



## Chapter 7 — Mitigation and Commitments

Since publication of the Draft Environmental Impact Statement (DEIS), the following substantive changes have been made to this section:

- Section 7.2 – Updated discussion of Context Sensitive Solutions with regard to access and road closures, updated impact and mitigation discussions to reference Refined Preferred Alternative 2 where applicable, added information on mitigation focus areas and mitigation sites, updated Forest Mitigation discussion to reference conservation easement management responsibilities, added information on Amendment to the Tier 1 revised Biological Opinion (BO), added information on pre-construction Indiana bat mist netting, and clarified reference to minimizing floodplain impacts.
- Section 7.3.1 – Updated I-69 Community Planning Program discussion to reference the Greene County Comprehensive Plan and the Monroe County SR 37 Corridor Plan, updated Context Sensitive Solutions discussion with regard to access and road closures, and clarified INDOT’s commitments for wildlife crossings.
- Section 7.3.2 – Updated discussion of relocations to reference Refined Preferred Alternative 2.
- Section 7.3.3 – Updated Noise Abatement discussion to reference Refined Preferred Alternative 2, updated Construction Noise discussion to reference timing of barrier wall construction.
- Section 7.3.4 – Updated groundwater and karst discussion to provide additional detail regarding USEPA Class V injection well permits, updated to add commitment regarding perpetuation of groundwater flow paths, clarified that blasting within areas where dimension limestone is being quarried will be completed following specifications developed in consultation with limestone industry representatives, updated Tree Clearing and Borrow Sites/Waste Disposal discussions to reference current tree clearing restriction dates, and updated discussion on Eastern box turtle regarding INDOT and FHWA coordination with IDNR.
- Section 7.3.5 – Updated the status of Phase Ia Archaeology and the modified Effect Finding, added reference to signature of the Memorandum of Agreement, and added information on the Virginia Ironworks and Victor Limestone Archaeological Districts.
- Section 7.3.6 – Updated Roadway Lighting discussion regarding the height of roadway lighting.
- Section 7.3.7 – Updated to reference impacts associated with Refined Preferred Alternative 2.



## Section 4—Final Environmental Impact Statement

- Section 7.3.9 – Updated to include the commitment to avoid wetlands and other water resources throughout final design, and the identification of such waters on the design plans as well as to include erosion control measures near the wetlands, updated to reference impacts and mitigation requirements associated with Refined Preferred Alternative 2, and added information on Section 4 mitigation focus areas.
- Section 7.3.11 - Updated to reference impacts and mitigation commitments associated with Refined Preferred Alternative 2, added information on Section 4 mitigation focus areas and mitigation sites, and removed reference to non-wetland riparian areas that are not in a floodway being mitigated at a 1:1 ratio per linear foot basis as this will be determined in consultation with IDEM and USACE.
- Section 7.3.12 – Updated with stream impacts for Refined Preferred Alternative 2, updated Stream Relocations discussion to note additional mitigation commitments and efforts to continue to minimize impacts, and revised number of bridges that provide openings sufficient for deer to cross under the highway.
- Section 7.3.13 – Updated to Mitigation Measures for Wildlife discussion to clarify that INDOT is committing to providing 11 structures that will meet the minimum dimensions for deer crossings and 18 structures may or may not provide these dimension but still provide opportunities for wildlife movement, removed reference to placing roadway lighting on the shortest poles possible, and added information regarding placement of riprap.
- Section 7.3.15 – Updated to present impacts associated with Refined Preferred Alternative 2.
- Section 7.3.16 – Updated to provide discussion of pre-construction mist netting, added information on the Amendment to the Tier 1 revised BO and Section 4 Tier 2 Biological Assessment (BA) and BO, updated tree clearing restriction dates, clarified discussion of minimizing floodplain impacts, revised the order of the Conservation Measures so they match what is stated in Chapter 5.17.
- Section 7.3.17 – Updated to discuss impacts associated with Refined Preferred Alternative 2, added information on Rule 5 permit, updated to discuss additional mitigation commitments, revised information on Class V injection wells, added information on recently discovered cave, and added **Table 7-1a**, Best Management Practices in Karst Terrain.
- Section 7.4 and **Table 7-2** - Updated to present impacts, costs and mitigation requirements/commitments associated with Refined Preferred Alternative 2.
- Section 7.4 – Under Stream Mitigation, added that stream mitigation ratios will be determined in consultation with IDEM and USACE; under Historic and Archaeological, added information on the Virginia Iron Works Archaeological District and the Victor Limestone Archaeological District and archaeological mitigation.



## 7.1 Introduction

Since the earliest phases of the Tier 1 study, efforts have been made to avoid human and natural resources. In particular, avoidance and the opportunity to minimize impacts were used in the decision-making process to identify a Tier 1 preferred alternative. After alternatives were identified, further efforts were undertaken to develop comprehensive mitigation measures. Environmental agencies and the public were instrumental in providing assistance to avoid and minimize impacts upon both the human and natural environment, and have helped develop many of the mitigation measures in this chapter.

This chapter is organized based upon the mitigation commitments made in Tier 1 for the Preferred Alternative 3C. These commitments have been retained, and additional refinements are being made in each of the Tier 2 EISs. Section 7.2 discusses the major mitigation initiatives first presented in the Tier 1 EIS. These commitment initiatives have continued in Tier 2. Section 7.3 lists specific mitigation measures and commitments for each environmental resource category for I-69 Section 4. Section 7.4 provides mitigation costs and explains the methods used for estimating mitigation costs. From a mitigation standpoint, the Section 4 alternatives are similar, and mitigation costs for each of the Section 4 alternatives are expected to be similar as well.

## 7.2 Major Mitigation Initiatives

Mitigation opportunities have been explored throughout the National Environmental Policy Act (NEPA) process. INDOT and FHWA have contacted state and federal environmental agencies, environmental organizations, and the public to provide input on both creative and traditional approaches for replacement of environmental resources that may be impacted as a result of this project. Based on this consultation, FHWA and INDOT have developed a number of major mitigation initiatives, including several initiatives that go beyond the requirements of the law or regulation. These initiatives are summarized in **Table 7-1**. Initiatives that apply to Section 4 are explained in greater detail in the text that follows.

| <b>Major Initiatives</b>   | <b>Description</b>  |
|--|---|
| Context Sensitive Solutions (CSS)/ Community Advisory Committees (CAC) | CSS is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist, which has been implemented during the Tier 1 and Tier 2 EIS development and will continue through subsequent design. |
| Indiana Bat Hibernacula  | INDOT and FHWA will attempt to purchase and protect hibernacula (winter habitat) for the Indiana bat.   |
| Wetland Mitigation   | INDOT and FHWA will replace wetlands impacted by the Refined Preferred Alternative 2 in accordance with INDOT's Wetlands MOU. Sites have been secured and mitigation construction is underway for some sections in advance of highway construction.   |
| Forest Mitigation  | INDOT and FHWA will mitigate upland forests impacted by the Refined Preferred Alternative 2 at a ratio of 3:1. Multiple sites have been secured for this mitigation effort.   |
| I-69 Community Planning Program  | INDOT and FHWA have developed a program that establishes a regional strategy for managing growth.   |



Section 4—Final Environmental Impact Statement

|   |   |
|---|---|
| Geographic Information System (GIS)       | INDOT and FHWA have developed a statewide GIS Atlas that is comprised of more than 170 different layers. This Atlas is available on the Indiana Map website.  |
| Update County Historic Surveys            | INDOT and FHWA will provide financial and technical assistance to IDNR to support the completion of field surveys and publication of County Interim Reports.  |
| Biological Surveys on Wildlife and Plants | INDOT has worked with resource agencies to conduct biological surveys for threatened and endangered species. Follow-up surveys for the Indiana bat are also being made prior to and during construction. These Indiana bat surveys are being initiated prior to construction. |
| Bridging of Floodplains                   | INDOT and FHWA will bridge the Patoka Rivers and Flat Creek floodplains. This bridging has been incorporated into the Section 2 Alternatives. There are no floodplains in Section 4 which are anticipated to be bridged in their entirety.                                    |
| Distance Learning                         | INDOT and FHWA will continue to support distance- learning opportunities for students in Southwest Indiana as part of the public outreach for transportation projects.  |

**Context Sensitive Solutions (CSS)/Community Advisory Committees (CAC)**—Context sensitive solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist. INDOT has adopted the following policy endorsing the use of CSS in transportation project development:<sup>1</sup>

“It is the policy of the Indiana Department of Transportation (INDOT) to incorporate context sensitive solutions into the development, construction and maintenance process for improvements to the state jurisdictional transportation system. The process for incorporating context sensitive solutions is intended to establish a basis for the development, construction, and maintenance process to incorporate a community’s character and desires in transportation improvements. The context sensitive solution process is intended to be a flexible approach in allowing for latitude and to enhance environmental, scenic, historic, and unique community elements into a transportation improvement. INDOT believes that the implementation of context sensitive solutions will allow transportation officials, with input from community stakeholders to strike a balance between providing safe, cost effective and efficient highway facilities while protecting and enhancing community values.

“The establishment of context sensitive solutions incorporates accepted effective design practices. Context sensitive solutions allow ideas such as preservation of historic places, scenic and natural environmental enhancement, and community values to be considered within the objectives of mobility, safety and economics.”

To design and construct a freeway that is truly sensitive to the environment through which it will be traversing, FHWA and INDOT will seek the continued assistance from the communities near the corridor through Tier 2 design and construction phases of the project. For this reason, Community Advisory Committees (CACs) have been established in each Tier 2 NEPA study section. Early in Tier 2, INDOT and FHWA worked with the local officials, MPOs, and others to identify specific representatives from neighborhood groups, emergency response personnel, schools, local advocacy groups, etc., to be members of each CAC. FHWA and INDOT met with the CACs to describe the status of the project, ask them to distribute information to their

<sup>1</sup> *Statement of INDOT Policy for Context Sensitive Solutions* (approved March 3, 2003).



constituents, and to also seek feedback from them and their constituents. In addition to the CACs, FHWA and INDOT have public information meetings about the project at key project milestones (see **Figure 7-1**, p. 7-66).

The specific outcome of CSS will depend, in part, on input from the CACs. The use of CSS and CACs may result in:

- Improving the aesthetics of the highway by planting native wildflowers (see **Figure 7-2**, p. 7-66), minimizing riprap on sideslopes and in ditches, and using attractive structures (e.g., bridges, retaining walls, signs, etc.).
- Construction of an overpass at Dry Branch Road (Greene CR 750E and 900E) to provide access to residences from the north or south since this valley is known to occasionally flood.
- Construction of grade separations at Mineral-Koleen Road (CR 350S, CR 360S, and CR 880E) (Greene County), Dry Branch Road (Greene County), Burch Road (Monroe County), Harmony Road (Monroe County), Bolin Lane (Monroe County) to maintain local connectivity.
- Construction of a Greene/Monroe County Line interchange to serve traffic commuting between Bloomfield, Cincinnati, Crane NSWC and Hobbieville and the greater Bloomington urbanized area. Development of a set of low-cost design criteria that also minimizes the environmental footprint of the interstate.

Other Context Sensitive Solutions that have been developed include six Access Roads.

- Access Road 1 would maintain travel between CR 475E and CR 450S (west of CR 475E) and the current access to Taylor Ridge Cemetery.
- Access Road 2a would modify the existing cul-de-sac at the south end of Spruce Road. The new cul-de-sac will be constructed slightly north of the existing one with a new connection to Pine Road in the Clifty Hills Subdivision.
- Access Road 3 would be built on the west side of SR 45 to the south of I-69 to provide access to two residential properties.
- Access Road 4 would maintain the connection of Greene CR 1250E to SR 45 facilitating travel between the Hobbieville area and Owensburg.
- Access Road 5 is proposed to extend east from SR 54, on the south side of I-69, to provide access to properties whose current access would be terminated by the construction of I-69.
- Access Road 6 would be built on the east side of SR 45 to the north of I-69 to provide access to one residential property and one undeveloped parcel.

**Indiana Bat Hibernacula**— Indiana bat hibernacula (caves where Indiana bats overwinter) are present within the Section 4 Winter Action Area (WAA). Per the Tier 1 Revised Biological



## Section 4—Final Environmental Impact Statement

Opinion (BO), opportunities will be investigated to purchase, at fair market value, from “willing sellers,” an Indiana bat hibernaculum(a) including associated autumn swarming/spring staging habitat. After purchase and implementation of all management efforts, hibernaculum(a) and all buffered areas will be turned over to an appropriate government conservation and management agency for protection in perpetuity via conservation easements. At present, INDOT and FHWA have purchased a Conservation Easement for two Priority 1A hibernacula. In 2009, these two hibernacula showed approximately 37,000 wintering Indiana bats. INDOT and FHWA have also purchased mitigation property including one Priority 3 hibernacula that in 2009 showed over 800 wintering Indiana bats, as well as over 350 acres of autumn swarming/spring staging habitat.

**Wetland Mitigation**—Wetlands are an important natural resource because they support rich biological communities and provide floodplain protection. The construction of this project will impact wetlands of varying types. For the I-69 Evansville to Indianapolis project as a whole, the majority of impacted wetlands are expected to be forested wetlands. To mitigate for these wetland losses, INDOT and FHWA will follow the mitigation ratios listed in their Wetlands MOU (signed January 28, 1991). See **Appendix W**, *Wetlands Memorandum of Understanding*, which was provided as Appendix T in the Tier 1 FEIS. The MOU was developed to ensure that wetland impacts are avoided, minimized, and mitigated to compensate for the loss of wetland functions and values. Section 4 Alternatives wetland impacts to emergent, scrub/shrub, and forested wetlands would range from approximately 5.26 acres to 13.09 acres. Based on the MOU ratios (see Section 7.3.9), mitigation for all wetland impacts ranges from approximately 15.56 acres (Alternative 3) to 39.41 acres (Alternative 1). The Refined Preferred Alternative 2 impacts approximately 5.32 acres to 9.55 acres of wetlands. Mitigation for wetland impacts for the Refined Preferred Alternative 2 range from approximately 15.79 acres to 29.14 acres.

Wetland mitigation sites are preferred in areas connected to existing wetlands and forests that currently provide habitat for both federal- and state-listed threatened and endangered species. It is INDOT’s intention to restore wetlands in areas that have the greatest opportunity to develop into naturally functioning wetlands and provide habitat for threatened and endangered species. Such mitigation sites will be designed, constructed, and monitored. Once a site has become established, the site may be donated to an appropriate local or governmental agency. All mitigation sites will have a deed restriction on them identifying them as mitigation sites and protecting them in perpetuity from future disturbance. Each wetland will be designed with the assistance of appropriate environmental review agencies to include habitat and structures (e.g., nesting boxes, platforms, water control, etc.) for specific wildlife species. Signage will be erected along the boundary of mitigation sites to protect these areas from mowing and herbicide spraying.

### Tier 1 Conceptual Mitigation Plan

For Section 4, three potential mitigation sites have been identified in the *Revised Tier 1 Conceptual Forest and Wetland Mitigation Plan & Comparison of Tier 1 Plans* (see **Appendix S** for this Plan and a comparison to the original *Tier 1 Forest and Wetland Mitigation and Enhancement Plan*, which was provided as Appendix NN in the Tier 1 FEIS):



- The Doans Creek mitigation area is located along Doans Creek just north of the Crane NSWC and south of SR 58. Within the proposed mitigation area there were two Indiana bat secondary roost trees found south of Doans Creek. The roost trees were both shagbark hickories. The area is a mix of bottomland and upland hardwood forest with interspersed grazing. Opportunities for mitigation in this area are excellent due to the vast amount of forest in the adjacent Crane NSWC. This area has the potential to preserve existing core forest areas, which would serve as habitat for many interior forest bird species and the Indiana bat. If there are non-forested tracts in the area, additional core forest could be obtained through reforestation. In addition, preservation of existing core forest habitat will protect it from being impacted by others. A secondary area for mitigation could be within the Crane NSWC. Approval from the Crane NSWC would need to be obtained for any mitigation. Currently there are no mitigation sites planned within Crane NSWC.
- The Plummer Creek mitigation site in Greene County includes unique geological features. In addition, a significant spring is located immediately to the south. This area would be an excellent opportunity for increasing summer and winter habitat for the Indiana bat and increasing wetlands along Black Ankle Creek that are fed by a spring. There are a number of springs in this area that can offer unique cool water habitat. Prior converted wetlands are common in the Plummer Creek bottoms and flooding is not unusual in this floodplain. All opportunities will be explored to add to existing habitats in this mitigation area, including the possibility of adding onto the existing Martin County State Forest lands located near the project area. A reproductive female Indiana bat was tracked to 2 secondary roost trees within this proposed mitigation site. One of these trees was a live shagbark hickory and the other was dead and unidentifiable.
- The Indian Creek mitigation area is located east of SR 45 around the Breeden Road area. Forest mitigation may come in the form of protecting existing woods and the planting of additional upland and bottomland woods. An Indiana bat secondary roost site was found within this area. It was a small wooden utility pole located in a yard between a house and a garage. The bats were found within a plastic sleeve that runs up and down the side of the pole. Trees may be planted to create additional core forest habitat for this area. There are also many karst features, which include 3 caves within this mitigation area.

It is important to note that mitigation for the Indiana bat is focused in the Summer Action Area (SAA) and/or Winter Action Area (WAA). Indiana bat summer habitat will be created and enhanced in the Action Area through wetland and forest mitigation focused on riparian corridors and existing forest blocks to provide habitat connectivity. All sites named above are in the Action Area. The Plan noted that the mitigation sites identified in the Plan were conceptual, and that specific mitigation sites would be determined during or after Tier 2, and further noted that INDOT would acquire mitigation sites only from willing sellers at fair market value.

Subsequent mitigation planning for Section 4 has included the refinement of mitigation focus areas based on Indiana bat maternity colony areas, Indiana bat hibernacula, review of existing managed lands and existing habitat blocks which could be expanded and/or preserved. In consultation with the environmental resource agencies, these refined mitigation focus areas have been reviewed and landowner contacts made to identify willing sellers and determine specific



## Section 4—Final Environmental Impact Statement

parcels which could be acquired for mitigation purposes. The Tier 2 Section 4 BA includes mitigation information for Section 4. The BA identifies 36 possible mitigation sites for Section 4. Seven (7) focus areas were targeted for the Section 4 mitigation: SR 57, Doan's Creek Maternity Colony, Plummer Creek Maternity Colony, Little Clifty Branch Maternity Colony, Indian Creek Maternity Colony Area, Cave<sup>2</sup>, and Garrison Chapel Valley. Coordination with these landowners has resulted in the acquisition of 18 properties for Section 4 mitigation, with an additional 18 properties which are still in the acquisition phase. Details on the specific Section 4 sites are included in the Tier 2 Section 4 BA, in **Appendix JJ1, Redacted Section 4 Tier 2 Biological Assessment**, of this FEIS.

**Forest Mitigation**—Forests are a large and important resource in Indiana. Indiana's forests make significant environmental and economic contributions, including timber, employment, outdoor recreation, protection of soil and water resources, and habitat for many plant and animal species, including threatened and endangered species. Prior to European settlement, forests covered about 85% of the State. Forested land was converted to farmland as farming became a central part of Indiana's economy. The acreage of forested land reached its low during the early 1900s and increased until the 1990s. Today, forested land in Indiana appears to have reached a plateau. Approximately 20% of Indiana is forested, and most of the forested land is located in the southern half of the State.

For the I-69 Evansville to Indianapolis project as a whole, FHWA and INDOT committed to mitigate impacts to upland forests at a 3 to 1 ratio. Mitigation goals are to replace direct forest impacts at a minimum 1 to 1 ratio and provide up to a 2 to 1 ratio of forest preservation. The 3 to 1 ratio will be achieved for the overall I-69 Evansville to Indianapolis project; the ratio for an individual Tier 2 section could be higher or lower than 3 to 1. The potential impacts to upland forests due to Section 4 Alternatives of the proposed I-69 project vary from approximately 872.01 acres (Alternative 2 – low cost) to 1,168.40 acres (Alternative 1 - initial). Based on the 3 to 1 ratio, the Alternatives would require approximately 2,616 to 3,505 acres for mitigation. The Refined Preferred Alternative 2 impacts approximately 872.12 to 1,087.37 acres of upland forest. Based on the 3 to 1 ratio, the Refined Preferred Alternative 2 would require approximately 2,616 to 3,262 acres of mitigation. In the case of any forests in a floodway, a 2 to 1 replacement or 10 to 1 preservation ratio would apply, as applicable by the IDNR Construction in a Floodway permit. If needed, the necessary permit would be secured before or during the design phase of the project.

