APPENDIX B-1

Screening Report

JULY 2017

ORX 69

SCREENING REPORT

I-69 Ohio River Crossing Project

Evansville, IN and Henderson, KY

OHIO RIVER CROSSING

Screening Report

I-69 Ohio River Crossing Project
Evansville, IN and Henderson, KY

July 28, 2017

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1 INTRODUCTION

Federal Highway Administration (FHWA), Indiana Department of Transportation (INDOT), and Kentucky Transportation Cabinet (KYTC) issued a Notice of Intent (NOI) in the *Federal Register* on February 13, 2017 for the preparation of an Environmental Impact Statement (EIS) for the I-69 Ohio River Crossing (ORX) project in the Evansville, IN and Henderson, KY area. The NOI represents a revision to the original NOI that was issued for the Project on May 10, 2001. Under the original NOI, a Draft Environmental Impact Statement (DEIS) was completed in 2004, but the Project was subsequently suspended in 2005.

The I-69 ORX project is needed because there is a lack of system linkage across the Ohio River for the National I-69 Corridor. Currently, cross-river traffic is limited to two US 41 bridges, which are classified as principal arterials and do not meet interstate design standards. As a result, the purpose of the Project is to provide system linkage and connectivity between I-69 in Indiana and I-69 in Kentucky that is compatible with the National I-69 Corridor.

The scoping phase represents the first step in this new EIS process for the I-69 ORX project. This phase includes presenting the Project's scope, schedule, purpose and need, and proposed range of alternatives to the agencies and public to obtain their input. As part of this phase, the Project's logical termini and purpose and need were defined, with input from the public and the resource agencies, to help identify and develop a project area and range of alternatives to be considered. The project area for the I-69 ORX project extends from I-69 (formerly I-164) in Indiana on the south side of Evansville (i.e., northern terminus) across the Ohio River to I-69 (formerly Edward T. Breathitt Pennyrile Parkway) southeast of Henderson, KY (i.e., southern terminus) (Figure 1-1). The section of Edward T. Breathitt Pennyrile Parkway between KY 351 and KY 425 that was not re-designated as I-69 has been recently re-designated as US 41. The Project generally encompasses a triangular-shaped area that extends from approximately 0.5 mile west of the I-69/US 41 interchange to 0.5 mile east of the I−69/SR 662 interchange in Indiana and south into Kentucky to I-69 near KY 136.

The screening process has been developed to evaluate and screen a full range of alternatives down to a smaller number that will be carried forward for detailed evaluation in the DEIS. For the screening process, the alternatives are developed at a conceptual level – referred to in this phase of the project as "corridors" – and evaluated using screening criteria that include the corridor's ability to satisfy the Project's purpose and need and a comparison of potential environmental impacts. Additional evaluation criteria included engineering factors, such as potential construction costs, construction complexity, and a qualitative assessment of the relative level of right-of-way and lifecycle/operations and maintenance costs. Corridors were also compared with regard to their potential impacts to environmental resources. Although the resources were not weighted, consideration was given to impacted resources that would require environmental

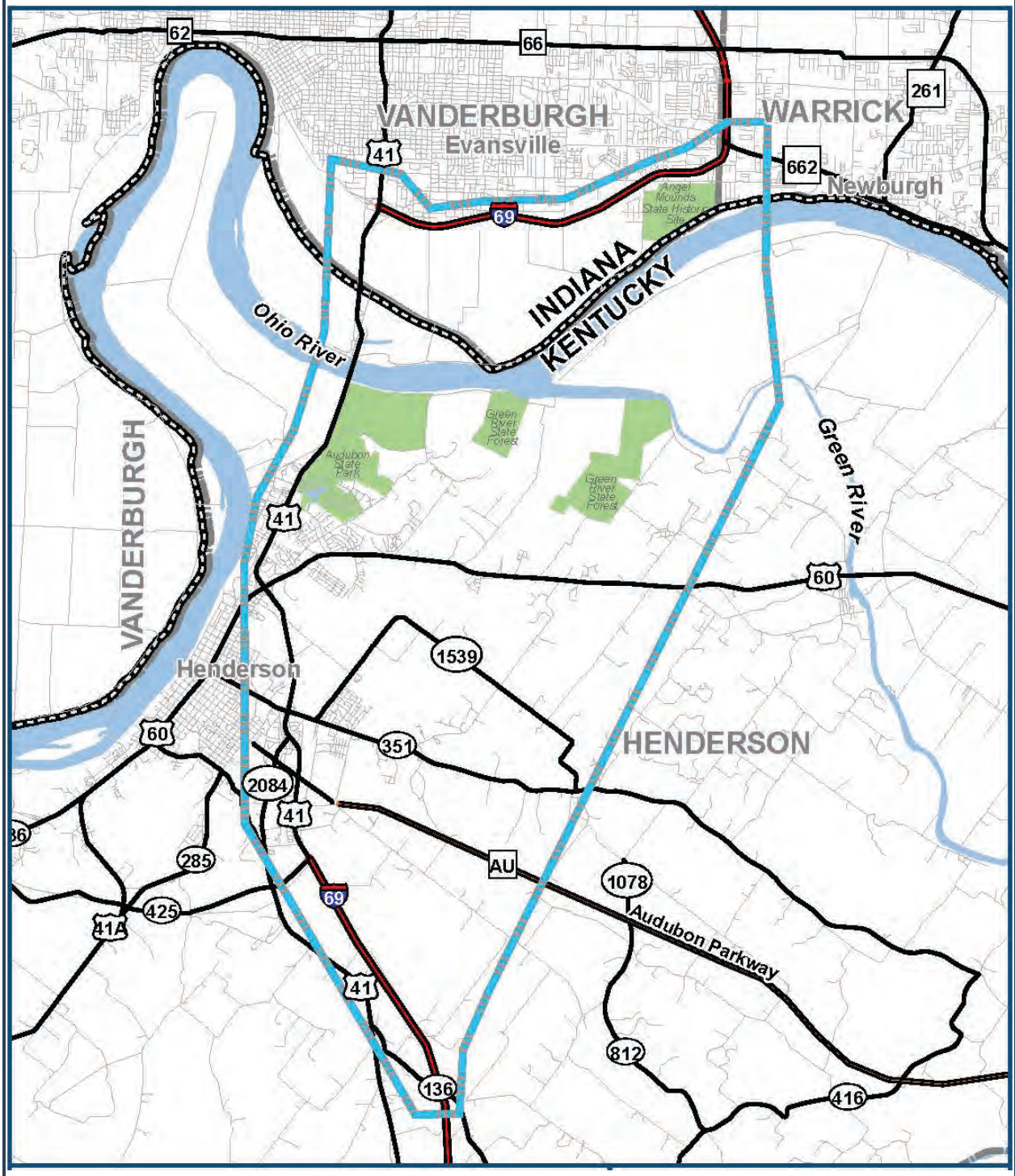

Figure 1-1. Project Area

permits or impact sensitive environmental areas such as wetlands, endangered species habitat, and/or Section 4(f) properties (both natural and historic). The goal of the screening process was to identify financially feasible corridors that satisfied the Project's purpose and need while minimizing environmental impacts.

The purpose of this Screening Report is to present the Project's initial range of alternatives to be considered, discuss the results from the screening analysis, and identify the corridors recommended to be carried forward for further development and evaluation in the DEIS. Section 6 of this report provides additional information about the next steps.

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2 DEVELOPMENT OF ALTERNATIVES

The 2004 *Interstate 69 Henderson, Kentucky to Evansville, Indiana Draft Environmental Impact Statement* and the 2014 *I-69 Feasibility Study, Henderson, Kentucky, SIU #4, Final* were reviewed to determine if any of the alternatives evaluated for those studies warranted consideration for the I-69 ORX project. From this review, the following range of alternatives were developed, renamed, and presented to the public and agencies to obtain their input (Figure 2-1). Based on input from the public and agencies, no changes were made to the range of alternatives (See Section 2.2). All of the corridors were derived from the previous studies and no new corridors were developed.

- **West Corridor 1** (Based on Alternative 7 from the 2014 Feasibility Study)
- **West Corridor 2** (Based on Corridors F and G from the 2004 DEIS and Alternatives 5 and 6 from the 2014 Feasibility Study)
- **Central Corridor 1** (Based on Alternative 1a from the 2014 Feasibility Study)
- **Central Corridor 2** (Based on the Preferred Alternative 2 from the 2004 DEIS)
- **East Corridor** (Based on Alternative 3 from the 2004 DEIS)

For the screening phase of the I-69 ORX project, 2,000-foot-wide study limits were developed for each corridor. Within each, a conceptual roadway design was then developed to establish a footprint to be used for determining potential impacts. The conceptual designs resulted in some modifications to the alternatives from the previous studies to avoid/minimize environmental impacts. In addition to the corridors listed above, the I-69 ORX project will also include a No Build Alternative. More detailed descriptions of the No Build Alternative and the corridors are provided in Section 2.1.

For purposes of the screening process only, for the Central and East Corridors it was assumed that both US 41 bridges would remain open, due to the distance from existing US 41 bridges, and the potential effect that the change in access would have to all of the residents and businesses along US 41. However, during the development of detailed alternatives for the DEIS, options will be considered for closing one or both of the existing US 41 bridges and the local traffic impacts will be evaluated. For West Corridors 1 and 2, it was assumed that both US 41 bridges would be closed due to the corridors' proximity to the US 41 bridges (i.e., from a traffic capacity standpoint, there would be no need to have both the US 41 bridges and the new bridge adjacent to each other and there would also be no change to cross-river access). During development of the detailed alternatives, potential options for the existing US 41 bridges will be evaluated.

2.1 DESCRIPTION OF CORRIDORS

The following sections provide a more detailed description of the range of alternatives that were evaluated as part of the screening process. Conceptual designs were developed for each corridor based on AASHTO's *A Policy on Design Standards – Interstate System.* Previous traffic modeling efforts in the project area, including those prepared as part of the 2004 DEIS, have

