



Chapter 4—Affected Environment

4.1 Introduction

Since publication of the Draft Environmental Impact Statement (DEIS), **Figure 4.1-1** (p. 4-3) has been modified to show the correct boundaries of Monroe and Lawrence counties.

The purpose of the Affected Environment chapter of this Environmental Impact Statement (EIS) is to give a general overview of the existing social, economic, and natural characteristics of the Section 4 I-69 Study Area. This general overview is intended to provide a greater understanding of the Study Area and place into context the impacts described in Chapter 5, *Environmental Consequences*. The following topics are discussed in this chapter:

- **Section 4.2 – Human Environment (Community Impact Assessment)** describes the social, economic and physical characteristics within the Section 4 Study Area as well as the agricultural amenities.
- **Section 4.3 – Natural Environment** describes the geology, water resources, and ecosystems within the Section 4 Study Area.
- **Section 4.4 – Cultural Resources** describes the various historical and archaeological resources in the Section 4 Study Area.
- **Section 4.5 – Hazardous Materials** identifies known hazardous materials data collected from the Indiana Department of Environmental Management.
- **Section 4.6 – Air Quality** describes the general conditions of the existing air quality and identifies areas of nonattainment.
- **Section 4.7 – Noise** characterizes the current highway noise environment within the Study Area and identifies areas that already experience noise levels that exceed FHWA and INDOT standards.

Information presented in this chapter was derived from a number of sources including field surveys, public and agency input, literature reviews, and existing Geographic Information System (GIS) data. Throughout this EIS, analyses have focused within specific geographic areas or “study areas” appropriate for analysis of each type of potential impact. **Table 4.1-1** briefly describes each of these “study areas” and the resources or disciplines in which they are used.

Name	Definition	Applicable Disciplines
Purpose & Need Study Area	Five-county area including Greene, Monroe, Lawrence, Martin, and Owen counties (see Section 2.3).	Needs Assessment, Project Performance Measures, Energy Impact Analysis



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Table 4.1-1: Definitions of “Study Area”

Name	Definition	Applicable Disciplines
Study Area	The set of all census tract block groups that the approved I-69 corridor in Section 4 (which generally is 2,000 feet wide) passes through (see Figure 4.1-1 , p. 4-3).	Socioeconomic Data
Section 4 Corridor	The Section 4 portion of the corridor is generally 2,000 feet in width other than three locations as approved in the Tier 1 Record of Decision (ROD) (see Figure 1-3 , p 1-19). The Section 4 portion of the corridor widens to over 1 mile along the Greene-Monroe County Line from just north of Hobbieville Road (CR 1260 E/CR 190 S) in Greene County to just north of Carter Road in Monroe County. There are also two locations in Monroe County where the Section 4 portion of the corridor narrows to about 1,200 feet. These are near Evans Lane and in the vicinity of Rockport Road and Lodge Road. Tier 2 studies identify a final alignment within the approved corridor.	Natural Resources
Area of Potential Effects (APE) - Historic	The APE is defined as an area centered on the Tier 1 2,000-foot wide corridor and extending one mile either side of this corridor. Except at interchanges, the APE was narrowed to one-half mile at certain locations along the Tier 1, Section 4 corridor where visibility was limited by extensive vegetation and/or severe topography. West of the Greene/Monroe County Line, the APE was expanded to the west to include the area that encompasses the two alternative connector road corridors being studied between the proposed Greene/Monroe County Line interchange and SR 45 and also the area west of SR 45 along SR 445 (see Section 5.13.2.2).	Historic Resources
Area of Potential Effects (APE) - Archaeological	For archaeological resources, the APE is defined through consultation with IDNR-DHPA as the right-of-way for the preferred alternative (see Section 5.14.2.2).	Archaeological Resources
Indirect Impact Study Area	The 55 Transportation Analysis Zones (TAZs) within Greene and Monroe counties in which additional growth in population and/or employment is associated with Section 4 of I-69 (see Section 5.24.3 and Figure 5.24-1 (p. 5-827)).	Indirect Impacts
Geographic Scope	Greene and Monroe counties (see Section 5.24.3, subsection titled “2. Establish the Geographic Scope for the Analysis”).	Cumulative Impacts

Within Chapters 4 and 5, the term "Study Area," as defined above, is used for the analysis of all social and economic impacts, and is shown in **Figure 4.1-1** (p. 4-3). Natural resources are described and impacts analyzed within the approved 2,000-foot corridor, which is referred to throughout this document as the “Section 4 corridor.”



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4.2 Human Environment (Community Impact Assessment)

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

- Section 4.2.2.2 – Updates to local land use planning efforts and additional details about the I-69 Community Planning Program.
- Section 4.2.3 – Correction of existing agricultural land use statistics in Section 4 Corridor. Agricultural land use statistics in this section match those in **Table 4.2-10**.

This *Human Environment* section summarizes the trends and status of the social and demographic characteristics for the State of Indiana, Greene and Monroe counties, and the I-69 Section 4 Study Area. Topics discussed in this section encompass a broad spectrum of human conditions and activities. These include population, households, employment, education, and economic characteristics. Also discussed are transportation facilities, travel patterns, and accessibility; institutions such as churches, health care facilities, and libraries; police, fire, and emergency medical services; and land use plans and zoning. The results of the Community Impact Assessment (CIA), Section 4.2, provide the basis for the evaluation of impacts presented in several sections in Chapter 5, *Environmental Consequences*.

The Study Area, located in Southeastern Greene County and Southwestern Monroe County, is composed of the Year 2000 Census Tract Block Groups (BG) through which the Section 4 study corridor passes. The Study Area is identified below and depicted on **Figure 4.1-1** (p. 4-3).

Greene County: Census Tract 9547—**BG 1, BG 4 and BG 5**

Census Tract 9553—**BG 1 and BG 2**

Monroe County: Census Tract 11.03—**BG 2 and BG 3**

Census Tract 12—**BG 5, BG 6 and BG 7**

4.2.1 Social Characteristics

4.2.1.1 Demographic Profile

The following paragraphs provide a demographic profile of the Study Area. The data is derived from the Year 2000 Census and offers a comparison of the Study Area with Greene and Monroe counties, the State of Indiana, and, in most instances, the nation as a whole.

Approximately 11,120 people live in the Section 4 Study Area. The Greene County portion of the study area has a population of 7,688, which is about 23.2% of the total county population, while the Monroe County portion of the study area has a population of 3,432, which is about 2.8% of the total county population. **Table 4.2-1** shows the population data for the United States, Indiana, Greene and Monroe counties, and the Study Area.



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Table 4.2-1: Population Comparison, 2000 Census

GEOGRAPHIC AREA		Population
United States		281,421,906
Indiana		6,080,485
Greene County, Indiana		33,157
Monroe County, Indiana		120,563
STUDY AREA	Study Area Population	
Greene County		
Census Tract 9547 —Block Group 1	2,852	
Block Group 4	1,912	
Block Group 5	978	
Census Tract 9553 —Block Group 1	1,067	
Block Group 2*	879	
Subtotal	7,688	
Monroe County		
Census Tract 11.03 – Block Group 2	823	
Block Group 3	556	
Census Tract 12 —Block Group 5	794	
Block Group 6	773	
Block Group 7	486	
Subtotal	3,432	
Study Area Total	11,120	

* Census Tract 9553 – Block Group 2 overlaps in Tier 2 Section 3 and Section 4.

Source: U.S. Census Bureau, Census 2000, Summary File 1, Table P1.

Note: U.S. Census Bureau, Census 2010, Summary File 1 is not scheduled for release until June through August, 2011

4.2.1.2 Special Populations

Special populations that may incur unique issues associated with the project development could include group housing for university students, concentrations of individuals and families associated with certain religious or ethnic groups, or areas that may have many extended families living within close proximity that have dependent care needs.

The north terminus of Section 4 is approximately two miles south of the City of Bloomington. Bloomington is home to Indiana University (IU) which is located approximately three miles northeast of the I- 69 Section 4 Corridor.

Because of the small size of the student population living within Census Tracts reviewed for Section 4 and the proximity of IU to the Section 4 corridor, potential IU students living within the Section 4 Study Area are limited and thus are not considered a special population.

There are reported neighboring families living within some areas of the Section 4 corridor, however, these extended and possible dependent care families appear to be limited in number and do not represent a major special population. As such, there are no special populations located within the Section 4 corridor or Study Area.



4.2.1.3 Community History

A brief history of communities in the Study Area is provided in the *Phase Ia Archaeological Investigations Section 4 Literature Review - Section 4, US 231 to SR 37* (January 20, 2006) and *Historic Property Report, Section 4, US 231 to SR 37* (August 29, 2006) reports and summarized below. The locations of the communities are shown on **Figure 4.1-1** (p. 4-3).

Indiana was named a Territory in 1800 when Congress, in response to rising population in the Northwest Territory, divided the area into the Ohio Territory and the Indiana Territory. The territorial seat of government was initially established at Vincennes and then moved to Corydon in 1813. In 1816 Indiana became the 19th state in the nation. The capital was moved to Indianapolis in 1825.

The earliest permanent settlers in the area arrived at Vincennes as early as 1732. During the early settlement period, most immigrants came from the Upland South, Great Britain, and France. Around 1830 German migration became more prevalent. During this period, transportation to the area known today as Greene and Monroe counties consisted mainly of American Indian and animal trace trails. Commerce during the territorial period was limited by the primitive conditions and consisted mainly of trapping and trading with merchants who mostly occupied crossroads or main trails. After becoming a state, transportation improvements stimulated agriculture, mining, and trade in Southwestern Indiana. The years from 1816 through 1850 were characterized by progression of the area from scattered wilderness settlements to a society of artisans, farmers, and merchants. From the 1850s to this day, mining and agriculture continue to shape the economy and society in Greene County while limestone quarrying, manufacturing, and agriculture continue to influence the economy and society of Southwestern Monroe County. Greene County was named for General Nathaniel Greene who commanded the southern theater in the Revolutionary War and was instrumental in eventually forcing Cornwallis to retreat to Yorktown. The county was formed in 1821 by combining lands from Daviess and Sullivan counties. The first County Seat was located at Burlington but was relocated to Bloomfield in 1824 due to lack of an adequate water supply at the former site.

Greene County communities located within the Study Area are as follows. None of these communities are incorporated cities or towns. The Town of Bloomfield, which is located about seven miles north of the west terminus of the Section 4 corridor, is the nearest incorporated community in Greene County.

- **Doans** (Taylor Township) was the site of an early pottery works established in the 1850s.
- **Scotland** (Taylor Township) was the center of growth for several commercial enterprises in the 1820s including nearby gristmills, a sawmill, and a tannery. Scotland was formally platted in 1835. Seen as a thriving crossroads in the 1830s, the town was named for the homeland of many men and women who had settled there.
- **Koleen** (Jackson Township) had become a small community by 1839 or 1840, although it would not become a formal post office stop until 1879. The name Koleen could be the result of the misspelling of Colleen, an Irish word for girl and the homeland of many settlers in the



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area, or a variation of the word “kaolin,” which is pottery clay that was known to be abundant in the area.

- **Owensburg** (Jackson Township) also was the site of a pottery kiln and its close proximity to the source of kaolin contributed to its success.
- **Cincinnati** (Center Township) was founded about 1840. Reportedly, the community was located along an old cattle trail, named for its resemblance to Cincinnati, Ohio, and sprang up around an inn that was a favorite stopping place for cattle drivers.
- **Hobbierville** (Center Township) was originally named Jonesboro. The name was eventually changed as another town in Indiana was so named.

Monroe County, named in honor of James Monroe the fifth President of the United States, formally ceded from Orange County on January 14, 1818, and organized April 10, 1818. Bloomington, northeast of the Study Area, became the county seat on April 11, 1818. Indiana University was established at Bloomington in 1820.

Monroe County communities located within the Study Area are as follows. Like the Study Area communities in Greene County, none of these communities are incorporated. The City of Bloomington, which is located about two miles northeast of the north terminus of the Section 4 corridor, is the nearest incorporated community in Monroe County.

- **Stanford** (Van Buren Township) was platted in the 1830s and by 1850 included 150 residents, four general stores, a sawmill, several gristmills, and two or three blacksmiths. As a commercial center, the village continued to maintain population and size until after the turn of the twentieth century when its greater distance from the limestone quarries, other industries, and railroad lines favored growth in other communities.
- **Kirksville** (Indian Creek Township) is the birthplace and childhood home of legendary guitar master and country music singer Junior Brown. Working with guitar maker Michael Stevens, Brown invented the “guit-steel,” a double-necked electric guitar in 1985.

4.2.1.4 Population Trends

Table 4.2-2 summarizes historical population counts and population projections for 2010, 2020, and 2030 for the nation, state, Greene and Monroe counties, and the Study Area. The comparative analysis of U.S. Census Bureau’s census data from the years 1980, 1990 and 2000, shows that both Greene and Monroe counties outpaced the state in population gains in the 1970s. The 1980 census recorded an 11.6% increase for Greene County and a 13.7% increase for Monroe County. Between 1980 and 1990, Indiana and Monroe County continued to show an increase (1.0% and 9.4%, respectively) while Greene County experienced a no change in population. Between 1990 and 2000, gains were recorded for the state (9.7%), Greene County (8.3%), and Monroe County (9.6%).