In Section 4, the proposed forest mitigation sites are the same as those described above for wetland mitigation. This mitigation will be accomplished either by purchasing and protecting existing tracts of forests or by planting trees. Preference will be given to areas contiguous to large forested tracts that have recorded federal- and state-listed threatened and endangered species. Coordination with resource agencies will assure that these forest mitigation sites are strategically situated in biologically attractive ecosystems. All forest mitigation lands will be protected in perpetuity via conservation easements or other appropriate measures. The species to be planted and the long-term management of these mitigation sites will be coordinated with the agencies relative to the conditions of the necessary permits and authorizations.

---

<sup>2</sup> This cave is an important Indiana bat hibernaculum.





INDOT will be the long-term manager of these sites unless they are turned over to another agency or land steward for long-term management. As long as INDOT is the long-term manager of the mitigation sites, it will be INDOT's responsibility to cover any cost that are needed to correct any misplaced actions/inactions by the easement-granting landowners. If the mitigation site(s) that are owned fee simple by INDOT are turned over to another long-term management agency or land steward, the receiving agency or land steward would be taking on the responsibility to cover this cost and this will need to be included in the land transfer documentation from INDOT to the long-term manager. INDOT will not be able to turn over properties with conservation easements to other agencies because INDOT will not own the land. If INDOT has a conservation easement on a mitigation site, that conservation easement and associated restrictions will remain in force if the land owner transfers the land to someone else.

**I-69 Community Planning Program**—The I-69 Community Planning Program will set in place a regional strategy for providing resources to local communities to manage the growth and economic development associated with I-69. The program has provided grants for local communities (cities, towns, and counties) to prepare plans to manage potential new developments along with the I-69 corridor. The local communities have used these grants to prepare transportation land use plans, zoning and subdivision ordinances, and special highway corridor “overlay zones” for development. The total cost of this program is budgeted at \$2 million. The I-69 Community Planning Program is a two-phase effort:

- **Phase 1** (which has been completed) is a regional planning assessment and development of regional planning strategies and resources for the entire I-69 corridor impact area. It included establishing partnerships, inventories, review of regulations and legislation, identification of needs, preparation of processes and models, identification of environmentally sensitive areas, farmland protection strategies, workshops, and providing technical planning support.
- **Phase 2** provides for the actual grants to local communities for the preparation of local plans and growth management ordinances. It will include public involvement activities, planning framework and corridor land use planning, economic development strategies, model planning ordinances, and developing a plan implementation program. On October 29, 2007, INDOT awarded \$950,000 in grants to communities located along the I-69 corridor in Southwest Indiana. Greene County, the town of Bloomfield, and the city of Linton together were awarded a grant for \$150,000. Monroe County and the city of Ellettsville together were awarded a grant for \$100,000. Using this grant, Greene County developed its Draft Comprehensive Plan on August 3, 2009. On February 1, 2008, Monroe County submitted an application for a \$50,000 grant. The grant was awarded to Monroe County in the second phase of the program on July 30, 2008, and this grant was used for the preparation of a transportation corridor plan for SR 37/I-69.

Under this approach, INDOT's role will be to provide technical and financial assistance to communities that desire to develop plans for growth related to I-69. No local community will be required to participate in the program. Eligible communities in Section 4 are as follows: Greene and Monroe counties and the cities/towns of Linton, Bloomfield, Ellettsville and Bloomington.



## Section 4—Final Environmental Impact Statement

**Geographic Information System (GIS)**—A GIS is an interactive network of maps (i.e., layers) that depict various environmental, social, and economic resources. Each set of resources (e.g., wetlands, forests, historic resources) is mapped on a different layer, which can be overlaid on other layers for purposes of determining the impacts of project alternatives on specific resources. INDOT and FHWA, along with the Indiana Geological Survey (IGS), developed a comprehensive GIS dataset covering the entire Tier 1 26-county Study Area in Southwest Indiana to assist in assessing impacts of the I-69 Evansville to Indianapolis project. This GIS for Southwest Indiana is comprised of approximately 170 different layers of aquatic, terrestrial, mineral, social, and economic information for the 26 counties. Most of the information contained in these layers was obtained from other state and federal agencies including the USEPA, U.S. Bureau of Census, IDNR, IDEM, IGS, and FEMA. With the publication of the I-69 Tier 1 DEIS, the IGS made this information available to all agencies and the public on its website. Building on the Southwest Indiana GIS, INDOT, and FHWA subsequently developed a statewide GIS Atlas that consists of layers for similar resources for each county throughout the State of Indiana (<http://inmap.indiana.edu/viewer.htm>).

**Update County Historic Surveys**—IDNR, Division of Historic Preservation and Archaeology (DHPA), manages the Indiana Historic Sites and Structures Inventory (IHSSI) and performs the duties of the State Historic Preservation Officer (SHPO) in the Section 106 process. Many of the publications upon which it relies to assemble its Inventory are older and require updating or require underwriting of publication costs associated with the printing of additional documents. INDOT and FHWA will provide financial and technical assistance to the SHPO to support the completion of field surveys and publishing of County Interim Reports for the Inventory.<sup>3</sup> Also, INDOT and FHWA will cooperate with the IDNR-DHPA to provide the most current information on historic structures in counties that the selected alternative traverses or is near (i.e., Gibson, Pike, Daviess, Martin, Greene, Monroe, Morgan, Johnson, and Warrick counties, and the portion of Marion County that includes Decatur, Perry, and Franklin townships). This commitment was developed through the Tier 1 Section 106 process. The Section 106 process requires federal agencies to consider impacts to historic and archaeological resources when undertaking major federal actions. See Appendix P of the Tier 1 FEIS for the Section 106 Memorandum of Agreement (MOA), which contains these commitments.

As part of this commitment, IDNR-DHPA will be provided with GIS data and the IHSSI survey forms when they are completed following the completion of this study, and the surveys for Martin and Greene counties mentioned previously will begin. The survey for Monroe County can begin after the FEISs in both Sections 4 and 5 are published. (Note: these surveys are outside the Area of Potential Effects studied as part of the Section 106 process to identify impacts by the project on historic resources.)

**Biological Surveys on Wildlife and Plants**—The Endangered Species Act requires federal agencies to consult with the USFWS and ensure that their actions do not jeopardize any federally-listed threatened or endangered species or significantly impact or adversely modify any critical habitat of those species. Therefore, during Tier 1 studies, formal and informal

---

<sup>3</sup> These surveys will be completed in accordance with a Memorandum of Agreement following approval of the Record of Decision for the Section(s) located within or near each specific county.



consultation with USFWS was conducted. The consultation provided for INDOT and FHWA to submit a Tier 1 Biological Assessment (BA) of potential impacts of the Evansville-to-Indianapolis project on threatened and endangered species. Within the counties through which the alternatives traverse, there are two federally-listed endangered species—the Indiana bat and the fanshell mussel, and one federally-protected species—the bald eagle.<sup>4</sup> The conclusion of the consultation process included the issuance of a Tier 1 Biological Opinion (BO) by USFWS.

Coordination with USFWS during Tier 2 resulted in the re-initiation of Tier 1 formal consultation for the Indiana bat. Additional information provided by Tier 2 bat surveys prompted USFWS to re-examine the effects of the project as a whole on this species. Current information shows no bald eagle nests within the corridor, and mussel surveys found no eastern fanshell mussels. Thus, there has been no reinitiation of formal consultation on the bald eagle or eastern fanshell mussel.

The re-initiation of formal consultation resulted in the preparation of an Addendum to the Tier 1 BA which was provided to the USFWS. The BA Addendum detailed information gathered on the Indiana bat during Tier 2 studies and after the original BO was issued. Upon completion of its review of the Addendum, USFWS submitted a revised Tier 1 BO, including an Incidental Take Statement, to FHWA and INDOT on August 24, 2006. In the revised Tier 1 BO, USFWS confirmed its original opinion that the I-69 project is “not likely to adversely affect the eastern fanshell mussels” (p. 37); and “is not likely to jeopardize the continued existence of either the Indiana bat or the bald eagle.” Regarding the Indiana bat, USFWS concluded “the proposed extension of I-69 from Evansville to Indianapolis will have greater impacts to Indiana bats than were originally considered,” but the project “is not likely to jeopardize the continued existence of the Indiana bat and is not likely to adversely modify the bat’s designated Critical Habitat.”

On April 11, 2011, the Federal Highway Administration again reinitiated Tier 1 consultation based on new maternity colony information, as well as documentation of the disease White Nose Syndrome (WNS) within the action area. On May 25, 2011, the USFWS issued an Amendment to the August 24, 2006 Tier 1 revised BO, including a revised Incidental Take Statement. The Amendment to the Tier 1 revised BO addresses each of the sections of the Tier 1 Revised BO dated August 24, 2006 that required new analysis for effects to the Indiana bat; otherwise the Tier 1 revised BO remains in effect.

In addition, a Tier 2 BA specific to Section 4 was submitted to USFWS on November 1, 2010. USFWS approved a Tier 2 BO for Section 4 on July 6, 2011. USFWS concurred with FHWA and INDOT’s determinations, and noted “the effects associated with the proposed construction, operation, and maintenance of Section 4 of I-69 are within the scope of effects contemplated in the recently amended Tier 1 Revised Programmatic Biological Opinion (2011). Upon evaluation

---

<sup>4</sup> Note: On July 9, 2007, the USFWS removed the bald eagle from the list of endangered and threatened species under the Endangered Species Act. Since that time; however, the bald eagle has been protected by the Bald Eagle and Golden Eagle Protection Act, 16 U.S.C. §§ 668-668d. On May 20, 2008, the USFWS issued regulations governing permits under the Bald and Golden Eagle Protection Act for the projects that obtained an incidental take permit under the ESA. 50 C.F.R. Part 22. On June 25, 2009, the USFWS issued INDOT and FHWA a permit under the Bald and Golden Eagle Protection Act for the I-69 Evansville to Indianapolis project based on the incidental take permit under the ESA. 50 C.F.R. Part 22. FHWA and INDOT will comply with the Bald and Golden Eagle Protection Act permit requirements established by FWS, which include the Terms and Conditions associated with the Incidental Take Statement.



## Section 4—Final Environmental Impact Statement

of the proposed project, we believe incidental take of Indiana bats in the Section 4 Action Area is likely, but the impact of such taking is not likely to jeopardize the continued existence of the Indiana bat and is not likely to adversely modify the bat's designated Critical Habitat.” (p. 1)

Pursuant to the BO, INDOT is cooperating with USFWS, IDNR, and other agencies and organizations to complete the following: (1) biological surveys for rare and endangered species; (2) surveys of known Indiana bat hibernacula (i.e., caves); (3) funding of research for discovery of new hibernacula; (4) funding of research on autumn and spring habitat for the Indiana bat; (5) funding for captive-rearing research on mussels; and (6) funding for the writing and printing of informative pamphlets on bats, bald eagles, and mussels in Indiana. Field studies in Section 4 included generalized pedestrian surveys during project field work, harp and mist netting for Indiana bats with radiotelemetry and Anabat, bridge habitat surveys and cave fauna survey. Tier 2 studies related to the Indiana bat began in the summer of 2004 and continued through the winter of 2006. All survey results have been included as an Addendum to the previous Tier 1 BA. In addition, pre-construction mist netting was conducted for a portion of Section 4 in the summer of 2010. The results of this mist netting were included in a separate report which was provided to USFWS.FHWA and INDOT agreed to commitments and mitigation documented in the revised Tier 1 BO, which incorporates by reference the revised *Tier 1 Conceptual Forest and Wetlands Mitigation and Enhancement Plan* (see **Appendix S**). Proposed mitigation for the Indiana bat includes providing additional forested and wetland habitat for this species, purchasing Indiana bat hibernacula, and installation of bat friendly gates at hibernacula.

Conservation measures were jointly developed by the FHWA, INDOT, and USFWS during informal consultation and were subsequently incorporated into the Tier 1 BA and the Tier 1 BA Addendum as part of the official Proposed Action for the I-69 project. Since conservation measures are part of the Proposed Action, their implementation is required under the terms of the consultation. These measures were specifically designed to avoid and minimize impacts of the proposed action on Indiana bats and bald eagles and to further their recovery. Section 7.3.15 presents the conservation measures applicable to Section 4. Section 5.17, *Threatened and Endangered Species*, and the revised Tier 1 BO (**Appendix DD**, *Revised Tier 1 BO*) provide a history of the Section 7 consultation for this project, and the revised Tier 1 BO contains the complete list of conservation measures for the I-69 project as a whole.

**Bridging of Floodplains**—Floodplains are a vital part of a river or stream ecosystem. They are important because they act as flood buffers, water filters, and nurseries, and are major centers of biological life in the river or stream ecosystem. They are important for maintenance of water quality since they provide fresh water to wetlands and backwater areas, dilute salts and nutrients, and improve the overall health of the habitat of many species of birds, fish, and plants. They are important biologically since they represent areas where many species reproduce and are important for breeding and regeneration cycles. The complete bridging of a floodplain avoids and minimizes habitat impacts and maintains wildlife corridors. Similarly, it minimizes any floodplain encroachments, reduces significantly the loss of wetlands, forests, and farmland, and minimizes impacts to threatened and endangered species. Although it is not anticipated that any floodplains in Section 4 will be bridged in their entirety, floodplain encroachments will be minimized, where reasonable, through design practices such as longer bridges and perpendicular stream crossings. There are five Federal Emergency Management Agency (FEMA) mapped



floodplains crossed in Section 4: Black Ankle Creek, Dry Branch, Plummer Creek, Indian Creek, and an unnamed tributary to Clear Creek. A hydraulic study during final design will determine the length of the spans. A final hydraulic design study will be completed during the design phase, and a summary of this will be included with the Field Check Plans and Design Summary. The channels of Black Ankle, Dry Branch, Plummer, Mitchell Branch, Indian Creek and a portion of their overbanks will be bridged to minimize stream and riparian impacts.

**Distance Learning**—Distance-learning opportunities for students in Southwest Indiana continue to be available. One such opportunity is by means of GIS maps and databases developed and compiled for use in proposed I-69 planning. Digital data and on-line maps are being made available from a server accessed on the Indiana Map website: <http://inmap.indiana.edu/viewer.htm>.

### **7.3 Section 4 Mitigation Measures and Commitments**

This section lists specific proposed mitigation measures and commitments for each resource category in Section 4. An overall I-69 mitigation tracking method has been developed in consultation with permitting agencies and the USEPA. The mitigation tracking is accomplished using a database with a GIS component. INDOT has coordinated with agencies to identify agency-specific information to be included in the database for tracking. Information on purchased, constructed, and potential mitigation sites, as well as the anticipated natural resource mitigation required and available credits of I-69 are continually being updated within the tracking system. The first annual tracking report was issued on February 22, 2010.

INDOT and FHWA have developed two types of commitments, including those that are required and those which are for additional consideration. All commitments associated with mitigation measures to address regulatory requirements and permit conditions are identified as required. These include items such as wetland and stream mitigation to address Section 404/401 permit requirements and habitat mitigation measures to address the terms and conditions of the incidental take statement provided in the Section 4 Tier 2 BO (including by reference the conservation measures proposed in the Tier 1 BA and Section 4 Tier 2 BA). In addition, other mitigation measures which address general recommendations by review agencies, but are not associated with regulatory requirements are in some instances identified as for further consideration. These measures often require final design level information to determine feasibility of implementation in various portions of the project and for final cost evaluation to determine cost benefit considerations.

INDOT's mitigation tracking system monitors the status of all commitments, including those identified as "for consideration." The tracking system flags each of these commitments to require that it be affirmatively considered during post-NEPA design. If it cannot be implemented, then the requestor is informed as to why it could not be implemented. The mitigation tracking system will designate any instances where a stakeholder has identified a specific commitment as critical and INDOT (for that reason) identifies that commitment as required and not "for consideration."



## Section 4—Final Environmental Impact Statement

Commitments identified as for further consideration (such as access roads for parcels landlocked by the project) require final design level information to determine the cost effectiveness of the specific measures at specific locations. Such information includes final anticipated construction cost, residual parcel appraised value, etc. As noted above, these measures will be tracked in post-NEPA design through INDOT's commitments tracking database to document whether they are implemented.

In the event of any differences of wording between the commitments listed below and the final conditions of a regulatory action (existing BO, anticipated permits, etc.), the final wording of the condition of the regulatory action takes precedence over the FEIS.

### 7.3.1 Land Use

Section 4 is mainly rural. The majority of the project corridor traverses sparsely populated, forest, and agricultural land with residences on scattered locations. There are 10 subdivisions within the corridor. The following measures will be utilized to mitigate the potential impacts of this project on land-use patterns:

1. **I-69 Community Planning Program**— The I-69 Community Planning Program will help to set in place a regional strategy for providing resources to local communities to manage the growth and economic development associated with I-69. Greene and Monroe counties and the cities/towns of Linton, Bloomfield, Ellettsville and Bloomington were eligible for grants.

The I-69 project website provides a link to the Community Planning Program website ([www.i69indyevn.org/CommunityPlanningProgram](http://www.i69indyevn.org/CommunityPlanningProgram)). The Website contains information including a concise description of the program, examples of planning “toolbox” features that could be used to help local communities plan for I-69, a summary of the kick-off meetings with agencies and communities, and other information about the program. Included in the meeting summaries are a list of communities that were represented at the Section 4 meetings in October 2006 and feedback received from community representatives at the meeting regarding issues of local importance, their vision for the future 20 years hence, questions about the grant program, and features of the toolbox they might consider using.

Eligible communities in attendance at Section 4's October 2006 meetings were Bedford, Ellettsville, Linton, and Greene County. Issues of local importance included preservation of access, concerns over uncontrolled growth, annexations, maintaining downtown vibrancy, and traffic patterns for Amish. Economic development and increased tourism were identified as the most important elements in the 20-year vision of all communities represented. The grant applications were made available to communities beginning in August 2007.

On October 29, 2007, INDOT awarded \$950,000 in grants to communities located along the I-69 corridor in southwest Indiana. Greene County, the Town of Bloomfield, and the City of Linton together were awarded a grant for \$150,000. Using this grant, Greene County adopted its Comprehensive Plan on August 3, 2009. The stated land use development policy of the Greene County Comprehensive Plan includes the identification, preservation and



development of economic development sites at the proposed interchanges of I-69. The plan also includes environmental preservation policy objectives.

On February 1, 2008, Monroe County submitted an application for a \$50,000 grant. The grant was awarded to Monroe County in the second phase of the program on July 30, 2008, and this grant was used for the preparation of a transportation corridor plan for SR 37/I-69. The Monroe County SR 37 Corridor Plan was developed in 2010 as a result of the I-69 Planning Grant Program. The plan recommends that the County Line interchange should provide no direct access to Monroe County roads, be limited access only, and development in the vicinity of the proposed I-69 Section 4 County Line interchange (South Connector Road - located in Greene County) be strongly discouraged. The plan further recommends that construction in the connector road area be limited to rural residences and traditional agricultural-related facilities.

Due to its robust existing planning program, the City of Bloomington elected not to participate in the program (see **Appendix T**, *I-69 Planning Grant Program Update*, for further information).

2. **Context Sensitive Solutions (CSS)** is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist. A Community Advisory Committee (CAC) was developed in the fall of 2004 to facilitate communication between project team members and representatives of key constituent groups in the project area. Through a series of three meetings, committee members learned details of the project and provided feedback on such subjects as local needs and plans, community issues, and the development of alternatives.

Local access, farmland impacts, economic development, and the potential impact of the project on emergency response times were the issues most frequently raised by CAC members as important considerations in planning the interstate's location and design features. The information they provided regarding farming operations, travel patterns, local development plans, and critical emergency response routes helped guide the development of alternatives that would avoid or minimize farmland severances and maintain the connectivity of many local roads.

- The following are some of the local access measures that are now proposed in the project as part of the CSS process: construction of an overpass at Dry Branch Road (Greene CR 750E and 900E) to provide access to residences from the north or south as this valley is known to occasionally flood; construction of grade separations at Mineral-Koleen Road (CR 350S, CR 360S, and CR 880E), Burch Road (Monroe County), Harmony Road (Monroe County), Bolin Lane (Monroe County) to maintain local connectivity; Access Road (AR 1) to maintain travel between CR 475E and CR 450S (west of CR 475E) and the current access to Taylor Ridge Cemetery, Access Road (AR 2a) to maintain the connection between Spruce Road and Pine Road just north of the interstate right-of-way, Access Road (AR 3) to provide

**Section 4—Final Environmental Impact Statement**

access to two residential properties on the west side of SR 45 to the south of I-69, Access Road (AR 4) to maintain the connection of Greene CR 1250E to SR 45 facilitating travel between the Hobbieville area and Owensburg and construction of a Greene/Monroe County Line Interchange to serve traffic commuting between Bloomfield, Cincinnati, Crane NSWC and Hobbieville and the greater Bloomington urbanized area, Access Road (AR 5) to extend east from SR 54, on the south side of I-69, to provide access to properties whose current access would be terminated by the construction of I-69, and Access Road (AR 6) would be built on the east side of SR 45 to the north of I-69 to provide access to one residential property and one undeveloped parcel.