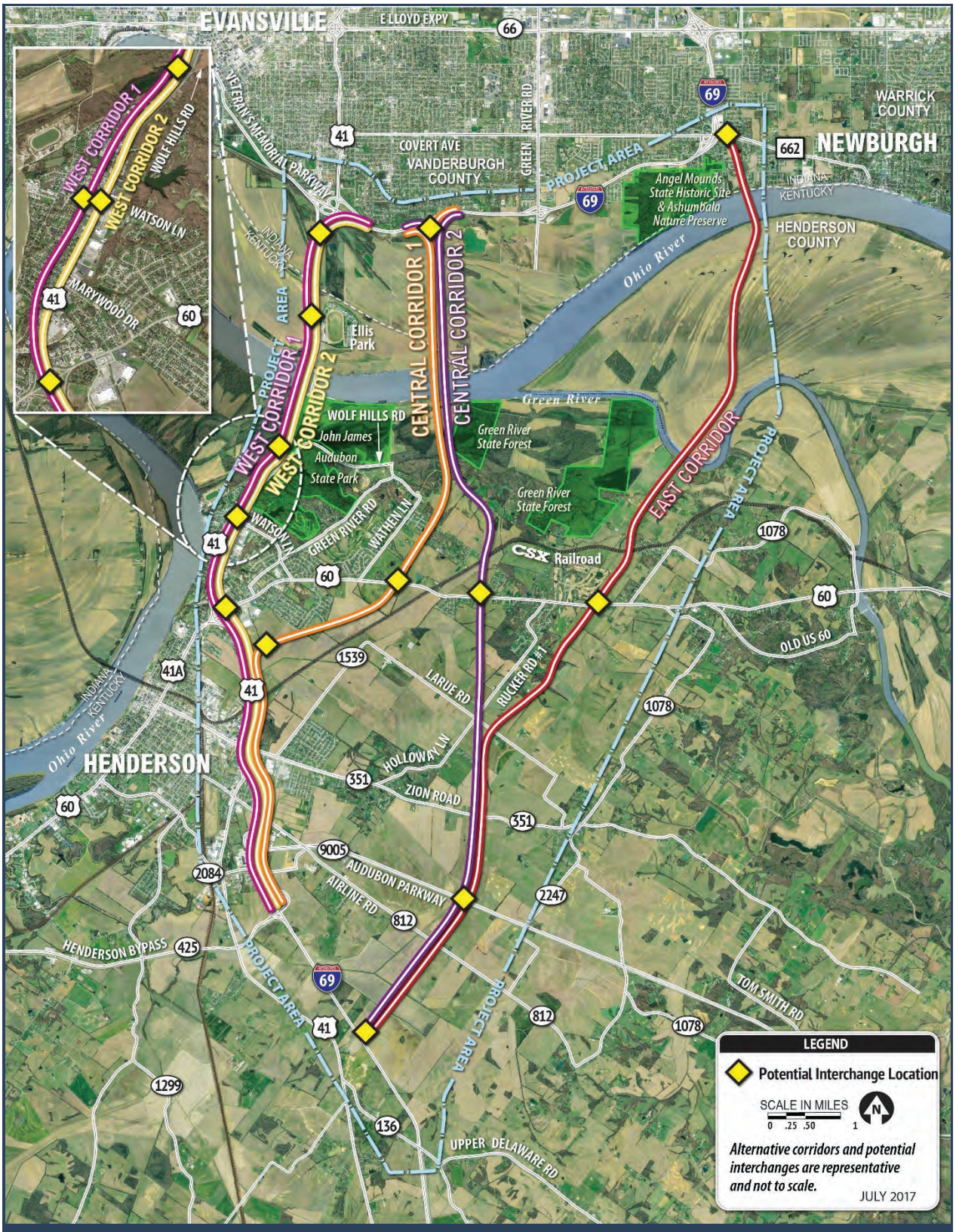

Figure 2-1. Range of Alternatives

forecasted the number of trips across the river both with and without a new I-69 crossing. While the forecasted traffic volumes vary, each indicates the need for a minimum of six travel lanes across the river in the Evansville region within the next 20 years. As such, for West Corridors 1 and 2, which would remove the existing US 41 bridges, as described below, a six-lane bridge was assumed. For Central Corridors 1 and 2 and East Corridor, which for the purposes of screening were assumed to retain both existing US 41 bridges, a four-lane bridge was assumed (a minimum of four lanes is required to meet interstate design standards). The two West Corridors utilize an urban design, reflecting the urbanized setting in those corridors, with a narrower median and a barrier wall. For the Central and East Corridors, a rural design with a wider depressed grass median was used. Based on these design standards, the widths of the study corridors varied based on the number of lanes, median widths, whether it was an urban or rural design, and whether it was a bridge or at-grade facility.

In general, the approximate widths of the corridors ranged from 250 feet to 750 feet. In addition to the mainline, potential interchange locations were identified and conceptual interchange designs developed to establish an estimated impact area. Final decisions regarding each potential interchange location will be made following the screening process and will be based on a range of factors including right-of-way, environmental impact, cost, and compatibility with local agency development plans.

2.1.1 No Build Alternative

Although a No Build Alternative does not meet the purpose and need for the project, it must be included as a project alternative in accordance with the National Environmental Policy Act (NEPA). Thus, the No Build Alternative will be carried forward for further evaluation in the DEIS as a baseline comparison for the build-alternatives. The No Build Alternative assumes that all the transportation projects listed on the Evansville Metropolitan Planning Organization's (EMPO) Transportation Improvement Program (TIP) would be built except for the I-69 ORX project. It is assumed that the No Build Alternative would likely include the major rehabilitation or replacement of the existing US 41 bridges, even though it is currently not included in the EMPO TIP. This assumption is based on a review of recent bridge inspection reports and an understanding of the structure types and traffic loads. It is anticipated that the structural condition of the bridges will continue to deteriorate within the next 25-30 years to the point where a major rehabilitation or replacement of the bridges would be the most cost effective solution. It is expected that such a project would eventually be added to the EMPO TIP before the design year of the I-69 ORX project (i.e., 2045).

2.1.2 West Corridor 1

West Corridor 1 would begin on existing I-69 in Indiana just east of the US 41 interchange and become the through movement. East/west ramp connections would be provided to Veterans Memorial Parkway and north/south ramp connections would be provided to US 41. An interchange may be provided in the area near Ellis Park. I-69 would continue south over the Ohio River with the main span bridge just west of the existing US 41 bridges. The next interchange may be near Wolf Hills Road and could provide access to US 41 as well as Wolf Hills Road and Stratman Road. I-69 would continue south, running near and parallel to US 41, approximately

one block west of US 41 and the commercial strip. The next potential interchange location could be at Watson Lane. I-69 would then continue south and tie into the existing fully-controlled access section of US 41 just south of the US 60 interchange, which would be reconstructed. The portion of US 41 from US 60 to the existing I-69 near KY 425 would be upgraded to interstate standards. The total length for West Corridor 1 is 11.1 miles which include 2.9 miles of existing US 41.

2.1.3 West Corridor 2

West Corridor 2 begins at the same location as West Corridor 1 and follows the same alignment to near Wolf Hills Road where an interchange could be provided to Wolf Hills and Stratman roads. I-69 would then follow existing US 41 through the Henderson commercial strip, with local access provided as needed. The next potential interchange location could be at Watson Lane. I-69 would continue south, within the existing US 41 corridor, to a reconstructed US 60 interchange. West Corridor 2 would then follow the same path as West Corridor 1 along existing US 41 to the existing I-69 near KY 425. The total length for West Corridor 2 is 11.0 miles which include 2.9 miles of existing US 41.

2.1.4 Central Corridor 1

Central Corridor 1 begins at existing I-69 in Indiana just west of the Green River Road interchange. An interchange with Veterans Memorial Parkway could be provided. I-69 would continue south and bridge the floodway and Ohio River just west of a gas transmission line. I-69 would remain just west of the gas transmission line near the Green River State Forest, then turn southwest toward US 60 where an interchange could be provided. I-69 would continue southwest and tie into the existing US 41 with fully-controlled access. An interchange and a connector to US 41 could be provided. The portion of US 41 from the interchange with Central Corridor 1 to existing I-69 would then be upgraded to interstate standards. The total length for Central Corridor 1 is 11.2 miles which include 2.8 miles of existing US 41.

2.1.5 Central Corridor 2

Central Corridor 2 begins at the same location as Central Corridor 1 and follows nearly the same alignment south across the Ohio River except that it would be located on the east side of a gas transmission line. Just south of the Green River State Forest, I-69 would veer southeast, bridging the CSX railroad, and continue to US 60 where an interchange could be provided. The corridor would continue south and cross Larue Road and then Holloway Lane. Both would be bridged over I-69. I-69 would continue south, crossing Zion Road, to a system interchange that could be provided with the Audubon Parkway. Zion Road would be bridged over I-69. I-69 would continue southwest crossing Airline Road and then tie into existing I-69. I-69 would be the through movement, and an interchange could be provided to connect to US 41. The total length for Central Corridor 2 is 13 miles.

2.1.6 East Corridor

The East Corridor begins on existing I-69 in Indiana near SR 662 (Covert Avenue). A system interchange could be provided to the southwest to provide access to SR 662 and existing I-69. The interchange would be just east of Angel Mounds State Historic Site. I-69 would continue south, crossing the Ohio River and its floodway/floodplain, to a new bridge over the Green River just

east of the Green River State Forest. I-69 would then bridge CSX railroad and continue south to a potential interchange at US 60. The interstate would then cross Larue Road and then follow Central Corridor 2 from just south of Larue Road to the existing I-69. Like Central Corridor 2, East Corridor could also include an interchange at Audubon Parkway. The total length for East Corridor is 14.9 miles.

2.2 PUBLIC AND AGENCY REVIEW OF RANGE OF ALTERNATIVES

The proposed range of alternatives to be considered for the I-69 ORX project was presented to local, state, and federal agencies and the public to obtain their input. The alternatives were presented as general corridors.

On April 12, 2017, the range of alternatives was presented at the first Interagency Advisory Committee (IAC) meeting and comments were sought. While there were a number of topics discussed at the April 2017 meeting, the only comment received at the meeting from agencies regarding the range of alternatives was whether the alternatives would include a pedestrian/bicycle pathway. At this phase of the Project, the alternatives do not include a pedestrian/bicycle pathway, but this option will be considered later in the EIS process. No specific comments were provided regarding changes to the range of alternatives. Following the meeting, the United States Environmental Protection Agency (USEPA) and the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology (INDR-DHPA) submitted comments indicating that they agreed with the proposed range of alternatives. Additional comments were received from agencies regarding potential impacts to specific resources, and these comments have been considered as part of the screening evaluation presented in Section 4.

On April 13, 2017, the range of alternatives was presented at the first River Cities Advisory Committee (RCAC) meeting. During and after the meeting, no comments were received regarding the proposed range of alternatives.

Public open houses were held on April, 18, 2017 in Henderson, KY and on April 20, 2017 in Evansville, IN. Additional public feedback regarding the project has been received via phone, visits to the project offices, email, mail, and Facebook.

Based on the input received at the IAC meeting, RCAC meeting, and public open houses, it was determined that no changes to the proposed range of alternatives would be needed for the screening process.

A summary of all the public comments received as of May 31, 2017, is located on the Project website at I69OhioRiverCrossing.com.

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3 SCREENING CRITERIA

As part of the screening process, multiple criteria were established to evaluate and screen the proposed project corridors. They include the purpose and need performance measures, environmental and engineering criteria. Each are detailed below.

3.1 PURPOSE AND NEED

As part of the re-initiation of the I-69 ORX project, a study was conducted to identify the Project's purpose and need that would drive the development of alternatives and aid in the evaluation of these alternatives. Based on the results of this study, and as documented in the Project's purpose and need statement, four primary issues that need to be considered include:

- Lack of National I-69 Corridor system linkage
- High cost of maintaining cross-river mobility on existing facilities
- Unacceptable levels of service for cross-river traffic
- High-crash locations in the I-69/US 41 corridor

Based on the Project's needs, the Project purpose includes the following:

- Provide cross-river system linkage and connectivity between I-69 in Indiana and I-69 in Kentucky that is compatible with the National I-69 Corridor.
- Develop a solution to address long-term cross-river mobility.
- Provide a cross-river connection that reduces traffic congestion and delay.
- Improve safety for cross-river traffic.

From the Project's purpose, the following performance measures were established to be used in evaluating each alternative's ability to satisfy the Project's purpose and need:

- Provide a roadway facility for SIU #4 that can be designated as I-69.
- Provide a cost effective and affordable plan for long-term cross-river mobility.
- Provide a river crossing for I-69 operating at a minimum level of service (LOS) D in the design year (C is preferable).
- Provide a river crossing that improves safety.

These performance measures were used in the screening of project alternatives.

3.2 POTENTIAL ENVIRONMENTAL IMPACTS

Based on an understanding of the project area and the potential impacts of the Project through the review of previous studies (e.g., 2004 DEIS, 2014 Feasibility Study), windshield surveys, and the scoping process, INDOT, KYTC, and FHWA selected the following environmental resources to be used in the screening process. More detailed descriptions of data collection methodologies

for each resource are presented in Section 4.2 along with potential impacts to these resources that would be associated with each corridor.

- Wetlands
- Rivers/Streams/Open Water
- Floodplains/Floodways
- Forested Habitat (Also used for determining potential impacts to suitable habitat for the federally protected Indiana bat and northern long-eared bat.)
- Managed Lands
- Section 4(f) Properties (Public parks/recreation areas and wildlife/waterfowl refuges)
- Section 4(f) Historic Properties/Districts
- Section 6(f) Properties
- Prime Farmland Soil/Active Farmland
- Residential Relocations
- Business Relocations
- Public Facilities and Services
- Religious Facilities Relocations
- Cemeteries
- Known Archaeological Sites/Areas of High Archaeological Probability
- Potential Environmental Justice Populations
- Community Cohesion
- Noise Sensitive Receptors
- Known Underground Storage Tanks (UST)/Contaminated Material Sites

These resources were selected because they represent significant resources used in comparing and screening the corridors and/or would require agency review, approval, and permitting . East of Henderson and south of Evansville, the project area is rural with large tracts of farmland. Urban and suburban areas are limited to the City of Henderson on the west side of the project area and the City of Evansville north of I-69. Commercial development is concentrated along US 41 in Henderson. The northern portion of the project area consists of large tracts of floodplains and floodways associated with the Ohio River, which support large tracts of forested wetlands south of the river. Notable public lands include the John James Audubon State Park and Green River State Forest in Kentucky and the Angel Mounds State Historic Site in Indiana.