Projections for the years 2010, 2020, and 2030 indicate Monroe County’s population will continue to record gains, but those gains will not approach those of the past three decades, and



will, in fact, progressively lessen from 9.3% in 2010 to 6.3% in 2020, to 5.0% by 2030. During that same period, projections show Indiana’s population increases (5.5%, 5.1%, and 4.2%) and Greene County’s (0.5%, 0.3%, and –0.3%) are expected to lessen as well.

	1980	1990	2000	2010	2020	2030
United States	226,545,805	248,709,873	281,421,906	308,936,00	335,805,00	363,584,00
Number Change	23,243,774	22,167,674	32,712,033	26,811,000	26,869,000	27,779,000
% Change	11.4%	9.8%	13.2%	9.5%	8.7%	8.3%
Indiana	5,490,224	5,544,159	6,080,485	6,417,198	6,743,728	7,024,457
Number Change	294,832	53,935	536,326	336,713	326,530	280,729
% Change	5.7%	1.0%	9.7%	5.5%	5.1%	4.2%
Greene County	30,416	30,410	33,157	33,334	33,447	33,359
Number Change	3,522	-6	2,747	177	113	-88
% Change	11.6%	-0.0%	8.3%	0.5%	0.3%	-0.3%
Monroe County	98,783	108,978	120,563	132,940	141,828	149,228
Number Change	13,562	10,195	11,585	12,377	8,888	7,400
% Change	13.7%	9.4%	9.6%	9.3%	6.3%	5.0%

Source: U.S. Bureau of the Census, 1980, 1990, and 2000. U.S. population projections, number change, and percent change are interim projections consistent with Census 2000, released March 2004. Projections were provided by STATS Indiana.

In 2004,¹ Greene County’s population was ranked 49th among Indiana’s 92 counties, down from its year 1990 ranking of 46th, while Monroe County fell from 11th in 1990 to 13th in 2004. Projections for the year 2010 predict Greene County’s ranking will rise to 48th and Monroe County’s will rise to 12th.

Age

Following the nationwide trend, Indiana, Greene and Monroe counties, and all locations within the Study Area have an aging population, according to the Year 2000 Census. The median age in Indiana in 2000 was 35.2, up from 32.8 in 1990. The median age in Greene County (38.9) was above the state’s median. Additionally, Greene County had a slightly higher percentage of people aged 65 and over (15.0%) than did the state (12.4%), while Monroe County’s percentage of elderly (9.7%) was below that of the nation, Indiana, and Greene County.

Within the Study Area, Greene County Tract 9553-BG 2 had the greatest percent of its population aged 65 and over (12.1%) followed by Greene County Tract 9547-BG 5 (11.0%). Monroe County Tract 12-BG 7 and Greene County Tract 9553-BG 1 recorded the lowest percent of preschool age children (5.3% and 5.6%, respectively) of all locations in the Study Area. All of the Study Area Census Tract Block Groups recorded a lower percentage of elderly than the state and all other jurisdictions. Monroe County Tract 11.03 BG 2 recorded the highest percentage of preschool age children (9.6%) of the entire Study Area, exceeding national, state, and county percentages. The 2000 Census age distribution data for the nation, state, Greene and Monroe counties, and the Study Area are shown in **Table 4.2-3**.

¹ STATS Indiana.



GEOGRAPHIC AREA										
	United States			Indiana		Greene County		Monroe County		
Population	281,421,906			6,080,485		33,157		120,563		
Age (Percent)										
Preschool (0-4)	6.8%			7.0%		6.1%		5.0%		
School Age (5-17)	18.9%			18.9%		18.2%		12.7%		
Adult (18-24)	9.6%			10.1%		8.8%		20.2%		
Adult (25-44)	30.2%			29.5%		26.3%		33.5%		
Adult (45-64)	22.0%			22.1%		25.6%		18.9%		
Senior (65+)	12.4%			12.4%		15.0%		9.7%		
STUDY AREA										
	Greene County					Monroe County				
	CT 9547			CT 9553		CT 11.03		CT 12		
	BG 1	BG 4	BG 5	BG 1	BG 2*	BG 2	BG 3	BG 5	BG 6	BG 7
Population	2,852	1,912	978	1,067	879	823	556	794	773	486
Age (Percent)										
Preschool (0-4)	6.5%	6.6%	5.7%	5.6%	6.7%	9.6%	8.5%	6.5%	5.7%	5.3%
School Age (5-17)	21.0%	20.0%	18.1%	20.2%	18.7%	22.6%	18.3%	21.8%	20.8%	23.5%
Adult (18-24)	7.2%	9.4%	7.2%	7.7%	7.2%	6.0%	5.8%	5.0%	7.1%	7.0%
Adult (25-44)	34.1%	32.9%	31.7%	28.7%	27.4%	33.8%	32.9%	33.9%	31.7%	33.7%
Adult (45-64)	22.9%	23.7%	26.3%	26.9%	28.0%	21.0%	25.2%	24.7%	27.6%	24.1%
Senior (65+)	8.3%	7.4%	11.0%	10.9%	12.1%	7.0%	9.4%	8.1%	7.1%	6.4%
<i>CT = Census Tract. BG = Block Group within a Census Tract.</i> <i>* Census Tract 9553 – Block Group 2 overlaps in Tier 2 Section 3 and Section 4.</i>										

Source: U.S. Census Bureau, Census 2000, Summary File 1, Table P12.



Race

The 2000 Census was notable as the first census to allow respondents to identify themselves as having more than one race.² The 2000 data (**Table 4.2-4**) shows that the Study Area had a lower concentration of minorities than did the state. Among those reporting one race only, the percentage of whites in the State of Indiana was 87.5%, while whites comprised anywhere from 96.9% to 99.0% of the population in Greene and Monroe counties and the Study Area.

Blacks or African-Americans, alone, comprised 8.4% of the state's population, while Greene and Monroe counties recorded 0.1% and 3.0%, respectively. In the Study Area, the percentages of Blacks or African-Americans are even lower. Four of the Block Groups recorded 0.0%; and the remaining six Block Groups ranged from 0.1% to 1.1%.

In other categories, the Study Area racial populations ranged from 0.0% to 0.6% American Indian/Alaska Native, 0.0% to 0.8% Asian, and 0.0% to 0.6% Some Other Race. Those reporting Hispanic or Latino Origin ranged from 0.1% to 1.9%, with the overall average being 0.7%. The highest Hispanic/Latino concentration was in Greene County Census Tract 9547-BG 4 (1.9%). This was higher than Greene County overall (0.8%), equal to Monroe County, and below Indiana (3.5%) and the nation (12.5%).

Households and Housing

According to the household and housing data provided in the 2000 Census (**Table 4.2-5**), Indiana (at 71.4%) is above the nation (66.2%) in the percentage of owner-occupied housing units. All locations within the Study Area have higher percentages of owner-occupied housing than either the state or the nation. However, Monroe County's overall low rate of owner-occupied units and high percentage of renter occupied units is likely due to the student population of IU and their need for rental units for student housing. Additionally, all locations within the Study Area have lower percentages of renter-occupied units (7.2% to 22.5%) than the national and state percentages (33.8% and 28.6%, respectively). Greene County Tracts 9547-BG 4 and BG 5 had the highest percentage of vacant housing (12.3%) almost double that of the highest percentage (6.5%, Tract 12-BG 6) in Monroe County.

² The Year 2000 Census form gave persons the opportunity to select more than one racial category to indicate multi-racial heritage. Previous censuses permitted persons to select only one racial category. Therefore, the current census's population-by-race data cannot be compared with that of previous censuses.



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GEOGRAPHIC AREA	Total Population	One Race							Population of Two or More Races	Hispanic or Latino Origin
		Population of One Race	White Alone	Black or African American Alone	American Indian & Alaska Native Alone	Asian Alone	Native Hawaiian & Other Pacific Islander Alone	Some Other Race Alone		
United States	281,421,906	274,595,678	211,460,626	34,658,190	2,475,956	10,242,998	398,835	15,359,073	6,826,228	35,305,818
Percent	100.0%	97.6%	75.1%	12.3%	0.9%	3.6%	0.1%	5.5%	2.4%	12.5%
Indiana	6,080,485	6,004,813	5,320,022	510,034	15,815	59,126	2,005	97,811	75,672	214,536
Percent	100.0%	98.8%	87.5%	8.4%	0.3%	1.0%	0.0%	1.6%	1.2%	3.5%
Greene County	33,157	32,955	32,691	26	104	72	5	57	202	268
Percent	100.0%	99.4%	98.6%	0.1%	0.3%	0.2%	0.1%	0.2%	0.6%	0.8%
Monroe County	120,563	118,596	109,510	3,615	317	4,067	56	1,031	1,967	2,235
Percent	100.0%	98.4%	90.8%	3.0%	0.3%	3.4%	0.1%	0.9%	1.6%	1.9%
STUDY AREA										
Greene County										
CT 9547, BG 1	2,852	2,840	2,824	3	12	1	0	0	12	13
Percent	100.0%	99.6%	99.0%	0.1%	0.4%	0.1%	0.0%	0.0%	0.4%	0.5%
CT 9547, BG 4	1,912	1,902	1,880	0	10	0	0	12	10	36
Percent	100.0%	99.5%	98.3%	0.0%	0.5%	0.0%	0.0%	0.6%	0.5%	1.9%
CT 9547, BG 5	978	968	967	0	1	0	0	0	4	6
Percent	100.0%	99.0%	99.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.4%	0.6%
CT 9553, BG 1	1,067	1,066	1,056	1	6	2	0	1	1	2
Percent	100.0%	99.9%	98.9%	0.1%	0.6%	0.2%	0.0%	0.1%	0.1%	0.2%
CT 9553, BG 2*	879	875	870	1	2	1	0	1	4	7
Percent	100.0%	99.5%	99.0%	0.1%	0.2%	0.1%	0.0%	0.1%	0.5%	0.8%
Monroe County										
CT 11.03, BG 2	823	821	805	9	1	3	0	3	0	2
Percent	100.0%	99.8%	97.8%	1.1%	0.1%	0.4%	0.0%	0.4%	0.0%	0.2%
CT 11.03, BG 3	556	552	539	6	1	3	1	2	4	5
Percent	100.0%	99.3%	96.9%	1.1%	0.2%	0.5%	0.2%	0.4%	0.7%	0.9%
CT 12, BG 5	794	785	784	0	0	1	0	0	3	6
Percent	100.0%	98.8%	98.7%	0.0%	0.0%	0.1%	0.0%	0.0%	0.4%	0.8%
CT 12, BG 6	773	768	763	0	5	0	0	0	4	1
Percent	100.0%	99.4%	98.7%	0.0%	0.6%	0.0%	0.0%	0.0%	0.5%	0.1%
CT 12, BG 7	486	478	471	1	2	4	0	0	8	1
Percent	100.0%	98.4%	96.9%	0.2%	0.4%	0.8%	0.0%	0.0%	1.6%	0.2%
Study Area Total	11,120	11,055	10,959	21	40	15	1	19	50	79
Percent	100.0%	99.4%	98.6%	0.2%	0.4%	0.1%	0.1%	0.2%	0.4%	0.7%

CT = Census Tract. BG = Block Group within a Census Tract.
 * Census Tract 9553 – Block Group 2 overlaps in Tier 2 Section 3 and Section 4.

Source: U.S. Census Bureau, Census 2000, Summary File 1, Table P3.



I-69 EVANSVILLE TO INDIANAPOLIS TIER 2 STUDIES

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Table 4.2-5: Comparative Households and Housing Characteristics

GEOGRAPHIC AREA	Households				Housing Occupancy				
	Total Households	Households with individuals under 18	Households with individuals 65 and older	Average household size	Total housing units	Occupied units*	Owner occupied units**	Renter occupied units**	Vacant units*
United States	105,480,101	38,022,115	24,672,708	2.59	115,904,641	105,480,101	69,815,753	35,664,348	10,424,540
Percent	100.0%	36.0%	23.4%		100.0%	91.0%	66.2%	33.8%	9.0%
Indiana	2,336,306	834,826	524,632	2.53	2,532,319	2,336,306	1,669,162	667,144	196,013
Percent	100.0%	35.7%	22.5%		100.0%	92.3%	71.4%	28.6%	7.7%
Greene County	13,372	4,574	3,532	2.44	15,053	13,372	10,702	2,670	1,681
Percent	100.0%	34.2%	26.4%		100.0%	88.8%	71.1%	17.7%	11.2%
Monroe County	46,898	12,156	7,806	2.27	50,846	46,898	25,316	21,582	3,948
Percent	100.0%	25.9%	16.6%		100.0%	92.2%	49.8%	42.4%	7.8%
STUDY AREA									
Greene County									
CT 9547, BG 1	1,097	447	173	2.59	1,167	1,097	959	138	70
Percent	100.0%	40.7%	15.8%		100.0%	94.0%	82.2%	11.8%	6.0%
CT 9547, BG 4	711	274	108	2.69	811	711	653	58	100
Percent	100.0%	38.5%	15.2%		100.0%	87.7%	80.5%	7.2%	12.3%
CT 9547, BG 5	401	134	84	2.44	457	401	365	36	56
Percent	100.0%	33.4%	20.9%		100.0%	87.7%	79.9%	7.9%	12.3%
CT 9553, BG 1	413	155	82	2.58	457	413	349	64	44
Percent	100.0%	37.5%	19.9%		100.0%	90.4%	76.4%	14.0%	9.6%
CT 9553, BG 2*	351	123	81	2.50	397	351	311	40	46
Percent	100.0%	35.0%	23.0%		100.0%	88.4%	78.3%	10.1%	11.6%
Monroe County									
CT 11.03, BG 2	287	136	45	2.87	295	287	251	36	8
Percent	100.0%	47.4%	15.7%		100.0%	97.3%	85.1%	12.2%	2.7%
CT 11.03, BG 3	223	82	39	2.49	236	223	170	53	13
Percent	100.0%	36.8%	17.5%		100.0%	94.5%	72.0%	22.5%	5.5%
CT 12, BG 5	296	122	46	2.68	310	296	267	29	14
Percent	100.0%	41.2%	15.5%		100.0%	95.5%	86.1%	9.4%	4.5%
CT 12, BG 6	286	115	39	2.70	306	286	260	26	20
Percent	100.0%	40.2%	13.6%		100.0%	93.5%	85.0%	8.5%	6.5%
CT 12, BG 7	176	78	22	2.76	184	176	156	20	8
Percent	100.0%	44.3%	12.5%		100.0%	95.7%	84.8%	10.9%	4.3%
Study Area Total	4,241	1,666	719	2.63	4,620	4,241	3,741	500	379
Percent	100.0%	39.3%	17.0%		100.0%	91.8%	81.0%	10.8%	8.2%

Source: STATS Indiana; U.S. Census Bureau, Census 2000, Summary File 1, Tables H3, H4, and Summary File 3, Tables H56 and H76.