In addition, a set of low-cost design criteria has been developed that minimizes the environmental footprint of the Interstate. The low-cost design criteria help the roadway to better follow the existing ground contours reducing bridge heights and minimizing the large road cuts and steeper side slopes help reduce the cut and fill construction limits

Another CSS measure addresses resource agency concerns with respect to wildlife crossings and the interstate. Potential wildlife crossings are proposed at 37 Section 4 locations. INDOT is committing to meeting the minimum dimensions for deer (8 feet tall by 24 feet wide of dry crossing) at 11 locations. The additional 18 crossings may or may not meet the minimum dimensions for deer, but are anticipated to provide opportunities for wildlife movement across the interstate. In addition, two other possible wildlife crossings are recommended that may also provide opportunity for wildlife movement across the interstate. In addition, designs for Section 4 also show bridges crossing over 6 roads that may also provide opportunity for wildlife movement across the interstate. Refer to Section 7.3.13 for additional information.

No additional CSS issues or options have been identified in Section 4 at this time. Further public input will be received during the final design stage. Other Context Sensitive Solutions may be incorporated as the study process continues for this project.

**7.3.2 Social and Neighborhood**

Section 4 is rural in nature, and residences are generally located on widely scattered sites throughout the project area. Section 4 has 10 residential subdivisions located within the Section 4 corridor. These include Clifty Hills, Whippoorwill, Shady Meadows, Shea Estates, and Timber Trace within Greene County, and Sierra Hills, Rolling Glen Estates, Farmers Field Acres, Victor Heights, and Bailey West/Glenview within Monroe County. In addition to the neighborhoods associated with the unincorporated communities and subdivisions, other rural residential clusters are located along many of the county roads within the Section 4 corridor. A total of 102 residences are in the rights-of-way of one or more of the alternatives. The total number of residences that would be acquired for right-of-way ranges from 62 to 77 depending on the alternative selected. Of these residences, most are single-family dwellings or mobile homes. There is one church located with the Section 4 corridor. Under the low-cost design criteria, Refined Preferred Alternative 2 will result in an estimated 69 residential and four businesses displacements. Under the initial design criteria, Refined Preferred Alternative 2 will result in 73 residential and four businesses displacements. There would be no direct impacts to the church or





changes in access for visitors under any alternative. The following measures will be utilized to mitigate impacts on this residential area or local communities:

1. **Local and Access Roads**—Where reasonable and cost effective, local access roads (e.g., frontage roads and road relocations) will be used to maintain accessibility for residences, farm operations, businesses, churches, schools, and other land uses. The determination of whether access roads to potentially landlocked parcels will be constructed or whether the landlocked parcels will be acquired due to the cost of providing access will be made during final design.
2. **Changes in roads used** by school bus routes will be discussed with the school systems well in advance of when they actually take place so the school systems can adjust routes in a timely manner. Where roads are severed, provisions for turnarounds will be included during the final design phase of the project.
3. **Road Closures**—Efforts have been made to minimize the disruption of local crossroads and minimize impacts to school bus and emergency provider routes. The alternatives were developed that avoid closure of local roads where possible: in some locations the interstate will overpass the county roads, while in other instances the county roads will bridge the interstate. Whether overpasses in these areas need wider shoulders or less steep grades will be investigated during the design phase of the project. Any roads terminated at the interstate will be provided a cul-de-sac or other means to allow large vehicles such as school buses or county maintenance vehicles sufficient turn around space. Appropriate signing will be placed at the nearest intersection to warn that the road does not provide for through traffic.
4. **Relocations**—Efforts have been made to minimize the number of relocations. All acquisitions and relocations required by this project will be completed in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended, 49 CFR (Code of Federal Regulations) 24, and Title VI of the Civil Rights Act of 1964. No person displaced by this project will be required to move from a displaced dwelling unless comparable replacement housing is available to that person. INDOT will take required actions to ensure fair and equitable treatment of persons displaced as a result of this project up to and including providing replacement housing of last resort as defined in 49 CFR 24.404. Relocation resources for this project are available to residential and business relocatees without discrimination. Advisory services will be made available to farms and businesses, with the aim of minimizing the economic harm to those businesses and farm establishments.

There are no unique relocation situations anticipated with any build alternative. If a displaced resident cannot be relocated due to the unavailability of comparable housing, or because comparable housing is not available within the statutory limit of the Uniform Relocation Act, then housing of last resort will be made available to these persons. Last resort housing includes, but is not limited to, rental assistance, additions to existing replacement dwellings, construction of new dwellings and dwelling relocation. Replacement dwellings must meet the requirements of decent, safe, and sanitary standards as established by FHWA.



## Section 4—Final Environmental Impact Statement

Relocation resources would be available to all residential relocates without regard to race, creed, color, sex, national origin, or economic status, as required by the Uniform Act and Title VI of The Civil Rights Act of 1964. Financial assistance will be available to eligible persons displaced by this project. Payments received are not considered as income under the provisions of the Internal Revenue Code of 1954; or for the purposes of determining any person's eligibility, or the extent of eligibility, for assistance under the Social Security Act or any other Federal law.

5. **Cemeteries**—Eight cemeteries are located within the project corridor. The right-of-way for Access Road #1 that will provide modified access to Taylor Ridge Cemetery from CR 475E. Refined Preferred Alternative 2 is within 100 feet the cemetery. If disturbance of ground within 100 feet of a cemetery gravesite is proposed, a development plan will be completed and submitted to IDNR Division of Historic Preservation and Archaeology during the design phase of project development as per the Indiana Historic Preservation and Archaeology Act (IHPAA).

### 7.3.3 Noise

Section 4 is rural in nature, and residences are generally located on widely scattered sites throughout the project area. Section 4 has 10 residential neighborhoods within the project area and a cluster of residences located along SR 54 and SR 45. The following measures will be considered to mitigate noise impacts of the project on noise-sensitive receivers:

1. **Noise Abatement Measures** – Noise abatement measures have been analyzed. These included roadway geometrics (see next point) and noise barriers. The Refined Preferred Alternative 2 will result in 88 (90 low-cost design criteria) traffic noise impacts. Of these, 82 (84 for the low-cost design criteria) are substantial increase impacts only and 6 (6 low-cost design criteria) are both NAC and substantial increase impacts. An evaluation of the substantial increase impacts indicate that 51 (50 low-cost design criteria) of the impacts will experience a substantial increases between 15 and 20 dBA, 32 (33 low-cost design criteria) of the impacts have substantial increases between 20 and 25 dBA, and 7 (5 low-cost design criteria) of the impacts have substantial increases of 25 dBA or greater. Since none of these impacted receivers exceed the NAC by 15 dBA or more, they are not considered to be severely impacted. (Section 5.10, *Highway Noise*), The noise barrier analysis utilizing both the initial design criteria and the low-cost design criteria resulted in no noise barriers meeting the cost-effectiveness portion of the “reasonable” criteria (\$30,000 per benefited receiver). Accordingly, no noise barriers are shown as mitigation for Section 4. This is a change from the DEIS, which did show one noise barrier (Noise Barrier G-1) being provided. This change occurred as a result of the application of INDOT's new noise policy and correction of the algorithm used in the DEIS noise impact analysis; see Chapter 5.10 for more information.

A final determination on noise abatement for Refined Preferred Alternative 2 will be made during the design phase. At such time, additional noise analysis will be performed to more accurately determine barrier performance, barrier characteristics (length and height), and the optimal barrier location for any potential noise barriers that may be recommended for noise abatement. At this time, if noise abatement is determined to be feasible and cost-effective,



then potentially affected property owners will be surveyed in accordance with the requirements set forth in the *INDOT Noise Policy* to determine whether they do or do not want noise abatement.

2. **Roadway Geometrics** – The final design of the preferred alternative may include shifting the alternative both vertically and horizontally, wherever feasible, to minimize noise impacts where other factors are not prohibitive.
3. **Construction Noise** – Consideration will be made to provide reasonable and feasible noise abatement, including noise barrier walls, early in construction for the added benefit of mitigating construction noise. Construction vehicles will be required to follow *INDOT Standard Specifications* on controlling noise. Blasting will be performed in accordance with the *INDOT Standard Specifications* for roadway construction. Consideration will be given to the timing of blasting in order to minimize noise impacts to sensitive receivers during periods of occupancy.
4. **Coordination Among Local Planning Authorities** – Since most of the proposed project would be located on a new roadway, the potential does exist for local officials and developers to help minimize adverse noise impacts through the use of careful land use planning. With regard to currently undeveloped land, the creation of a “buffer zone” or locating noise sensitive developments a reasonable distance away from the project would help minimize future noise impacts. Local planning authorities will be provided with the 66 dBA noise contour mapping and can utilize it to develop noise compatible land uses outside the 66 dBA buffer zone. This mapping is provided in **Appendix X**, *Final Noise Technical Report*, of this FEIS. Copies of this FEIS will be provided to Greene and Monroe County officials for use in noise-sensitive land use planning.

#### 7.3.4 Construction

Section 4 will be constructed as a freeway, using Best Management Practices. The following measures will be utilized to mitigate construction impacts:

1. **Construction Plans** – Environmentally-sensitive locations (e.g., wetlands, historic structures, archaeology sites, sinkholes) in the general area will be clearly shown on construction plans. Sites within the right-of-way will be delineated. These sites will not be permitted for use as staging areas, borrow, or waste sites.
2. **Erosion Control** – Erosion control devices will be used to minimize sediment and debris from leaving the project site in runoff. Timely revegetation after soil disturbance will be implemented and monitored. Revegetation will consider site specific needs for water. Erosion control measures will be put in place as a first step in construction and maintained throughout construction. Any riprap used below the high water mark will be of a large diameter in order to allow space for habitat for aquatic species after placement. Slopes will be designed that resist erosion. If slopes exceed 2 to 1, they will include stabilization techniques. Soil bioengineering techniques for bank stabilization will be considered where situations allow.



## Section 4—Final Environmental Impact Statement

- 3. Groundwater and Karst** – Best Management Practices (BMP) will be implemented during construction to protect groundwater. Where groundwater from private, individual wells is the principal source of potable water, grassy swales or equivalent methods to divert stormwater from the road to ditches and streams, and construction methods to reduce turbidity that construction temporarily causes will be among the measures employed to protect sources of potable water. Stormwater runoff protection measures will be installed at all karst features in the right-of-way at the initiation of construction and maintained until all stormwater drainage has been diverted away from the feature, or final permanent stormwater treatment measures are in **place**.

**Procedures to reduce** the impacts to karst will be implemented in accordance with INDOT's *Standard Specifications* and the 1993 Karst MOU between INDOT, IDNR, IDEM and USFWS.

Per USEPA written comments on the DEIS, a firm commitment has been added that if active groundwater flow paths are discovered, measures will be taken to perpetuate the flow and protect water quality.

USEPA Class V injection well permits may be required for various types of projects. For example such a permit could be required by EPA Region 5 if a Class V injection well is located within the karst region of the state, a sole source aquifer area, a state designated source water protection area for a public water supply, or anywhere untreated fluids discharged through a Class V well may otherwise endanger an underground source of drinking water. If there are measures in place to prevent contamination of groundwater, a Class V well could be authorized by rule rather than by a permit. A Class V Well Inventory Form would need to be provided to EPA Region 5 prior to construction of a Class V injection well so that EPA could determine if a Class V injection well permit will be required for any Class V wells. For the I-69 project, if the inventory information provided indicates that any injection well would likely contaminate any underground source of drinking water, a permit would be required. Any permit would need to be applied for and obtained prior to construction of the Class V well.

- 4. Air Quality** – Construction equipment will be maintained in proper mechanical condition. Fugitive dust generated during land clearing and demolition procedures will be controlled by proper techniques. All bituminous and Portland cement concrete proportioning plants and crushers will meet the requirements of the Indiana Department of Environmental Management (IDEM). Dust collectors must also be provided on all bituminous plants. Dry, fine aggregate material removed from the dryer exhaust by the dust collector must be returned to the dryer discharge unless otherwise directed by the project engineer.
- 5. Parking and Turning Areas** – Prior to construction, planning for parking and turning areas outside the construction limits but within the right-of-way for heavy equipment will be located to minimize soil erosion and impacts to identified resources.
- 6. Tree Clearing** – The potential construction impacts to the Indiana bat's summer and winter habitat will be addressed in accordance with the requirements of the USFWS's revised Tier 1



BO for the I-69 Evansville to Indianapolis project, which was issued on August 24, 2006 and Amendment to the revised Tier 1 BO issued May 25, 2011 (see Appendix DD, Revised Tier 1 BO) and any subsequent formal consultation conditions specific to Section 4. These measures include the following (with revisions based on USFWS's updated dates): Tree and snag removal will be avoided or minimized. No trees with a diameter of three or more inches will be removed between April 1 and November 15 within the Winter Action Area (WAA) and April 1 and September 30 within the Summer Action Area (SAA) to avoid any direct take of Indiana bats. Tree clearing will be allowed in the WAA from November 16 to March 31, and tree clearing will be allowed from October 1 through March 31 in the SAA. Tree clearing and snag removal will be kept to a minimum and limited to within the construction limits. Tree clearing will be kept to a minimum outside of the clear zone with woods kept in as much of a natural state as reasonable in bifurcated sections with widened medians. Forested medians will be managed following the IDNR State Forest timber management plan.

7. **Emerald Ash Borer** – INDOT will consult IDNR to determine appropriate measures during tree clearing to address concerns about the emerald ash borer.
8. **Eastern Box Turtle** – INDOT and FHWA will continue to coordinate with IDNR with regard to potential impacts upon eastern box turtles.
9. **Revegetation** – Revegetation of disturbed areas will occur in accordance with INDOT standard specifications. Woody vegetation will only be used a reasonable distance beyond the clear zone to ensure a safe facility. Revegetation of disturbed soils in the right-of-way and medians will utilize native grasses and native wildflowers as appropriate, such as those cultivated through INDOT's Roadside Heritage program.<sup>5</sup>
10. **Spill Prevention/Containment** – Contractors will be required to provide an acceptable spill response plan. This response plan will include telephone numbers for emergency response personnel and copies of agreements with any agencies which are part of the spill-response effort. An emergency contact telephone number also is required. The Rule 5 permit that contractors must obtain will require that all have spill containment plans in their contract documents.
11. **Heavy Blasting** – Heavy blasting is anticipated, and strict blasting specifications will be followed.

Blasting will be avoided between September 15 and April 15 in areas within 0.5 miles of known Indiana bat hibernacula. All blasting in the Winter Action Area (WAA) will follow the specifications developed in consultation with the USFWS and will be conducted in a manner in attempt to avoid compromising the structural integrity or alter the karst hydrology of nearby caves serving as Indiana bat hibernacula. Blasting within areas where dimension

---

<sup>5</sup> INDOT's program was developed in cooperation with FHWA, IDNR, and IDEM and funded through a Federal Transportation Enhancement Project grant. The program promotes the use of native plants in state rights-of-way. The plants are grown on state-owned seed farms. The native plants not only provide aesthetic appeal along the highways, they also save the cost of frequent mowing, since the wildflower plantings are mowed only once a year, at the end of the growing season.



## Section 4—Final Environmental Impact Statement

limestone is being quarried will be completed following specifications developed in consultation with limestone industry representatives as well as the Indiana Geological Survey and other geology experts.

12. **Maintenance of Traffic** – Coordination with local agencies, emergency responders and schools will be conducted to ensure that appropriate access is maintained during construction with as little disturbance to emergency routes as possible. Early notice of detour routes will be provided to the local communities.
13. **Construction Noise** – Construction noise abatement measures may be required in areas where residences or other sensitive noise receivers are subjected to excessive noise from highway operations. Consideration will be given to providing reasonable and feasible noise abatement early in the construction phase to mitigate construction noise. Noise impacts could be controlled through the regulation of construction time and hours worked, using noise-controlled construction equipment, limitations of construction vehicles during evening and weekend hours and by locating equipment storage areas away from noise sensitive areas.
14. **Construction in a Floodway** – Construction in a Floodway permit(s) will be applied for before or during the design phase of this project.
15. **Surveys** – The undersides of existing bridges that must be removed for construction of I-69 will be visually surveyed and/or netted to determine their use as night roosts by Indiana bats during the summer. (Note: This work has been completed. Sixty-six bridges and culverts in the Section 4 corridor were inspected for bats. No Indiana bats were found at any of the bridge locations within the Section 4 corridor.)
16. **Memoranda of Understandings (MOUs)** – Construction will adhere to the Wetland MOU (dated January 28, 1991). The primary purpose of the Wetland MOU is to fulfill water resource permitting requirements. In so doing, the Wetland MOU serves to minimize impacts to the Indiana bat by mitigating for wetland losses and creating bat foraging areas at greater ratios than that lost to the project.
17. **Equipment Maintenance** – Construction equipment will be maintained in proper mechanical condition. All servicing of construction equipment will take place in a designated maintenance area away from environmentally-sensitive areas.
18. **Borrow Sites/Waste Disposal** – BMPs will be used in the construction of this project to minimize impacts related to borrow and waste disposal activities. Solid waste generated by clearing and grubbing, demolition or other construction practices will be removed from the location and properly disposed. All burning will be monitored. Contractors are required to follow safeguards established in INDOT's *Standard Specifications* (Section 203.08 Borrow or Disposal) that include obtaining required permits. Prior to their use, borrow sites will be assessed for impacts to resources such as archaeological resources, wetlands, etc., and appropriate measures taken to avoid or mitigate impacts to these resources. Special Provisions will include prohibiting tree clearing from April 1 to November 15 within the Winter Action Area of the Indiana bats and from April 1 to September 30 in the Summer



Action Area, as identified in the revised Tier 1 and Tier 2 BOs. Tree clearing will be allowed in the Winter Action Area from November 16 to March 31, and tree clearing will be allowed from October 1 through March 31 in the Summer Action Area. Special Provisions will also include prohibiting the filling or other damaging of wetlands within the right-of-way outside the construction limits. Note that this does not include isolated ponds such as farm ponds or those developed from old borrow sites since these are exempt from regulation because they are manmade bodies of water constructed from uplands.

19. **Wetlands Within the Right-of-Way** – Wetlands within the right-of-way that are not within the construction limits will be delineated and protected from construction impacts.
20. **Training of Construction and Maintenance Personnel** – All I-69 engineering supervisors, equipment operators, and other construction personnel and INDOT and/or other maintenance staff will attend a mandatory environmental awareness training that discloses where known sensitive Indiana bat sites are located in the project area, addresses any other concerns regarding Indiana bats, and presents a protocol for reporting the presence of any live, injured, or dead bats observed or found within or near the construction limits or right-of-way during construction, operation, and maintenance of I-69.

### 7.3.5 Historic and Archaeological Resources

The Area of Potential Effects (APE) for the aboveground resources survey in Section 4 is centered on the 2,000-foot to one-mile wide corridor that was selected at the end of the Tier 1 Study as the preferred alternative. The APE of Section 4 extends one mile beyond the termini of the approximately 27-mile long corridor for a total length of approximately 29 miles. The width of the APE is generally one mile on each side of the 2,000-foot to one-mile wide corridor, but extends beyond this limit as appropriate where alternative access considerations extend outside of the corridor. For archaeological resources, the APE will be defined by the right-of-way limits of the preferred alternative which will average approximately 380 feet (low-cost design criteria) to 500 feet (initial design criteria) in width. A Phase Ia field reconnaissance was conducted for the right-of-way of the Preferred Alternative APE. Archival research and site file checks focused on the larger 2,000-foot to one-mile wide study corridor, as defined in the Tier 1 FEIS.

The Scotland Hotel is the sole National Register of Historic Places (NRHP)-listed property located within the Section 4 APE. In addition, ten above-ground properties within the Section 4 APE were determined to be NRHP-eligible. These properties include: the Blackmore Store, the Clifty Church, the Koontz House, the John May House, the Stipp-Bender Farmstead, the Harris Ford Bridge, the Philip Murphy-Jonas May House, Greene County Bridge No. 311, Monroe County Bridge No. 83 and the Maurice Head House. The John May House and the Philip Murphy-Jonas May House are no longer extant. It has been determined that the project would have no adverse effect upon above-ground historic properties.

Phase Ia archaeological survey has been conducted for the Section 4 Preferred Alternative APE to identify whether NRHP-eligible archaeological resources are located within the APE and to determine what effect the proposed I-69 undertaking could have on those resources. A total of 65 sites were identified within the APE (see **Table 5.14-2**). Eleven individual sites within the



## Section 4—Final Environmental Impact Statement

Section 4 Refined Preferred Alternative 2 right-of-way were recommended for avoidance or additional study and seven creek crossing locations were identified for Phase Ic archaeological investigations.