3.3 ENGINEERING

Engineering criteria were used to screen the corridors and include Construction Cost, Right-of-Way Cost, Lifecycle/Operation and Maintenance Cost, and Construction Complexity. An explanation for these screening criteria follows:

3.3.1 CONSTRUCTION COST

Costs were developed utilizing major construction items including earthwork, pavement, and structures. These items were quantified based on conceptual level design. Structure costs were determined on a per-square-foot basis. Different per-square-foot costs were used for the main span structure over the Ohio River, the floodway structures, and other structures. Anticipated

noise walls and retaining walls were included in the cost estimates. A unit price per interchange was added: a system interchange was $30 million and a service interchange was $15 million. A 40 percent contingency to account for additional costs associated with such items as final design changes and escalation costs for construction material was added to the total construction cost based on recent experience on other major projects in the region. The uncertainty of the main span bridge type at this early conceptual design phase created the need for a range of construction costs for each corridor.

3.3.2 Right-of-Way Cost

A qualitative analysis was used for estimating right-of-way cost. The number of residential and business relocations were counted within each study corridor. A low/medium/high impact determination was assigned relative to each corridor. A low determination meant few residential and/or business relocations. A high determination meant numerous residential and/or business relocations.

3.3.3 Lifecycle/Operations and Maintenance Cost

A qualitative analysis was used to assess lifecycle/operations and maintenance costs for each corridor and the existing US 41 bridges. Two criteria, one addressing major river crossings and another addressing new roadway, were developed. For major river crossings, the criteria were based on the continued maintenance of the existing US 41 bridges and the construction of new river bridges over the Ohio River and Green River (for the East Corridor). Corridors that retained the existing US 41 bridges (in addition to constructing a new Ohio River bridge) received a high rating. Corridors that replaced the existing US 41 bridges, resulting in only one river bridge to maintain, received a low rating.

For the roadway, the criteria for the lifecycle/operations and maintenance costs was based on the total length of new lane miles for each corridor. This was determined by multiplying the total length of new roadway by the number of lanes provided. The length of new lane miles directly corresponds to the potential lifecycle/operations and maintenance cost.

3.3.4 Construction Complexity

A qualitative analysis was used to assess construction complexity for each corridor. A low/medium/high determination was made relative to each study corridor. The construction complexity reflects how difficult the construction would be due to maintenance of traffic, access requirements, and projected construction time. A low determination meant fewer conflicts with existing traffic, fewer number of parcels and access points, and potential for expedited construction. A high determination meant a greater number of conflicts with existing traffic, a greater number of parcels and access points, and an anticipated longer construction time.

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4 EVALUATION OF CORRIDORS

Each corridor was evaluated based on the screening criteria presented in Section 3. The results of this evaluation are discussed in the following sections for each screening criterion and are summarized in Table 4-1.

4.1 PURPOSE AND NEED

The following sections discuss each corridor's ability to satisfy the Project's purpose and need performance measures.

4.1.1 PROVIDE A ROADWAY FACILITY FOR SIU # 4 THAT CAN BE DESIGNATED AS I-69

Because each corridor would include a new interstate facility across the Ohio River that would connect the existing I-69 sections in Indiana and Kentucky, all the corridors would satisfy this purpose and need criterion.

4.1.2 PROVIDE A COST EFFECTIVE AND AFFORDABLE PLAN FOR LONG-TERM CROSS-RIVER MOBILITY

In the screening process, this purpose and need criterion is based on a synthesis of travel lanes, construction costs, and revenue potential. Each of the corridors would provide sufficient capacity—a minimum of six lanes—across the Ohio River to satisfy long-term mobility demands. The cost-effectiveness of each corridor was assessed at this level based on initial construction cost, and affordability was based on revenue potential.

4.1.3 PROVIDE A RIVER CROSSING FOR I-69 OPERATING AT A MINIMUM LOS D (C IS PREFERABLE)

Based on the qualitative analysis of projected traffic volumes for the year 2040, it was determined that each corridor would likely function at Level of Service (LOS) D or better, based on the number of through lanes provided. Thus, all the corridors would satisfy this purpose and need performance measure.

4.1.4 PROVIDE A RIVER CROSSING THAT IMPROVES SAFETY

Because each corridor would include a new interstate facility across the Ohio River that would connect the existing I-69 sections in Indiana and Kentucky, each project corridor would improve the overall safety for cross-river traffic by shifting traffic from existing US 41, which is classified as a principal arterial, to a new interstate facility. Most of US 41—from the I-69 interchange in Indiana to the US 60 interchange in Kentucky—has been identified as a high-crash location. In addition, the US 41 bridges over the Ohio River have been designated functionally obsolete due to narrow lanes and shoulders.

Table 4-1. Screening Criteria Summary

	WEST CORRIDOR 1	WEST CORRIDOR 2	CENTRAL CORRIDOR 1	CENTRAL CORRIDOR 2	EAST CORRIDOR
Corridor Features					
Corridor Length	8.6	8.7	9.4	13.0	14.9
Travel lanes on new I-69 Ohio River bridge (number)	6	6	4	4	4
Future of Existing US 41 Bridges (assumption reflected in impact analysis below)	Removed	Removed	Retained	Retained	Retained
Purpose and Need					
Provide a roadway facility for SIU #4 that can be designated as I-69.	Yes	Yes	Yes	Yes	Yes
Provide a cost effective and affordable plan for long-term cross-river mobility.	Provides for mobility Moderately cost-effective	Provides for mobility Moderately cost-effective	Provides for mobility Highly cost-effective	Provides for mobility Moderately cost-effective	Provides for mobility Less cost-effective
Provide a river crossing for I-69 operating at a minimum LOS D (C is preferable).	Yes	Yes	Yes	Yes	Yes
Provide a river crossing that improves safety.	Yes	Yes	Yes	Yes	Yes
Potential Environmental Impacts					
Wetlands (type/acres)	Emergent: 2.1 Forest/Shrub: 38.0 Total: 40.1	Emergent: 1.8 Forest/Shrub: 34.4 Total: 36.2	Emergent: 4.5 Forest/Shrub: 49.7 Total: 54.1	Emergent: 3.6 Forest/Shrub: 44.7 Total: 48.3	Emergent: 14.1 Forest/Shrub: 6.5 Total: 20.6
Open Water (acres)	14.2	11.4	9.6	12.3	2.1
River/Streams (number/length in feet)	24 / 11,025	24 / 11,175	31 / 17,431	36 / 27,516	58 / 39,094
Floodway (acres)	28	28	27	35	28
Floodplain Impact (acres)	80	80	165	284	391
Forested Habitat (acres)	69	67	120	118	62
Managed Lands[1] (number/acres)	3 / 51	3 / 42	3 / 49	2 / 34	0 / 0
Potential Section 4(f) Recreation/Refuge Properties (Public parks/recreation areas and wildlife/waterfowl refuges)[2] (number/acres)	0 / 0	0 / 0	0 / 0	1 / 3	0 / 0
Potential Section 4(f) Historic Properties/Districts[2] (number)	2	2	0	0	0
Known Archaeological Sites (number)	1	1	2	2	2

	WEST CORRIDOR 1	WEST CORRIDOR 2	CENTRAL CORRIDOR 1	CENTRAL CORRIDOR 2	EAST CORRIDOR
Areas of High Archaeological Probability (acres)	114	93	357	551	691
Section 6(f) Properties (number/acres)	0	0	0	0	0
Prime Farmland Soils (acres)	288	274	477	767	1,008
Active Farmland (acres)	27	23	394	652	819
Residential Relocations (number)	213	119	2	13	144
Business Relocations (number)	21	58	0	0	0
Public Facilities and Services Relocations (number)	1	0	0	0	0
Religious Facilities Relocations (number)	1	1	0	0	0
Cemeteries (number)	0	0	0	0	0
Potential Impacts to Environmental Justice Populations	Medium	Medium	Low	Low	Medium
Potential Community Cohesion Impacts	High	High	Low	Low	Medium
Noise Sensitive Receptors (number)	1,028	933	378	134	125
Potential UST/Contaminated Material Sites (number)	1	17	2	1	2
Engineering/Cost					
Construction Cost ($ Million Low-High)	920 – 1,060	910 – 1,050	740 – 860	880 – 1,000	1,000 – 1,130
Right-of-Way Cost (Low/Medium/High)	High	High	Low	Low	High
Major River Crossing Lifecycle/ Operation and Maintenance Cost (Low/Medium/High	Low	Low	High	High	High
Roadway Lifecycle/Operation and Maintenance Cost (new lane miles of roadway)	40	40	26	52	60
Construction Complexity (Low/Medium/High)	Medium	High	Low	Low	Medium

Values evaluated as being among the best for the criterion

Values evaluated as being among neither the best nor poorest for the criterion

Values evaluated as being among the poorest for the criterion

[1] Includes IBCF Sites, Eagle Slough Natural Area, NRCS WRP Easements, and/or Vigo Coal Wetland Mitigation Sites.

[2] Impacts to Section 4(f) properties were limited to only the potential direct use of the property. It does not include the evaluation of constructive use or potential adverse effects to historic sites due to proximity impacts (e.g., noise and visual). As part of the DEIS, a more detailed evaluation of Section 4(f) properties, impacts, and avoidance measures, which may include new and/or previously dismissed alternatives, will be conducted.

4.2 ENVIRONMENTAL

The following sections discuss the environmental resources evaluated in the screening process and the potential impacts the corridors could have on each resource. Information on these environmental resources was collected within the project area from existing data, such as the National Wetland Inventory (NWI), National Hydrography Datasets (NHD), previous Project studies, and other sources that are listed for each resource in the following sections. Windshield surveys were performed within the 2,000-foot wide study corridors to supplement the secondary source data.

4.2.1 WETLANDS

Current NWI (United States Fish and Wildlife Service 2017), NHD (United States Geological Survey 2017), and windshield surveys were used to estimate the total acreage of wetlands potentially impacted within the corridors. Wetlands within the project area are shown in Figure 4-1.

Nine wetland features, not previously included in the NWI dataset, were identified via the windshield survey. The approximate boundaries of these features were digitized into the Project's Geographic Information System (GIS) database with appropriate attribute data.

NWI coverage was field-verified via windshield surveys and updated where appropriate, and the Cowardin classification was either confirmed or adjusted. Overall, the NWI mapping appeared to be accurate. One NWI area, previously documented to be a palustrine forested (PFO) wetland, was clear-cut at the time of the windshield survey. In this case, the wetland classification was revised to palustrine emergent (PEM) in the GIS database. The majority of NWI wetlands within the project area are located south of the Ohio River within the Ohio River floodplain. There is also a complex of wetlands immediately south of I-69 in what appear to be borrow pits or strip mines in the Indiana portion of the Project area,.

Where possible, field staff also verified the presence of the wetlands described in the *Preliminary Wetland Delineation Report* (Bernardin Lochmueller and Associates, Inc. 2005), which was prepared for the Preferred Alternative after the 2004 DEIS was published. Ten out of 11 wetlands described in the report were verified and added to the project database. In some cases, the boundaries were slightly larger than listed in the report. Regarding the one wetland that was not added to the database, there was insufficient information provided in the report to accurately determine its location. Because wetland and water resources change over time and wetland delineation guidelines have changed, new wetland surveys will need to be conducted for the I-69 ORX project EIS.

As shown in Table 4-1, Central Corridor 1 and Central Corridor 2 were found to have the greatest potential to impact wetlands. Central Corridor 1 has the potential to impact 54.1 acres of wetlands and Central Corridor 2 has the potential to impact 48.3 acres of wetlands. West Corridor 1 and West Corridor 2 would impact 40.1 and 36.2 acres, respectively. Forest/scrub shrub is the predominant wetland type potentially impacted by the West and Central Corridors. East Corridor is expected to have the least wetland impacts at 20.6 acres. The majority of these wetland impacts (14.1 acres) would be emergent.

