 43
Lat Dec: 37.7603
Location: TEWMEY LANE

Ecoregion: INTERIOR PLATEAU
Stream Name: SALT RIVER
Map Name: CORNISHVILLE
River Mile: 130.2
Long Dec: -84.8772

Stream Order: 4

Collection Date: *7/12/1989*

RepNum: *1*
Collector: *S. CALL, S. COHN, LC*

Equipment:

Program: *INT*

Chemical Parameter	*Value*	*Collection Method*
Alkalinity	142	Grab;reported
Ammonia	0.081	Grab;reported
Chloride	7.1	Grab;reported
Hardness	173	Grab;reported
Nitrate	1.02	Grab;reported
pH	8.4	Grab;reported
Specific Conductance	349	Grab;reported
TDS	206	Grab;reported
TKN	0.716	Grab;reported
Total P	0.2	Grab;reported
TSS	8	Grab;reported
Turbidity	5.3	Grab;reported

APPENDIX C.
PHOTOGRAPHS

Photo 1. Salt River looking downstream at the KY 152 bridge.

Photo 2. Salt River looking upstream from KY 1989 bridge.

Photo 3. Salt River near its confluence with Town Creek.

Photo 4. Town Creek west of the water treatment facility.

Photo 5. Town Creek behind water treatment facility.

Photo 6. Dam on Salt River upstream of the KY 152 bridge.

Photo 7. Mapped NWI PFO wetland in northwest corner of the study area that did not possess wetland hydrology.

Photo 8. Possible isolated wetland just south of the water treatment plant.

Photo 9. Two ponds located in the western portion of the study area near KY 1989.

Photo 10. Tributary to Salt River near the KY 152 bridge.

Photo 11. Tributary to Salt River in the northwest corner of the study area.

Photo 12. Typical pasture in the study area.

Photo 13. Industry within the study area.

Photo 14. Construction within the study area.

U.S. Fish & Wildlife Service
Kentucky Ecological Services Field Office

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Endangered, Threatened, & Candidate Species in _____MERCER_____ County, KY

Group	Species	Common name	Legal* Status	Known** Potential	Special Comments
Mammals	*Myotis sodalis*	Indiana bat	E	P	
	Myotis grisescens	gray bat	E	K	
Mussels	*Pleurobema clava*	clubshell	E	K	
	Cyprogenia stegaria	fanshell	E	K	
	Epioblasma torulosa rangiana	Northern riffleshell	E	K	
	Obovaria retusa	ring pink	E	K	
Plants	*Lesquerella globosa*	globe bladderpod	C	K	
	Trifolium stoloniferum	running buffalo clover	E	P	

NOTES:

* Key to notations: E = Endangered, T = Threatened, C = Candidate, CH = Critical Habitat

**Key to notations: K = Known occurrence record within the county, P = Potential for the species to occur within the county based upon historic range, proximity to known occurrence records, biological, and physiographic characteristics.