In addition to the Phase Ia archaeological survey, a historic context was prepared for the Virginia Ironworks and Victor Limestone areas. The context recommended a discontinuous Virginia Iron Works Archaeological District and a discontinuous Victor Limestone Archaeological District as eligible for the NRHP. Three individual sites within these two recommended-eligible districts are also in the right-of-way for Section 4; two the sites were recommended as Contributing to the districts. SHPO concurred with the recommendation of discontinuous districts and recommended avoidance or additional work for one Contributing site within the Virginia Iron Works District and one Contributing site within the Victor Limestone District. The finding for the project is Adverse Effect, due to impacts to the Contributing sites within these two districts.

Commitments for completion of additional archaeology investigations at these sites are included in a Memorandum of Agreement (MOA) (see **Appendix N**, *Section 106 Documentation*). If the results of further testing show that additional archaeological investigations or mitigation would be warranted, that work would be completed, in consultation with the Indiana SHPO, before construction of the project could begin in those areas. Any areas or sites requiring further investigation will be included in the Record of Decision (ROD).

On July 15, 2010, FHWA signed a Finding of Effects for Section 4 of the I-69 Evansville to Indianapolis Study: Historic Properties Affected – Adverse Effect, since a potential existed for an adverse effect with not all archaeological surveys completed. Since the publication of the DEIS, archaeological investigations have revealed the presence of two discontinuous archaeological districts considered eligible for listing in the NRHP: Virginia Iron Works Archaeological District and Victor Limestone Archaeological District. The criteria of adverse effects apply to the Virginia Iron Works Archaeological District and the Victor Limestone Archaeological District because a Contributing site in each district will be impacted by the project. A modified finding of Historic Properties Affected – Adverse Effect, which included an adverse effect to the Virginia Iron Works Archaeological District and the Victor Limestone Archaeological District (as well as the potential for adverse effects on archaeological sites still requiring additional investigation) was issued by FHWA on January 18, 2011. The SHPO concurred with the Adverse Effect finding on February 15, 2011. For detailed information, see the Identification of Effects Report and the 800.11(e) documentation in **Appendix N** and Chapter 5.14 of this document.

Since there are no adverse effects to aboveground historic properties in the Section 4 APE, there is no resolution of adverse effects required for aboveground resources. A Memorandum of Agreement was signed on May 12, 2011 for archaeological resources. The MOA also included general mitigation as part of a larger mitigation stipulation for the I-69 corridor that was provided for in the I-69 Tier 1 MOA. See Chapter 5.14, Archaeology Impacts, for additional information and **Appendix N** for a copy of the MOA.

At the conclusion of Tier 1, FHWA and INDOT entered into a Section 106 Memorandum of Agreement (MOA). The Section 106 MOA includes the following stipulations and





commitments between INDOT, FHWA, and the SHPO. The Section 106 consulting process in Section 4 during Tier 2 is in compliance with these commitments:

**I. Section 106 Consultation during Tier 2 Studies**

- A. Tier 2 Sections.** Section 4, as defined in the Tier 1 EIS, is considered a separate undertaking for purposes of Section 106 consultation.
- B. Applicable Requirements.** FHWA conducted Section 106 consultation for Section 4 in accordance with all applicable Federal and Indiana State laws and regulations, including Section 106 of the National Historic Preservation Act (16 USC § 470f) and the Section 106 regulations (36 CFR Part 800), and also including 16 USC § 470hh and 16 USC § 470w-3, which require the confidentiality of archaeological site information to be maintained. Nothing in the MOA is intended to supersede or modify any requirement contained in the Section 106 statute, the Section 106 regulations, or any other applicable laws or regulations.
- C. Coordination of Tier 2 Studies in Adjacent Sections.** FHWA consulted with the SHPO regarding the coordination of Section 106 consultation activities in adjacent Tier 2 sections early in the development of this section.
- D. Consulting Parties.** During Tier 2, the same party may be designated as a consulting party for more than one section.

**II. Tier 2 Section 106 Commitments and Conceptual Mitigation**

As part of the Tier 1 MOA, FHWA, and INDOT agree to implement and/or fund the activities listed in this section as part of the Tier 2 environmental studies. The Tier 1 MOA also provided that additional commitments may be made, as appropriate, as an outcome of the Section 106 consultation process for each Tier 2 section. It has been determined that the Section 4 initial and low-cost design criteria alternatives would have no adverse effects on aboveground properties. Since there are no adverse effects to aboveground historic properties in the Section 4 APE, there is no resolution of adverse effects required for aboveground resources. An MOA was signed on May 12, 2011 for archaeological resources. The MOA also included general mitigation as part of a larger mitigation stipulation for the I-69 corridor that was provided for in the I-69 Tier 1 MOA. See Chapter 5.14, Archaeology Impacts, for additional information and **Appendix N** for a copy of the MOA.

**A. Avoidance and Minimization of Impacts in Section 4**

- 1. In General. In accordance with the consultation process required under Section 106 and in accordance with other applicable laws, FHWA and INDOT sought ways to avoid, minimize, and mitigate adverse impacts to the environment, including adverse effects to historic properties.



## Section 4—Final Environmental Impact Statement

2. Resources in Adjacent Sections. FHWA and INDOT ensured that the scope of work for Section 4 includes an analysis of resources (including aboveground and archeological resources) located just beyond the termini for that section. This analysis is intended to ensure that decisions reached in one section do not prematurely limit consideration of avoidance alternatives for resources in adjacent sections.
3. Alternatives Analysis in Tier 2 studies. Section 4 considered alternatives for completing I-69 between the beginning and end termini. The range of alternatives considered in Section 4 was confined to the corridor selected in Tier 1. However, the flexibility existed to consider alternatives outside the selected corridor. It should be noted that the County Line interchange and access roads extend outside of the project corridor.
4. Context-Sensitive Solutions. Not needed for historic properties in Section 4.
5. Noise Abatement. Not needed for historic properties in Section 4.

**B. Preservation and Enhancement** – Not needed in Section 4.

**C. Education and Interpretation** – The Section 4 MOA included general mitigation as part of a larger mitigation stipulation for the I-69 corridor that was provided for in the I-69 Tier 1 MOA. This mitigation involves the preparation of an audio tour focusing on the cultural and natural environment along the I-69 corridor. Specific to the Section 4 portion of the tour, there is a proposed community history component whereby local members of the community can record memories/stories that relate to selected cultural themes; these memories/stories will be incorporated into the audio tour if feasible.

**D. Technical Support for Section 106 Activities**

1. GIS Capability. FHWA and INDOT will assist the SHPO to develop its GIS capability to facilitate Tier 2 consultation and to support historic preservation reviews for other transportation projects in Southwest Indiana.
2. Interim Reports. FHWA and INDOT will provide funding and technical assistance to support a comprehensive effort to update the Interim Reports for Monroe and Martin counties.
3. Archaeology. FHWA and INDOT will provide financial and technical assistance to the SHPO for the further development of GIS-based tools for identifying and recording archaeological sites.

The IDNR-DHPA and INDOT have agreed upon a plan for support of the GIS capability and for the implementation of the Interim Reports. Together with FHWA, they are preparing a Memorandum of Understanding (MOU) that will allow for funding these endeavors.



#### 7.3.6 Visual Impacts

The view from the road is rolling to rugged terrain with extensive areas of forest interspersed by agricultural pasture, and several streams. While development is generally sparse, there are many rural residences, some farmsteads, and a few subdivisions, especially at the north end of the corridor. Some panoramic vistas will be created along the road, especially at the crossing of the Black Ankle Creek valley near Koleen in Greene County. The following measures will be utilized to address impacts on visual resources:

1. **Design Elements**—Mitigation measures may include vegetative screening, roadside ditch enhancements with wetland and wildflower plantings, and a visual barrier to screen views from the road toward the Fern Hills Club.
2. **Context Sensitive Solutions**—Efforts will be made in this project to create positive impacts and reduce negative impacts without compromising traffic operations and safety.
3. **Roadway Lighting**—Non-diffuse lighting will be considered, where appropriate. Any lights installed will be at least 40 feet above the highway in order to avoid collisions between bats and vehicles. Lighting locations will be identified during final design. The locations could include the SR 45 and 37 interchanges.

#### 7.3.7 Hazardous Material Impacts

No RCRA, brownfield, UST, CERCLA, or LUST sites were identified within the Section 4 corridor. There is one UST database site (Petro-Plus and Crossroads Café, FID 15998) located adjacent to the corridor that may be impacted by the Refined Preferred Alternative 2 as a result of the development of the Greene/Monroe County Line interchange South Connector Road. A Phase II Environmental Site Assessment will be performed prior to or as part of right-of-way acquisition. The USTs located within the Refined Preferred Alternative 2 will be removed in accordance with applicable state and federal laws and regulations. As part of the removal of the USTs, an impact assessment consisting of soil and/or groundwater testing will be performed.

There is one LUST database site located within close proximity to the proposed right-of-way for the Greene/Monroe County Line interchange South Connector Road associated with the Refined Preferred Alternative 2. The owner of this site (Pinewood Village, FID 19717) is currently performing subsurface investigations to determine the extent of the release from the UST located on this property. The IDEM site files for property shall be reviewed to assess the results of the Initial Site Characterization report and any other investigations that may be performed at this facility. Based on the results of the review of the IDEM site files, if warranted a Phase II Environmental Site Assessment consisting of soil and/or groundwater testing will be conducted to determine if the properties located within the ROW limits of the Refined Preferred Alternative 2 have been impacted.

There are two additional locations that lie within the Section 4 Refined Preferred Alternative 2 that represent a potential environmental concern. These sites consist of an open dump/auto graveyard, and a lumber yard/mill. A Phase I Environmental Site Assessment will be performed for the lumberyard/mill property prior to the or as part of right-of-way acquisition. A Phase II



## Section 4—Final Environmental Impact Statement

Environmental Site Assessment will be performed, if warranted based on the results of the Phase I Environmental Site Assessment.

A Phase II Environmental Site Assessment will be conducted for the property where the open dump/auto graveyard is located to determine if the soil and/or groundwater have been impacted. The Phase II Environmental Assessment will be performed prior to or as part of right-of-way acquisition. The debris will be removed and properly disposed of in accordance with applicable state and federal laws and regulations.

One dry oil or gas well was identified within the right-of-way limits of the Refined Preferred Alternative 2. This dry well shall be cut and capped in accordance with the requirements of the IDEM and the IDNR.

Numerous rural residences and farms were identified within the Section 4 corridor that may have the potential for aboveground storage tanks (ASTs) and USTs to be present. These tanks are typically used for the on-site storage of chemicals associated with pesticides and herbicides and fuel for equipment. No specific sites were identified. If any of these AST's and/or are encountered within the Refined Preferred Alternative 2, then they will be removed in accordance with applicable state and federal laws and regulations. As part of the removal of the USTs, an impact assessment consisting of soil and/or groundwater testing will be performed.

During the field inspection, utility owned pole-mounted electrical transformers located along public rights-of-way were observed. No visible indicators of oil leakage were observed. Coordination will occur with the owners of electrical transformers before and during construction for proper handling and removal of any transformers or pipes affected by the Refined Preferred Alternative 2.

In addition the following mitigation measures shall be implemented as required:

1. **Hazardous Material Cleanup**—Appropriate cleanup of hazardous materials and/or removal of underground storage tanks (USTs) and aboveground storage tanks (ASTs) may be required if a contaminated site is purchased. INDOT will coordinate with the appropriate agencies and property owners to see that proper cleanup of any contaminated sites are completed.
2. **Relocating Pipelines Transporting Hazardous Material**—Where construction would require the removal/relocation of buried fuel (oil, natural gas, and diesel) pipelines, coordination will occur with pipeline owners, per INDOT's *Standard Specifications*. Also, stipulations in the *Standard Specifications* will be followed to ensure safe removal/relocation of the pipelines and associated appurtenances, and appropriate remediation of soils and groundwater impacts, should such be necessary. In addition, the procedure will include advance notification of IDEM regarding the potential for contamination of groundwater and need for remediation.
3. **Discovery of Improperly Abandoned Wells**—INDOT will be responsible for proper closing of any improperly abandoned well discovered during construction within the project right-of-way, according to INDOT Standard Operating Procedures for closing wells that are



to be abandoned. In addition, the procedure will include advance notification of IDEM regarding the potential for contamination of groundwater and need for remediation.

### 7.3.8 Floodplain Impacts

The Federal Emergency Management Agency (FEMA) mapped floodplains crossed in Section 4 are at Black Ankle Creek, Dry Branch, Plummer Creek, Indian Creek and an unnamed tributary to Clear Creek (formerly May Creek). A final hydraulic design study will be completed during the final design phase, and a summary of this will be included with the Field Check Plans and Design Summary. The following measures will be utilized to address impacts on floodplains:

1. **Encroachments**—Longitudinal and transverse floodplain encroachments will be minimized, where reasonable, through design practices such as longer bridges and perpendicular stream crossings. The crossings at Black Ankle Creek, Dry Branch, Plummer Creek and the unnamed tributary to Clear Creek (formerly May Creek) are transverse crossings. A hydraulic study during final design will determine the length of the span. Refined Preferred Alternative 2 would encroach longitudinally upon the Indian Creek floodplain approximately 3,200 feet south of Carmichael Road. Refined Preferred Alternative 2's crossings of Indian Creek are transverse. Flood easements may be acquired at these or other locations if determined appropriate.

### 7.3.9 Wetland Impacts

There are approximately 41.52 acres of wetlands (11.45 acres of forested wetlands, 3.06 acres of scrub/shrub wetlands, and 27.01 acres of emergent wetlands) and 25.02 acres of ponds within the Section 4 corridor. Within the Section 4 corridor there are 18 forested wetlands, 28 emergent wetlands, eight scrub/shrub wetlands, and 68 open water ponds. The total area of open water features identified outside of the Section 4 approved corridor in the location of the proposed County Line interchange is 1.29 acres. No other wetlands were identified in this area. Of these 122 wetlands in the Section 4 corridor, 38 are within the right-of-way of one or more alternatives (see Section 5.19.2, *Surface Waters*). For the purposes of the Section 4 INWRAP analysis, some of these wetlands were combined into complexes.

The *Final Wetland Technical Report* (see **Appendix F**) identified 22 of the wetlands as “waters of the U.S.,” and therefore under the jurisdiction of USACE and IDEM and one as a “waters of the state” (isolated) and would be regulated solely by IDEM.<sup>6</sup> For the most part, the wetlands are not of high quality. Early efforts were directed to avoiding wetlands, especially in the Doans Creek areas. The following measures will be utilized to address impacts on wetlands.

**Additional Avoidance and Minimization**—Wetlands and wetland complexes will continue to be avoided as much as possible. If unable to be avoided completely, wetland impacts will be minimized by shifts in the alignment. INDOT and FHWA are committed to mitigating for unavoidable wetland losses. Wetlands outside the actual footprint of the project will be

---

<sup>6</sup> USACE will make a jurisdictional determination that will take into account all aquatic resources, including wetlands, subject to Section 404 Permit jurisdiction. A wetland determination report will be prepared and submitted to USACE prior to the submittal of the permit applications.



## Section 4—Final Environmental Impact Statement

protected from secondary construction impacts. A firm commitment has been made that wetlands and other water resources will be actively avoided throughout the final design of the Section 4 roadway. All avoided water resource areas within the right-of-way will be identified on the design plans and these areas will have erosion control measures as approved by IDEM as part of the overall erosion control plan for the roadway project to prevent any filling or contamination of these areas during construction of the Section 4 project.

1. **Wetland MOU**—Wetlands determined to be “waters of the U.S.” will be replaced in accordance with the MOU between INDOT, USFWS, and IDNR as dated January 28, 1991, or any successor agreement entered into by these agencies. While not signatory to the agreement, USACE typically follows the mitigation ratios within the MOU. Under the 1991 MOU, wetlands would be mitigated as follows:

- Farmed 1 to 1.
- Scrub/shrub and palustrine/lacustrine emergent 2 - 3 to 1 depending upon quality.
- Bottomland hardwood forest 3 – 4 to 1 depending upon quality.
- Exceptional, unique, critical (i.e. cypress swamps) 4 and above to 1 depending upon quality.

The identification of wetlands as “waters of the U.S.” was based on definitions and guidance found in 33 CFR 328.3, Corps Regulatory Guidance Letters and the wetland delineation manual, and field observations performed as part of the Indiana Wetland Rapid Assessment Protocol (INWRAP) evaluation. USACE and IDEM will make the final determinations regarding the jurisdictional status of wetlands. Based on mitigation ratios identified above, mitigation for wetland impacts by the alternatives would range from 15.56 to 39.41 acres. The precise amount of mitigation that will be required will be determined during the permitting process.

2. **Revised Tier 1 Conceptual Forest and Wetland Forest Mitigation Plan**—The *Revised Tier 1 Conceptual Forest and Wetlands Mitigation and Enhancement Plan* identifies the general location of 13 potential mitigation sites for the design and construction of wetlands and upland forest. For Section 4, the sites are Doans Creek, Plummer Creek, and Indian Creek (see “Wetland Mitigation” and “Forest Mitigation,” Section 7.2 for a description of these sites). Subsequent to the identification of these mitigation focus areas, additional focus areas have been identified for Section 4 mitigation. These focus areas include: Veale Creek, SR 57, Doans Creek, Plummer Creek, Little Clifty Branch, Indian Creek, an undisclosed cave<sup>7</sup>, and the Garrison Chapel Valley in Daviess, Martin, Greene, and Monroe Counties. **Figure 7-3** (p. 7-66) through **Figure 7-5** (p. 7-66) show examples of wetland mitigation.

3. **Wetland Pooling/Banking**—If appropriate, wetland mitigation may include wetland pooling or banking. *Wetland pooling or banking is an effort to build one large wetland*

---

<sup>7</sup> The cave (the name of which is not disclosed) is an important Indiana bat hibernaculum.



mitigation site to mitigate for a number of smaller impacts from potentially a number of projects typically in the same watershed. This typically results in a much more functional and valuable replacement wetland.

4. **Wetland Mitigation and Monitoring Plans**—As determined during Section 404 and Section 401 permitting, Wetland Mitigation and Monitoring Plans will be prepared.
5. **Spraying of Herbicides**—To prevent herbicides from entering wetland areas, “Do Not Spray” signs will be posted as appropriate in the right-of-way.

#### 7.3.10 Farmland Impacts

Currently, agricultural lands comprise about 29% of the total corridor. The following measures will be used to address impacts on farmland:

1. **Existing Property Lines**—Where reasonable, alternatives will follow existing property lines and minimize dividing or splitting of large tracts of farmland to reduce the creation of point rows and uneconomic remnants.
2. **Farmland Access**—Many farm parcels that would lose access as a result of the project will be provided access via new roads as features of the project. Where providing access is not deemed reasonable from an economic standpoint (i.e., it would cost more to provide new access than to acquire the property), the disposition of landlocked parcels and uneconomic remnants will be addressed during final design. In several locations overpasses will be provided to maintain the connectivity of local roads. The overpasses would facilitate access to farm operations divided by I-69.
3. **Farmland Protection**—The NRCS has been contacted and appropriate analyses has been conducted in accordance with the Farmland Protection Policy Act for Section 4. In addition, coordination will continue with the NRCS in Section 4 to determine the feasibility of participating in the Farm and Ranch Lands Protection Program (formerly known as the Farmland Protection Program).
4. **I-69 Community Planning Program**—Section 4 counties and local jurisdictions have completed comprehensive land use plans using funding and assistance provided through the I-69 Community Planning Program. This program has assisted local communities plan for future development.

#### 7.3.11 Forest Impacts

The potential impacts to upland forests in Section 4’s Refined Preferred Alternative 2 range from 872.12 acres to 1,087.37 acres. The following measures will be utilized to address impacts on forests:

1. **Forest Mitigation Ratio**—Upland forest impacts will be mitigated at a ratio of 3 to 1 for the I-69 Evansville to Indianapolis project as a whole, through the preservation and/or



## Section 4—Final Environmental Impact Statement

replacement of forested lands within Southwest Indiana. Mitigation goals are to replace direct forest impacts at a 1 to 1 ratio and provide an additional 2 to 1 ratio of forest preservation. All forest mitigation lands will be protected in perpetuity by conservation easements or other preservation mechanism. It is anticipated that most of the mitigation for forest impacts in Section 4 will be located within the Section 4 Study Area (see item #2, below). However, forest mitigation is being developed on a project-wide basis, and may include large tracts that serve as mitigation for multiple Tier 2 sections. The 3 to 1 mitigation ratio may not necessarily be provided within each Tier 2 section; however, the total mitigation for all forest impacts will be 3 to 1. For purposes of discussing the potential mitigation requirements for forest impacts in Section 4 in this FEIS, the 3 to 1 ratio has been used. Using this ratio, mitigation for the forest impacts as a result of the Refined Preferred Alternative 2 would range from 2,616 to 3,262 acres of upland forest mitigation.