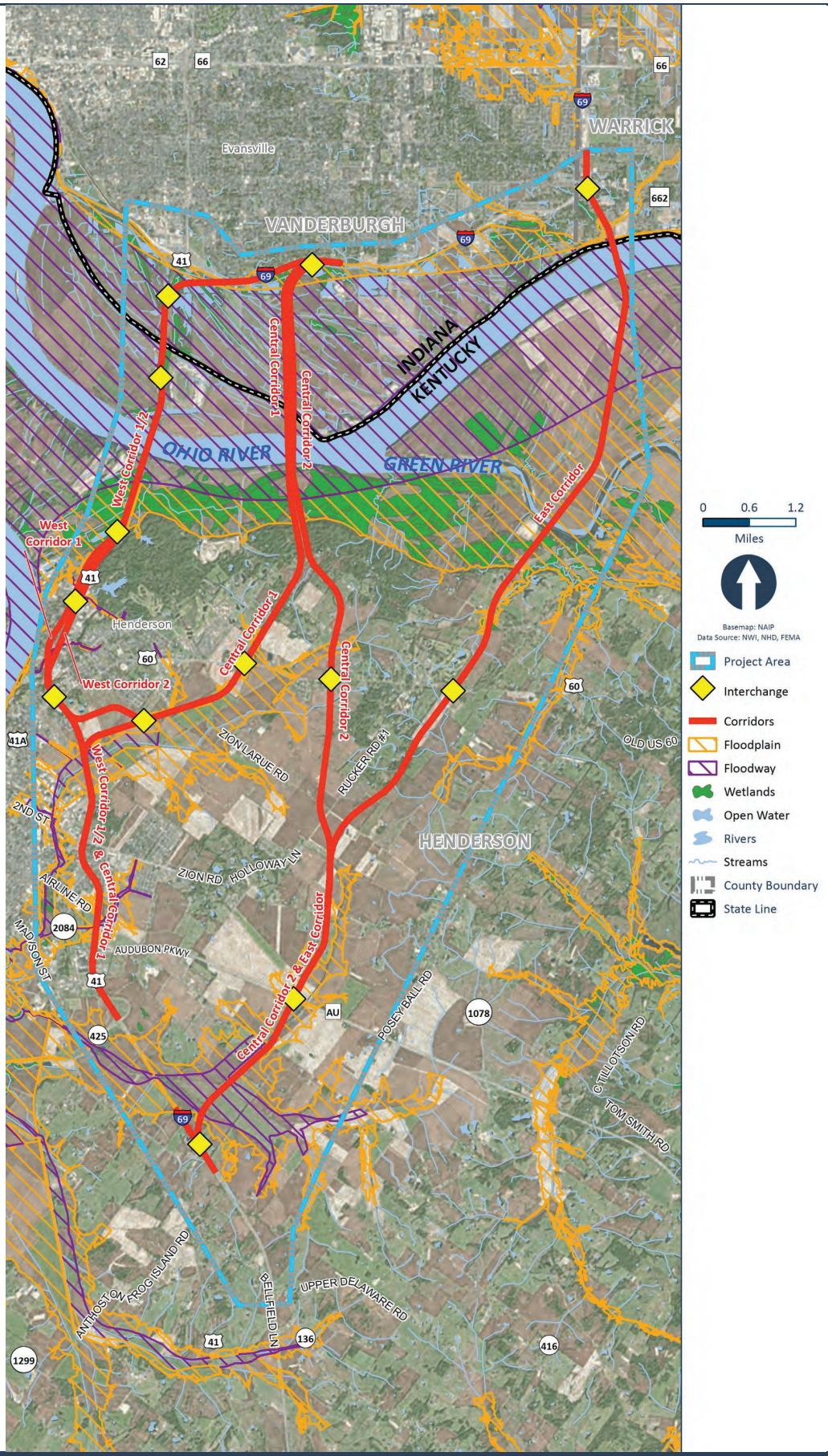

Figure 4-1. Wetlands, Rivers, Streams, Open Water, Floodplains, and Floodways

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4.2.2 RIVERS/STREAMS/OPEN WATER

Data from the NHD and windshield surveys were used to identify rivers, streams, and open water within the project area and the 2,000-foot wide study corridors. Two freshwater ponds, not previously included in the NHD dataset, were identified and digitized with approximate boundaries. Rivers, streams, and open water located within the project area are shown in Figure 4-1.

Major waterbodies within the proposed corridors include the Ohio and Green rivers. Tributaries include North Fork Canoe Creek, Eagle Creek, and Mound Slough. Several agricultural drainage ditches and farm ponds are interspersed throughout the proposed corridors, and many of the streams in the project area have been channelized, ditched, leveed, cleared (Bernardin Lochmueller and Associates, Inc., 2005) (Service., 2017) (Survey, 2017), or have other man-made disturbance that alter their natural character and hydrology.

As shown in Table 4-1, West Corridor 1 has the highest open water impacts at 14.2 acres, while East Corridor has the lowest impacts at 2.1 acres. West Corridor 1 and West Corridor 2 have the fewest number and length of river and stream impacts, with both resulting in 24 crossings and more than 11,000 feet of impacts. The East Corridor has the greatest number at 58 crossings and 39,094 feet of impacts.

4.2.3 FLOODPLAINS/FLOODWAYS

Federal Emergency Management Agency (FEMA) mapping data was used to identify floodways and floodplains within the project area. According to FEMA, a floodway is the "channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height". A floodplain represents the area associated with a river/stream that would be flooded during a 100-year storm event. The major floodways within the project area are associated with the Ohio and Green rivers. Floodplains and floodways are shown in Figure 4-1.

As shown in Table 4-1, the East Corridor would impact the largest area of floodplains, at 391 acres. West Corridor 1 and West Corridor 2 would have the lowest potential impacts to floodplains, at 80 acres each. Floodway impacts are relatively equal among the five corridors, with Central Corridor 2 being slightly higher than the others, at 35 acres.

4.2.4 FORESTED HABITAT

Forested habitats are characterized by a dominance of trees with overlapping crowns forming a canopy cover. These naturally vegetated areas were identified on aerial imagery, and boundaries were digitized in GIS. Forested areas were mapped to demarcate potentially suitable habitat for the northern long-eared bat (*Myotis septentrionalis*) and Indiana bat (*Myotis sodalis*), which are federally protected species under the Endangered Species Act. Records indicate that other federally protected species, including other threatened and endangered species, bald and golden eagles, and migratory birds may be present in the project area. However, available secondary source data does not allow for the analysis of potential impacts to those species in the screening process. This analysis and further agency coordination regarding the potential presence and impacts to other protected species will be included in the DEIS. Forested habitat within the project area is shown in Figure 4-2.

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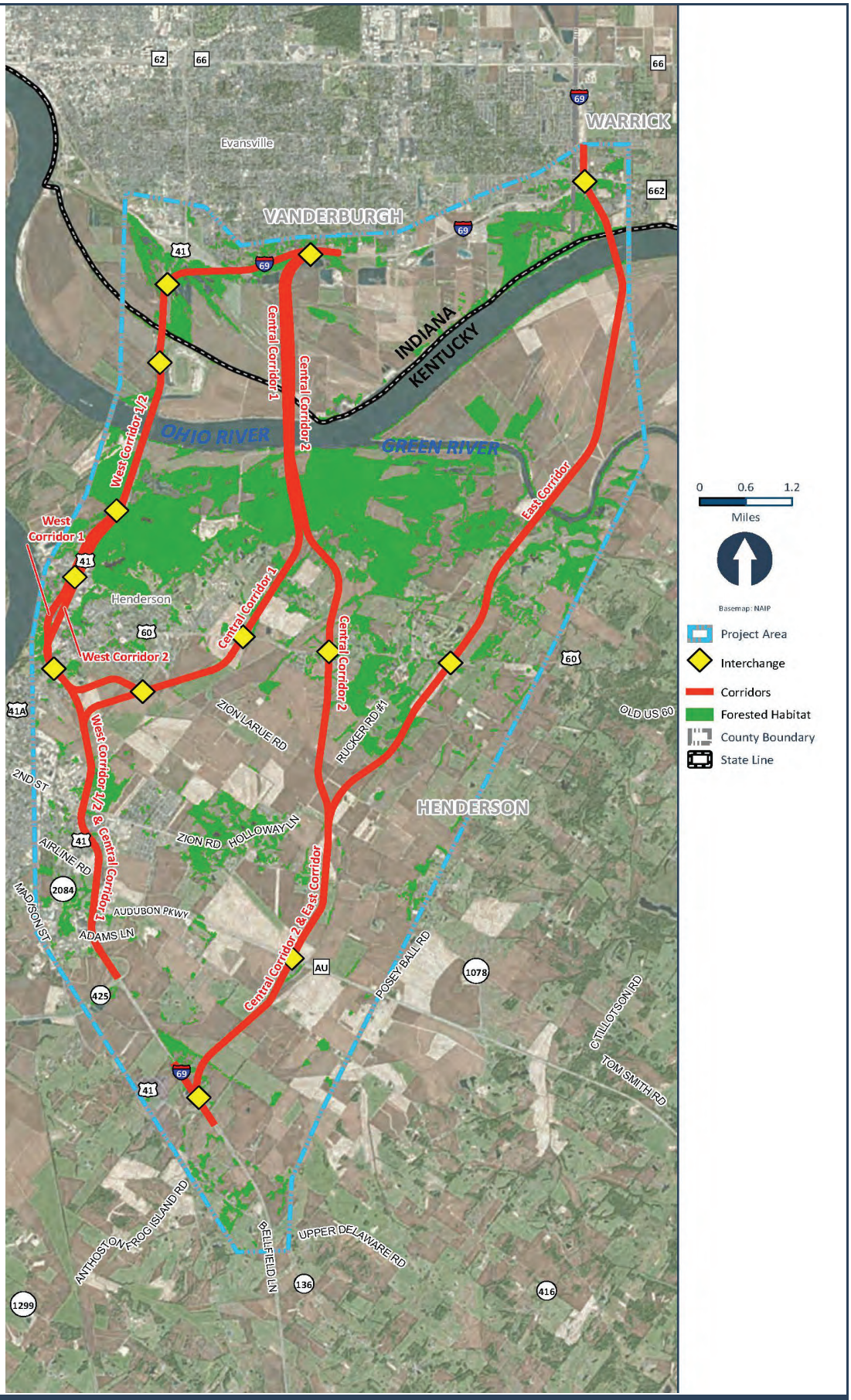

Figure 4-2. Forested Habitat

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The largest contiguous tracts of forested habitat within the project area are south of the Ohio River near John James Audubon State Park, Green River State Forest, and within the floodplains of the Ohio River. Large tracts of forested habitat were also identified along Eagle Creek, south of I-69 in Indiana. Tree rows lining agricultural fields are interspersed throughout the project area. There were 183 forested habitat areas near the corridors that were identified and digitized in GIS.

As shown on Table 4-1, Central Corridor 1 and Central Corridor 2 are expected to have the highest potential impacts to forested habitat at 120 and 118 acres, respectively. The potential impacts to forested habitat from the West and East Corridors range from 62 to 69 acres.

4.2.5 Section 4(f) Properties (Public Parks/Recreation Areas and Wildlife/Waterfowl Refuges)

Section 4(f) properties include public parks, recreation areas, and wildlife and waterfowl refuges. They also include historic sites, which are covered in Section 4.2.14 of this report. Potential Section 4(f) properties were identified within the project area using GIS databases from property assessors' offices in Henderson County, KY and Vanderburgh County, IN, and online resources, particularly for information about park and recreation facilities..

Potential Section 4(f) properties within the project area are shown in Figure 4-3, and potential impacts are presented in Table 4-1. Impacts to potential Section 4(f) properties were limited to only the potential direct use of the property, and do not include the evaluation of constructive use associated with proximity impacts (e.g., noise and visual). As part of the DEIS, a more detailed evaluation of Section 4(f) properties, impacts, and prudent and feasible avoidance measures, which may include new and/or previously dismissed alternatives, will be conducted.