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At 86.1%, Monroe County Tract 12-BG 5 had the highest percentage of owner-occupied dwellings. This was substantially higher than that of the nation (66.2%), Indiana (71.4%), or the Study Area average (81.0%). The total number of households counted in Tract 12-BG 5 was 296. Tract 11.03-BG 2 recorded the highest average household size (2.87 people) and average family size (3.21 people [also equaling Monroe County Tract 12-BG 7]), while the Study Area averages were 2.63 and 3.04, respectively. Monroe County Tract 11.03-BG 2 also had the highest percentage (47.4%) of households with individuals under age 18, which was well above the Study Area's average of 39.3% and Indiana's 35.7%. Greene County Tract 9553-BG 2 had the highest percentage (23.0%) of households with elderly (aged 65+) individuals. Tract 12-BG 7 recorded only 12.5%, which was the lowest percentage of all locations in the comparison.

School Enrollment and Educational Attainment

Educational attainment has been found to correlate with lifelong income levels. The increasing number of well-paying jobs in high-tech industries that require an educated workforce is likely to tie income to education even more closely in the future. At the same time, such industries are attracted to communities that can provide a well-educated workforce. These industries expand the community's tax base while their higher wages fuel spending, spur the local economy, and improve quality of life, overall—all of which generally makes a community attractive to similar industries. U.S. Department of Labor, Bureau of Labor Statistics (BLS) and U.S. Census data show a correlation between the education attained and both the unemployment rate and median weekly earnings (year 2003 dollars). The unemployment rate and median weekly earnings for a person with some high school but no diploma was 8.8% and \$396, respectively; for a high school graduate, 5.5% and \$554; and for a bachelor's degree, 3.3% and \$900.³ Thus, educational attainment could be expected to play an increasingly important role in the success or failure of a community's economic development efforts and growth.

Table 4.2-6 summarizes educational enrollment and attainment data from the 2000 Census for the nation, the state, Greene and Monroe counties, and the Study Area. **Table 4.2-7** shows a comparison of the educational attainment for adults 25 and over based on the 2000 Census. In general, the educational attainment has improved in the state and two counties in the years between the 1990 and 2000 census.

³ Source—BLS website: www.bls.gov; Unemployment rate, 2003 BLS annual average; Earnings, earnings, March 2003, Bureau of the Census.



Table 4.2-6: Educational Enrollment and Attainment Characteristics (Year 2000 Census)

	United States		Indiana		Greene County		Monroe County		Study Area	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
School Enrollment										
Population 3 years and over enrolled in school	76,632,927	100.0%	1,603,554	100.0%	7,678	100.0%	52,065	100.0%	2,813	100.0%
Nursery school, preschool	4,957,58	6.5	108,711	6.8	536	7.0	1,602	3.1	185	6.6%
Kindergarten	4,157,49	5.4	88,979	5.5	441	5.7	1,188	2.3	129	4.6%
Elementary (grades 1-8)	33,653,6	43.9	714,684	44.6	3,946	51.4	9,826	18.9	1,457	51.8
High school (grades 9-12)	16,380,9	21.4	338,493	21.1	1,593	20.7	4,533	8.7	628	22.3
College or graduate school	17,483,2	22.8	352,687	22.0	1,162	15.1	34,916	67.1	414	14.7
Educational Attainment										
Population 25 years and over	182,211,	100.	3,893,2	100.	22,396	100.	65,489	100.	7,330	100.
Less than 9 th grade	13,755,4	7.5	206,540	5.3	1,394	6.2	1,854	2.8	402	5.5%
9 th to 12 th grade, no diploma	21,960,1	12.1	489,000	12.6	3,274	14.6	5,683	8.7	1,013	13.8
High school graduate	52,168,9	28.6	1,447,7	37.2	9,728	43.4	17,140	26.2	3,234	44.1
Some college, no degree	38,351,5	21.0	768,856	19.7	4,145	18.5	11,669	17.8	1,217	16.6
Associate degree	11,512,8	6.3	225,535	5.8	1,512	6.8	3,191	4.9	388	5.3%
Bachelor's degree	28,317,7	15.5	475,247	12.2	1,453	6.5	13,091	20.0	766	10.5
Graduate/professional degree	16,144,8	8.9	280,366	7.2	890	4.0	12,861	19.6	310	4.2%
Percent high school graduate		80.4		82.1		79.2		88.5		80.7
Percent bachelor's degree or		24.4		19.4		10.5		39.6		14.7

Source: U.S. Bureau of the Census, Year 2000 Census.

Source: U.S. Census Bureau, Census 2000, Summary File 3, Table P148.

Table 4.2-7: Educational Attainment—Adults 25 Years or Older (Year 2000 Census)

County	No High School Diploma	Percent	High School Only	High School or More (%)	Bachelor's Degree or Higher (%)
Indiana	695,540	17.9%	1,447,734	82.1%	19.4%
Greene	4,668	20.8%	9,728	79.2%	10.5%
Monroe	7,537	11.5%	17,140	88.5%	39.6%

Source: US Bureau of the Census, Year 2000 Census: web source: <http://www.stats.indiana.edu/web/county/edattain90.html>

Source: U.S. Census Bureau, Census 2000, Summary File 3, Table P148.

The 2000 Census showed that, in general, educational attainment is higher in Monroe County than in the nation, state and Greene County. Conversely, educational attainment in Greene County was lower than the nation, state, and Monroe County. The percent of those 25 and older who have a high school diploma was 82.1% for Indiana, 79.2% for Greene County, 88.5% for Monroe County, and 80.7% for the Study Area. The Study Area had a higher percentage of its over-25 population with at least a bachelor's degree than did Greene County (14.7% versus 10.5%, respectively); however, it fell short of Indiana's 19.4% and Monroe County's 39.6%. Overall, Monroe County exceeded the national percentage (80.4%) of those 25 and older with



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high school diplomas, and the nation's percent (24.4%) of that population having a bachelor's degree.

Income and Persons Below Poverty Level

Table 4.2-8 shows the per capita income and the median household income of the nation, the state, and Greene and Monroe counties, and the income ranges for the Study Area. **Table 4.2-9** shows the data for the individual Block Groups in the Study Area. One location in the Study Area Census Tract 11.03-BG 2 in Monroe County recorded a higher median household income, and higher median family income (\$53,929, and \$59,940, respectively) than the other block groups in the comparison. As noted previously (**Table 4.2-6**), Tract 12-BG 5 had the highest percentage of owner-occupied housing in the Study Area. Tract 11.03-BG 2 had the youngest population, and the highest average household size and average family size of all locations in the Study Area (Monroe County Tract 12-BG 7 also has average family size equal to Tract 11.03-BG 2). For the most part, the Study Area is rural and sparsely populated; however, near its northern terminus at SR 37, the Farmers Field and Rolling Glen subdivisions are comprised of single-family houses ranging in age from approximately 10 years or newer, and ranging in good to excellent condition.

The percentage of the total population living below the poverty level was lowest in Monroe County Tract 12-BG 6 (0.0%), compared with the nation's 12.4%, Indiana's 9.5%, and Greene and Monroe counties' 11.0% and 18.9%, respectively. The percent of those younger than 18 living below poverty level was highest in Greene County Tract 9547-BG 5 (24.5%), which was notably higher than the nation and the state percentages (16.6% and 12.2%, respectively).

Regarding percentage of elderly people living below poverty, all five Greene County Study Area Block Groups and two Monroe County Study Area Block Groups exceeded the State percent (7.7%). In addition, four Greene County and two Monroe County Study Area Block Groups exceeded the nation (9.9%) and/or the Greene and Monroe Counties percent (9.5% and 6.9%, respectively). Monroe County Tract County Tract 11.03-BG 3 (23.5%) had the highest percent followed by Greene County Tract 9553-BG 2 (19.0%), Tract 9547-BG 5 (18.4%), Tract 9547-BG 4 (11.8%), and Tract 9553-BG 1 (11.8%). In addition, Monroe County Tract 11.03-BG 2 (9.6%) exceeded the Monroe County percent. At the other end of the spectrum, three Monroe County Tracts had 0.0% of elderly below poverty level.



Table 4.2-8: 1999 Comparative Median Household Income, Per Capita Income, and Percent Living Below Poverty Level

	United States	Indiana	Greene County	Monroe County	Study Area Range of Values
Median Household Income					
Total	\$41,994	\$41,567	\$33,998	\$33,311	\$29,619 - \$53,929
Median Family Income					
Total	\$50,046	\$50,261	\$41,523	\$51,058	\$36,250 - \$59,940
Per Capita Income					
Total	\$21,587	\$20,397	\$16,834	\$18,534	\$16,731 - \$26,294
Percent Living Below Poverty Level					
Total (Individuals)	12.4%	9.5%	11.0%	18.9%	0.0 - 15.8%
% of All Youths (Ages 0-17) Below Poverty Level	16.6%	12.2%	15.0%	12.4%	0.0 - 24.5%
% of All Elderly (Ages 65+) Below Poverty Level	9.9%	7.7%	9.5%	6.9%	0.0 - 23.5%

Source: U.S. Census Bureau, Census 2000, Summary File 3, Tables P53, P82 and P87.

Table 4.2-9: Comparative Median Household Income, Per Capita Income, and Percent Living Below Poverty Level – Study Area, Only

Subject	Greene County					Monroe County				
	CT 9547			CT 9553		CT 11.03		CT 12		
	BG 1	BG 4	BG 5	BG 1	BG 2*	BG 2	BG 3	BG 5	BG 6	BG 7
Median Household Income										
Total	\$39,298	\$37,685	\$29,619	\$39,125	\$32,938	\$53,929	\$43,333	\$43,958	\$51,200	\$33,875
Median Family Income										
Total	\$41,361	\$47,250	\$36,250	\$45,515	\$36,406	\$59,940	\$45,500	\$45,391	\$52,150	\$37,000
Per Capita Income										
Total	\$17,233	\$16,731	\$16,798	\$18,666	\$18,065	\$18,824	\$26,294	\$18,824	\$23,645	\$22,127
Percent Living Below Poverty Level										
Total (Individuals)	9.2%	10.4%	15.1%	5.6%	15.8%	2.7%	3.2%	5.4%	0.0%	9.5%
% of All Youths (Ages 0-17) Below Poverty Level	9.9%	14.6%	24.5%	1.8%	12.9%	2.1%	0.0%	9.8%	0.0%	15.8%
% of All Elderly (Ages 65+) Below Poverty Level	8.7%	11.8%	18.4%	11.8%	19.0%	9.6%	23.5%	0.0%	0.0%	0.0%
CT = Census Tract BG = Block Group within a Census Tract * Census Tract 9553 – Block Group 2 overlaps in Tier 2 Section 3 and Section 4.										

Source: U.S. Census Bureau, Census 2000, Summary File 3, Tables P53, P82 and P87



4.2.1.5 Neighborhoods and Community Cohesion

Residential neighborhoods are identifiable areas within a community that retain some quality or character which distinguishes them from other areas. Houses are grouped within close proximity and are generally of common age, size, style, and condition. Many of the residents tend to have similar socio-economic characteristics and values. Neighborhood interactions occur because of reasonable walking distances between residents. Residential neighborhoods in the Study Area include small unincorporated communities or residential subdivisions.

As discussed in Section 4.2.1.3 and shown in **Figure 4.1-1** (p. 4-3), several unincorporated communities developed in the Study Area as historical settlements. These communities have distinguishable neighborhood characteristics. Because they are not incorporated under State statute, they do not have defined jurisdictional limits. For characterization by this study, they have been defined by their loose proximity of houses, businesses, churches, and public buildings. None of the unincorporated communities are located within the actual Section 4 corridor; however, the west end of the South Connector Road corridor between the proposed Greene/Monroe County Line interchange and SR 45 terminates at SR 45 on the east edge of Cincinnati.