2. **Forest Mitigation**—INDOT has consulted with appropriate resource agencies regarding forest mitigation measures. Potential forest mitigation sites are identified in the *Revised Tier 1 Conceptual Forest and Wetlands Mitigation and Enhancement Plan & Comparison of Tier 1 Plans* (see **Appendix S**). The plan provides a list of possible replacement sites. For Section 4, the sites are the Doans Creek, Plummer Creek, and Indian Creek areas (see “Wetland Mitigation” and “Forest Mitigation,” Section 7.2 for a description of these sites). Subsequent to the identification of these mitigation focus areas, additional focus areas have been identified for Section 4 mitigation. These focus areas include: Veale Creek, SR 57, Doans Creek, Plummer Creek, Little Clifty Branch, Indian Creek, Cave<sup>8</sup>, and the Garrison Chapel Valley in Daviess, Martin, Greene, and Monroe Counties. Currently, 36 mitigation properties have been identified and are expected to provide for 1,168 acres of reforestation and 2,636 acres of forest preservation, for a total forest mitigation of 3,804 acres. Other areas may also be identified.
3. **Riparian Forest Mitigation**— Riparian impacts were calculated by identifying plant communities within 100 feet of a stream. If these riparian forests are identified as wetland forests, the impacts will be mitigated according to the Wetland MOU. If the riparian forests are identified as non-wetland forests in a floodway, impacts will be mitigated according to IDNR ratios: 2 to 1 replanting or 10 to 1 preservation. Impacts to non-wetland riparian areas that are not in a floodway will be mitigated in consultation with IDEM and USACE. All non-wetland riparian forest replacement will be included as part of the 3 to 1 upland forest mitigation. Refined Preferred Alternative 2 would impact between 323.28 and 389.30 acres of non-wetland riparian habitat. Of this total, approximately 312.96 to 377.20 acres have been identified as forested, and are already included in the totals for forest mitigation. The remaining 10.32 to 12.10 acres, identified as other riparian areas, include areas with trees but do not meet the definition of forest. These areas will be mitigated as described in this paragraph. The total length of stream impacts for Refined Preferred Alternative 2 is estimated to be range from approximately 93,196 linear feet to 111,247 linear feet.

---

<sup>8</sup> The cave is an important Indiana bat hibernaculum.





### 7.3.12 Water Body Modifications Impacts

Depending upon the design criteria implemented, Refined Preferred Alternative 2 will cross between 218 and 232 streams, including 10 perennial streams, between 30 and 31 intermittent streams, and between 178 and 191 ephemeral streams. The total length of streams within the right-of-way of Refined Preferred Alternative 2 ranges from approximately 93,196 linear feet to 111,247 linear feet. In addition, Refined Preferred Alternative 2 will impact between 7 and 9 ponds. The total impact to these ponds ranges from approximately 1.71 to 2.35 acres. The following measures will be utilized to address impacts on water bodies:

1. **Signage**—Water bodies, wetlands and other natural areas outside the construction limits but within the right-of-way will be delineated and posted with “Do Not Disturb” signs.
2. **Tree Clearing**—Tree clearing and snag removal will be kept to a minimum and limited to within the construction limits and calendar requirements. In the median, tree clearing will be kept to a minimum with woods kept in as much a natural state as reasonable if it is sufficiently outside any clear zone requirements.
3. **Stream Relocations**—The realignment of surface streams or impacts to riffle-pool complexes and natural stream geomorphology will be avoided where reasonable. In instances where this is not possible, stream impacts will be minimized and mitigated. Stream relocations within Indiana bat maternity colony areas will be completed using the natural channel design features that are identified through coordination with the resource agencies.

Stream mitigation will be completed to adequately mitigate for linear feet of stream impacts in coordination with both the USACE and IDEM during the permitting process of the Section 4 project. Wherever possible, both banks of stream mitigation areas will be protected. If both banks cannot be protected, coordination with both IDEM and USACE will be completed to identify the amount of mitigation credits that INDOT may receive based on the proposed mitigation site.

Coordination with IDEM and USACE has been initiated and will continue throughout the development of the proposed mitigation sites that will be offered for compensatory mitigation in Section 4. Natural channel stream designs for perennial and larger intermittent stream relocation located within the Indiana bat maternity colony areas and the Winter Action Area may include but will not be limited to stream designs that incorporate riffle/run/pool/glide or step/pool sequences and sinuosity to replicate natural channel geomorphology, in stream natural structures (log and rock vanes) to help prevent streambank erosion, and riparian buffer plantings outside the clear zone of the roadway. Off-site channel restoration for compensatory mitigation will also be completed including the same natural channel design features.

Per IDEM comments received on the DEIS, consideration will be given in the design phase to planting trees and shrubs along relocated streams and outside right-of-way edge.



## Section 4—Final Environmental Impact Statement

Continued efforts will be made during final design to identify design features that would minimize impacts at stream crossings, including measures to keep channel and bank modifications to a minimum and, where feasible, avoid channel alterations below the ordinary high water mark elevation. Mitigation of stream impacts could include installing three-sided culverts or oversized box culverts sunk into the streambed that would retain the natural channel bottom, thereby facilitating the migration of stream fauna through the culverts, and reducing impacts to the flow rate. The culverts should be of sufficient size to prevent upstream bed instability and erosion of downstream banks.

Per IDEM written comments on the DEIS, a firm commitment was added to evaluate measures for bank stabilization, reinforcement and erosion control for final design of the South Connector Road bridge over Indian Creek to minimize natural channel migration.

Per IDNR written comments on the DEIS, a firm commitment was added that during the design phase, consideration will be given to using alternative armoring materials and including portions of dry land under the bridge opening that is not armored with riprap. The use of bio-engineering techniques to provide natural armoring of stream banks will be considered and implemented where practicable. Installation of riprap will be limited to areas necessary to protect the integrity of structures being installed. If riprap is required, it will be installed outside the thalweg and between the toe of slope and the ordinary high water mark (OHWM) where possible. In some instances, such as culvert inlets and outlets, riprap may need to be placed within the thalweg to prevent scour. Riprap will be installed at the same elevation as the thalweg to avoid fish passage issues. Riprap may also be needed above the (OHWM) to protect bridge piers and abutments from scour where bio-engineering will not suffice.

Other details of mitigation will be coordinated with the agencies with jurisdiction during the permitting process. In addition, INDOT will coordinate with IDEM, IDNR, and USACE to take into account any recent stream stabilization projects. In addition, any stream relocations required within an Indiana bat maternity colony area in Section 4 will be completed with a natural stream design. USFWS will be included in the coordination regarding the relocation during the permitting process to assure that any concerns relative to the Indiana bat are addressed as part of the stream relocation.

4. **Below-water Work**—Where reasonable, below-water work will be restricted to placement of piers, pilings and/or footings, shaping of spill slopes around the bridge abutments, and placement of riprap. Any in-stream construction timing restrictions will be addressed during permitting.
5. **Channel Work**—Where reasonable, channel work and vegetation clearing shall be restricted to within the width of the normal approach road right-of-way.
6. **Artificial Bank Stabilization**—The extent of artificial bank stabilization will be minimized. Soil bio-engineering techniques for bank stabilization will be considered where situations allow.



7. **Riprap**—If riprap is utilized for bank stabilization, it shall be of appropriate size and extend below the low-water elevation to provide for aquatic habitat.
8. **Culverts**—Culverts and other devices **will** be placed so that they do not preclude the movement of fish and other aquatic organisms. Culverts and other devices will be used to preserve existing drainage patterns. Consideration will be given to oversized culverts to allow for the passage of small fauna at locations where it is determined to be appropriate and reasonable. Current preliminary designs for at least 11 bridges within the Refined Preferred Alternative 2 provide openings that are sufficiently large to allow deer and other wildlife to use them to cross under the new highway.
9. **Erosion Control**—Erosion control devices such as burlap, jute matting, grading, seeding and sodding shall be used to minimize sediment and debris in tributaries of the project.

### 7.3.13 Ecosystems Impacts

Section 4 is predominately forested, and numerous wildlife habitat areas were identified that span the entire Section 4 corridor for considerable distance. Alternative alignments have been located to minimize impacts to wildlife habitats where possible. The following measures will be utilized to address impacts on ecosystems:

1. **Do Not Spray Or Mow**—Where woody vegetation, wetlands, wildflowers or environmentally-sensitive locations occur, “Do Not Spray or Mow” signs will be posted.
2. **Invasive Plant Species**—INDOT is a member of the Invasive Plant Species Assessment Group (IPSAWG), and as a member, develops recommendations for selling and planting plant species in the State. In mitigation sites and within the proposed right-of-way for I-69, INDOT will use appropriate herbicides and/or physical mechanisms to control invasive plants, such as purple loosestrife, canary reed grass, kudzu, Japanese knotweed and others.
3. **Migratory Bird Treaty Act**—Coordination with the USFWS will continue pursuant to the Migratory Bird Treaty Act of 1918.
4. **Conservation Measures for Wildlife**—Transportation designers will work with appropriate agencies to determine the most feasible and practical conservation measures for the maintenance of wildlife movements and landscape connectivity.
5. **Mitigation Measures for Wildlife**—In a letter dated September 28, 2006, the Indiana Department of Natural Resources (IDNR) made several recommendations related to wildlife crossings. The IDNR recommended crossings where habitat is present on both sides of the road, and in lowland and upland locations. They recommended that any new bridges and redesigned bridges in areas of high wildlife use have design specifications that provide for wildlife habitat connectivity including an adequate space under bridges with dry land unarmored with riprap with minimum dimensions (8 feet tall by 24 feet wide) to allow for wildlife passage. In addition, the IDNR recommended deer exclusion fencing. They also recommended that bridges and culverts should extend beyond top of bank or contain an above-water ledge for wildlife use, and culverts should consist of a natural bottom.



## Section 4—Final Environmental Impact Statement

In addition, they stated because of the width of the roads and right-of-ways, grated culverts may be required in some areas to provide light in the passage, thus facilitating their use. Areas with heavy white-tailed deer traffic should provide bridges or culverts large enough to pass a male deer with antlers. Smaller culverts can be used for passage of smaller animals (e.g. small mammals, reptiles and amphibians). The IDNR also recommended other appropriate mitigation measures be implemented where the highway crosses significant habitat area, including placing any lights on the shortest poles possible to limit the spread of light and shielding the light so it only shines on the highway and not up or out from the road. In the Tier 2 Section 4 BA, it has been committed that any lights installed will be at least 40 feet above the highway in order to avoid collisions between bats and vehicles. Non-diffuse lighting will be used when possible. Details of lighting will be identified during the final design.

Based on habitat and landscape connectivity and in coordination with the IDNR, mitigation measures specific to Section 4 include 37 potential wildlife crossings. The IDNR recommended several crossings in Section 4. Of these recommended crossings, INDOT is committing to providing wildlife crossings that meet or exceed the minimum dimensions of 8 feet tall by 24 feet wide (of dry crossing) at the following 11 locations:

1. Black Ankle Creek (including CR 600E)
2. Dry Branch (including Dry Branch Road/CR750E)
3. Plummer Creek (including Mineral Kolen Road/CR 360S)
4. Mitchell Branch
5. Mitchell Branch Tributary (including SR 54)
6. Indian Creek A (including Carmichael Road)
7. Indian Creek B
8. Indian Creek C
9. Indian Creek D
10. Clear Creek Tributary D (formerly Happy Creek)
11. Clear Creek Tributary E (formerly May Creek)

Structures at the following 18 locations will provide additional opportunities for wildlife movement across the interstate, but may or may not meet the minimum 8 feet by 24 feet (of dry crossing) dimension requirements. When feasible, these crossings will be designed to meet the specified dimensions. The majority of the crossings below are intermittent or ephemeral in nature, thus potentially providing crossing opportunities within the stream channel during dry periods.

1. Doans Creek Tributary A
2. Doans Creek Tributary B
3. Bogard Creek Tributary
4. Flyblow Branch
5. Black Ankle Creek Tributary
6. Plummer Creek Tributary
7. Little Clifty Branch Tributary A
8. Little Clifty Branch Tributary B



9. Mitchell Creek Minor Tributary
10. Indian Creek Tributary A
11. Indian Creek Tributary B
12. Indian Creek Swale
13. Indian Creek Tributary Swale
14. Indian Creek Tributary C
15. Clear Creek Tributary A
16. Clear Creek Tributary B
17. Clear Creek Tributary C
18. Clear Creek Tributary F

In addition, two other possible wildlife crossings are recommended. They include:

1. Dowden Branch Tributary
2. Dowden Branch

Roadway designs for Section 4 also show bridges crossing over the following six roads, which could also provide additional opportunity wildlife movement across the interstate.

1. Carter Road (connector roadway)
2. Breeden Road
3. Rockport Road
4. Lodge Road
5. Tramway Road
6. Bolin Lane

The above proposed structures are located where habitat is present on both sides of the road and are in lowland and upland areas. Eleven of the above structures, as currently proposed, will provide a wildlife crossing in excess of the minimum dimensions required to allow larger mammals (i.e. deer) to pass (at least 8 feet high by 24 feet wide of dry crossing) beneath the highway. The larger dimensions of these structures as well as using 3-sided structures will help promote the maintenance of aquatic communities and wildlife movement. The remainder of crossings will also provide additional crossing opportunities for smaller wildlife including small mammals, amphibians and reptiles using smaller culverts and pipes. In addition, overpasses will be constructed at the Carter Road, Breeden Road, Rockport Road, Lodge Road, Tramway Road and Bolin Lane locations which could also aid in wildlife movement.

During the design phase, and where appropriate and practicable, the following measures may be implemented:

- Grating culverts in order to provide natural lighting.
- Incorporating vegetation plantings that will provide adequate cover for wildlife to access these crossings from adjacent areas of cover.
- Fencing to funnel wildlife toward these crossings will also be evaluated during design.



## Section 4—Final Environmental Impact Statement

- Vegetation plantings and fencing will be assessed in regards to the habitat remaining after final design, the final size of structures, topography, fill material used in the roadway, and cost.
- Natural bottoms for the box culverts will be used for these crossings where feasible to further promote maintenance of aquatic communities and wildlife movement.

Efforts will be made to promote cross-connectivity and permeability for wildlife in Section 4. In addition, a number of the wildlife crossings are located within or near proposed mitigation properties. On April 6, 2010, the Indiana Department of Transportation (INDOT) and the IDNR met and discussed the above 37 wildlife crossings proposed in Section 4. The meeting presented information that showed the distribution, permeability and connectivity for wildlife crossings, all of which followed the IDNR's earlier recommendations. Meeting minutes for this meeting can be found in **Appendix C**, *Agency Coordination Correspondence*.

In written comments on the Section 4 DEIS, IDNR commented that rip-rapped areas should not be considered in determining the provided wildlife crossing dimensions. Specific information related to locations where riprap will be used and quantities to be used will not be available until the final design phase of the project. During the design phase, consideration will be given to using alternative armoring materials and including portions of dry land under the bridge opening that is not armored with riprap. The use of bio-engineering techniques to provide natural armoring of stream banks will be considered and implemented where practicable. Installation of riprap will be limited to areas necessary to protect the integrity of structures being installed. If riprap is required, it will be installed outside the thalweg and between the toe of slope and the ordinary high water mark (OHWM) where possible. In some instances, such as culvert inlets and outlets, riprap may need to be placed within the thalweg to prevent scour. Riprap will be installed at the same elevation as the thalweg to avoid fish passage issues. Riprap may also be needed above the OHWM to protect bridge piers and abutments from scour where bio-engineering will not suffice. In addition, INDOT and FHWA will continue to coordinate with IDNR with regard to potential impacts upon eastern box turtles.

### 7.3.14 Water Quality Impacts

As the QHEI/HHEI scores indicate, the majority of streams crossed by the alternatives have at least moderate water quality. About 57% of the QHEI scores fell into the highest quality category. About 29% of the HHEI scores fell into the highest quality categories. The Lower White River Watershed and Lower East Fork White River Watershed are the two major watersheds traversed by the project corridor. These watersheds are briefly described in Chapter 4, Section 4.3.2, *Water Resources*. The following measures will be utilized to address impacts on water quality:

1. **Stream Crossings**—Where reasonable, the Refined Preferred Alternative 2 will cross rivers and streams at their narrowest floodway width and reduce the number of stream relocations and floodplain encroachments.
2. **Stream Mitigation Plans**—Develop stream mitigation plans where necessary.



3. **Disturbed In-Stream Habitats**—Return disturbed in-stream habitats to their **original condition, when possible**, upon completion of construction in the area.
4. **Tree Clearing**—Minimize tree clearing and snag removal near streams and rivers. [Note: Providing approximately 20 feet of cleared space around a bridge would be permitted to allow sufficient room for bridge maintenance and inspection.]
5. **Wetlands**—Avoid wetlands as much as possible and follow the Wetland Memorandum of Understanding (MOU) dated January 28, 1991, between INDOT, IDNR, and USFWS. Replace all wetlands at the appropriate mitigation ratio as identified in the Wetland MOU.
6. **Erosion Control**—Follow Best Management Practices (BMPs) for erosion control in the project.
7. **Roadside Drainage**—Where appropriate, construct roadside ditches that are grass-lined and connected to filter strips and containment basins.
8. **Spill Prevention/Containment**—Include in roadway design appropriate measures for spill prevention/containment. Contractors will be required to provide an acceptable spill response plan. This response plan will include telephone numbers for emergency response personnel and copies of agreements with any agencies which are part of the spill-response effort. An emergency contact telephone number also is required. The Rule 5 permit that contractors must obtain will require that each contractor have spill containment plans in their contract documents. Special measures including diversions of highway runoff from direct discharge off of bridge decks into streams, and containment basins to detain accidental spills, will be incorporated into final design plans for perennial streams within any of the Indiana bat maternity colony areas.
9. **Road Salt Spray and Salt Runoff**—Make every effort to minimize the amount of salt used on the bridges and roads. Use alternative substances or low salt (e.g., sand) as much as possible. INDOT's Standard Operating Procedures for applying deicing chemicals to roadways and bridges is included in this FEIS as **Appendix Q**, *INDOT SOP's – Wells, Asbestos, Snow & Ice Control*.

### 7.3.15 Managed Lands

For the purposes of this study, managed lands include all of the following: all outdoor recreational facilities, all publicly managed lands, and all private properties whose owners participate in federal, state, and local wetland, habitat, or other conservation and management programs. There are federal and state interests in many of the privately-owned managed lands in the form of cost-sharing agreements, purchased easements, or property tax reductions. Federal and state funds have been or are being expended on many of these properties. There are 38 privately owned managed land properties located throughout the Section 4 corridor. Thirty participate in the IDNR Classified Forest and Wildlands Program (CFWP). Eight are enrolled in the USDA-NRCS Conservation Reserve Program. Fifteen managed lands parcels would be impacted about equally, as the Alternatives share a common alignment in proximity to these



## Section 4—Final Environmental Impact Statement

properties. The Alternatives will result in a similar number of inaccessible managed land parcel remnants, and will also result in a similar number of CFWP-managed parcels smaller than 10 acres in size that will not be eligible to remain in the program. The Refined Preferred Alternative 2 would impact between 203.82 and 256.65 acres of managed lands.

None of the programs described above involve relinquishment of ownership of the property through dedication of a permanent conservation easement or other method of terminating property rights. The properties are privately owned and are not officially designated as a park, recreational area, or wildlife or waterfowl refuge; therefore they do not qualify for protection under Section 4(f) of the Department of Transportation Act of 1966, 49 USC 303(c) (see Chapter 8 of this FEIS for a discussion of Section 4(f)). With the exception of any wetland and forest areas within the managed properties, mitigation for impacts to the managed land areas could be accomplished through repayment to the resource agencies of amount associated with each cost-sharing agreement and abiding by other agreement stipulations. These mitigation measures would apply only if the agreements are still in force (i.e., the time stipulated periods have not expired).

### 7.3.16 Threatened and Endangered Species

In field studies for Section 4 of the project, in the summer of 2004, nine federally-listed Indiana bats were captured in the Indiana bat study area. Five roost trees were found from radio tagging of the bats. None of these were located within the project corridor. A second round of bat studies was performed in 2005. Two Indiana bats were captured at the mist net sites. No additional maternity roost trees were identified. Fifteen caves judged to be suitable Indiana bat habitat were trapped (fall 2005) and surveyed (winter 2006). Four Indiana bats were trapped, and one Indiana bat was found during the winter search.