The largest Section 4(f) resource near West Corridor 1 and West Corridor 2 is John James Audubon State Park, which has recently expanded to include an additional 649 acres, for a total size of approximately 1,182 acres. Neither of these corridors would directly impact the park.

The Green River State Forest, a potential Section 4(f) resource with a total of 1,107 acres, is adjacent to Central Corridors 1 and 2. In addition to timber and other resource extraction purposes, this property permits recreational use (e.g., hiking, hunting, camping, etc.). Additional evaluation and coordination, to be completed following the screening process, will be required to determine if Section 4(f) applies to the entire property or only portions of it. While Central Corridor 1 would avoid the state forest, Central Corridor 2 would potentially impact approximately 3 acres of the state forest. No other Section 4(f) properties associated with public parks, recreation areas, and wildlife/waterfowl refuges would be impacted by these corridors.

The Angel Mounds State Historic Site and Ashumbala Nature Preserve in Indiana, which together total more than 1,100 acres, are considered Section 4(f) resources and are located near the East Corridor. Although the East Corridor would not directly impact these properties, concerns were raised in the 2004 DEIS regarding noise, vibration, and visual impacts, and in a letter received May 10, 2017, from the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology (IDNR-DHPA), it was noted that the East Corridor may result in adverse noise and visual impacts.

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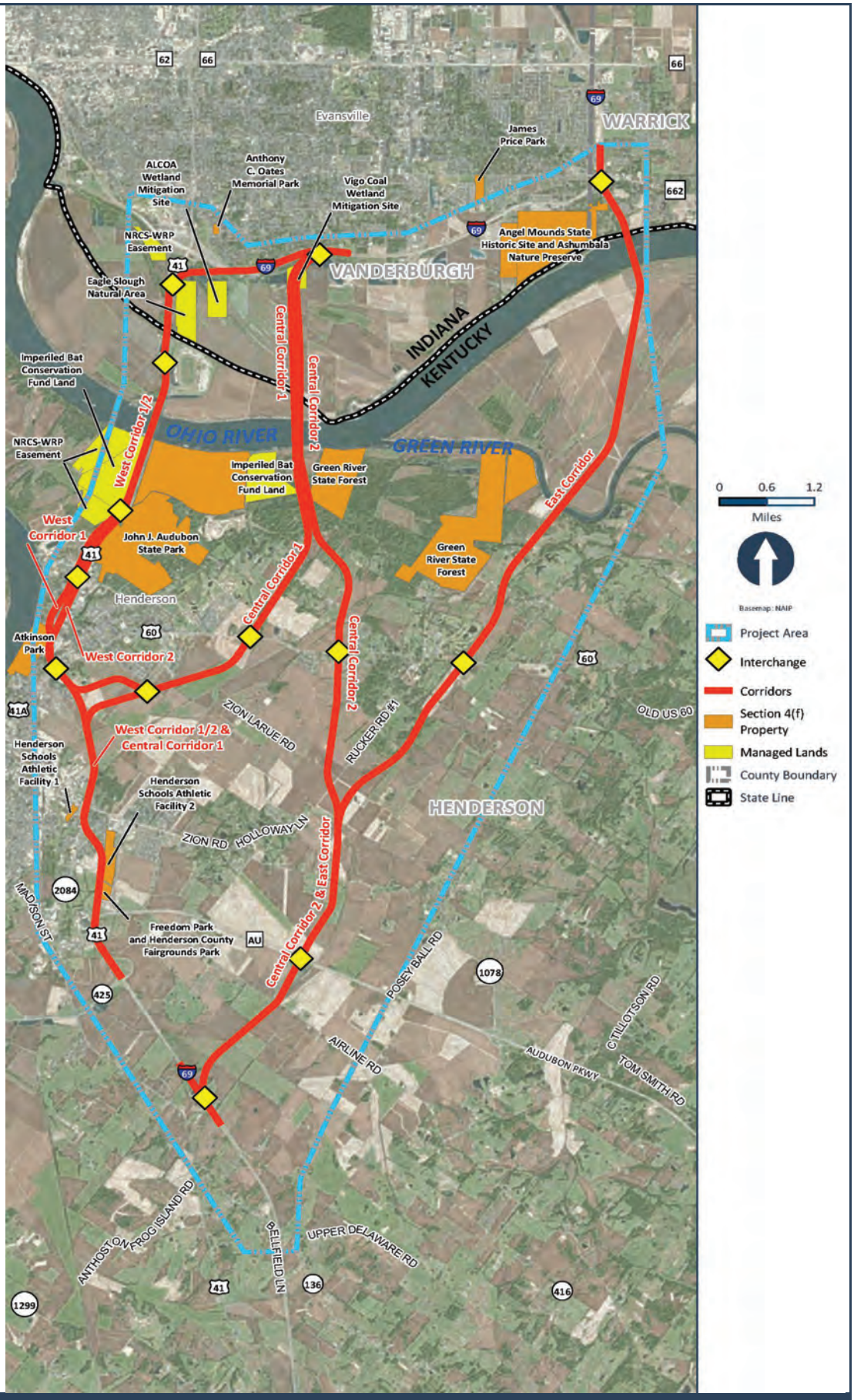

Figure 4-3. Potential Section 4(f) Property and Managed Lands

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4.2.6 SECTION 4(f) HISTORIC PROPERTIES/DISTRICTS

A screening of the corridors was conducted to identify historic structures and districts. Literature review and windshield surveys were conducted, and data was gathered from cultural resource information available from the aboveground technical reports that were prepared from 2002 to 2005 for the 2004 DEIS, 2005 *Memorandum of Agreement* (MOA), and the 2014 I-69 Feasibility Study. In addition, the Indiana Division of Historic Preservation and Archaeology (DHPA) and Kentucky Heritage Council (KHC) provided updated data and shapefiles for resources within the project area. Historic resources located within the project area are shown in Figure 4-4.

A windshield survey for aboveground resources was conducted within the study corridors from May 8 to May 10, 2017. This work involved survey of environmental data within each of the study corridors and the preliminary visual area of potential effects (APE). The windshield survey identified one resource, the southbound US 41 bridge, that was not previously evaluated but is likely to be deemed eligible for the National Register of Historic Places (NRHP). Its eligibility will be formally determined in a future phase of this Project. Historic properties located near the proposed corridors are listed below.

WEST CORRIDORS 1 AND 2

- The US 41 Twin Bridges. The northbound Audubon Bridge, constructed in 1932, is an NRHP-eligible resource. The southbound bridge, constructed in 1965, has not been evaluated for the NRHP but would likely be deemed eligible.
- NRHP-listed John James Audubon State Park.
- NRHP-listed William Soaper Farm.
- NRHP-eligible Henry Barret House, located at the US 41/US 60 interchange.

CENTRAL CORRIDOR 1

- NRHP-eligible McClain House and Ellis-Neville House/Lee-Baskett House**.** A discrepancy in prior documentation of the properties was identified and is in the process of being clarified with the Kentucky State Historic Preservation Office (SHPO). At this time, neither property is believed to be directly impacted by Central Corridor 1.

CENTRAL CORRIDOR 2 AND EAST CORRIDOR

- NRHP-eligible McCormick-Stagg Farm, White-Priest House, and White-Goehring House.

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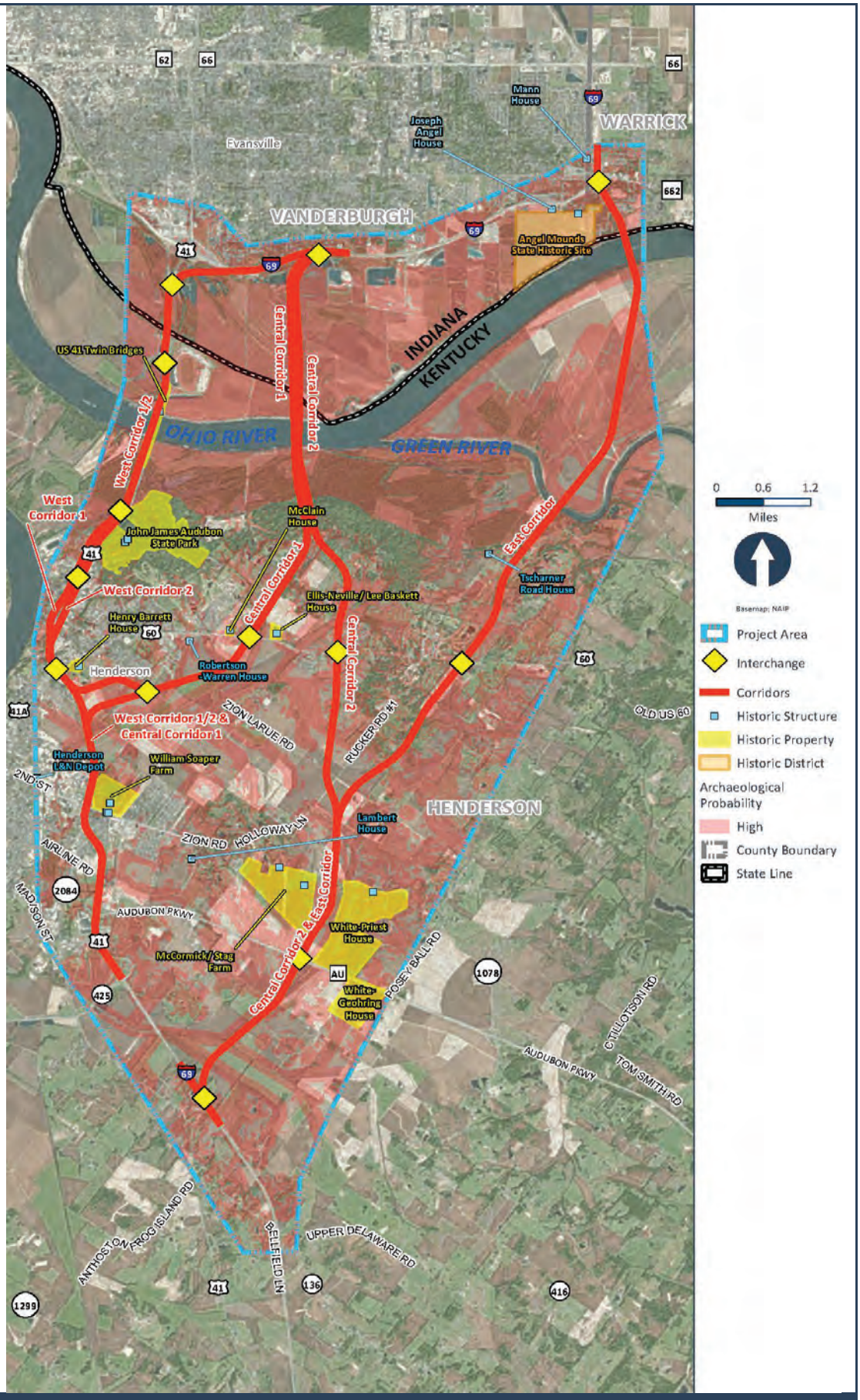

Figure 4-4. Section 4(f) Historic Properties/Districts and Areas of High Archaeological Probability

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EAST CORRIDOR

- NRHP-eligible Glenn Black House and Library and Mann House.
- NRHP-eligible Joseph Angel House. This resource is no longer standing and appears to have been demolished ca. 2005.
- Epworth Cemetery and Williams Cemetery are located near the Morningsong Cumberland Presbyterian Church. Epworth Cemetery is noted to have been moved to the Rose Hill Cemetery.
- NRHP-eligible 10345 Tscharner Road House.

In accordance with Section 106 of the National Historic Preservation Act, the identification of historic properties and the determination of effects and mitigation will continue throughout the EIS process for the I-69 ORX project. Based on the results of the screening analysis, it is anticipated that only West Corridors 1 and 2 would have the potential to directly affect historic properties (Table 4-1). This potential impact is associated with the proposed removal of the two US 41 bridges. For this screening analysis, both bridges were assumed to remain open for the Central and East Corridors.

Additional historic-aged residences and businesses are located in each corridor, either within its boundaries or within the visual APE. Additional research and survey would be required on these properties to determine eligibility and potential for impact (visual or direct).