Unincorporated communities with residential neighborhood characteristics within the Study Area portion of Greene County are:

- **Doans** (Taylor Township) is located along SR 45/58 near the intersection with CR 500E. It consists of approximately 12 to 15 homes.
- **Scotland** (Taylor Township) is situated around the intersection of CR 745S and CR 200E (Main Street). There are 40 to 45 homes, three businesses, two churches, a fire station, a post office, and a small park in Scotland. The WestGate @ Crane Technology Park is being developed immediately south/southwest of Scotland.
- **Koleen** (Jackson Township) developed along the north bank of Plummer Creek at the junction of CR 260S and CR 610E. The community consists of 20 to 25 homes, one business, one church, and a post office.
- **Owensburg** (Jackson Township) is located just north of SR 58 at the intersection of CR 640S and CR 1150E. Owensburg is comprised of about 30 homes, two businesses, two churches, a fire station, a post office, a library, and two small parks.
- **Cincinnati** (Center Township) developed in the area generally bordered by SR 45 on the east/southeast, SR 54 on the west/southwest, and SR 445 on the north. The community is comprised of about 30 homes in addition to the homes located in the Shady Meadows and Shea Estates subdivisions located adjacent to the east side of Cincinnati. The community also has a bank, thirteen businesses, two churches, a library, and a fire station. The new Eastern Greene High School is located in Cincinnati.



- **Hobbieville** (Center Township) is located along CR 1250E and CR 1260E just off of SR 54. It is comprised of 20 to 25 homes and a church.

Unincorporated communities with defined residential neighborhoods within the Study Area portion of Monroe County are as follows:

- **Stanford** (Van Buren Township) is located along SR 45 near the intersection of Burch Road. The community has about 30 homes, four businesses, two churches, a fire station, and a post office.
- **Kirksville** (Indian Creek Township) is located along Rockport Road. It is comprised of about 20 homes, a fire station, and a small park.

Subdivisions result from the division of land into two or more lots that are recorded and then made available for sale. Traditional, or modern, residential subdivisions are typically developed in accordance with a local zoning ordinance that implements a community's land use or comprehensive plan. Such subdivisions often include areas dedicated for public roads and utilities in addition to the platted lots. Prior to March 16, 2009,⁴ Greene County did not implement local planning jurisdiction, however, several large tracts of land have been subdivided into multiple lots with defined locations of identity (unrecorded subdivisions). In Monroe County, both major and minor subdivisions are regulated by a local subdivision ordinance.

Unrecorded subdivisions within or adjacent to the Section 4 corridor in Greene County (developed prior to March 16, 2009) are as follows. These subdivisions are shown on **Figure 4.2-1** (p. 4-53).

- **Clifty Hills** is located north of Plummer Creek between Koleen and SR 45. This subdivision has a combination of about 25 stick-built, modular, and mobile homes situated on lots that range from 1 to 32 acres in size. The Section 4 corridor passes through the southeast corner of the subdivision.
- **Whippoorwill** has about 16 mobile and modular homes on 1 to 5 acre lots along the north side of CR 35N (Carmichael Road). Whippoorwill is located in the middle of the Section 4 corridor.
- **Shady Meadows** is located adjacent to the east side of SR 45 in the vicinity of Cincinnati. There are approximately 45 to 50 mobile and modular homes on 1 to 2 acre lots. This subdivision is located adjacent to both the North and South Connector Road corridors that are under consideration for connecting the proposed Green/Monroe County Line interchange with SR 45.

⁴ On March 16, 2009, Greene County adopted a Comprehensive Plan and established an Area Plan Commission. These actions will enable Greene County to enact a possible future zoning ordinance that implements the land use plan component of the Comprehensive Plan, a possible future subdivision ordinance, and a possible subdivision plat approval process.



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- **Shea Estates** is located adjacent to the east side of SR 45 in the vicinity of Cincinnati. There are approximately 13 homes on 0.5 to 2 acre lots. This subdivision is located adjacent to the South Connector Road corridor that is under consideration for connecting the proposed Green/Monroe County Line interchange with SR 45.
- **Timber Trace** has about 46 homes on 0.5 to 2 acre lots. This subdivision is located between SR 45 and the Greene/Monroe County line at CR 350N. A few lots in the southeast corner of this subdivision are located within the Section 4 corridor.

Residential subdivisions within or adjacent to the Section 4 corridor in Monroe County are as follows. These subdivisions are also shown on **Figure 4.2-1** (p. 4-53).

- **Sierra Hills** is located south of Bolin Lane just east of Rockport Road. There are 6 homes along Boruff Road in this subdivision. Three lots on the east side of Boruff Road are located within the Section 4 corridor.
- **Rolling Glen Estates** is located south of Bolin Lane just west of Victor Pike. This is a fairly new subdivision that is still being developed. There are currently 20 homes on 1 to 2.25 acre lots and 24 undeveloped lots. The northwest portion of this subdivision is located within the Section 4 corridor.
- **Farmers Field Acres** is located on the north side of Bolin Lane between Rockport Road and Victor Pike. There are 23 homes on 1 to 2.5 acre lots. This subdivision is still being developed. There are 23 undeveloped lots. About one-half (eastern portion) of this subdivision is located within the Section 4 corridor.
- **Victor Heights** is located on the west side of Victor Pike just north of Bolin Lane. There are 8 homes in this subdivision. Lots range from 0.25 to 0.5 acres. The corridor passes through most of this subdivision.
- **Bailey West/Glenview** is located on the south side of That Road between SR 37 and Victor Pike. There are 23 homes in the Bailey West subdivision and 8 homes in the adjacent Glenview subdivision. Lots range from 1 to 2.0 acres. All of the Glenview subdivision and eight homes in the Bailey West subdivision are located within the Section 4 corridor.

In addition to the neighborhoods associated with the unincorporated communities and subdivisions, other residences are located along many of the county roads within the Section 4 corridor. Excluding farmsteads, these residences are either located on individual, isolated lots or in small clusters of adjacent houses. Because of disparities in age, size, style, and condition of the housing units, the residential clusters do not depict a traditional neighborhood entity. It is quite likely, however, that some of these residential areas have developed neighborhood characteristics due to socio-economic values or, at a minimum, interactive associations due to proximity. Some adjacent or nearby homes may have related or extended family associations. Such small residential clusters are located along SR 54, CR 1260E, CR 35N (Carmichael Road), and CR 100N in Greene County and Carter Road, Breeden Road, Burch Road, Evans Lane, Evans Road, Harmony Road, Rockport Road and West Evans Lane in Monroe County.



4.2.2 Physical Characteristics

4.2.2.1 Current Land Use

The approved corridor for Section 4 contains 7,498 acres. Existing land uses within the approved corridor are summarized in **Table 4.2-10** and are mapped in **Figure 4.2-2** (p. 4-59). Approximately 64% of the land in the Section 4 corridor is upland habitat. The primary upland habitat is forest land, which is found throughout the corridor and is the predominant land cover in the Taylor Ridge area of Greene County (southwest of CR 475E), in the area between Black Ankle Creek and SR 45 in Greene County, along the Greene/Monroe County Line northeast of Hobbieville and east of Cincinnati, and between Evans Lane and Tramway Road in Monroe County.

About 29% of the land in Section 4 is in agricultural use. A majority of the agricultural land is used for pasture (hay production and grazing). Row crops occur at various locations throughout the corridor with the majority of row crops located between the south Section 4 terminus and Taylor Ridge southwest of Koleen in Greene County.

Developed land accounts for approximately 6% of the land in the Section 4 corridor. This land use includes single family residences located both in platted (Monroe County) and unplatted (Greene County) subdivisions and rural residences located along state highways, county roads, and remote rural plots. Commercial land is located near Rockport Road in Monroe County. One industrial site is located adjacent to the east side of the corridor just south of Tramway Road in Monroe County. Other developed land includes one church (Ashcraft Chapel in Greene County), several cemeteries, and land used for transportation, communications, and utilities.

Water, wetland habitat, and two abandoned limestone quarries are minor land uses in the Section 4 corridor. Collectively, these land uses are less than 2% of the Section 4 corridor.



Table 4.2-10: Summary of Existing Land Use Within the Section 4 Corridor		
Types of Land Use	Acres (% of total)	Description of Land Use in Corridor
Developed Land	481 (6.4%)	<ul style="list-style-type: none"> • Single Family Residential (no multi-family residential) • Commercial • Industrial • Transportation, Communications & Utilities • Churches & Cemeteries
Agricultural Land	2,164 (28.9%)	<ul style="list-style-type: none"> • Row Crop • Pasture (hay production & grazing lands) • Orchards & Nurseries • Agricultural Operations
Upland Habitat	4,803 (64.1%)	<ul style="list-style-type: none"> • Forest Land • Scrub/Shrub Land • Herbaceous Cover
Water	94 (1.3%)	<ul style="list-style-type: none"> • Streams and Rivers • Ponds
Wetland Habitat	42 (0.6%)	<ul style="list-style-type: none"> • Forested Wetland • Scrub/Shrub Wetland • Emergent Wetland
Mines/Quarries	1 (<0.1%)	<ul style="list-style-type: none"> • Limestone Quarries (abandoned)
Total Land Area in Corridor	7,498*	

* The total area of the approved Section 4 corridor is 7,498 acres. Total land use exceeds the total corridor area due to overlaps in certain land uses, such as forest overlapping a stream. Due to the overlap, the percentages will total greater than 100%.



4.2.2.2 Land Use Plans and Zoning

Greene County

The Greene County Comprehensive Plan⁵ was approved on August 3, 2009. The plan includes planning for economic development opportunities near the US 231 interchange and along SR 45 in the vicinity of the SR 45/SR 445 intersection near Cincinnati. The plan development was funded by the I-69 Community Planning Program (see Chapter 7, *Mitigation and Commitments*).

Monroe County

The *2004-2025 Monroe County Comprehensive Land Use Plan* was adopted by the Monroe County Plan Commission in January 2004. The county also has zoning and subdivision ordinances providing land use controls.

The Comprehensive Land Use Plan identifies transportation access as a primary factor for locating large-tract industrial uses within the county and identifies an area of approximately 1,000-acres in the vicinity of the SR 37/Dillman Road intersection as an excellent location for future employment uses. The Plan also notes the “construction of I-69 proximate to this location would enhance it for large-tract industrial uses.” The SR 37/Dillman Road intersection is located about 1 mile south of the north terminus of Section 4.

The Comprehensive Land Use Plan includes a “Street and Road Management System Thoroughfare Plan and Capital Improvement Program” that was amended by Ordinance 97-07 to “show the proposed route of Interstate 69 through Monroe County, Indiana.” The thoroughfare plan notes that the amendment “...is consistent with the Commissioner’s duty to plan for the opening, the vacating and the maintenance of roads within the unincorporated areas of Monroe County, Indiana, and would promote the health, safety, comfort and general welfare of the citizens of Monroe County, Indiana.”

The recommended land uses⁶ along the Section 4 corridor, are Natural Resource Residential between the Greene County line and Lodge Road, Mineral Resources between Lodge Road and Tramway Road, and Employment between Tramway Road and SR 37. The Natural Resource Residential category is a very low density land use with a minimum lot size of 10 acres. The low density is intended to protect sensitive watershed areas. The Mineral Resource category includes all uses associated with the operation of quarries, such as the extraction, storage, processing and transportation of the quarry product. The category includes currently inactive dimension or other limestone quarries that may eventually reactivate. The Employment category is designated for employment uses that will be developed on large parcels of relatively flat land with few environmental constraints and which will be served by roadways with high traffic-carrying capacity matched by visual exposure from the highway.

⁵ Greene County Comprehensive Plan, Bernardin, Lochmueller and Associates, Inc., August 2009

⁶ Recommended Land Use Map; Monroe County, IN; January 2004

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In May 2006 Monroe County embarked on an update to its Comprehensive Plan. The *Monroe County Comprehensive Plan* (December 2010) was forwarded to the Monroe County Board of Commissioners for consideration following approval at the December 21, 2010 regular meeting of the Monroe County Plan Commission. The Recommended Property Use Plan along the Section 4 corridor indicates Farm and Forest use from the Greene County line to the vicinity of Breeden Road, Rural Residential use in the general area between Breeden Road and Lodge Road, Farm and Forest use generally between Lodge Road and Tramway Road, and Bloomington Urbanizing Area use north of Tramway Road. Policies for the development of lands within the different property use categories are included in the updated plan.

I-69 Community Planning Program

A commitment was made in Tier 1 to develop a Community Planning Program for the I-69 project. The program was developed to establish a regional strategy by providing resources to local communities to manage development growth associated with I-69. The program provided grants to local communities (cities, towns and counties) to prepare land use plans, transportation plans, zoning and subdivision ordinances, special highway corridor “overlay zones,” or other local planning initiatives to manage new developments or to stimulate economic growth along the I-69 corridor.