Pre-construction mist netting was conducted in 2010 for five of the 30 sites within Section 4. The pre-construction mist netting is a commitment in the revised Tier 1 BO. One male Indiana bat was captured and a radio-transmitter was placed on the bat. It was tracked to one primary roost tree and three secondary roost trees. The primary roost tree was located on land that is currently privately owned and not under INDOT control, but within the Section 4 Refined Preferred Alternative 2's right-of-way. This roost tree is no longer standing. The USFWS has been made aware of these circumstances.

Studies conducted in accordance with the Tier 1 revised BO have determined that the project in Section 4 has the potential to affect the summer and winter habitat of the Indiana bat. On April 11, 2011, the Federal Highway Administration reinitiated Tier 1 consultation based on new maternity colony information, as well as documentation of the newly discovered disease White Nose Syndrome (WNS) within the action area. On May 25, 2011, the USFWS issued an Amendment to the August 24, 2006 Tier 1 revised BO, including a revised Incidental Take Statement. The Amendment to the Tier 1 revised BO addresses each of the sections of the Tier 1 Revised BO dated August 24, 2006 that required new analysis for effects to the Indiana bat; otherwise the Tier 1 revised BO remains in effect.





A Section-specific Tier 2 BA for Section 4 on the Refined Preferred Alternative has been prepared for USFWS in accordance with procedures established in the revised Tier 1 BO. It was submitted to USFWS-Bloomington Field Office (BFO) in November 2010. The BA provided USFWS new information regarding potential direct and indirect impacts resulting from the Section 4 project, including discussion of the expanded SAA and WAA for the Indiana bat, and documents compliance with the requirements of the revised Tier 1 BO.

The Section 4 Tier 2 BA addresses specific impacts associated with Section 4 of I-69. The Tier 2 BA contains updated information on reasonably certain impacts of the Section 4 Refined Preferred Alternative and proposed mitigation since the Tier 1 BA Addendum of March 7, 2006.

The Tier 2 BA is intended to be reviewed in concert with the Tier 1 documents, field studies, and Section 4 DEIS. Based on the Tier 2 BA and associated documents, FHWA and INDOT reached an opinion that the overall impacts to the species as discussed in the Tier 2 BA remain consistent with the findings in the Tier 1 revised BO and that the specific impacts within the Section 4 Tier 2 project are consistent with those analyzed in the consultation documented in the revised Tier 1 BO and Amendment to the revised Tier 1 BO. FHWA and INDOT recommend in the BA that USFWS adopt a “Likely to Adversely Affect” conclusion for the Indiana bat.

FHWA and INDOT agreed to commitments and mitigation documented in the revised Tier 1 BO, which incorporates by reference the *Revised Tier 1 Forest and Wetlands Mitigation and Enhancement Plan*; and the Tier 2 BA. Proposed mitigation for the Indiana bat includes providing additional forested and wetland habitat for this species (see subsections *Wetland Mitigation* and *Forest Mitigation*, below).

In its Section 4 Tier 2 BO issued on July 6, 2011 (See Appendix JJ2), USFWS concurred with FHWA and INDOT’s determinations, and noted “the effects associated with the proposed construction, operation, and maintenance of Section 4 of I-69 are within the scope of effects contemplated in the recently amended Tier 1 Revised Programmatic Biological Opinion (2011). Upon evaluation of the proposed project, we believe incidental take of Indiana bats in the Section 4 Action Area is likely, but the impact of such taking is not likely to jeopardize the continued existence of the Indiana bat and is not likely to adversely modify the bat’s designated Critical Habitat.” (pg. 1) USFWS further stated: “with successful implementation and maturation of the proposed mitigation projects, permanent protection of two Priority 1A hibernacula, and other proposed mitigation and conservation measures, we anticipate that long-term habitat conditions for these colonies will be suitable and sustainable for the long-term survival and recovery of the species.” (pg. 50) The issuance of the Section 4 Tier 2 BO concluded formal Section 7 consultation in I-69 Section 4.

The following reasonable and prudent measures were included in the Section 4 Tier 2 BO and will be completed as part of this project. Reasonable and prudent measures are actions the USFWS believes necessary or appropriate to minimize the impacts to the Indiana bat.

1. In the Section 4 Tier 2 BA (page 114), the FHWA proposed to implement numerous conservation measures and mitigation efforts as part of their proposed action and these measures are hereby incorporated by reference. These measures will benefit a variety of



## Section 4—Final Environmental Impact Statement

wildlife species, including Indiana bats. FHWA should take necessary steps to ensure that successful implementation of all conservation measures is achieved to the fullest extent practicable in a timely manner.

2. The implementation status of all the proposed conservation measures, mitigation efforts, and research and any related problems need to be monitored and clearly communicated to the Service on an annual basis.

The following terms and conditions were included in the Section 4 Tier 2 BO and will be completed as part of this project.

1. The FHWA, in consultation with the Service, must develop detailed, site-specific final mitigation plans for each secured mitigation site within six (6) months securing the site or within six (6) months of the issuance of this BO, whichever is later. All mitigation sites must be identified and secured within 3 years of the issuance of this biological opinion, including the development of final mitigation plans. The mitigation plans will not be conceptual, but rather will contain detailed descriptions for each phase of mitigation including 1) initial construction and establishment, 2) 5-year, post-construction monitoring phase, and 3) long-term management. The Section 4 final mitigation plans will address and/or establish the following: quantifiable criteria and methods for assessing success of all mitigation plantings and functionality of constructed wetlands and streams, approved lists of tree/plant species to be planted (and their relative abundance/%), approved lists of herbicides for weed control, proposed construction schedules, annual post-construction monitoring schedules, and a long-term, ongoing management/stewardship strategy.

To ensure timeliness, the FHWA must begin construction and/or reforestation within the Section 4 Mitigation Areas either before (the most preferable option) or during the first summer reproductive season (1 April – 30 September) immediately after any I-69 related tree clearing or construction begins in Section 4 anywhere within each 2.5-mile radius maternity area. Once initiated, all Service-approved construction and tree plantings within the Section 4 Mitigation Areas must be completed within 3 calendar years.

2. FHWA will provide the Service with a written annual report that summarizes the previous year's monitoring, conservation and mitigation accomplishments, remaining efforts, and any problems encountered within Section 4. This annual report will be completed throughout the 5-year post-construction monitoring period. The annual report for Section 4 may be a stand-alone document or included as part of the annual report required under the Tier 1 Term and Condition Number 2 (amended May 25, 2011). (p. 70)

Conservation measures were jointly developed by the FHWA, INDOT, and USFWS during informal consultation and were subsequently incorporated into the Tier 1 BA and the Tier 1 BA Addendum as part of the official Proposed Action for the I-69 project. The Tier 2 BA and mitigation plan are consistent with the mitigation and commitments in the revised Tier 1 BO, except where status changes were made in conservation measures reported in the revised BO.



Since conservation measures are part of the Proposed Action, their implementation is required under the terms of the consultation. These measures were specifically designed to avoid and minimize impacts of the proposed action on Indiana bats and to further their recovery. The conservation measures applicable to Section 4 are presented below. Section 5.17, *Threatened and Endangered Species*, and the revised BO (**Appendix DD**) provide a history of the Section 7 consultation for this project, and the revised BO contains the complete list of conservation measures for the I-69 project as a whole. In the event of any differences of wording between the conservation measures listed below and the Section 4 Tier 2 BA and BO, the BA and BO take precedence over the FEIS. It should be noted that a revised Incidental Take Statement<sup>9</sup> has been included at the end of the Amendment to the Tier 1 revised BO (see **Appendix DD**) with its non-discretionary Reasonable and Prudent Measures and associated Terms and Conditions to further minimize the incidental take of both Indiana bats and bald eagles.

### **INDIANA BAT (*Myotis sodalis*)**

#### **A. CONTEXT SENSITIVE SOLUTIONS**

##### **WINTER HABITAT**

1. **Alignment Planning**—Efforts will be made to locate Interstate alignments beyond 0.5 miles from known Indiana bat hibernacula.

Status – All four alternatives have been located greater than 0.5 miles from any of the 15 known Indiana bat hibernacula.

2. **Blasting** – Blasting will be avoided between September 15 and April 15 in areas within 0.5 miles of known Indiana bat hibernacula. All blasting in the WAA will follow the specifications developed in consultation with the USFWS and will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of nearby caves serving as Indiana bat hibernacula.

Status – To be completed.

3. **Hibernacula Surveys** – A plan for hibernacula surveys will be developed and conducted in consultation with and approved by USFWS during Tier 2 studies.

Status – The survey plan was developed in consultation with USFWS and fieldwork has been completed. To date, 373 cave records were evaluated and 250 caves were visited in the field. Of these, 61 caves were surveyed for Indiana bats in 2004-2005 and 16 caves had fall harp trapping in 2005. The 16 caves that were harp trapped in the fall of 2005

---

<sup>9</sup> Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of the Incidental Take Statement.



## Section 4—Final Environmental Impact Statement

also had internal cave surveys completed in December 2005. Three new Indiana bat hibernacula were identified as a result of these surveys.

4. **Karst Hydrology** – To avoid and minimize the potential for flooding, dewatering, and/or microclimate (i.e., temperature and humidity) changes within hibernacula, site-specific efforts will be made to minimize changes in the amount, frequency, and rate of flow of roadway drainage that enters karst systems that are determined to be hydrologically connected to Indiana bat hibernacula.

Update – There is one hibernaculum for which hydrological connectivity with the corridor has been established. Karst feature dye tracing from inputs within the corridor established a positive dye trace to this cave in December 2005. Additional dye tracing in 2009 also had a positive dye trace for this cave. Efforts will be made to minimize any disturbance to the hydraulic/hydrologic function of these features, and their relationship to this cave, thus minimizing any potential changes to the hibernaculum microclimate. Where appropriate and practical, special planning should be conducted to insure drainage to these recharge features is dispersed through natural vegetation and/or an engineered treatment system before entering the groundwater system. Also, special consideration, where appropriate and practicable, should be made to insure that construction does not sever these recharge features by sedimentation or impervious cover.

### AUTUMN/SPRING HABITAT

5. **Tree Removal** - To minimize adverse effects on bat habitat, tree (three or more inches in diameter) cutting will be avoided within five miles of a known hibernaculum. If unavoidable, cutting will only occur between November 15 and March 31.

Status – USFWS has clarified that cutting can only occur within the Winter Action Area between November 16 and March 31. No tree cutting within the Winter Action Area will occur between April 1 and November 15.

### SUMMER HABITAT

6. **Alignment Planning**—Efforts will be made to locate Interstate alignments so they avoid transecting forested areas and fragmenting core forest where reasonable.

Status – Efforts have been made to avoid and minimize fragmenting forests.

7. **Tree Removal**—Tree and snag removal will be avoided or minimized as follows:
  1. **Tree Cutting**—To avoid any direct take of Indiana bats, no trees with a diameter of 3 or more inches will be removed between April 1 and September 30. Tree clearing and snag removal will be kept to a minimum and limited to within the construction limits. In the median, outside the clear zone, tree clearing will be kept to a minimum with woods kept in as much a natural state as reasonable. Forested medians will be managed following the IDNR State Forest timber management plan.



Update – The Revised Tier 1 BO and the Section 1 Tier 2 BO include the dates of April 15 to September 15. However, after that BO was issued, USFWS provided (on February 14, 2008) revised tree clearing restriction dates of April 1 to September 30 for areas not within the Indiana bat Winter Action Area. Within the Winter Action Area, tree cutting can only occur between November 16 and March 31. No tree cutting within the Winter Action Area will occur between April 1 and November 15. The I-69 project is governed by the conditions of the BO; however, INDOT and FHWA have adopted the updated tree clearing restriction dates for the project.

2. **Mist Netting**—In areas with suitable summer habitat for the Indiana bat, mist net surveys will be conducted between May 15 and August 15 at locations determined in consultation with USFWS as part of Tier 2 studies. If Indiana bats are captured, some will be fitted with radio transmitters and tracked to their diurnal roosts for at least 5 days unless otherwise determined by USFWS.

Status – Completed. A total of 148 mist net sites was surveyed (30 in Section 4) in 2004 and 49 sites (three in Section 4) were surveyed or resurveyed in the summer of 2005. (Note: Nine federally listed Indiana bats were captured in the Indiana bat study area for Section 4 in 2004. None of these were captured within the project corridor. Five roosts were found in Section 4 from radio tagging of the bats. None of these were located within the Section 4 corridor. Two Indiana bats were captured during a second round of bat studies performed in 2005).

8. **Bridges**—Bridges will include the following design features:
  - a. **Surveys**—The undersides of existing bridges that must be removed for construction of I-69 will be visually surveyed and/or netted to determine their use as night roosts by Indiana bats during the summer.

Status – Completed. A total of 259 bridges and culverts were inspected for Indiana bats. Of the bridges surveyed, Indiana bats were found under one bridge. (Note: Sixty-six bridges and culverts were surveyed in Section 4. No Indiana bats were found roosting under the bridges and culverts associated with the Section 4 corridor.) At a bridge associated with the Section 3 corridor, five of the 13 Indiana bats captured in the 2004 Indiana bat study area were found. In 2005, an assessment at the same location found nine Indiana bats during the day and six at night. INDOT and FHWA have worked with USFWS to provide fencing below this bridge at both ends to prevent human disturbance. USFWS monitoring of this location is ongoing.

- b. **Bat-friendly Bridges**—Where feasible and appropriate, Interstate and frontage road bridges will be designed to provide suitable night roosts for Indiana bats and other bat species in consultation with USFWS.

Update – Due to concerns relative to attracting bats to the high-speed interstate facility, it is currently proposed to not include any bat friendly bridges on I-69.

**Section 4—Final Environmental Impact Statement**

- c. **Floodplains**—Where reasonable and appropriate, floodplains and oxbows will be bridged to protect environmentally sensitive areas.

Update – To be completed. (Note: Although it is not anticipated that any floodplains in Section 4 will be bridged in their entirety, floodplain encroachments will be minimized, where reasonable, through design practices such as longer bridges and perpendicular stream crossings. There are five FEMA mapped floodplains crossed in Section 4: Black Ankle Creek, Dry Branch, Plummer Creek, Indian Creek, and an unnamed tributary to Clear Creek (formerly May Creek). A hydraulic study during final design will determine the length of the spans. A final hydraulic design study will be completed during the design phase, and a summary of this will be included with the Field Check Plans and Design Summary. The channels of Black Ankle, Dry Branch, Plummer, Mitchell Branch, Indian Creek and a portion of their overbanks will be bridged to minimize stream and riparian impacts.

9. **Stream Relocations**—Site-specific plans for stream relocations will be developed in design considering the needs of sensitive species and environmental concerns. Plans will include the planting of woody and herbaceous vegetation to stabilize the banks. Such plantings will provide foraging cover for many species. Stream Mitigation and Monitoring plans will be developed for stream relocations, as appropriate.

Status – To be completed.

**ALL HABITATS**

10. **Medians and Alignments**—Variable-width medians will be used where appropriate to minimize impacts to sensitive and/or significant habitats. Context Sensitive Solutions will be used, where possible. This may involve vertical and horizontal shifts in the interstate.

Status – It was determined that there were no locations where variable-width medians would reduce impacts to sensitive and/or significant habitats. A typical median width of 60 feet is proposed for Section 4. No trees will be left in the median.

11. **Minimize Interchanges** - Efforts have been made to limit interchanges in karst areas, thereby limiting access and discouraging secondary growth and impacts. In Tier 2, further consideration will be given to limiting the location and number of interchanges in karst areas.

Status – No additional interchanges are proposed in Section 4. A potential interchange near the Greene/Monroe County line identified in Tier 2 is included in the Alternatives. A potential interchange at SR 54 identified in Tier 1 was studied in Tier 2 and is no longer under consideration.

12. **Memoranda of Understandings (MOUs)**—Construction will adhere to the Wetland MOU (dated January 28, 1991) and the Karst MOU (dated October 13, 1993). The Wetland MOU minimizes impacts to the Indiana bat by mitigating for wetland loss; and creating bat foraging areas at greater ratios than that lost to the project. The Karst MOU



avoids and minimizes impacts to the Indiana bat by numerous measures which protect sensitive karst features including hibernacula.

Status – Wetland impacts associated with Section 4 will be mitigated in accordance with the Wetlands MOU. Procedural steps 1-4 of 17 procedural steps outlined in the Karst MOU are being addressed in Tier 2. Additional procedural steps to be completed.

13. **Water Quality**—Water contamination will be avoided/minimized by the following:

- a. **Equipment Service**—Equipment servicing and maintenance areas will be designated to areas away from streambeds, sinkholes, or areas draining into sinkholes.

Status - Procedural steps 1-4 of the Karst MOU are being addressed in Tier 2. Additional procedural steps to be completed.

- b. **Roadside Drainage**—Where appropriate, roadside ditches will be constructed that are grass-lined and connected to filter strips and containment basins.

Update - Specific impacts to karst features and treatment of drainage has not been determined at this time. Impacts to specific karst features will be addressed via consideration of alternative drainage and other appropriate mitigation features during final design. Such treatment measures include peat and sand filters, gravel filters, vegetated buffers, and lined spill or run-off containment structures.

- c. **Equipment Maintenance**—Construction equipment will be maintained in proper mechanical condition.

Status - To be completed.

- d. **Spill Prevention/Containment**—The design for the roadway will include appropriate measures for spill prevention/containment.

Status - Special measures including diversions of highway runoff from direct discharge off of bridge decks into streams, and containment basins to detain accidental spills, will be incorporated into final design plans for perennial streams within the Indiana bat maternity colony areas to address water quality concerns associated with Indiana bats. This will include the bridges crossing Black Ankle Creek, Dry Branch, and the 3 most northern Indian Creek crossings. The remaining perennial streams Plummer Creek, Mitchell Branch, the southernmost Indian Creek, an Unnamed Tributary to Clear Creek (also known as Happy Creek), and an Unnamed Tributary to Clear Creek (also known as May Creek) crossings all fall within the Winter Action Area.

Measures for spill prevention/containment will be included in the roadway design. Contractors will be required to provide an acceptable spill response plan. This response plan will include telephone numbers for emergency response personnel and copies of agreements with any agencies which are part of the spill response effort.



## Section 4—Final Environmental Impact Statement

An emergency response telephone number is also required. The Rule 5 Permit that contractors must obtain will require that each contractor have spill containment plans in their contract documents.

- e. **Herbicide Use Plan** - The use of herbicides will be minimized in environmentally sensitive areas, such as karst areas that are protective of Indiana bats and their prey. Environmentally sensitive areas will be determined in coordination with INDOT as appropriate. Appropriate signage will be posted along the interstate to alert maintenance staff.

Update – The use of herbicides will be minimized within the environmentally sensitive habitats. Environmentally sensitive habitats within Section 4 include Black Ankle Creek/Koleen Bottoms and all Indian Creek crossings. In addition, the herbicide use plan will include any drainage area of a karst feature which is used for highway drainage.

- f. **Revegetation**—Revegetation of disturbed areas will occur in accordance with INDOT standard specifications. Woody vegetation will only be utilized beyond the clear zone. Revegetation of disturbed soils in the right-of-way and medians will utilize native grasses and wildflowers, as appropriate, similar to the native seed mixes of other nearby states.

Update – Revegetation of disturbed areas will occur in accordance with INDOT standard specifications. Woody vegetation will only be used a reasonable distance beyond the clear zone to ensure a safe facility. Revegetation of disturbed soils in the right-of-way and medians will utilize native grasses and wildflowers as appropriate, such as those cultivated through INDOT’s Roadside Heritage program. Locations that may be considered, but are not limited to, include Black Ankle Creek crossing, Indian Creek Crossings, and an Unnamed Tributary to Clear Creek (also known as May Creek) crossing. Other areas that may be considered will be at the interchange locations.

- g. **Low Salt Zones**—A low salt and no spray strategy will be developed for this project. A signing strategy for these items will also be developed. The low-salt zones will be determined in coordination with INDOT. The low salt zones will be delineated in the section-specific Tier 2 BAs.

Update – The karst region begins at Taylor Ridge Road and extends north to SR 37 within Section 4. The low salt zones will be defined within any drainage area of a karst feature which is used for highway drainage.

- h. **Bridge Design**—Where feasible and appropriate, bridges will be designed with no or a minimum number of in-span drains. To the extent possible, the water flow will be directed towards the ends of the bridge and to the riprap drainage turnouts.

Status – To be completed.





14. **Erosion Control**—Temporary erosion control devices will be used to minimize sediment and debris. Timely revegetation after soil disturbance will be implemented and monitored. Revegetation will consider site specific needs for water and karst. Erosion control measures will be put in place as a first step in construction and maintained throughout construction.