4.2.7 KNOWN ARCHAEOLOGICAL SITES/AREAS OF HIGH ARCHAEOLOGICAL PROBABILITY

Data was gathered from cultural resource information available from the technical reports that were prepared from 2002 to 2005 for the 2004 Draft EIS, 2005 MOA, and 2014 I-69 Feasibility Study. In addition, the IDNR-DHPA, KHC, and Kentucky Office of the State Archaeologist (OSA) provided updated data and shapefiles for the project area.

There were four potentially eligible archaeological sites identified within proximity of the West and Central Corridors**.** As shown in Table 4-1, it is expected that one archaeological site would be impacted by the West Corridors while the Central and East Corridors would impact two archaeological sites.

Angel Mounds is a National Historic Landmark located near the East Corridor. Woodland Mound is also designated and located within the proposed expansion of Angel Mounds. Other potentially eligible archaeological sites are located near this corridor but will not be directly impacted.

To identify areas with a high probability to contain archaeological resources, a simple predictive model was constructed for the project area in ArcGIS utilizing Spatial Analyst and readily available data layers. The variables selected include slope, distance to water (river, streams, wetlands), soil drainage class, and soil slope class. For high probability areas, the slope is 0 to 6 percent, the distance to water is 0 to 150 meters, and the soil is extremely well, very well, or well drained. Developed/urban areas with these characteristics were not designated as high probability areas. The areas of high archaeological probability within the project area are shown in Figure 4-4. As shown in Table 4-1, the East Corridor (691 acres) and Central Corridor 2 (551

acres) would have the highest impacts to areas of high archaeological probability, while West Corridor 1 (114 acres) and West Corridor 2 (93 acres) would have the least.

4.2.8 Section 6(f) Properties

Section 6(f) properties that received grants from the National Park Service's Land and Water Conservation Fund (LWCF) were identified by reviewing the listing of grants provided for projects in Henderson County, KY and Vanderburgh and Warrick counties, IN on the National Park Service's website. John James Audubon State Park and Atkinson Park, shown in Figure 4-3, have both received LWCF funds. However, neither would be directly impacted by any of the corridors.

4.2.9 Managed Lands

Several properties were identified in the project area that are managed for conservation. These properties, although not protected by Section 4(f), have easements or controlling agreements that protect their use. Examples of managed lands include Imperiled Bat Conservation Fund (IBCF) properties, NRCS Wetland Reserve Program (WRP) easements, the Eagle Slough Natural Area, and Vigo Mine Coal Wetland Mitigation Sites. Managed lands located within the project area are shown in Figure 4-3.

Information on privately-owned nature preserves in the project area was provided by the Sycamore Land Trust. Information related to properties purchased with IBCF, which are to be managed as conservation land, was provided by the US Fish and Wildlife Service (USFWS).

As shown in Table 4-1, the East Corridor is not expected to impact any managed lands. The West Corridors and Central Corridor 1 would have the highest impacts to managed lands, with each potentially impacting three properties with impacts ranging from 42 to 51 acres.

4.2.10 Prime Farmland Soil/Active Farmland

Prime farmland soils were identified from the NRCS Web Soil Survey. Active farmland was derived from the 2011 National Land Cover Database (NLCD2011) and updated using aerial imagery. Areas designated as "pasture/hay" and "cultivated crops" were considered active farmland. Prime farmland soils and active farmland within the project area are shown in Figure 4-5.

As shown in Table 4-1, East Corridor 1 would have the greatest potential impacts to prime farmland soils, at 1,008 acres, while West Corridors 1 and 2 would have the fewest acres of potential impacts, at 288 acres and 274 acres, respectively. Similarly, the East Corridor would have the greatest potential impacts to active farmland, at 819 acres, while West Corridors 1 and 2 would have the fewest acres of potential impacts, at 27 and 23 acres, respectively.

4.2.11 Residential Relocations

Aerial photography and information obtained from the County Assessor or Property Valuation Administrator (PVA) was used to determine the number of potential residence and business relocations for each corridor. PVA information was used to determine the number of units within each apartment building. Each apartment unit is considered a single relocation. For existing mobile home parks, each lot was included as a potential relocation whether or not it contained a mobile home.

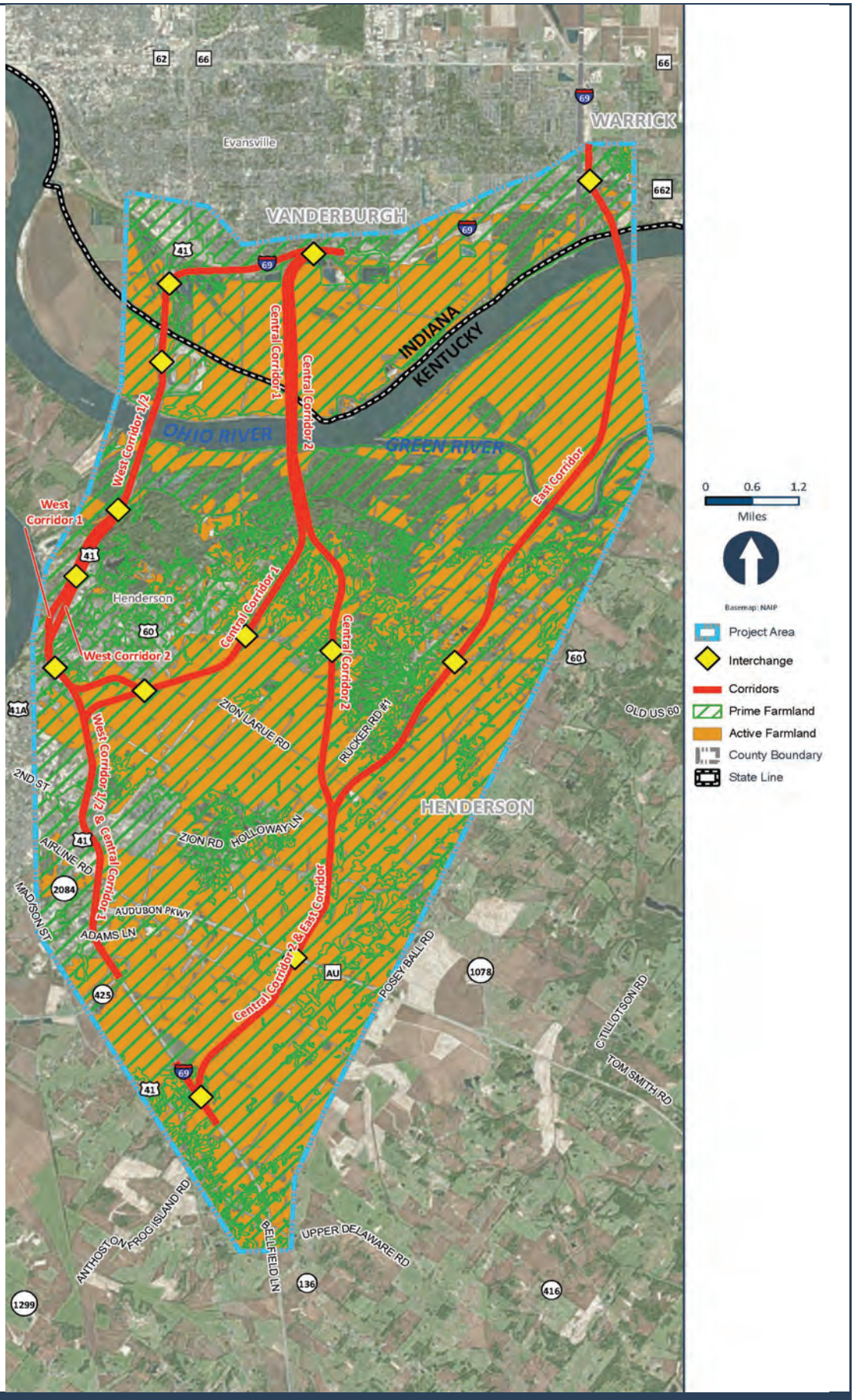

Figure 4-5. Prime Farmland Soils and Active Farmland

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In Kentucky, most of the potential residential relocations are associated with the West Corridors and are located along existing US 41 in Henderson. In Indiana, most of the residential relocations are associated with the East Corridor and are located within the proposed SR 662/I-69 interchange area. As shown in Table 4-1, West Corridor 1 would have the highest number of potential residential relocations, at 213, while Central Corridor 1 and Central Corridor 2 would have the fewest potential residential relocations with two and 13, respectively. The East Corridor would have the second highest number of potential residential relocations, at 144. West Corridor 2 would have 119 potential relocations.

4.2.12 Business Relocations

Aerial photography, information obtained from the county assessor or PVA, and windshield surveys were used to determine the number of potential business relocations within each corridor. As shown in Table 4-1, The Central and East Corridors would not result in any business relocations. West Corridor 1 would have 21 potential business relocations, most along the existing US 41 commercial strip. Because West Corridor 2 would follow existing US 41 through the Henderson commercial strip, it would result in the highest number of potential business relocations at 58.

4.2.13 Public Facilities and Services

Public facilities and services were identified through a review of existing shapefiles and publicly available information from sources including *IndianaMap*, Kentucky Geography Network, previously gathered information, and information obtained from the county assessor or PVA (Figure 4-6).

As shown in Table 4-1, West Corridor 1 is the only corridor that would potentially result in an impact and relocation of a public facility. The U.S. Social Security Administration (SSA) building is located at 2000 North Elm Street, Henderson, KY. This facility is privately-owned but contains U.S. SSA offices, which are open to the public and provide a public service.

4.2.14 Religious Facilities

The corridors were scanned for the presence of religious facilities through the review of existing shapefiles and publicly available information from sources including IndianaMap, Kentucky Geography Network, and previously-gathered information as well as information obtained from the County Assessor or PVA and windshield surveys (Figure 4-6). As shown in Table 4-1, West Corridor 1 and West Corridor 2 would result in the potential relocation of one religious facility. None of the other corridors would result in the relocation of religious facilities.

4.2.15 Cemeteries

The project area was scanned for cemeteries through the review of existing shapefiles and publicly available information from sources including from IndianaMap, Kentucky Geography Network, and previously gathered information as well as information obtained from the county assessor or PVA (Figure 4-6). No direct impacts to cemeteries were identified within any of the corridors. Further evaluation of potential direct and proximity impacts (e.g., noise and visual) to cemeteries will be conducted as needed for the DEIS.

4.2.16 Potential Impacts to Environmental Justice Populations

For this screening effort, the U.S. Census Bureau 2015 American Community Survey (ACS) Five-Year Estimates were used to identify the percentages of minority and low-income populations for the census tracts within the project area. Census tracts with minority or low-income populations greater than 50 percent were considered potential environmental justice (EJ) populations. In addition, any census tract with a minority or low-income population percentage that was 25 percent greater than the minority (i.e., 13.19 percent) or low-income (i.e., 15.53 percent) population percentage of the Evansville Metropolitan Planning Organization (EMPO) three-county region, was also considered a potential EJ population. From this evaluation, nine census tracts with potential EJ populations were identified within the project area (Figure 4-7). None of the corridors involve potential residential relocations within census tracts with potential EJ populations. However, given the number of residential relocations associated with West Corridor 1, West Corridor 2, and East Corridor, and the corridors' proximity to the identified potential EJ populations, impacts for each of these corridors were rated as medium. The project team is reaching out to low-income and minority organizations in the project area to better identify EJ populations and the potential direct and indirect impacts to them. These efforts and the results of the analysis and measures taken to avoid, minimize and mitigate impacts to EJ populations will be documented in the DEIS.

4.2.17 Community cohesion

A qualitative assessment was conducted to determine each corridor's potential impacts to community cohesion. For the purpose of this screening effort, a cohesive community was defined as any well-defined concentration of residences (i.e., neighborhoods/subdivisions) and associated businesses. These areas were identified using aerial photography. A rating of low, medium, and high was assigned to each corridor based on the potential number and extent of communities that would be bisected by the corridor. The ratings are based on a relative comparison of each corridor. West Corridors 1 and 2 were rated high because they would bisect the neighborhoods and businesses along US 41 in Henderson. The East Corridor was rated medium because it would bisect the neighborhoods located southeast of the I-69/SR 662 interchange in Indiana. Finally, Central Corridors 1 and 2 were rated low because they would not bisect any neighborhoods.