The I-69 Community Planning Program was a two-phase effort. Phase 1 activities included developing community planning tools, preparing regional planning and economic development strategies for the entire I-69 corridor area, and establishing the framework for the Phase 2 program. The Phase 2 program provided grants up to \$50,000 for communities to develop planning programs to capture the economic benefits and manage associated growth in a way to protect sensitive environmental resources resulting from the I-69 highway development. These grants totaled \$1,500,000 for the entire Evansville-to-Indianapolis corridor. Greene County, in conjunction with the City of Bloomfield and the City of Linton, used the grant for the preparation of the first Comprehensive Plan for Greene County. Monroe County used the grant for the preparation of the *State Road 37 Corridor Plan*. Other planning studies within the Section 4 Study Area that were developed using the I-69 Community Planning Program grant included the *Lawrence County 2009 Strategic Plan* and the *City of Bedford 2010 Comprehensive Plan*. Section 7.2, *Major Mitigation Initiatives*, describes the program in greater detail.

4.2.2.3 Travel Patterns and Accessibility

Throughout the Tier 2 Section 4 public involvement process, accessibility has been one of the topics most often raised by local residents, emergency responders, the farming community, quarry operators, commuters, elected officials, and economic development interests. The importance of increased interstate access has been highlighted as a key factor to be considered in choosing the interchange locations for I-69 Section 4. As a result, interstate access has been identified as one of the five local goals comprising the project Purpose and Need for Section 4 (See Chapter 2, *Purpose and Need*).

In addition to increased interstate access, other local travel patterns and accessibility issues that may be affected by the construction of I-69 Section 4 are:



- The local and regional use of SR 45
- The characteristics and conditions of some local roads as related to considerations for the potential closure of these roads at I-69 or the use of these roads for rerouted local travel
- Existing truck route used by a local limestone quarry company

State Road 45

SR 45 generally parallels the entire length of the Section 4 corridor. Excluding US 231 and SR 37 at the Section 4 termini, SR 45 has the highest traffic volume of any highway in the Section 4 study area with over 13,000 vehicles per day currently using SR 45 in Southwest Monroe County. Predictions estimate that traffic along SR 45 will reach 17,000 vehicles per day in Southwest Monroe County by 2030 under a no-build scenario. Traffic volume and level of service (LOS) predictions for 2030 under a no-build scenario are shown in **Table 4.2-11**.

Arterial routes for travel between Bloomfield in Greene County and the Bloomington urbanized area are limited. The primary route used for travel between these two populated areas and for intermediate access to lands in Eastern Greene County and Southwest Monroe County is SR 45. This route for travel between Bloomfield and Bloomington is SR 54 (Bloomfield to Cincinnati), SR 445 (in Cincinnati), and SR 45 (Cincinnati to Bloomington).

SR 45 is also the primary route used by Crane NSWC employees living in the Bloomington area and trucks traveling between SR 37 on the southwest side of Bloomington and Crane NSWC. Access to Crane NSWC, in the vicinity of Section 4, can be made at the West Gate and the North Gate. The West Gate is located on SR 558 about 1 mile east of US 231 and 1.5 miles south of the Section 4 west terminus at US 231. The West Gate is the designated truck access to Crane NSWC. The North Gate is at the intersection of SR 45 and SR 58 about 4 miles south of the Section 4 corridor. This gate is restricted to employee and vendor access (no truck access). SR 45 is an important route for access to both of these Crane NSWC gates.



Table 4.2-11: SR 45 Traffic Volume and Level of Service Predictions (2030, No-Build Scenario)

	SR 45 Segment	Average Daily Traffic (ADT)	Level of Service
Greene County	US 231 – CR 200E	4,042	B
	CR 200E – CR 400E	4,901	D
	CR 400E – CR 500E	4,618	C
	CR 500E – CR 750E	4,508	C
	CR 750E – CR 900E	4,452	C
	CR 900E – SR 45/SR 58 Junction	4,620	C
	SR 45/ SR 58 Junction – CR 635S	3,246	B
	CR 635S – CR 400S/CR 425S	3,347	B
	CR 400S/CR 425S – CR 225S	3,529	B
	CR 22 S – CR 185S	3,574	B
	CR 185S – SR 54 (South Junction)	4,489	C
	SR 54 (South Junction) – SR 54 (North Junction)	6,599	D
	SR 54 (North Junction) – CR 35N (Carmichael)	4,774	C
	CR 35N (Carmichael) – CR 100N (Carter)	4,600	C
	CR 100N (Carter) – SR 445	4,704	C
	SR 445 – N. Connector Road	10,555	E
N. Connector Road – CR 350N	10,555	E	
CR 350N – Greene/Monroe Co. Line	10,806	E	
Monroe County	Greene/Monroe Co. Line – Breeden	12,524	E
	Breeden – Burch	13,694	E
	Burch – Harmony/Garrison Chapel	14,877	E
	Harmony/Garrison – Leonard Springs	16,025	E
	Leonard Springs – Kirby/Ison	14,913	E
	Kirby/Ison – Duncan	15,521	E
	Duncan – Airport	15,950	E
	Airport – Curry	17,770	E

Source: I-69 Corridor Travel Demand Model; Bernardin, Lochmueller & Associates, Inc.; for Year 2030 traffic

SR 45 is routed with SR 58 from the US 231 intersection east to the Crane NSWC North Gate. Existing traffic on this segment of SR 45/SR 58 ranges from about 3,000 to 3,900 vehicles per day. Predicted volumes are estimated to increase up to 4,900 vehicles per day. Levels of service along this segment of SR 45/SR 58 are expected to be LOS-B and LOS-C except for a short segment of the highway in the vicinity of Doans where the travel flow is expected to drop to LOS-D.



Existing traffic on SR 45 between the SR 45/SR 58 junction at the Crane NSWC North Gate and the SR 54 intersection near Cincinnati ranges from about 2,400 to 4,500 vehicles per day. Predicted volumes are similar to the existing volumes. Anticipated levels of service along this segment of SR 45 are LOS-B and LOS-C. SR 45 crosses the Section 4 corridor between CR 400S/CR 425S and CR 225S. A potential SR 45 interchange is included in interchange Options 2 and 6.

From the south junction with SR 54 south of Cincinnati to the intersection with SR 445 on the northeast side of Cincinnati, SR 45 traffic volumes are currently about 4,500 to 6,300 vehicles per day. The predicted traffic volumes indicate a slight increase up to approximately 6,600 vehicles per day along the short segment of SR 45/SR 54. Level of service on this combined route segment is predicted to be LOS-D. Traffic on SR 45 between the north junction of SR 45/SR 54 and the SR 445 intersection is predicted to operate at LOS-C.

Traffic volumes along SR 45 significantly increase north of the SR 445 intersection and continue to increase as the highway proceeds northeast into Monroe County toward the southwest side of Bloomington. The existing traffic volume immediately north of the SR 445 intersection is about 9,800 vehicles per day and increases to over 13,400 vehicles per day as SR 45 approaches Curry Pike in Monroe County. Predicted traffic volumes are estimated to increase to over 10,500 vehicles per day just north of the SR 445 intersection and over 17,700 vehicles per day near Curry Pike. With the predicted traffic increases, level of service for this segment of SR 45 is expected to be LOS-E.

Local Roads

Many of the local roads that cross the Section 4 corridor follow stream valleys or ridgelines due to the undulating terrain. As such, several of these roads have substantial distances between intersecting crossroads. An evaluation of these roads was made when considering local road closures at the new highway versus the building of grade separations to maintain local travel on some of these low traffic volume roads (see Section 5.6, *Traffic Impacts*). Terminating some of these roads could result in considerable added travel distances for residents, school buses, fire/emergency response vehicles, residential service and delivery vehicles, or farm equipment.

Some of the local roads that cross or parallel the Section 4 corridor have substandard roadway conditions. These conditions include unimproved surfaces, narrow widths, inadequate roadway geometry (steep vertical grades and sharp horizontal curves), and/or drainage problems including seasonal flooding. An evaluation was made when considering the use of these roads for revised local travel due to possible road closures at the new highway. (see Section 5.6, *Traffic Impacts*)

Quarry Truck Traffic

Victor Oolitic Stone Company is located along Victor Pike south/southeast of the Section 4 corridor in Monroe County. About 150 outbound flatbed semi trucks hauling dimensional limestone blocks and slabs use Victor Pike daily as the designated truck route for access to SR 37. Direct or indirect access to SR 37 via Victor Pike will need to be maintained. There is no

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Monroe County approved alternative local truck route for travel between Victor Oolitic Stone Company and SR 37.

Independent Limestone Company is located adjacent to the west side of the Section 4 corridor in the vicinity of Tramway Road in Monroe County. Independent Limestone Company uses Rockport Road as the truck route for access to SR 37.

4.2.2.4 Growth Trends and Issues

Minimal growth is occurring within the actual limits of the Section 4 corridor and adjacent study area.

New residential development is limited to a few scattered, single family residences and the continued development of homes in the Rolling Glen Subdivision. This subdivision, which is located both within and adjacent to the east side of the corridor just south of Bolin Lane in Monroe County, was platted prior to the Tier 1 selection of the 3C corridor. Twenty-five (25) of the 48 platted lots have been built upon in this subdivision.

No substantial new commercial development is taking place within the Section 4 corridor and adjacent study area. New businesses periodically open in the Robinson Industrial Park, which is located in the southwest quadrant of the SR 37/Victor Pike intersection. As of March 2010, 14 businesses have been developed on the 35 lots in this light industrial and service business development.

The only new industrial development within the Section 4 corridor is 3D Stone, Inc., which is located along the east edge of the corridor west of Victor Pike and south of Tramway Road. This is a limestone fabrication mill that produces custom cut limestone products.

New industrial development is also taking place near the Section 4 corridor at the WestGate @ Crane Technology Park (WestGate). WestGate, an Indiana Economic Development Corporation certified technology park, is located about 1.5 miles south/southeast of the proposed US 231 interchange just outside the Crane NSWC West Gate near the junction of Daviess, Greene, and Martin Counties. WestGate represents a natural marketplace for defense contractors currently providing technical support, and research and development services to Crane NSWC – the U.S. Navy’s third largest physical base which contributes more than \$2.0 million each day into the Indiana economy by employing approximately 2,600 scientists, engineers, and technical professionals, as well as a local contractor base of approximately 1,700 employees. Started in 2006, Westgate has grown to include more than 100,000 square feet of new construction and is now home to major international defense contractors such as Technology Service Corporation, ML Enterprises, EG&G, SAIC, ITT and others. Total employment at WestGate now exceeds 500 employees. New development planned for 2010 includes a 60,000 square foot training center and two other new mixed-use facilities totaling more than 50,000 square feet.⁷

⁷ www.westgatecrane.com. Last accessed March 29, 2010



The Greene County Commissioners have expressed their support for I-69 Section 4 in the approved corridor, noting economic development opportunities anticipated to occur upon its construction (See Chapter 11). The proposed SR 45 interchange is approximately four miles north of the Crane NSWC North Gate. The Greene County Economic Development Corporation anticipates the WestGate @ Crane Technology Park's proximity to the US 231 interchange will benefit the county economically by encouraging development related to Crane NSWC.

4.2.2.5 Community Facilities and Services

The following sections list the community facilities and related services available within the Section 4 corridor and the project's broader Study Area. These include schools, churches and cemeteries, libraries, fire/police/EMS stations, hospitals, parks and recreation areas, bicycle and pedestrian facilities, and utilities/infrastructure. Community facilities located within and near the Section 4 corridor are shown on **Figure 4.2-3** (p. 4-65). State highways and local roads are shown on **Figure 4.2-3** and, for the broader regional basis, on **Figure 4.2-4** (p. 4-71).

Schools

The Bloomfield School District, Eastern School District of Greene County, and Monroe County School Corporation serve the Study Area. There are no school buildings located within the project corridor. Several primary and secondary schools are located within the Study Area.

- **Greene County:** In Section 4, there are two school districts that serve the area within the project corridor. The Bloomfield School District serves the western portion of the Section 4 corridor and adjacent study area. There are no school buildings from this school district located near the project corridor. The Eastern School District of Greene County serves the central portion of the Section 4 corridor and adjacent study area. Eastern Greene Elementary School and Eastern Greene Junior High School are located on SR 54 approximately 3 miles northwest of the Section 4 corridor. Eastern Greene High School is located on SR 54 approximately 2.5 miles west of the Section 4 corridor. The 2008-2009 school enrollments (in parentheses) are Bloomfield Elementary School (575), Bloomfield Junior/Senior High School (530), Eastern Greene Elementary School (521), Eastern Greene Middle School (425), and Eastern Greene High School (388).
- **Monroe County:** There are three school buildings operated by the Monroe County School Corporation, and one private school operated by the Lighthouse Christian Academy in the Section 4 Study Area. These schools, and their 2008-2009 enrollments (in parentheses), are Lighthouse Christian Academy (260), Clear Creek Elementary School (475), Lora L. Batchelor Middle School (530), and Bloomington High School South (1,733).

Churches

Ashcraft Chapel is the only church located within the project corridor. There are nine churches in close enough proximity to the project corridor to potentially be impacted by access issues resulting from the project. Some of the data included herein, such as membership and history of



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each church, was obtained from a survey, the results of which are presented in **Section 5.3, Land Use and Community Impacts**.