Update – BMPs will be used in the construction of this project to minimize impacts of erosion. Erosion control measures will be put in place as a first step in construction and maintained throughout construction. Temporary erosion control devices, such as silt fencing, check dams, sediment basins, inlet protection, sodding, and other appropriate BMPs will be used to minimize sediment and debris in tributaries and karst features within the project area. Timely revegetation will be implemented after soil disturbance and monitored. Any riprap used will be of a large diameter in order to allow space for habitat for aquatic species after placement. Slopes will be designed that resist erosion. If slopes exceed 2 to 1, they will include stabilization techniques. Soil bioengineering techniques for bank stabilization will be considered where situations allow.

15. **Parking and Turning Areas**—Parking and turning areas for heavy equipment will be confined to sites that will minimize soil erosion and tree clearing, and will avoid environmentally sensitive areas, such as karst.

Status – To be completed.

## **RESTORATION / REPLACEMENT**

### **SUMMER HABITAT**

1. **Summer Habitat Creation / Enhancement**— Indiana bat summer habitat will be created and enhanced in the Action Area through wetland and forest mitigation focused on riparian corridors and existing forest blocks to provide habitat connectivity. The following areas and possibly others will be investigated for wetland and forest mitigation to create and enhance summer habitat for the Indiana bat: Pigeon Creek, Patoka River bottoms, East Fork of the White River, Thousand Acre Woods, White River (Elnora), First Creek, American Bottoms, Ray’s Cave, Sexton Springs Cave, Garrison Chapel Valley, Beanblossom Bottoms, White River (Gosport), White River (Blue Bluff), and Bradford Woods.

In selecting sites for summer habitat creation and enhancement, priority will be given to sites located within a 2.5 mile radius from a recorded capture site or roost tree. If willing sellers cannot be found within these areas, other areas may be used as second choice areas as long as they are within the Action Area and close enough to benefit these maternity colonies, or are outside the Action Area but still deemed acceptable to the USFWS.

Where appropriate, mitigation sites will be planted with a mixture of native trees that are largely comprised of species that have been identified as having relatively high value as



## Section 4—Final Environmental Impact Statement

potential Indiana bat roost trees. Tree plantings will be monitored for five years after planting to ensure establishment and protected in perpetuity via conservation easements.

Update: The Section 4 Tier 2 BA identifies a total of 36 properties for mitigation. Seven (7) focus areas were targeted for the Section 4 mitigation: SR 57, Doan's Creek Maternity Colony, Plummer Creek Maternity Colony, Little Clifty Branch Maternity Colony, Indian Creek Maternity Colony Area, Cave<sup>10</sup>, and Garrison Chapel Valley. The 36 sites also include sites acquired by INDOT for preservation and sites that have been acquired or are in the acquisition process which have anticipated future restoration and replanting activities. These 36 sites are expected to provide a total of more than 2,636 acres of forest preservation and over 1,168 acres of reforestation. The combined sites will also provide 2.0 acres of Scrub-shrub Wetlands, more than 12 acres of Emergent Wetlands and more than 13 acres of Forested Wetlands. Additional details on these sites is presented in the Section 4 Tier 2 BA in **Appendix JJ1**, *Redacted Section 4 Tier 2 Biological Assessment*.

2. **Wetland MOU**—Wetlands will be mitigated at ratios agreed on in the Wetland MOU (dated January 28, 1991). Wetland replacement ratios are as follows:
  - a. Farmed wetlands 1 to 1
  - b. Scrub/shrub and palustrine/lacustrine emergent wetlands 2 - 3 to 1 depending upon quality
  - c. Bottomland hardwood forest wetlands 3 - 4 to 1 depending upon quality
  - d. Exceptional, unique, critical (i.e. cypress swamps) 4 and above to 1 depending upon quality

Update – To be completed (Note: Refined Preferred Alternative 2 (Low-Cost and initial design criteria) impacts approximately 3.33 to 5.34 acres of emergent, 0.18 to 0.45 acres of scrub/shrub wetlands, 1.71 to 2.35 acres palustrine unconsolidated bottom and 1.81 to 3.76 acres of forested wetlands. Based on the range of mitigation ratios described in Section 7.3.9, *Wetland Impacts*, the total area needed for mitigation of impacts to wetlands for Refined Preferred Alternative 2 ranges from approximately 15.79 to 29.14 acres (including a 25% buffer), depending on the mitigation ratios applied and the design criteria implemented.) The 36 Section 4 mitigation sites identified to date are estimated to provide a combined 12 acres of Emergent Wetlands, 2.0 acres of Scrub-shrub Wetlands, and 13 acres of Forested Wetlands.

3. **Forest Mitigation**—The Tier 1 *Forest and Wetland Mitigation and Enhancement Plan* (Appendix P) identifies the general location of potential mitigation sites for upland and bottomland forests. Preference will be given to areas contiguous to large forested tracts that have recorded federal-and state-listed species. The actual mitigation sites implemented will be determined in or following Tier 2 in consultation with the USFWS

<sup>10</sup> The cave is an important Indiana bat hibernaculum.



and other environmental review agencies. Coordination with the environmental review agencies will assure that these forest mitigation sites are strategically situated in biologically attractive ecosystems. Forest impacts will be mitigated at a ratio of 3 to 1. All forest mitigation lands will be protected in perpetuity via conservation easements. The 3 to 1 forest mitigation may not be located entirely within the Action Area. Forest impacts occurring within each of the 13 2.5-mile radius maternity colony areas would be mitigated by replacement (i.e. planting of new forest and purchase of existing) at approximately 3 to 1, preferably in the vicinity of the known roosting habitat.

Update – To be completed. (Note: Forest impacts will be mitigated at a ratio of 3 to 1. Section 4 will require approximately 2,616 (low-cost design criteria) to 3,262 acres (initial design criteria) of upland forest mitigation for Refined Preferred Alternative 2. All forest mitigation lands will be protected in perpetuity via direct purchase or conservation easements. **Figure 7-7** (p. 7-66) shows an example of reforestation. The 36 mitigation properties that have been identified are expected to provide for 1,168 acres of reforestation and 2,636 acres of forest preservation, for a total forest mitigation of 3,804 acres, or 542 acres more than needed to fulfill the agreed-upon mitigation ratios. These extra acres may be applied as necessary to other future INDOT mitigation projects.

## **CONSERVATION / PRESERVATION**

### **WINTER HABITAT**

1. **Hibernacula Purchase** - Opportunities will be investigated to purchase at fair market value from “willing sellers,” one or more Indiana bat hibernaculum(a) including associated autumn swarming/spring staging habitat. After purchase and implementation of all management efforts, the hibernaculum(a) and all buffered areas will be turned over to an appropriate government conservation and management agency for protection in perpetuity via conservation easements.

Update – Property owners of Indiana bat hibernacula within the Winter Action Area and one hibernaculum outside of the Winter Action Area were contacted to determine if they would be willing sellers. Currently, three hibernacula (including two Priority 1a caves) have been secured, and an offer is outstanding on a fourth hibernaculum.

2. **Hibernacula Protection** – With landowner permission, investigations will be coordinated with the USFWS on acquiring easements to erect bat-friendly angle-iron gates at cave entrances. These gates prevent unauthorized human access and disturbance of hibernacula, while maintaining free airflow within the hibernacula within the Action Area. Gates will be constructed according to designs from the American Cave Conservation Association. Effects of gates on water flow and flash flooding debris will be carefully evaluated before and after gates are installed. Other structures (e.g., perimeter fencing) or techniques (e.g., alarm systems and signs) may also be used.

Status – To be completed.



## Section 4—Final Environmental Impact Statement

### AUTUMN/SPRING HABITAT

3. **Autumn/Spring Habitat Purchase** - Any hibernaculum(a) purchased as part of conservation for Indiana bat winter habitat will include associated autumn swarming/spring staging habitat to the maximum extent practicable. Any purchase will be from a willing seller at fair market value. In addition, some parcels containing important autumn swarming/spring staging habitat may be acquired near key hibernacula regardless of whether the hibernacula are acquired themselves. Any acquired autumn swarming/spring staging habitat would be turned over to an appropriate government conservation and management agency for protection in perpetuity via conservation easements. The purchase of forest would be included as part of the 3 to 1 forest mitigation.

Status – Property owners of Indiana bat hibernacula within the winter action area and one hibernaculum outside of the winter action area were contacted to determine if they would be willing sellers. Currently, three hibernacula (including two Priority 1a caves) have been secured, and an offer is outstanding on a fourth hibernaculum. Autumn/Spring habitat will be included for those parcels referenced above that are purchased as part of the I-69 project.

### SUMMER HABITAT

4. **Summer Habitat**—Investigations will be coordinated with the USFWS on purchasing lands at fair market value in the Action Area from “willing sellers” to preserve summer habitat. Any acquired summer habitat area would be turned over to an appropriate government conservation and management agency for protection in perpetuity via conservation easements.

Status – To be completed.

## EDUCATION / RESEARCH / MONITORING

### WINTER HABITAT

1. **Monitor Gated Caves** - All caves that have gates erected as mitigation for this project will have their temperature, humidity, bat activity and populations monitored before and for three years after gate installation. Infra-red video monitoring or other techniques deemed acceptable by USFWS will be conducted for a minimum of two nights in the appropriate season at each newly installed cave gate to ensure the bats are able to freely ingress and egress. Data acquisition will use a number of data loggers minimizing the need for entry into these caves. All precautionary measures will be taken to minimize potential impacts to hibernating Indiana bats.

Status – To be completed.



2. **Cave Warning Signs** - Where deemed appropriate by USFWS, the following may be done: signs will be posted that warn the public and discourage cave entry at hibernacula within/near the Action Area. Signs should be placed so that they do not block air flow into the cave and do not draw attention to the entrance and attract violators (USFWS 1999). Also, light-sensitive data loggers may be placed within the caves to assess the effectiveness of the warning signs at deterring unauthorized entries. Permission from the landowners must be obtained before erecting such signs and installing data loggers.

Status – To be completed.

3. **Biennial Census** – Total funding of \$50,000 will be provided to supplement the biennial winter census of hibernacula within/near the proposed Action Areas. Funding will be made available in consultation with the USFWS.

Status – To be completed.

#### AUTUMN/SPRING HABITAT

4. **Autumn/Spring Habitat Research** - Total funding of \$125,000 will be provided for research on the relationship between quality autumn/spring habitat near hibernacula and hibernacula use within/near the Action Area. This research should include methods attempting to track bats at longer distances such as aerial telemetry or a sufficient ground workforce. A research work plan will be developed in consultation with the USFWS. Funding will be made available as soon as practical after Notice to Proceed is given to the construction contractor for the applicable Tier 2 Section (or earlier).

Status – To be completed.

#### SUMMER HABITAT

5. **Mist Netting**— A work plan for surveying, monitoring, and reporting will be developed and conducted in consultation with and approved by USFWS. This mist netting effort will be beyond the Tier 2 sampling requirements. Fifty mist netting sampling sites are anticipated. Monitoring surveys focused at each of the 13 known maternity colonies will be completed the summer before construction begins in a given section and will continue each subsequent summer during the construction phase and for at least five summers after construction has been completed. If Indiana bats are captured, radio transmitters will be used in an attempt to locate roost trees, and multiple emergence counts will be made at each located roost tree. These monitoring efforts will be documented and summarized within an annual report prepared for USFWS.

Update – Five of the 30 total sites in Section 4 were mist netted in the summer of 2010. One male Indiana bat was captured and was tracked to a primary roost. This



## Section 4—Final Environmental Impact Statement

resulted in the identification of a fourth Indiana bat maternity colony in Section 4. Fourteen maternity colonies have been identified within I-69.

### GENERAL

6. **Educational Poster**—Total funding of \$25,000 will be provided for the creation of an educational poster or exhibit and/or other educational outreach media to inform the public about the presence and protection of bats, particularly the Indiana bat. Funding would be provided after a Notice to Proceed is issued for construction of the first section of the project.

Status – To be completed.

7. **GIS Information**—GIS maps and databases developed and compiled for use in proposed I-69 planning will be made available to the public. These data provide information that can be used to determine suitable habitats, as well as highlight other environmental concerns in local, county, and regional planning. Digital data and on-line maps are being made available from a server accessed on the Indiana Geological Survey (IGS) Website at IU: <http://igs.indiana.edu/arcims/statewide/index.html>. In addition, detailed GIS forest data (five-meter resolution) has been developed for the 13 maternity colony foraging areas (circles with 2.5-mile radius) and WAA. This data was developed in order to better determine habitat impacts to the Indiana bat. This is the most accurate and detailed forest data known to exist for those areas. This data could potentially be used by USFWS, other government agencies, or students to examine effects on the Indiana bat, other species, or ecosystems over time.

Status – Completed.

### BALD EAGLE (*Haliaeetus leucocephalus*)

On July 9, 2007, the USFWS removed the bald eagle from the list of endangered and threatened species under the Endangered Species Act. However, the bald eagle continues to have protection under the Bald and Golden Eagle Protection Act, 16 U.S.C. §§ 668-668d. On May 20, 2008, the USFWS issued regulations governing permits under the Bald and Golden Eagle Protection Act for the projects that obtained an incidental take permit under the ESA. 50 C.F.R. Part 22. FHWA and INDOT intend to comply, as appropriate, with the Bald and Golden Eagle Protection Act permit requirements established by USFWS prior to construction.

Most conservation measures for the bald eagle are also measures for the Indiana bat, and have been updated in the Indiana bat *Conservation Measures* section, described above. The conservation measures for the bald eagle are described in the Revised Tier 1 BO, (**Appendix DD**) and will be fully complied with as a part of the overall I-69 mitigation.



### 7.3.17 Karst

In the Tier 1 ROD, it was recognized that avoidance of impacts to karst terrain would not be possible, because all alternatives within Section 4 would be located within karst terrain. The alternatives will impact between 88 and 122 karst features. However, in the context of the Tier 2 study for Section 4, impacts to many specific karst features, including caves and areas of dense karst feature concentrations, have been avoided and or minimized during the development and screening of alternatives. In this way, the Section 4 project is being developed in a manner consistent with the 17 procedural steps outlined Karst MOU (included in **Appendix AA**, *Final Karst Report/Addendum to Karst Report (Redacted)*). Steps 1 through 4 have been completed to date. Steps 5 through 17 require more detailed design, or occur during and after construction. These will be completed as the project design advances, as well as during and after construction. The Refined Preferred Alternative 2 would impact between 88 (low-cost design criteria) and 108 (initial design criteria) karst features.

A primary objective of the Karst MOU is to minimize the effects of highway construction and operation on karst resources. The four strategies outlined in the Karst MOU to achieve this objective, in order of priority and/or effectiveness, are avoidance, alternative drainage, mitigation/treatment, and operation and maintenance. At this Tier 2 stage of the I-69 project, "avoidance" is accomplished by not impacting specific karst features, rather than avoiding karst terrain altogether.

Karst biological communities are known to be susceptible to alterations in temperature and humidity within their ecosystem. In accordance with the Karst MOU, a monitoring and maintenance plan will be developed for affected karst features. Also in accordance with the Karst MOU, if during construction additional karst features are discovered and it is found that the mitigation agreement must be altered, all of the agencies will be contacted and agreement reached prior to work continuing in that specific area of the project. It is also recommended that temporary caps be placed over any exposed karst feature discovered during construction to limit changes to temperature and humidity within the karst ecosystem.

Per USEPA written comments on the DEIS, a firm commitment has been added that if active groundwater flow paths are discovered, measures will be taken to perpetuate the flow and protect water quality.

Within Section 4, I-69 would be constructed primarily on undeveloped land, which, at the northern end of the project, consists of primarily karst terrain. Because the Section 4 corridor does not follow an existing highway corridor, careful planning of the highway alignment offers the best opportunity to avoid and minimize impacts to karst features. No alternative in the Section 4 projects could avoid all karst features. However, given the high importance of caves in a karst ecosystem, direct impacts to known caves were avoided during alternatives development and screening. However, since the publication of the DEIS, ongoing public outreach lead to the identification of a cave with the proposed rights-of-way for all Section 4 Alternatives. This feature did not exist when surveys were completed in 2004 - 2006. It has been identified and added to the impacts for all alternatives. See Section 5.21.3.10 for more information about this cave.

**Section 4—Final Environmental Impact Statement**

All alternatives also avoid direct impacts on denser concentrations of karst features, where practicable. Impacts to specific karst features will be addressed via consideration of alternative drainage and other appropriate mitigation/treatment measures. As was described in Section 5.21.1, avoidance of high value karst features has been a key objective in earlier studies dating back to the early 1990's.

Collection and management of highway runoff are important considerations during the development of the roadway design as well as the development of karst impact mitigation measures. The term “alternative drainage” in karst terrain involves directing highway runoff away from recharge features such as sinkholes, swallets and sinking streams. Alternative drainage also includes avoiding severing karst conduits between recharge features and discharge features so as to avoid/minimize potential downstream effects upon troglobitic species (cave-dwelling species adapted to total darkness) that cannot be directly observed due to lack of adequate access to caves which serve as their habitat. One dye trace in Section 4 showed a flowpath as long as four miles between dye injection and dye recovery. The average length of dye traces was just over one mile. Therefore, the potential exists for water quality degradation related to normal highway runoff as well as hazardous materials spills in locations removed from the Section 4 corridor. It should be noted that utilizing alternative drainage will not always be a viable option within the Section 4 corridor. In some areas karst features are distributed across the corridor, which could preclude diverting runoff from the highway away from all karst features. This is especially true in Monroe County. Identifying areas to divert runoff away from karst features may be easier to implement in portions of the corridor where the frequency of karst features is not as high.

Because this project will require a Rule 5 Permit issued by IDEM, the design will need to devote particular detail to Rule 5, Item B1 of the Erosion Control Plan Development, which states:

This item is included in the rule to place an emphasis on identification of pollutants that are associated with construction activity. In the past, the emphasis has been on sediment reduction; however the rule requires the plan preparer to identify other potential pollutants and their sources. Potential pollutant sources include material and fuel storage areas, fueling locations, exposed soils, leaking vehicles and equipment, etc.

To satisfy this item, the plan needs to contain a written description of the expected pollutants that could enter Storm water during the construction operation, and where those potential pollutants might be generated. In addition, the plan preparer should include discussion of measures or operational activities that will be initiated to minimize the danger of pollutants entering Storm water.

Several erosion and sediment control methods could be utilized in steep terrain including but not limited to surface stabilization measures, runoff control measures, sediment barriers and filters, and other measures including surface roughening and the use of retaining walls where appropriate. Surface stabilization measures could include such measures as temporary seeding, erosion control blankets, and riprap slope protection. While, runoff control measures could include temporary and permanent diversions, water bars, rock check dams, and temporary slope





drains. Finally, sediment barriers and filters could include silt fence, filter tubes/socks, and vegetative filter strips.

In areas where alternative drainage is not possible, mitigation and treatment for karst features receiving highway drainage will include the implementation of water quality treatment or abatement measures for highway runoff prior to its release toward karst features. Such measures include peat and sand filters, gravel filters, vegetative buffers, and lined spill or runoff containment structures. These structures could be constructed in appropriate locations along the highway to detain and/or treat highway runoff prior to discharge. Monitoring is required by the Karst MOU to assure that the drainage discharged from these structures has minimal impact on karst features.

When alternative drainage is not an option, potential highway construction, operation and maintenance measures used to perpetuate and/or treat highway drainage include, but are not limited to, the following:

- As stated in the Section 4 BA, low-salt zones will be defined within any drainage area of a karst feature which is used for highway drainage. Further coordination with the Karst MOU agencies will occur during the design phase of the project regarding low-salt zones.
- As stated in Step 8 of the Karst MOU, additional information on runoff treatment and protocol for long term monitoring will be developed in the design phase of the project and provided to the IDNR, IDEM and USFWS for review. As stated in Step 10 of the Karst MOU, an agreement between INDOT, IDNR, IDEM and USFWS that will specify the appropriate and practicable measures to offset unavoidable impacts to karst features will be signed prior to acceptance of final design plans.
- Installation of concrete caps, specially designed drainage structures, detention basins or swales, peat filters and spring boxes.
- Natural vegetative treatment for road runoff.
- Examination of the areas that receive runoff from the highway to detect soil piping or opening of buried karst features. Soil piping will be addressed by the contractor during the weekly erosion control inspections (or after every ½ inch of rainfall) required as part of the Rule 5 permit during construction. Inspections following construction will be determined during the final design phase as part of the monitoring and maintenance plan under Step 11 of the Karst MOU. It will be INDOT's responsibility or their designated agent's responsibility to perform these inspections. Quarterly inspections and inspections after all heavy rains are recommended for the first year. Annual or bi-annual inspections are recommended after the first year.
- Implementation of no-spray zones.
- Strict runoff/erosion control measures.
- Routine maintenance and inspection of treatment/containment structures.
- Development of a spill response plan.