4.2.18 Noise Sensitive Receptors

An assessment was performed to compare the corridors' potential to impact noise-sensitive land uses within a 500-foot buffer from the estimated outer travel lanes of each corridor. These 500-foot buffers were created using preliminary engineering details for each corridor. The 500-foot distance was selected based on INDOT noise modeling methodologies, representing the area of potential noise impacts.

For each corridor and its resulting buffer, the number of homes, apartments, trailers, parks and outdoor sensitive uses were calculated from aerial imagery. The following assumptions were made to develop the counts:

- Apartments were represented by the number of visible parking spaces.
- Parks were classified as small, medium, and large based on the area within the 500-foot buffer and assigned a representative count of two, five, or ten based on the size.

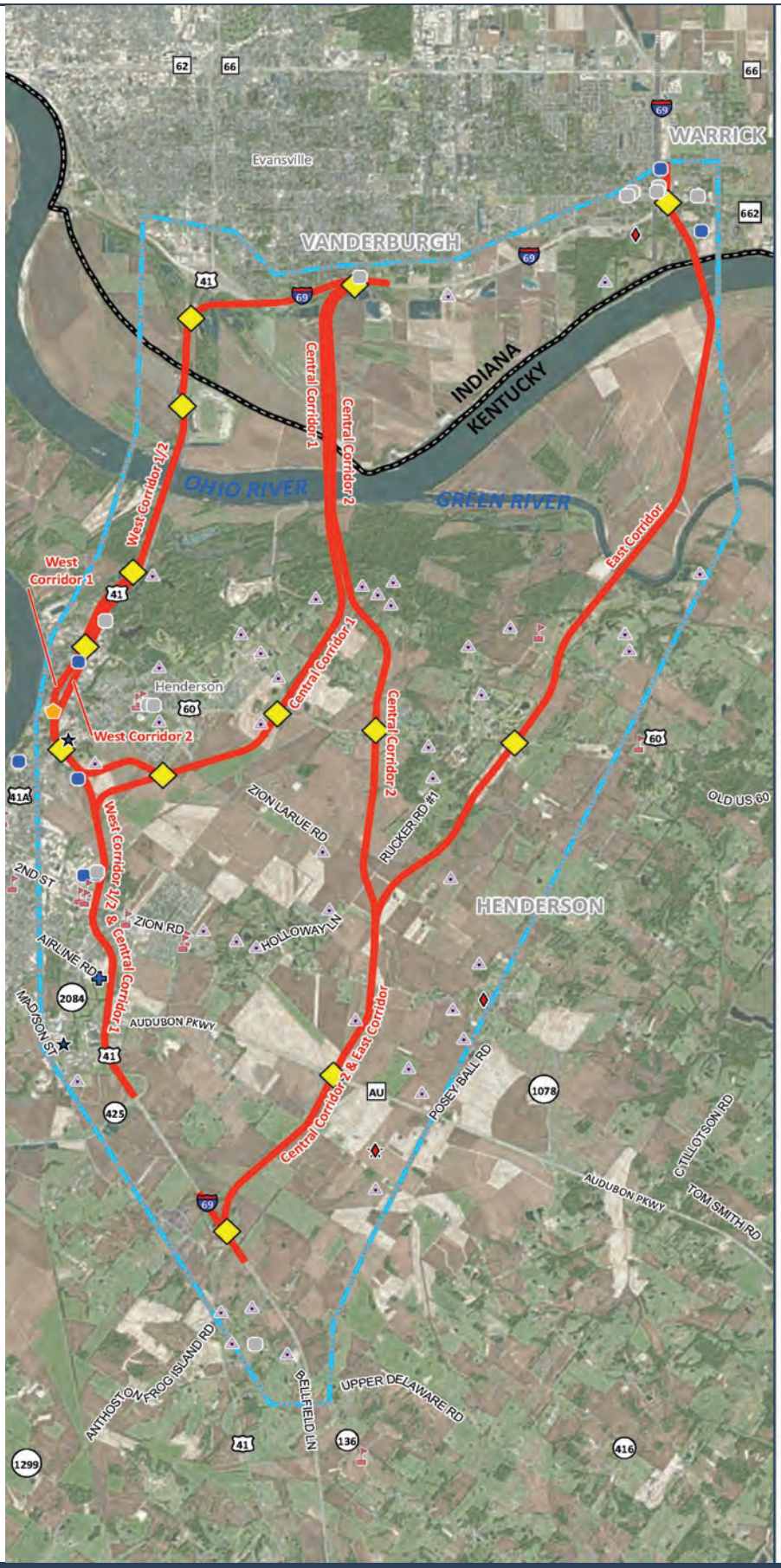

Figure 4-6. Public Facilities and Services/Religious Facilities/Cemeteries

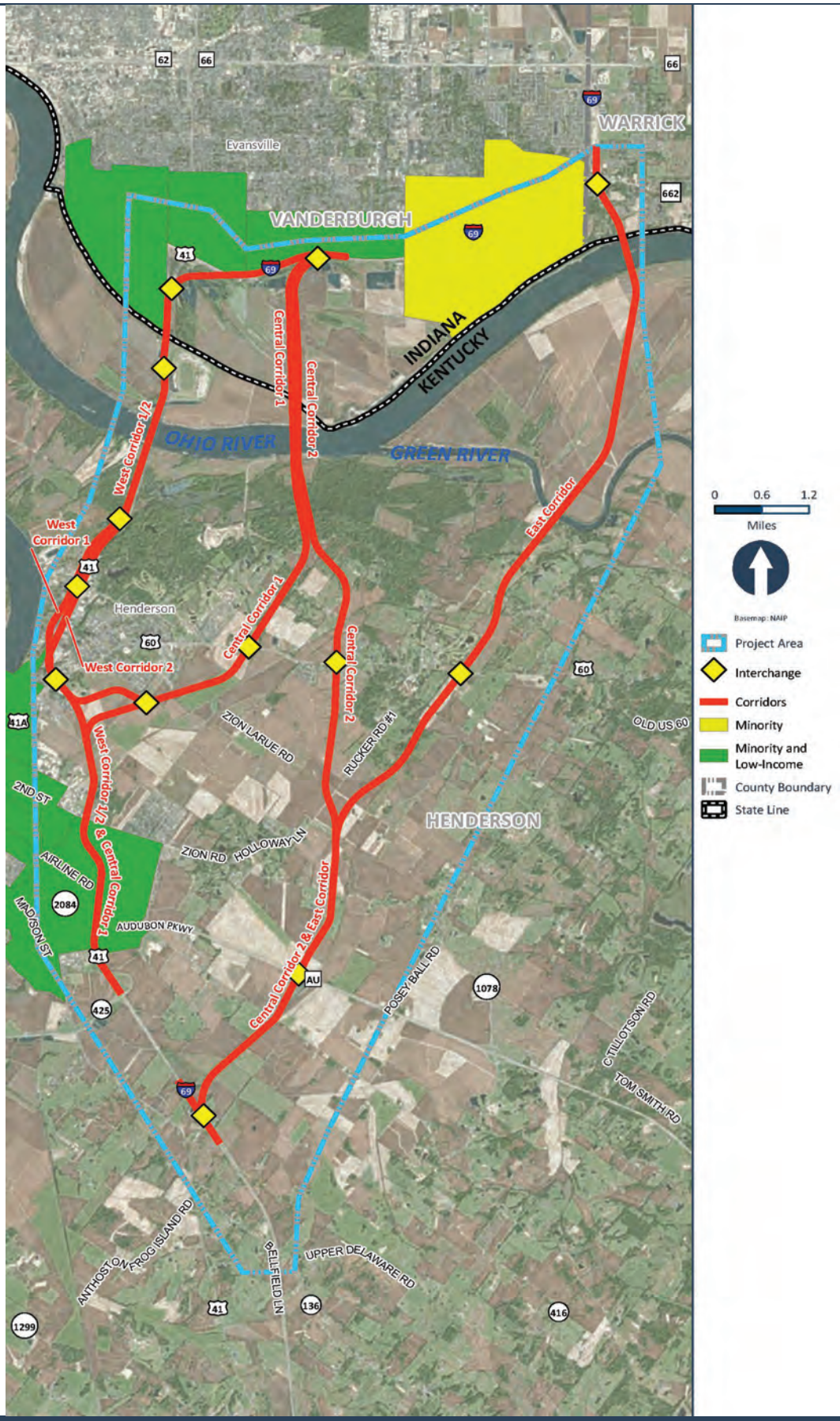

Figure 4-7. Census Tracts with Potential Environmental Justice Populations

Commercial outdoor uses were not incorporated into the total noise sensitive land uses, because an approximation of their equivalent receptor totals is not feasible without extensive ground investigations, and the impact threshold for these receptors is higher than the residential receptors.

The total number of noise sensitive receptors was calculated for each corridor. The number of noise sensitive receptors that would be acquired by the Project was then subtracted from the total receptors. These numbers are estimates based on available information and provide comparative levels of potential noise impacts for the screening process.

As shown in Table 4-1, West Corridors 1 and 2 would have the highest potential for noise impacts, 1,028 and 933 noise sensitive receptors, respectively. These higher impacts are associated with these corridors following existing US 41 through Henderson. Central Corridor 2 and the East Corridor would have the lowest potential for noise impacts, at 134 and 125 receptors, respectively. This is due to the rural natural of these corridors.

4.2.19 Potential Underground Storage Tanks (UST)/Contaminated Material Sites

An Environmental Data Resources (EDR) report for the project area identified more than 90 environmental sites of concern at over 80 site locations. Of these, 48 sites of concern are recommended for further investigation. These sites are shown on Figure 4-8. A one-half mile buffer was used, as is required for the underground storage tank (UST) and contaminated materials component of INDOT's Red Flag Investigation (RFI) process.

As shown in Table 4-1, West Corridor 2 would have the highest impacts to potential UST/contaminated material sites. This is associated with the corridor following the existing US 41 through the Henderson commercial strip and the higher number of business relocations. All the other corridors would only impact one or two sites.

4.3 ENGINEERING

4.3.1 Construction Cost

Central Corridor 1 has the lowest estimated construction costs of the five corridors (Table 4-1). It would utilize approximately 2.8 miles of the existing US 41 limited access highway, which would be upgraded to meet interstate standards. Therefore, the length of newly constructed roadway would be the least among the corridors, which contributes to the lower cost. The costs of future rehabilitation of one or both of the US 41 bridges are not included in the current construction costs.

The West Corridors would use the existing US 41 limited access highway. However, the West Corridors would require six lanes north of US 60 and traverse an urban area creating the need for retaining walls and noise walls. The additional construction and wider main span bridge over the Ohio River that would replace the existing US 41 bridges contributes to the higher construction costs.

The East Corridor would have the highest construction cost primarily due to having a longer length of newly-constructed roadway, additional interchanges, and a new bridge over the Green River.

4.3.2 Right-of-Way Cost

The Central Corridors both would have the least number of residential relocations and would traverse primarily rural land. As a result, these corridors would have low right-of-way costs (Table 4-1). The West Corridors traverse through the US 41 commercial strip and would have a large number of both residential and commercial relocations; therefore, these corridors would have high right-of-way costs. The East Corridor also would have a large number of residential relocations due to the SR 662/existing I-69/new I-69 interchange. Thus, this corridor was also rated as having high right-of-way costs.

4.3.3 Lifecycle/Operation and Maintenance Cost

Two criteria were established to evaluate the long-term lifecycle and operation and maintenance costs of each corridor. For the screening process, it was assumed that the West Corridors would replace the existing US 41 bridges, reducing the number of bridges to maintain and eliminating the aging structures. It was also assumed that the Central Corridors and East Corridor would retain both existing bridges in addition to constructing a new bridge, increasing the States' long-term costs. The option of closing one or both of the US 41 bridges will be evaluated in greater detail in the DEIS.

Regarding roadway maintenance, Central Corridor 1 would construct the smallest quantity of new lane-miles of roadway. The West Corridors are similar in length to Central Corridor 1, but because it would provide the only river crossing in the region, it would require six travel lanes, resulting in the second highest amount of new roadway to maintain. Central Corridor 2 and the East Corridor, due to their overall length, would add the largest quantity of new lane-miles of roadway.