- **Ashcraft Chapel:** Ashcraft Chapel is the only church within the project corridor. The church is located on CR 880E (Mineral to Koleen Road), just north of CR 425S and east of Koleen. The Indiana Annual Conference of Methodist-Episcopal Churches abandoned the church in 1963. This is an inactive church with no membership and no regularly scheduled services. It is occasionally used for special events. The Cemetery Association maintains the church and grounds.
- **Full Gospel Mission Church of Scotland:** The church is located on SR 45/58 near the Greene CR 215E intersection. This church is less than one-quarter of a mile south of the project corridor.
- **Koleen Methodist Church:** Located on Greene CR 330S, this church is approximately one-half mile north of the project corridor.
- **Clifty Chapel:** This church is located on Greene CR 975E, approximately one-half mile north of the project corridor. It has been at that location since 1861 and has been determined to be eligible for listing in the National Register of Historic Places.
- **Bethel Christian Community Church:** Located on CR 1250E, this church is approximately three-quarters of a mile south of the project corridor.
- **Hebron Baptist Church of Monroe County:** Located on Rock East Road in Monroe County, this church is approximately one-quarter of a mile east of the project corridor.
- **Cornerstone Apostolic Church:** This church is located on West Evans Road in Monroe County approximately one-quarter of a mile north of the project corridor.
- **Mount Zion Assembly of God:** The church is located on Harmony Road less than one-quarter of a mile south of the project corridor.
- **South Union Christian Church:** Located on Rockport Road approximately three-quarters of a mile west of the project corridor.
- **Clear Creek Christian Church:** Located on South Rogers Road in Monroe County, this church is approximately three-quarters of a mile east of the project corridor.

Cemeteries

A records search performed during Tier 1 and a field reconnaissance during Tier 2 identified the following nine cemeteries within the limits of the Section 4 corridor.

- **Dowden Cemetery:** Located on the east side of Greene CR 275E, north of Greene CR 625S.
- **Hassler Cemetery:** Located on the south side of Greene CR 625S, east of Greene CR 275E.
- **Taylor Ridge Cemetery:** Located on Greene CR 475E at Greene CR 450S.
- **Cooper Cemetery:** Located on Greene CR 725E.
- **Shoptaw Cemetery:** Located on Greene CR 360S.



- **Ashcraft Cemetery:** Located on Greene CR 360S.
- **Carmichael Cemetery:** Located on Carmichael Road in Eastern Greene County.
- **Sparks Cemetery:** Located southeast of the Timber Trace subdivision, northwest of Indian Creek.
- **Adams/Breeden Cemetery:** Located west of Breeden Road, north of Graves Road.

Several other cemeteries are located adjacent or near the project corridor. These include:

- **Unnamed Cemetery:** Located on the west side of US 231 approximately 0.3 mile northwest of the project corridor.
- **Old 16th Cemetery:** Located west of Greene CR 475E, north of Taylor Ridge Cemetery adjacent to the project corridor.
- **Freeman Cemetery:** Located immediately adjacent to the project corridor on the southwest side of Greene CR 235S, south of the bridge at Greene CR 1375N.
- **Dowden Cemetery:** Located on Greene CR 275E approximately 0.1 mile north of the project corridor.
- **Dobbins Cemetery:** Located on the west side of Greene CR 920E approximately 0.1 mile north of the project corridor.
- **Unnamed Cemetery:** Located along the unpaved easterly extension of Greene CR 450S, approximately 2,000 feet east of Greene CR 625E.
- **Storm Cemetery:** Located west of Greene CR 1375E, adjacent to the project corridor and west of Monroe County Line.
- **Fodrill Cemetery:** Located on the east side of Rock East Road, south of Carmichael Road approximately 0.7 mile east of the project corridor.
- **Burch Cemetery:** Located on the north side of Burch Road approximately 0.3 mile south of the project corridor.
- **Ketcham Cemetery:** Located on the west side of Victor Pike, south of Tramway approximately 0.3 mile southeast of the project corridor.

**Section 4—Final Environmental Impact Statement****Libraries**

There are no libraries located within the Section 4 corridor. The nearest libraries serving the residents of the Study Area are:

- Bloomfield-Eastern Greene County Public Library, Cincinnati, Greene County
- Bloomfield-Eastern Greene County Public Library, Hatfield Museum, Owensburg, Greene County
- Monroe County Public Library, Bloomington, Monroe County

Fire Protection

Properties within the Study Area are served by volunteer fire departments (VFD). Van Buren Township in Monroe County has a full-time (career) fire department serving the residents of both Van Buren and Indian Creek townships. These departments provide fire suppression and first responder medical services. The fire department boundaries are based upon the individual townships in which they reside; however, service area boundaries are often crossed by fire departments assisting neighboring departments under reciprocity agreements.

Fire departments (stations) that serve the Section 4 corridor and adjacent Study Area properties within Greene County are:

- Richland-Taylor Township VFD located on Main Street in Scotland (Greene CR 200E). This VFD serves residents of Scotland and Taylor Township.
- Owensburg/Jackson Township VFD located on Main Street in Owensburg. This VFD serves residents of Owensburg and Jackson Township.
- Center Township VFD, on SR 54, serves residents of Cincinnati, Hobbieville and Center Township.

Fire departments (stations) that serve the Section 4 corridor and adjacent Study Area properties within Monroe County are:

- Van Buren Township Fire Department Station 19, on Hinds Road, serves the residents of southern Van Buren Township (including the community of Stanford).
- Van Buren Township Fire Department Station 9, on Kirby Road, serves residents of northern Van Buren Township. Station 9 is the primary emergency responder for the Monroe County Airport.
- Indian Creek Township Fire Department serves residents of Indian Creek Township in Monroe County. The current fire station is located along Carmichael Road just west of the township in Greene County.
- Perry-Clear Creek Fire Department Station 11, on Kennedy Drive, serves residents in the far northeastern portion of the Section 4 Study Area.



The Bloomington Township Fire Department Station 5, on Old SR 37 north of Bloomington, is the primary hazardous materials responder for the Section 4 Study Area.

Police

The Greene County Sheriff's Department, in Bloomfield, serves residents of the entire county. The department's central dispatch operates the countywide police, ambulance, and fire dispatch service; handles 911 emergency calls; and dispatches the Bloomfield police.

The Monroe County Sheriff's Department, in Bloomington, serves residents of the entire county. The Sheriff's Department operates the central dispatch, which functions in the same manner as Greene County's central dispatch.

Emergency Medical Services

Emergency medical service (EMS) is available in the Study Area by dialing 911. Greene County has a county-owned-and-operated EMS service with ambulances located at the Bloomfield Fire Department and Eastern Greene County Fire Department (Solsberry) responding to incidents in the Study Area. In the Monroe County portion of the Study Area, the Bloomington Hospital Ambulance Service provides residents with EMS by dialing 911. Some fire departments in the Study Area also are capable of providing emergency medical services. An ambulance is also housed at Monroe Hospital (SR 37 at Fullerton Pike)

Hospitals

There are no hospitals located within the project corridor. Greene County General Hospital is located in Linton, approximately 15 miles northwest of the project corridor. Greene County General is a 109-bed facility that provides medical services for residents of Greene, Sullivan, Knox, and Daviess counties, Indiana.

Monroe Hospital is a 32-bed facility that provides medical services to Monroe County and surrounding area residents. Monroe Hospital is located within the Study Area adjacent to SR 37 at Fullerton Pike approximately 1.5 miles north of the project corridor. The nearest hospitals equipped to handle special illness patients include Monroe Hospital and Bloomington Hospital approximately 4 miles north of the project corridor.

Public Parks and Recreation Areas

There are no existing public parks or recreation areas within the project corridor. The Study Area contains various recreational facilities such as community (township) parks and playgrounds, some of which are located on school or church properties. However, none of these are located near the project corridor.

The Greene County Comprehensive Plan identifies the need for regional parks and recreation facilities; however, specific locations have not been identified in the plan. There are no proposed public parks or recreation areas in the Monroe County portion of the Section 4 corridor per the



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Monroe County Parks and Recreation Department 5-Year Plan⁸ or the 2004-2025 *Monroe County Comprehensive Land Use Plan*.

Bicycle and Pedestrian Trails

Neither Greene County nor Monroe County has existing designated bicycle or pedestrian trails located within or crossing the approved Section 4 corridor.

The *Monroe County Alternative Transportation & Greenways System Plan* (May 26, 2006) presents opportunities for the development of non-vehicular (walking, bicycling, and horseback riding) modes of travel to reduce vehicular trips, expand recreational opportunities, protect environmentally sensitive corridors, and connect existing and proposed area facilities. Opportunities are categorized as greenway, road improvement, freeway greenway, and district opportunities. As stated on page 3-13 of the Plan, “opportunities should not be considered a list of projects; rather, these opportunities articulate many possibilities for the enhancement of the alternative transportation network in Monroe County.” Greenway, road improvement, and freeway greenway opportunities along the approved Section 4 corridor are shown in **Figure 4.2-5** (p. 4-72). INDOT will coordinate with Monroe County regarding the future implementation of this Plan.

In March 2008 the City of Bloomington prepared its *Bicycle and Pedestrian Transportation & Greenways System Plan*. The approved Section 4 corridor is not located within the planning limits of this plan.

Many roads in Greene County and Monroe County are currently used for recreational biking. The Bloomington Bicycle Club has nine established on-road bicycle routes that traverse portions of Greene and Monroe counties within the vicinity of the Section 4 corridor. These routes are Harmony Hills (Training Ride #3); Hendricksville Ride to Rosie’s; The Limestone Tour (Kirksville & Stanford); McVile, Newark & Solsberry; Popcorn Ride; Hobbieville Ride; The Tulip Trestle (“A Yoo Hoo at Yoho’s”); Ride Around Bloomington; and, Bloomfield Covered Bridge.

Utilities and Infrastructure

- **Utilities:**

Electric — Electric service providers in the Study Area are the Utilities District of Western Indiana REMC, a member of the Hoosier Energy Power Network, and Duke Energy. The Utilities District of Western Indiana REMC provides electricity to a majority of the Section 4 corridor in both Greene and Monroe counties. Duke Energy mainly serves the northeastern portion of the corridor with aerial lines on Tramway Road, Bolin Lane, and along SR 37.

There are several overhead power transmission lines extending across the corridor. The Indianapolis Power and Light Company has a high-tension electrical transmission line which

⁸ www.co.monroe.in.us/parksandrecreation/index.htm. Last accessed March 29, 2010.



passes through the corridor over US 231 near the US 231/SR 45/SR 58 intersection. Hoosier Energy has two electrical transmission lines within the corridor. One runs north-south to the east of US 231, and the other enters the corridor along CR 1250E then traverses northeast exiting the corridor at CR 1320E. Duke Energy also has two overhead power transmission lines that pass through the corridor. One line traverses the corridor west of SR 45 in a northwest-southeast direction. The other line runs in a north-south direction and passes through the corridor near Tramway Road.

Water — In the Study Area, public drinking water is supplied by private wells and by municipally-owned systems that include Eastern Heights Utilities, Inc., Van Buren Water, Inc., and Southern Monroe Water, Inc. Eastern Heights Utilities in Bloomfield, Indiana, provides water throughout the Greene County portion of the project corridor and parts of Monroe County. Van Buren Water, Inc. serves the rural areas of Monroe County west of Bloomington and west to the Greene County line. The Southern Monroe Water Company provides water to the SR 37 area including mains on Bolin Lane. The City of Bloomington Utilities do not extend into the Section 4 project area; however, both Van Buren Water, Inc. and Southern Monroe Water, Inc. buy their water from the City of Bloomington which obtains its water supply from the Lake Monroe Reservoir.

Wastewater — The rural areas of the corridor in both Greene County and Monroe County use on-site sewage disposal systems (septic systems). No sewage treatment plants or major sewer lines are located within the Section 4 study area of Greene County. Although the Section 4 corridor is outside of the City of Bloomington, the Dillman Road Wastewater Treatment Plant, operated by the City of Bloomington Utilities, is located along SR 37 just south of the corridor.

Natural Gas — Vectren is the supplier of natural gas within the Study Area. They have a distribution network that serves the Farmer's Field and Rolling Glen subdivisions on the north and south sides of Bolin Lane respectively. Except for these two subdivisions, all other properties in the Section 4 study area use propane gas. Vectren also has two high-pressure transmission lines that cross the corridor. One is a 4" steel gas main in the right-of-way of SR 45. The other is a 16" steel gas main that runs north-south across the corridor in the vicinity of Tramway Road. Both lines are major transmission lines that cannot be interrupted during the heating season. Texas Gas Transmission, LLC has a 12" gas transmission line that crosses the corridor at SR 54 south of the Greene CR 1250E intersection.

Telephone — Smithville Telephone provides local telephone service in the Study Area. They have lines located along all roads that enter or cross the corridor and Fiber-optic lines along US 231, CR 660E, CR 1250E, CR 150S/CR 1320E/Hobbieville Road, Harmony Road, Rockport Road, and Bolin Lane. Most Smithville Telephone lines are buried and there is a switching building located on the west side of CR 215E approximately 500 feet north of SR 45/SR 58. AT&T has some aerial facilities in the US 231/SR 45/SR 58 intersection area which are located on REMC poles.

- **Local and State Roadway System:** Existing transportation facilities within the Study Area include a U.S. highway, four state routes, numerous county roads, and other rural roads. The



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U.S. highway is US 231, a north-south route that forms the western boundary of the southern portion of the Study Area (Census Tract 9553-BG 2). The state highways serving the Study Area are SR 45, SR 54, SR 445, SR 58, and SR 37. SR 45 and SR 54 are traversed by the project corridor. SR 58 is an east-west route that joins with SR 45 along the southern boundary of the Study Area but is only within the project corridor at the corridor's southern extreme. SR 37 is a north-south divided highway that is the northeastern boundary of Section 4. Interchanges with SR 45, SR 45/SR 445 near the Greene/Monroe County Line, and SR 37 are proposed with the alternatives carried forward for detailed study in Section 4 and are further discussed in Chapter 5, *Environmental Consequences*. The following county roads are within the project corridor and, as such, could be impacted by one or more proposed alternatives.