Class V injection well permits may be required for various types of projects. For example such a permit could be required by EPA Region 5 if a Class V injection well is located within the karst region of the state, a sole source aquifer area, a state designated source water protection area for a public water supply, or anywhere untreated fluids discharged through a Class V well may



Section 4—Final Environmental Impact Statement

otherwise endanger an underground source of drinking water. If there are measures in place to prevent contamination of groundwater, a Class V well could be authorized by rule rather than by a permit. A Class V Well Inventory Form would need to be provided to EPA Region 5 prior to construction of a Class V injection well so that EPA could determine if a Class V injection well permit will be required for any Class V wells. For the I-69 project, if the inventory information provided indicates that any injection well would likely contaminate any underground source of drinking water, a permit would be required. Any permit would need to be applied for and obtained prior to construction of the Class V well.

The Final Karst Report (**Appendix AA**) identifies additional Best Management Practices (BMPs) that will be considered for implementation for the project and includes additional information pertaining to mitigation. Under Step 8 of the Karst MOU, a monitoring and maintenance plan will be developed for affected karst features. A listing of karst feature treatment circumstances which may require BMP implementation, BMPs that may be implemented, and a numerical cross-reference to applicable Indiana Department of Transportation (INDOT) Standard Specifications, such as Standard Specification 205 pertaining to soil liners, is included in **Table 7-1a** below. The Standard Specifications are available on-line at: <http://www.in.gov/dot/div/contracts/standards>. This listing is not intended to be all-inclusive. These and other BMPs will be considered for implementation on a case by case basis.

| <b>Table 7-1a: Best Management Practices (BMPs) in Karst Terrain</b> |   |  |
|--|---|--|
| <b>Best Management Practice (BMP)</b>                                | <b>Description</b>  | <b>Numerical Reference to INDOT Standard Specification<sup>11</sup> (where applicable)</b>                         |
| <b><u>Ditch Lining</u></b>   |   |  |
| Compacted clay liner   | Lined ditches can be utilized to prevent erosion. The hydraulic analysis in design will determine the water flow and velocity to select the proper lining. This will not only reduce erosion, but limit the sediment transport into karst features. | 205 describes the installation of pond liners, synthetic liners and soil liners and could be adapted to this work. |
| Geosynthetic clay liner  | This is an effective method to protect groundwater penetration along a road side ditch.   | 205 describes the installation of pond liners, synthetic liners and soil liners and could be adapted to this work. |
| Flexible membrane liners   | Beneficial since these will conform to undulating topography.   | 205 describes the installation of pond liners, synthetic liners and soil liners and could be adapted to this work. |
| Concrete, portland cement or asphalt                                 | Can be used although not as aesthetic as the other options.   | 607 describes paved side ditch construction for both concrete and asphalt work.                                    |

<sup>11</sup> INDOT has not developed standard specifications for every conceivable mitigation need which may be encountered. If specific field conditions require a mitigation measure for which INDOT presently has no Standard Specification, then a Unique Special Provision could be developed and approved by INDOT.



| <b>Table 7-1a: Best Management Practices (BMPs) in Karst Terrain</b> |   |  |
|--|---|--|
| <b>Best Management Practice (BMP)</b>                                | <b>Description</b>  | <b>Numerical Reference to INDOT Standard Specification<sup>11</sup> (where applicable)</b>                 |
| <b>Sinkhole - Bridging</b>   |   |  |
| Culvert or bridges   | The INDOT Drainage Design Manual will be used to size the openings of bridges and culverts. Unique backwater conditions created by karst features will be evaluated further in design to assure proper detention storage. If a karst feature cannot be avoided, filled or capped, the roadway should span the feature and be anchored (reinforced) into competent bedrock. Cuts into bedrock should be minimized when possible. | 714, 715, 723 describe different culverts and concrete boxes and 3-sided structures that can be installed. |
| Reinforcing within cave  | The mortar will coat and strengthen the cave walls.   | 708 describes pneumatically placed mortar (shotcrete).   |
| Ground modification  | Can strengthen soils by injecting concrete or lime.   | 203 describes soils modification with chemical.  |
| Geopier with cap   | Typically installs quicker than traditional piers or piles; will provide strength to wide range of soils  | INDOT does not directly address Geopier, but 701 gives requirements for piles and piers.                   |
| Piles with cap   | Traditional method for vertical reinforcement of soils.   | 710 addresses pile installation.   |
| <b>Sinkhole - Filling</b>  |   |  |
| Rock pads  | Works where the velocity of the storm water needs to be decreased to prevent erosion.   | 205 describes rock splash pads as an erosion control measure.  |
| Large rock fill  | Effective for slope stability issues.   | 203 describes placing large rock fill before backfilling with structure backfill or borrow.                |
| Compaction grouting  | Useful where soil is loose or soft and does not need a large area for installation.   | A standard would have to be written for this.  |
| Cement grouting  | Effective where there are significant voids and cracks in load bearing rock   | 206 describes the process for grout injection.   |
| Dynamic compaction   | Will increase the density of the soil, even soil below the groundwater; best for granular soils.  | 203 describes excavation and backfilling requirements as well as chemical soil modification.               |
| Excavation, overlapping geotextiles, soil backfill                   | If a sinkhole is located within the new right of way, yet has a very small drainage area, then capping is more appropriate (versus installing a catch basin and standpipe).   | 203 describes excavation and backfilling requirements as well as chemical soil modification.               |
| Excavation, concrete cap, soil backfill                              | If a sinkhole is located within the new right of way, yet has a very small drainage area, then capping is more appropriate (versus installing a catch basin and standpipe).   | 203 describes excavation and backfilling requirements as well as chemical soil modification.               |



Section 4—Final Environmental Impact Statement

| Table 7-1a: Best Management Practices (BMPs) in Karst Terrain |  |   |
|---|--|---|
| Best Management Practice (BMP)                                | Description  | Numerical Reference to INDOT Standard Specification <sup>11</sup> (where applicable)  |
| <b>Other</b>  |  |   |
| Avoidance   | The alternatives have been screened for the number of karst features that may be affected. As design further details the road's cross section and alignment at a particular karst feature, avoidance should continue to be considered if cost effective and within appropriate design criteria.                                  |   |
| Alternative drainage  | Redirecting highway runoff away from karst recharge features. Will be implemented where feasible. In some areas, this is not an option due to karst features being distributed across the corridor (especially the eastern portion of Section 4).  |   |
| Earth berm construction                                       | Provides a natural look to the erosion control.  | 205 describes diversion berms of earth or rock as an erosion control method.  |
| Gabion berm construction                                      | May be appropriate at very steep slopes (>10%).  | Recurring provision 625-R-194 describes the requirements and placement of gabions.  |
| Open standpipe installation                                   | A chimney (standpipe), catch basin and rock filter is a common BMP for sinkholes located within the right of way of the new road. These were used in the SR 37 project.  | A standard would have to be written for this.   |
| Concrete catch basin installation                             | A chimney (standpipe), catch basin and rock filter is a common BMP for sinkholes located within the right of way of the new road. These were used in the SR 37 project. They can be enhanced to include a special basin to act as a hazardous material trap (HMT) that can be specially drained to avoid the adjacent watershed. | 720 describes catch basins and installation.  |
| Natural vegetative buffers                                    | Could be constructed in appropriate locations to detain/treat runoff prior to discharge. Same season re-vegetation should occur when possible.   | Section 621 describes installation of vegetative cover, as well as timeline for when they must be installed, and the method for installation. |
| Peat/sand/gravel filters                                      | Could be constructed in appropriate locations to detain/treat runoff prior to discharge.   | 205 describes placement of erosion control and filtering devices as an erosion control measure.   |
| Spring boxes  | Use to protect spring discharge  | 205 describes placement of erosion control and filtering devices as an erosion control measure.   |



| <b>Table 7-1a: Best Management Practices (BMPs) in Karst Terrain</b>                      |   |   |
|---|---|---|
| <b>Best Management Practice (BMP)</b>   | <b>Description</b>  | <b>Numerical Reference to INDOT Standard Specification<sup>11</sup> (where applicable)</b>  |
| Energy dissipation devices (e.g. scour holes, riprap linings, stilling basins)            | Use at culvert and storm sewer outlet locations to prevent erosion to existing channels. Will be based on INDOT's Drainage Design Manual. | Section 616 describes riprap placement and type for energy dissipation and scour protection.  |
| Agencies (IDNR, IDEM, USFWS) attend field checks/meetings                                 | Meet during later design in effort to negate/minimize adverse effects.  | Would need special standard provision; Indiana Design Manual defines the parties required to attend field checks during design, and Section 105 defines coordination procedures and agencies the contractor much include and coordinate with. |
| Notify the USFWS & IDNR if a state/federal listed species is observed during construction | Work will stop within the project area and these agencies will be notified.   | Would need special standard provision; Section 107 describes contractor's responsibilities to follow permits, laws, responsibility to the public.   |
| Newly discovered cave during construction   | Karst experts will be consulted to determine the significance of the cave.  | Would need special standard provision; Section 107 describes contractor's responsibilities to follow permits, laws, responsibility to the public.   |
| Geogrid or geotextile layers  | Could be installed in the lower reaches of embankments, embankment foundations or roadway subgrades.                                      | 214 describes geogrid installation requirements.  |
| <b>Operation/Maintenance</b>  |   |   |
| Discovery of karst features previously not known  | Examination of areas that receive runoff from highway to detect soil piping or opening of buried karst features.                          | A standard would have to be written for this.   |
| No-mowing, low salt or no-spray zones and associated signage                              | Implemented in order to increase vegetative groundcover and filter runoff prior to leaving right-of-way.                                  | Section 621 describes "Do Not Spray" and "Do Not Mow" signage and placement.  |
| Routine maintenance and inspection of treatment/containment structures                    | Verify capacity, integrity and operational efficiency of structure.   | Section 205 describes the type and frequency of inspection of temporary erosion control devices; INDOT assume responsibility of permanent devices after final acceptance of the project.  |
| Emergency response plan   | To be developed post-NEPA, as stated in Step 11 of the Karst MOU,   |   |
| Installation of signage alerting public that all spills are potentially hazardous         | In order to increase public awareness in sensitive areas.   | Would need a special provision; 802 describes sign placement and type for unique sign types.  |



## 7.4 Environmental Mitigation Costs

Environmental mitigation costs for the Section 4 Refined Preferred Alternative were determined on the following basis and can be found in **Table 7-2**. The estimated costs are in year 2010 dollars, and were determined using year 2007 dollars multiplied by an inflation factor (shown on **Table 7-2**) to account for estimated cost increases over time. Cost of some mitigation identified in Section 7.3 is difficult to estimate and is not included below. Some of these measures have been and/or will be incorporated into the design in a fashion that will not be quantifiable in regard to specific quantities and cost (i.e. parking and turning areas, equipment maintenance areas, etc.).

- 1. Wetland Mitigation**—The acres needed for wetland mitigation were determined for each alternative based on the expected impact acreage, type of wetland, and jurisdiction. Section 4 alternatives wetland impacts to emergent, scrub/shrub, and forested wetlands would range from approximately 5.26 acres to 13.09 acres. Ratios described in Section 7.3.9, *Wetland Impacts*, were used to estimate the number of acres needed to mitigate impacts to wetlands. Mitigation for all wetland impacts ranges from approximately 15.56 acres (Alternative 3) to 39.41 acres (Alternative 1). Mitigation for the Refined Preferred Alternative 2 would be between 15.79 and 29.14 acres of wetlands. (Note: The precise amount of mitigation that will be required will be determined during the permitting process.) The cost of this mitigation, including purchasing suitable parcels, designing and constructing wetlands, as well as administrative costs, was estimated at \$33,300 per acre (adjusted for inflation). Mitigation cost for the Refined Preferred Alternative 2 would range from approximately \$526,000 to \$970,000 in 2010 dollars.
- 2. Forest Mitigation**—The acres needed for forest mitigation were determined for each alternative based on the expected impact acreage. For the I-69 Evansville to Indianapolis project as a whole, the acreage needed for mitigation was determined by using a 3 to 1 ratio (with the goal being 1 to 1 for reforestation, to replace direct impacts, and 2 to 1 for preservation of existing forests). The cost of this mitigation, including securing suitable parcels, site design and planting of trees, as well as administrative costs, was estimated at approximately \$16,600 per acre (adjusted for inflation). The potential impacts to upland forests due to the proposed I-69 project vary from approximately 872.01 acres (Alternative 2) to 1,168.40 acres (Alternative 1). Mitigation for the forest impacts as a result of the alternatives for Section 4 would range from 2,616 to 3,505 acres of upland forest mitigation. The Refined Preferred Alternative 2 will require 2,616 to 3,262 acres of forest mitigation. Mitigation cost for the Refined Preferred Alternative 2 would range from \$43,426,000 to \$54,149,000 in 2010 dollars.
- 3. Other Riparian Areas**—“Riparian areas” refer to non-wetland land located immediately adjacent to streams. The width of these riparian areas can vary, and is generally wider in the upland areas where topography is more rugged and narrower in the flatter lowlands where agricultural fields use more of the land (see Section 5.19.2.3, *Analysis*, for further details on riparian areas). In general, impacts to these riparian areas are expected to be mitigated through the forest mitigation program wherever possible, but in some instances may be



treated separately. Of the 323.28 acres to 389.30 acres of non-wetland riparian area impacted by the Refined Preferred Alternative 2, 312.96 to 377.20 acres are forested and will be mitigated under the forest mitigation program, as described immediately above. The 10.32 acres to 12.10 acres of impacted other riparian areas are wooded but do not meet the USDA's technical definition of "forest." These areas are therefore not included in the forest mitigation, but are rather mitigated at the 1 to 1 ratio for mitigation of other (non-wetland) riparian habitat. At an estimated cost of \$16,600 per acre (inflated to Year 2010 prices), the total cost for mitigation of these 10.32 acres to 12.10 acres of other riparian areas impacted by the Refined Preferred Alternative 2 is estimated to be approximately \$171,000 to \$201,000.

4. **Noise Impact Mitigation**— No potential noise barriers were found to meet the cost-effectiveness portion of INDOT's reasonableness criteria. Accordingly, no costs for noise barrier construction are shown. A final determination on noise abatement for the Refined Preferred Alternative 2 will be made during the design phase. At such time, additional noise analysis will be performed to more accurately determine barrier performance, barrier characteristics (length and height), and the optimal barrier location for any potential noise barriers that may be recommended for noise abatement.
5. **Access Rights**—A value of \$2 million was estimated for the entire I-69 project (Evansville to Indianapolis) to represent the approximate cost to obtain access rights to any mitigation sites developed. Section 4 consists of approximately 27 miles of the 142-mile-long freeway, or approximately 19% of the total, for an estimated \$380,000. Adjusted for inflation, the cost would be \$421,000.
6. **Karst**— Karst mitigation measures include avoidance and minimization of impacts during project planning, construction-related mitigation measures such as implementation of BMPs, and post-construction mitigation measures such as water quality monitoring, BMP monitoring, and visual inspection of areas receiving highway drainage. Mitigation measures related to the physical construction of the highway and associated BMPs are included in the project construction cost estimates. An additional amount of up to \$1 million was applied to the entire I-69 project to represent potential cost for karst mitigation. These mitigation measure costs included in the \$1 million estimate are: water quality monitoring, BMP monitoring and inspection, or other measures described in the monitoring and maintenance plan that will be prepared per the Karst MOU. Of the \$1 million, \$500,000 is applied to Section 4. As stated above, this mitigation commitment addresses such measures as water quality monitoring and BMP monitoring. Much larger expenditures (included in the project construction cost estimate) are being made during construction to safeguard karst resources.
7. **Stream Mitigation**—The acres needed for stream mitigation were determined based on the expected impact acreage. IDEM and USACE criteria call for mitigating stream impacts based on the length of impact. Mitigation ratios will be determined in consultation with IDEM and USACE. Assuming a 1 to 1 ratio, the required mitigation would range from approximately 93,196 linear feet to 111,247 linear feet. The mitigation acreage estimates presented are useful in determining mitigation costs. Stream mitigation will be completed to



## Section 4—Final Environmental Impact Statement

adequately mitigate for linear feet of stream impacts in coordination with both the USACE and IDEM during the permitting process of the Section 4 project.

The cost of this mitigation, which could include securing suitable parcels, site design, stream stabilization projects, erosion control devices, stream mitigation and monitoring plans, filter strips, planting of woody and herbaceous vegetation to stabilize banks and provide foraging cover for many species, as well as administrative costs, was estimated at \$33,300 per acre (adjusted for inflation). The Refined Preferred Alternative 2 would impact between 15.80 and 19.42 acres of stream. Based on a 1 to 1 mitigation ratio, the mitigation cost associated with the preferred alternative would be between approximately \$526,000 and \$647,000 in 2010 dollars.

8. **Historic and Archaeological**—A value of up to \$5 million was applied to the entire I-69 project to represent potential cost to mitigate historic and archaeological impacts. Section 4 would have no above-ground historical mitigation measures; however, it will have archaeological mitigation measures for impacts to contributing sites within the Virginia Iron Works Archaeological District and the Victor Limestone Archaeological District. Archaeological mitigation will include additional surveys to document these resources. Such documentation may include but is not limited to: photographs, profiles, cross sections, and the collection of material samples. Mitigation funding will also include support of interim reports in Martin and Monroe counties. Mitigation measures will be finalized in the Section 106 memorandum of agreement. Pro-rating the \$5 million mitigation cost by the proportion of the entire project's length that is in Section 4 shows an estimated cost of \$950,000 attributable to Section 4. This cost includes activities related to the Tier 1 MOA, which encompass multiple sections and are yet to be completed such as interim report survey updates for historic properties, and guides, brochures and educational materials.
9. **Community Planning Program**—A uniform value of up to \$2 million was allocated for planning grants for local governments to use for setting up comprehensive plans to aid in planned development likely to occur at or near interchanges. Each eligible county/community could receive up to \$50,000. In Section 4, Greene and Monroe counties and the cities of Bloomfield, Linton, Ellettsville and Bloomington were eligible for grants. On October 29, 2007, INDOT awarded \$950,000 in grants to communities located along the I-69 corridor in Southwest Indiana. Greene County, the Town of Bloomfield, and the City of Linton together were awarded a grant for \$150,000. Monroe County and the City of Ellettsville together were awarded a grant for \$100,000. Thus the actual total program cost in Section 4 is \$250,000.
10. **Contingency**—For Tier 2, 20% of the previously outlined mitigation costs are estimated to cover contingencies. The contingency amount ranges from \$9,354,000 to \$11,618,000.

The total estimated mitigation cost for the Section 4 Refined Preferred Alternative 2, including the 20% contingency allowance, ranges from \$56,124,000 to \$69,706,000 in Year 2010 dollars.





| <b>Criteria</b>  | <b>Estimated Cost (Rounded)</b>     |
|--|-------------------------------------|
| Wetland Mitigation: 15.79 to 29.14 ac x \$33,300 (i.e., \$30,000 X 1.109**)  | \$526,000 to \$970,000              |
| Forest Mitigation: 2,616 to 3,262 ac x \$16,600 (i.e., \$15,000 X 1.109**)   | \$43,426,000 to \$54,149,000        |
| Riparian (non-forest, non-wetland) Mitigation: 10.32 to 12.10 ac x \$16,600 (i.e., \$15,000 X 1.109**)   | \$171,000 to \$201,000              |
| Stream Mitigation: 15.80 to 19.42 ac X \$33,300 (i.e., \$30,000 X 1.109**)   | \$526,000 to \$647,000              |
| Noise Mitigation   | \$0                                 |
| Access Rights: \$380,000* X 1.109**  | \$421,000                           |
| Karst: \$500,000*  | \$500,000                           |
| Historic and Archaeological: \$950,000*  | \$950,000                           |
| Community Planning: \$250,000  | \$250,000                           |
| Subtotal   | \$46,770,000<br>to \$58,088,000     |
| Contingency: 20% of subtotal   | \$9,354,000 to \$11,618,00          |
| <b>Total Cost 2010 Dollars</b>   | <b>\$56,124,000 to \$69,706,000</b> |
| <p>* Cost based on Section 4 percentage of total I-69 project estimates or on grant amount identified during Tier 1.<br/>           ** Year 2007 dollars X multiplier to account for inflation = 2010 dollars. Inflation multiplier is 1.109 (3.5% per year for 3 years).</p> <p>Notes:<br/>           All cost estimates have been rounded to the nearest 1000.<br/>           The cost estimating methodology is explained in <b>Appendix D</b>.</p> |                                     |



**Figure 7-1: Public Information Meeting**



**Figure 7-2: Roadside Native Wildflower Planting**



**Figure 7-3: Wetland Mitigation Site Before Construction**



**Figure 7-4: Wetland Mitigation Site During Construction**



**Figure 7-5: Wetland Mitigation Site During Monitoring Phase**



**Figure 7-6: Reforestation**