4.3.4 Construction Complexity

The construction complexity for the Central Corridors would be low due to limited traffic conflicts and fewer number of access issues, which provide greater opportunity to expedite construction (Table 4-1). The construction complexity for West Corridor 2 would be high as a result of numerous traffic conflicts and access challenges associated with the corridor traversing the US 41 commercial strip in Henderson. The construction complexity for West Corridor 2 was rated medium because it would travel through Henderson west of the existing US 41. The construction complexity for the East Corridor was also rated medium due to the complexity of the SR 662/I-69 interchange.

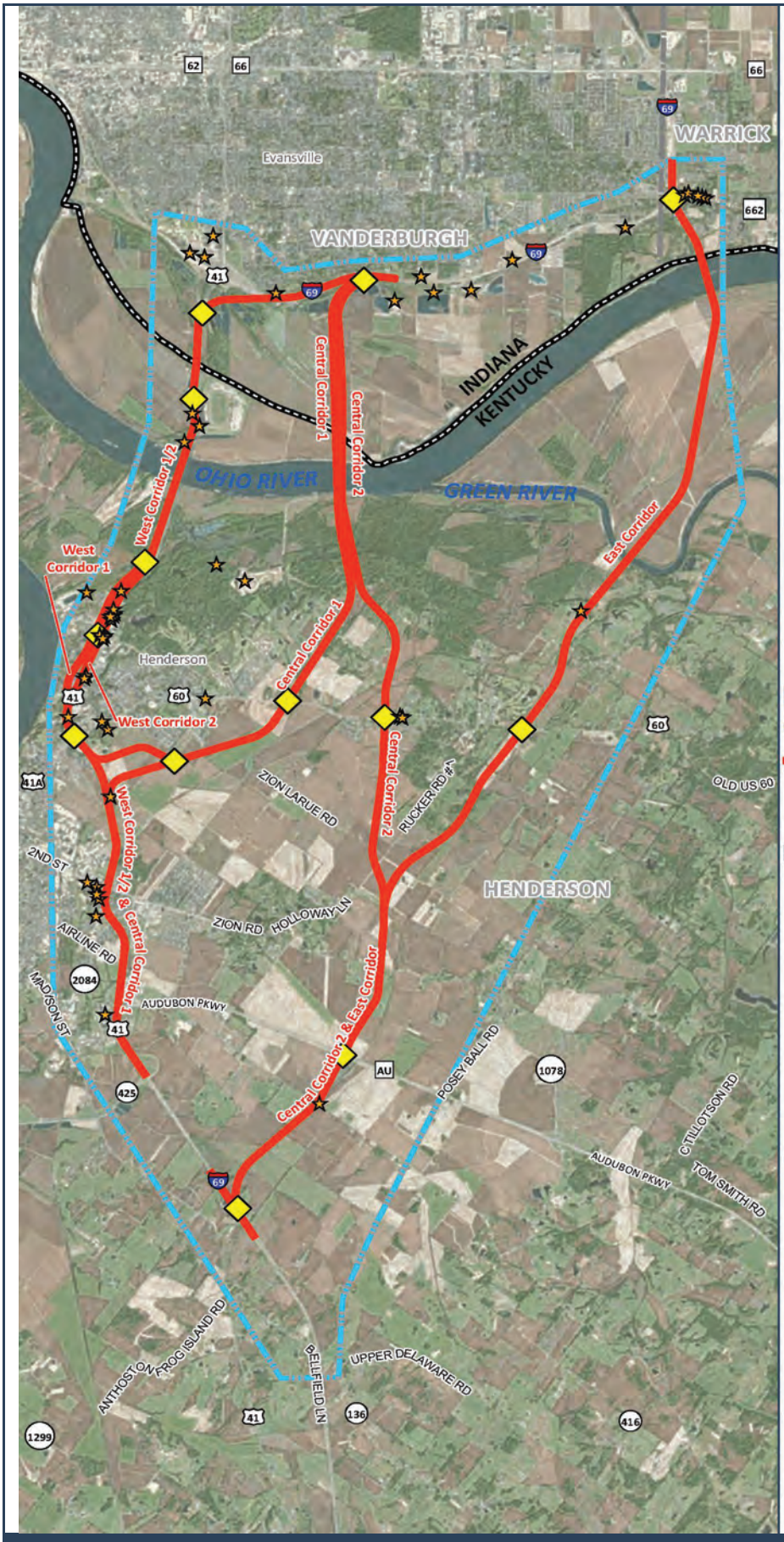

Figure 4-8. Potential UST/Contaminated Material Sites

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5 SUMMARY OF CORRIDOR EVALUATIONS

This section provides a comparative summary of the corridor evaluation data presented in the preceding sections. Advantages and disadvantages of each corridor, focused on differentiating criteria, are presented in Table 5-1.

5.1 WEST CORRIDORS 1 AND 2

West Corridors 1 and 2 overlap for much of their length and only differ for the short distance along the US 41 commercial corridor in Henderson, KY between Wolf Hills Road and US 60. Thus, the primary difference between the two corridors is that West Corridor 1 would result in more residential relocations while West Corridor 2 would result in more business relocations. In addition, West Corridor 2 would result in more impacts to potential UST/contaminated material sites, which represents the highest potential impacts compared to all the corridors. Both would result in the highest number of residential and business relocations and the highest impacts to noise sensitive receptors when compared to the Central Corridors. They were also rated high for potential impacts to community cohesion. However, because of the urban nature of these corridors, both would generally result in either similar or fewer impacts to natural resources than the Central and East Corridors. They would result in the fewest impacts to rivers/streams, floodplains, prime and active farmland, and areas with high archaeological probability. They, along with the East Corridor, would also have the lowest impacts to forested habitat when compared to the Central Corridors. Both West Corridors would impact the existing US 41 bridges, each of which is a potential Section 4(f) property. A primary advantage of both West Corridors as compared with the other corridors is they would provide low major river crossing lifecycle/operation and maintenance costs due to the removal of both of the existing US 41 bridges. The other advantage is that they would generally result in potentially fewer natural resource impacts. **Based on these advantages and similarities of the West Corridors, the recommendation is to carry forward both corridors for more detailed evaluation in the DEIS.** Options for the existing US 41 bridges will be considered as the alternatives are developed further for these corridors.

5.2 CENTRAL CORRIDOR 1

The primary advantages of Central Corridor 1 are that it would result in the lowest estimated construction cost of the five corridors and the fewest residential and business relocations. It was also rated low for potential impacts to community cohesion. This corridor would also utilize approximately 2.8 miles of the limited access portion of US 41, which would be upgraded to meet interstate standards. As a result, it would have the fewest new lane miles of roadway which would result in the lowest roadway lifecycle/operation and maintenance costs. The primary disadvantage of this corridor is that it would result in the highest impacts to forested wetlands and forest habitat. **Based on this evaluation, the recommendation is to carry Central Corridor 1 forward for more detailed evaluation in the DEIS.** The need for additional initial and long-term improvements in the US 41 corridor will be investigated, including possible future rehabilitation of one or both of the US 41 bridges.

Table 5-1. Summary-Level Corridor Comparison

	WEST CORRIDOR 1	WEST CORRIDOR 2	CENTRAL CORRIDOR 1	CENTRAL CORRIDOR 2	EAST CORRIDOR
Impact to Section 4(f) resources	Potential noise/visual/ access impacts to Audubon State Park; removal of existing US 41 bridges	Potential noise/visual/ access impacts to Audubon State Park; removal of existing US 41 bridges	None	Minor impact to Green River State Forest	Potential noise/visual impact to Angel Mounds State Historic Site
Impacts to Sensitive Ecological Resources	High impacts to habitat preservation areas and moderate impact to wetlands	High impacts to habitat preservation areas and moderate impact to wetlands	High impacts to forested wetland mitigation area; moderate impacts to other resources	High impacts to forested wetland mitigation area; moderate impacts to other resources	High impacts to streams; low impact to other resources
Farmland Impacts	Minimal farmland impacts	Minimal farmland impacts	Moderate farmland impacts	High farmland impacts	High farmland impacts
Social Impacts and Relocations	High number of residential relocations; moderate business relocations	High number of business relocations; moderate number of residential relocations	Minimal residential and business relocations	Minimal residential and business relocations	Moderate number of residential relocations
Construction and Right-of-Way Costs	High construction and ROW costs	High construction and ROW costs	Low construction and right-of-way costs	Moderate construction cost; moderate ROW costs	High construction cost, high ROW costs
Lifecycle/Operation and Maintenance Costs (River, Bridge, and Roadway)	Low	Low	Moderate	High	High

5.3 CENTRAL CORRIDOR 2

Central Corridor 2 overlaps with Central Corridor 1 for much of the alignment but ties into I-69 in Kentucky farther south from where Central Corridor 1 ties into US 41 just south of the US 60 interchange. As previously mentioned, Central Corridor 2 was included in the screening analysis because it is based on the 2004 DEIS Preferred Alternative. Some of the notable advantages of Corridor 2 include no business relocations and the second fewest residential relocations and noise sensitive receptors. It was also rated low for potential impacts to community cohesion. However, a key disadvantage of Central Corridor 2 when compared to Central Corridor 1, is that the new I-69 alignment would run parallel to the US 41 limited access highway and existing I-69 for nearly 5.75 miles, adding lane-miles of pavement, bridges, and new interchanges to the roadway inventory. At the time of the 2004 DEIS, the Breathitt Parkway had not yet been re-designated as

I-69; therefore, this redundancy was not considered. As a result, this corridor would have the second highest new lane miles of roadway, which would result in the second highest roadway lifecycle/operation and maintenance costs. Other key disadvantages are that it would result in the second highest impacts to wetlands, rivers/streams, open water, forested habitat, floodplains (highest impacts to floodways), prime and active farmland, and areas of high archaeological probability. This corridor would also potentially impact three acres of the Green River State Forest, a Section 4(f) property; however, it is expected that further design refinements would likely result in an alternative that could avoid this impact. **Based on these disadvantages, the recommendation is to dismiss Central Corridor 2 from further consideration**.

5.4 EAST CORRIDOR

Although the East Corridor would have the fewest impacts to wetlands, forested habitat, noise sensitive receptors, and managed lands, it would be the longest and most expensive corridor and would require an additional major bridge structure over the Green River. It would have the highest new lane miles of roadway which would result in the highest roadway lifecycle/operation and maintenance costs. Due to the Green River bridge, it would also have high major river crossing lifecycle/operation and maintenance costs. The East Corridor would have the highest impacts to prime and active farmland, rivers/streams, floodplains, and areas of high archaeological probability. It would also have the second highest number of residential relocations associated primarily with the interchange at SR 662 in Indiana. In addition, although the East Corridor would not directly impact the Angel Mounds State Historic Site, concerns were raised in the 2004 DEIS, and in a letter received May 10, 2017, from IDNR-DHPA, that the East Corridor may result in adverse noise and visual impacts, which could require an individual Section 4(f) evaluation. **Based on these disadvantages, the recommendation is to dismiss East Corridor from further consideration.**

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6 CORRIDORS RECOMMENDED FOR FURTHER DEVELOPMENT INCLUDING TOLLING OPTIONS

Based on the screening analysis, the following corridors are recommended to be carried forward for further evaluation in the I-69 ORX DEIS:

- **No Build Alternative**
- **West Corridor 1**
- **West Corridor 2**
- **Central Corridor 1**

Each of the corridors carried forward will be further developed to the same level of detail in the DEIS. Tolling options will also be evaluated for each corridor, including tolling both the new I-69 bridge and the existing US 41 bridges, and assessing various potential toll rates for various vehicle classes (e.g., trucks and cars). In addition, the traffic and Section 4(f) impacts of removing one or both US 41 bridges will be considered for Central Corridor 1. When further detail is available for the corridors above, including potential interchange locations, potential right-of-way impacts, determinations for which of the US 41 bridges would remain and which crossings would likely be tolled, there will be another round of public open houses and meetings with stakeholders and agencies to gather their feedback, prior to finalizing the alternatives and development of the DEIS.

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