Greene County: Main Street (CR 200E), CR 215E, CR 600S, CR 440E, CR 450S, CR 475E, CR 580E, CR 600E, CR 400S, CR 725E, CR 750E/CR 900E (Dry Branch Road), CR 360S, Cedar Road, Pine Road, Old Clifty Road (CR 920E/CR 975E), CR 1200E, CR 1250E, CR 1260E, CR 190S, CR 235S, CR 1320E, Carmichael Road (CR 35N), Whipporwill Lane, Carter Road (CR 100N/CR 150N), and CR 1390E.

Monroe County: Breeden Road, Burch Road, Evans Road and Evans Lane, Harmony Road, West Evans Lane, Rockport Road, Lodge Road, Tramway Road, Bolin Lane, Farmers Drive, Victor Pike, Victor Heights Drive, Production Drive, Commercial Street, Industrial Drive, Old Capital Pike, West Church Lane, Blue Sky Lane, Stansifer Lane, and West That Road.

- **Railroads**: Freight service is the only available railroad service in the vicinity of the Section 4 Study Area. The project corridor does not cross any operating railroad rights-of-way. The Indiana Railroad (INRD) operates an east-west line running generally parallel to the Section 4 corridor from approximately two miles north of the Study Area near Bloomington to approximately six miles north of the corridor near Bloomfield.
- **Airports**: The only airport in the vicinity of Section 4 is the Monroe County Airport, four miles southwest of Bloomington at 972 South Kirby Road. While scheduled commercial air service has been available in the past, none currently exists. The nearest airports for many national and all international locations are Indianapolis International Airport (approximately 60 miles), Louisville International Airport (approximately 103 miles) and Evansville Regional Airport (approximately 121 miles).

4.2.3 Farmland

Farmland is one of Indiana's most important resources. Agriculture and food processing are an intrinsic part of the state's economy, contributing \$17 billion annually and supporting 500,000 jobs in Indiana (Indiana Land Resources Council, 1999). Prior to European settlement, there was little farmland, with most of the state covered in forests and wetlands. Farmland acreage in Indiana reached its maximum in the early 1900s and has been declining since. Although farmland acreage is declining, farmland production continues to increase.



Farmland within Section 4 is located in the Crawford Upland and Mitchell Plateau physiographic divisions. The Crawford Upland is largely unglaciated and is a rugged highland with varied elevations and v-shaped valleys with sharp ridges to u-shaped valleys and rounded ridges. The Mitchell Plateau is a limestone, somewhat flat to rolling plain with many caves, sinkholes and continuous tracts of forests. For a detailed discussion of potential impacts to farmland as a result of this project, see Sections 5.4, *Farmland Impacts*, and 5.24, *Indirect and Cumulative Impacts*.

Prime Farmland

Prime farmland is essentially land that is best suited for growing crops. The National Resource Conservation Service (NRCS) defines prime farmland as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The land could be cropland pastureland, rangeland, forest land, or other land, but not urban built-up land or water. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods” (USDA-NRCS, 2002).

Although Indiana’s farmland, especially prime farmland, is an important resource, it is being converted to industrial, commercial, and residential uses. Often land that is well suited to agriculture (flat, well drained land) is also easiest to develop. From 1997 to 2007, approximately 75,197 acres of farmland was lost annually to other uses⁹. Much of this is high quality prime farmland. NRCS estimates that prime and important agricultural soils are being converted at a rate of 3 to 4 times that of less productive non-prime farmland (USDA-NRCS, 2002). A more detailed discussion on farmland trends in Indiana is found in the Tier 1 FEIS, Appendix F, *Agricultural Land Baseline and Trends*. Coordination with the NRCS regarding potential impacts to prime farmland in the Section 4 project corridor is described in Section 5.4, *Farmland Impacts*.

Agriculture: Greene and Monroe Counties

With 346,706 acres, Greene County ranks 6th among the state’s 92 counties in total land area and 49th in land area in agricultural use with 169,750 acres, which is 49% of the county’s land area. With 252,381 acres, Monroe County ranks 49th among the state’s 92 counties in total land area and 86th in land area in agricultural use with 53,538 acres, which is 21% of the county’s land area. In comparison, the total area of land Indiana devoted to agricultural use is 64.3% according to the USDA 2007 Census of Agriculture (see **Table 4.2-12**).

In contrast, the Section 4 corridor has about 2,164 acres of agricultural land which is approximately 29% of the corridor. Of this total agricultural land, there are about 1,673 acres of land that is used for pasture. This is approximately 77% of the agricultural land use. Most of the pasture is used for cattle grazing with the remainder used for hay production. There are several cattle farms within and adjacent to the corridor. These are generally located between US 231

⁹ http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_1_State_Level/Indiana/st18_1_001_001.pdf



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and the Black Ankle Creek valley in Greene County, and then from the general vicinity of SR 45 in Greene County to near the north project terminus in Monroe County. Windshield surveys of the corridor indicate the principal row crops are corn and soybeans.

Description	Greene County	Monroe County	Indiana
Total Land Area (acres)	346,706	252,381	22,956,877
Land in Farms (and % of Total Area)	169,750 (49.0%)	53,538 (21.2%)	14,773,184 (64.3%)
Number of Farms	799	481	60,938
Average Size of Farms	212	111	242
Average Value (Land, Bldgs.) per Acre	\$2,907	\$3,641	\$3,583
Planted Cropland (acres)	119,099	27,096	12,716,037
Harvested Cropland (acres)	110,257	22,747	12,108,940
Pastureland (acres)	30,368	15,434	986,522
Woodland (acres)	22,384	11,959	1,020,287

Source: U.S. Department of Agriculture, Year 2007 Census of Agriculture. This census is taken every five years covering the years ending in "2" and "7."

Table 4.2-13 summarizes the agricultural production in Greene and Monroe counties and state rankings according to USDA National Agricultural Statistics Service: Indiana, 2008-2009. Greene County ranked 5th statewide for hay production, which is the predominant agricultural crop in the Section 4 corridor. Greene County also ranked 75th statewide in corn and 52th in soybeans. As noted previously, there are several cattle farms in the Section 4 corridor which supports the Greene County 4th statewide ranking for beef cows. Monroe County ranked 20th statewide in hay and 86th in corn and 88th in soybeans. **Table 4.2-14** compares the production of the main crops in the two counties over the most recent three-year period for which the data are recorded.



Table 4.2-13: Agricultural Production and State Ranking—Greene and Monroe Counties

Description	Greene County		Monroe County	
	Planted/ Harvested (Acres)	Rank in State	Planted/ Harvested	Rank in State
Corn (2008)	45,200 / 27,100	75	6,000 / 4,700	86
Soybeans (2008)	52,400 / 51,500	52	7,300 / 7,200	88
Hay (2008)	NA / 20,500	5	NA / 11,100	20
Wheat (2008)	4,100 / 3,700	63	800 / 600	81
	Number of Animals	Rank in State	Number of Animals	Rank in State
Beef Cows (2008)	7,300	4	4,600	10
Milk Cows (2008)	500	34	NA	NA
Hogs (2007)	46,124	27	131	78
Sheep (2007)	967	14	287	62
Turkeys (2007)	387,703	4	41	22

Source: USDA Indiana Agricultural Statistics 2008-2009.

(http://www.nass.usda.gov/Statistics_by_State/Indiana/Publications/Annual_Statistical_Bulletin/0809/09index.asp).

Table 4.2-14—Production Inventory of Principal Crops—2006 Through 2008: Greene and Monroe Counties

Year	Corn		Soybeans		Wheat*		Hay**		Total	
	Greene	Monroe	Greene	Monroe	Greene	Monroe	Greene	Monroe	Greene	Monroe
Planted Acres										
2006	45,400	5,300	45,000	6,400	N/a	N/a	N/a	N/a	90,400	11,700
2007	55,400	7,000	35,500	5,600	N/a	N/a	N/a	N/a	90,900	12,600
2008	45,200	6,000	52,400	7,300	N/a	N/a	N/a	N/a	97,600	13,300
Average	48,667	6,100	44,300	6,433	-	-	N/a	N/a	92,967	12,533
Harvested Acres										
2006	44,500	4,800	44,800	6,400	N/a	N/a	15,500	12,100	104,800	23,300
2007	54,400	6,400	35,300	5,400	N/a	N/a	16,900	12,600	106,600	24,400
2008	27,100	4,700	51,500	7,200	N/a	N/a	20,500	11,100	99,100	23,000
Average	42,000	5,300	43,867	6,333	-	-	17,633	11,933	103,500	23,567
Production (thousands, 000)										
	Bushels		Bushels		Bushels		Tons (000)			
2006	6,398,000	652,800	2,023,700	255,500	N/a	N/a	41,500	32,600		
2007	8,401,800	876,800	1,462,400	172,700	N/a	N/a	30,700	25,900		
2008	3,677,000	671,000	2,213,600	273,400	N/a	N/a	52,700	29,400		
Average	6,158,933	733,533	1,899,900	233,867	-	-	41,633	29,300		



**Table 4.2-14—Production Inventory of Principal Crops—2006 Through 2008:
Greene and Monroe Counties (continued)**

Year	Corn	Soybeans	Wheat*	Hay**	Total
State Marketing Year Average Price					
	Per Bushel	Per Bushel	Per Bushel	Per Ton	
2006	3.17	6.53	3.41	98.5	
2007	4.39	10.2	5.2	151	
2008	3.75	9.3	5.91	145	
Average	3.77	8.68	4.84	131.50	

*NA = Not Available. Data for wheat is not available on the individual county level for wheat

**NA = Not Available. Data for planted hay is not provided as part of the Indiana Agricultural Statistics

Sources: USDA, National Agricultural Statistics Service, and Indiana Agricultural Statistics: 2007-2008 Edition
http://www.nass.usda.gov/Statistics_by_State/Indiana/Publications/Annual_Statistical_Bulletin/0708/08index.asp

4.2.4 Economic Characteristics

4.2.4.1 Labor Force Characteristics

Table 4.2-15 presents the labor force characteristics in the Study Area and comparative data for the United States, Indiana and Greene and Monroe counties. When the Year 2000 Census data were gathered, approximately 67.5% of the population in the Study Area over the age of 16 was considered to be in the labor force. Of these, nearly 96% were employed. The unemployment rate in the Study Area was 3.6%, which is lower than the rates reported for the country as a whole, the State of Indiana, Greene County, or Monroe County (5.8%, 4.9%, 5.4% and 4.1% respectively). Although comparative data at the Census Block Group level is not available, December 2009 data from the Indiana Workforce Development Cabinet indicates that the unemployment rate for the State of Indiana was 9.8%, Greene County was 8.7% and Monroe County was 6.0%.



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Table 4.2-15: Labor Force Characteristics

Populations	GEOGRAPHIC AREA				STUDY AREA										Study Area Total
					Greene County					Monroe County					
	United States	Indiana	Greene County	Monroe County	CT 9547			CT 9553		CT 11.03		CT 12			
					BG 1	BG 4	BG 5	BG 1	BG 2*	BG 2	BG 3	BG 5	BG 6	BG 7	
Total 16 years and over	217,168,077	4,683,717	25,967	101,432	2,221	1,504	730	784	730	577	375	562	607	321	8,411
	100.0%	100.0%	100.0%	100.0%	100%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
In Labor Force:	138,820,935	3,120,903	16,115	64,772	1,654	1,039	354	478	464	363	226	430	432	241	5,681
Percent 16 and over	63.9%	66.6%	62.1%	63.9%	74.5%	69.1%	48.5%	61.0%	63.6%	62.9%	60.3%	76.5%	71.2%	75.1%	67.5%
Civilian Labor Force:	137,668,798	3,117,897	16,095	64,671	1,654	1,039	354	478	464	353	226	430	432	241	5,671
Percent 16 and over	63.4%	66.6%	62.0%	63.8%	74.5%	69.1%	48.5%	61.0%	63.6%	61.2%	60.3%	76.5%	71.2%	75.1%	67.4%
Employed	129,721,512	2,965,174	15,219	61,998	1,559	1,019	354	465	454	341	217	392	432	233	5,466
Percent 16 and over	59.7%	63.3%	58.6%	61.1%	70.2%	67.8%	48.5%	59.3%	62.2%	59.1%	57.9%	69.8%	71.2%	72.6%	65.0%
Unemployed	7,947,286	152,723	876	2,683	95	20	0	13	10	12	9	38	0	8	205
Percent 16 and over	3.7%	3.3%	3.4%	2.6%	4.3%	1.3%	0.0%	1.7%	1.4%	2.1%	2.4%	6.8%	0.0%	2.5%	2.4%
Percent of Civilian Labor Force	5.8%	4.9%	5.4%	4.1%	5.7%	1.9%	0.0%	2.7%	2.2%	3.4%	4.0%	8.8%	0.0%	3.3%	3.6%
Armed Forces	1,152,137	3,006	20	101	0	0	0	0	0	10	0	0	0	0	10
Percent 16 and over	0.5%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	0.1%
Not in Labor Force	78,347,142	1,562,814	9,852	36,660	567	465	376	306	266	214	149	132	175	80	2,730
Percent 16 and over	36.1%	33.4%	37.9%	36.1%	25.5%	30.9%	51.5%	39.0%	36.4%	37.1%	39.7%	23.5%	28.8%	24.9%	32.5%
Currently Available Unemployment Rate, December 2009 (seasonally adjusted)	10.0%	9.8%	8.7%	6.0%	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

* Census Tract 9553 – Block Group 2 overlaps in Tier 2 Section 3 and Section 4.
CT = Census Tract **BG** = Block Group within Census Tract
Sources: U.S. Census Bureau, Census 2000; and Indiana Workforce Development (unemployment rate). Accessed on March 3, 2010.



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4.2.4.2 Major Employers and Industries

Table 4.2-16 lists the major business and industrial employers in Greene, and Monroe counties. While the majority of these major employers are located in Bloomington (Monroe County), the largest single employer is Indiana University northeast of the project area. Indiana University employs approximately 6,987 people. The other major business/industrial employers in Bloomington are Bloomington Hospital, Cook, Inc., Monroe County Schools, and Baxter BioPharma Solutions. Employment at these locations ranges from 3,500 to 1,043. The largest business/industrial employers in Greene County are Glenburn Home (nursing) and Greene County Hospital, in Linton, both with 250 employees.

Table 4.2-16: Major Employers Within the Greene and Monroe County Regions

Company	Product/Service	Location	Number Employees
Glenburn Home	Healthcare, Nursing Home	Greene Co.	250
Greene County Hospital	Hospital	Greene Co.	250
Science Applications International Corporation (SAIC)	Engineering	Bloomfield, Greene Co.	147
Advanced Building Concepts	Homebuilding	Linton, Greene Co.	80
Griffin Industries	Agricultural Waste Recycling	Newberry, Greene Co.	65
Bloomfield Manufacturing	Manufacturing - Tools	Bloomfield, Greene Co.	60+
Jerden Industries	Manufacturing - Automotive Components	Bloomfield, Greene Co.	60
Indiana University	Education	Bloomington, Monroe Co.	6,987
Bloomington Hospital	Health Care	Bloomington, Monroe Co.	3,500
Cook, Inc.	Medical Instruments	Bloomington, Monroe Co.	2,200
Monroe County Schools	Education	Bloomington, Monroe Co.	1,726
Baxter BioPharma Solutions	Pharmaceuticals	Bloomington, Monroe Co.	1,043
General Electric	Refrigerators	Bloomington, Monroe Co.	900
Marsh Supermarkets	Grocery	Bloomington, Monroe Co.	800
PTS	Electronic Remanufacturing	Bloomington, Monroe Co.	800
Kroger	Grocery	Bloomington, Monroe Co.	700
Stone Belt Arc Inc.	Assembly	Bloomington, Monroe Co.	547
Internal Medicine Associates	Medical Services	Bloomington, Monroe Co.	360
Crider & Crider, Inc.	Construction & Development	Bloomington, Monroe Co.	350
Finelight Strategic Marketing	Marketing/Advertising/PR/Interactive	Bloomington, Monroe Co.	347
Walmart	Retail	Bloomington, Monroe Co.	316
Tree of Life Midwest	Natural & Gourmet Food	Bloomington, Monroe Co.	304
Poynter Sheet Metal	Sheet Metal Contractor	Bloomington, Monroe Co.	300
Ivy Tech Community College	Education	Bloomington, Monroe Co.	300
Centerstone	Health Care	Bloomington, Monroe Co.	290
Weddle Bros. Construction	Construction	Bloomington, Monroe Co.	287
TIS	Printing	Bloomington, Monroe Co.	275
Sunrise Greetings	Greeting Cards	Bloomington, Monroe Co.	266
Author House	Self Publishing	Bloomington, Monroe Co.	258
Otis Elevator	Elevators	Bloomington, Monroe Co.	250

Sources: Greene County Economic Development Corporation; and Bloomington Economic Development Corp.: www.comparebloomington.org. Accessed on March 3, 2010. The data does not include employment in city and county government.



4.2.4.3 Local Employment and Income

Table 4.2-17 shows the employment by industry of persons living in the United States, Indiana, Greene County, Monroe County, and the Study Area as reported in the Year 2000 Census. Table 4.2-18 has the same information for the Census Block Groups within the Study Area. The two industrial categories that employ the largest percentage of people who live in the Study Area are Education, Health and Social Services, and Manufacturing (21.2% and 19.6% respectively). This is consistent with the comparative data for the State of Indiana and the two counties of the Study Area.

Table 4.2-17: Employment by Industry

Industry	United States		Indiana		Greene County		Monroe County		Study Area	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Agriculture, forestry, fishing & hunting, mining	2,426,053	1.9%	42,041	1.4%	827	5.4%	577	1.0%	237	4.3%
Construction	8,801,507	6.8%	196,152	6.6%	1,323	8.7%	3,462	5.6%	562	10.3%
Manufacturing	18,286,005	14.1%	678,078	22.9%	2,620	17.2%	6,195	10.0%	1,072	19.6%
Wholesale trade	4,666,757	3.6%	101,505	3.4%	411	2.7%	1,097	1.8%	179	3.3%
Retail trade	15,221,716	11.7%	349,133	11.8%	1,567	10.3%	6,860	11.1%	430	7.9%
Transportation and warehousing, & utilities	6,740,102	5.2%	153,421	5.2%	930	6.1%	1,776	2.9%	360	6.6%
Information	3,996,564	3.1%	62,714	2.1%	208	1.4%	2,031	3.3%	118	2.2%
Finance, insurance, real estate, & rental & leasing	8,934,972	6.9%	167,715	5.7%	506	3.3%	2,870	4.6%	159	2.9%
Professional, scientific, management, administrative, & waste management services	12,061,865	9.3%	186,104	6.3%	864	5.7%	3,987	6.4%	320	5.9%
Educational, health & social services	25,843,029	19.9%	572,921	19.3%	3,025	19.9%	20,846	33.6%	1,157	21.2%
Arts, entertainment, recreation, accommodation & food services	10,210,295	7.9%	217,830	7.3%	763	5.0%	7,269	11.7%	179	3.3%
Other services (except public administration)	6,320,632	4.9%	139,079	4.7%	882	5.8%	2,728	4.4%	299	5.5%
Public administration	6,212,015	4.8%	98,481	3.3%	1,293	8.5%	2,290	3.7%	394	7.2%
Total Civilian Labor Force, Employed	129,721,512	100.0%	2,965,174	100.0%	15,219	100.0%	61,988	100.0%	5,466	100.0%

Source: U.S. Census Bureau, Census 2000, Summary File 3, Table P49.



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Source: U.S. Census Bureau, Census 2000, Summary File 3, Table P49.

Industry	Greene County					Monroe County				
	CT 9547			CT 9553		CT 11.03		CT 12		
	BG 1	BG 4	BG 5	BG 1	BG 2*	BG 2	BG 3	BG 5	BG 6	BG 7
Agriculture, forestry, fishing & hunting, mining Percent	41 2.6%	38 3.7%	24 6.8%	29 6.2%	27 5.9%	14 4.1%	0 0.0%	33 8.4%	9 2.1%	22 9.4%
Construction Percent	116 7.4%	173 17.0%	23 6.5%	31 6.7%	39 8.6%	25 7.3%	14 6.5%	61 15.6%	40 9.3%	40 17.2%
Manufacturing Percent	376 24.1%	174 17.1%	102 28.8%	79 17.0%	58 12.8%	54 15.8%	43 19.8%	94 24.0%	81 18.8%	11 4.7%
Wholesale trade Percent	54 3.5%	12 1.2%	0 0.0%	25 5.4%	59 13.0%	7 2.1%	0 0.0%	14 3.6%	8 1.9%	0 0.0%
Retail trade Percent	128 8.2%	64 6.3%	24 6.8%	34 7.3%	48 10.6%	0 0.0%	43 19.8%	31 7.9%	42 9.7%	16 6.9%
Transportation and warehousing, & utilities Percent	155 9.9%	44 4.3%	13 3.7%	61 13.1%	2 0.4%	0 0.0%	12 5.5%	33 8.4%	29 6.7%	11 4.7%
Information Percent	17 1.1%	43 4.2%	0 0.0%	13 2.8%	13 2.9%	5 1.5%	0 0.0%	0 0.0%	15 3.5%	12 5.2%
Finance, insurance, real estate, & rental & leasing Percent	21 1.3%	35 3.4%	0 0.0%	25 5.4%	20 4.4%	30 8.8%	0 0.0%	15 3.8%	13 3.0%	0 0.0%
Professional, scientific, management, administrative & waste management services Percent	57 3.7%	78 7.7%	75 21.2%	12 2.6%	13 2.9%	11 3.2%	21 9.7%	7 1.8%	18 4.2%	28 12.0%
Educational, health & social services Percent	345 22.1%	162 15.9%	52 14.7%	73 15.7%	74 16.3%	135 39.6%	71 32.7%	96 24.5%	91 21.1%	58 24.9%
Arts, entertainment, recreation, accommodation & food services Percent	78 5.0%	33 3.2%	0 0.0%	9 1.9%	30 6.6%	5 1.5%	3 1.4%	0 0.0%	21 4.9%	0 0.0%
Other services (except public administration) Percent	104 6.7%	92 9.0%	0 0.0%	27 5.8%	15 3.3%	16 4.7%	7 3.2%	8 2.0%	19 4.4%	11 4.7%
Public administration Percent	67 4.3%	71 7.0%	41 11.6%	47 10.1%	56 12.3%	39 11.4%	3 1.4%	0 0.0%	46 10.6%	24 10.3%
Total—Civilian Labor Force, Employed	1,559	1,019	354	465	454	341	217	392	432	233

* Census Tract 9553 – Block Group 2 overlaps in Tier 2 Section 3 and Section 4.
 CT = Census Tract BG = Block Group within Census Tract



Table 4.2-19 shows employment characteristics by occupation for persons living in the United States, Indiana, Greene County, Monroe County, and the Study Area as reported by the U.S. Census Bureau in the Year 2000 Census. **Table 4.2-20** has the same information for the Census Block Groups within the Study Area. The two occupational categories with the largest percentages of people who live in the Study Areas are the Management, Professional, and Related Occupations category (26.6%); and the Sales and Office category (23.2%). Comparing these figures with those for the same categories for Indiana indicates that the percentages are similar. Statewide more people are in the Management, Professional, and Related Occupations category (28.7%) than the Sales and Office (25.3%).

Occupation	United States		Indiana		Greene County		Monroe County		Study Area	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Management, professional, & related occupations	43,646,731	33.6%	851,016	28.7%	3,811	25.0%	24,452	39.4%	1,549	28.3%
Service	19,276,947	14.9%	420,053	14.2%	2,348	15.4%	10,604	17.1%	660	12.1%
Sales and office	34,621,390	26.7%	749,971	25.3%	3,228	21.2%	15,751	25.4%	1,120	20.5%
Farming, fishing, & forestry	951,810	0.7%	12,209	0.4%	125	0.8%	129	0.2%	76	1.4%
Construction, extraction, & maintenance	12,256,138	9.4%	296,514	10.0%	2,431	16.0%	4,389	7.1%	814	14.9%
Production, transportation, & material moving	18,968,496	14.6%	635,411	21.4%	3,276	21.5%	6,663	10.7%	1,247	22.8%
Total—Civilian Labor Force, Employed	129,721,512	100.0%	2,965,174	100.0%	15,219	100.0%	61,988	100.0%	5,466	100.0%

CT = Census Tract BG = Block Group within Census Tract

Source: U.S. Census Bureau, Census 2000, Summary File 3, Table P50.



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Table 4.2-20: Employment Characteristics by Occupation—Study Area, Only

Occupation	Greene County					Monroe County				
	CT 9547			CT 9553		CT 11.03		CT 12		
	BG 1	BG 4	BG 5	BG 1	BG 2*	BG 2	BG 3	BG 5	BG 6	BG 7
Management, professional, & related occupations	360	285	80	102	143	176	71	110	117	105
Percent	23.1%	28.0%	22.6%	21.9%	31.5%	51.6%	32.7%	28.1%	27.1%	45.1%
Service	171	148	44	35	73	39	17	34	65	34
Percent	11.0%	14.5%	12.4%	7.5%	16.1%	11.4%	7.8%	8.7%	15.0%	14.6%
Sales and office	322	157	64	132	67	93	62	68	106	49
Percent	20.7%	15.4%	18.1%	28.4%	14.8%	27.3%	28.6%	17.3%	24.5%	21.0%
Farming, fishing, & forestry	16	0	0	25	13	0	0	0	0	22
Percent	1.0%	0.0%	0.0%	5.4%	2.9%	0.0%	0.0%	0.0%	0.0%	9.4%
Construction, extraction, & maintenance	245	200	56	78	70	33	22	77	21	12
Percent	15.7%	19.6%	15.8%	16.8%	15.4%	9.7%	10.1%	19.6%	4.9%	5.2%
Production, transportation, & material moving	445	229	110	93	88	0	45	103	123	11
Percent	28.5%	22.5%	31.1%	20.0%	19.4%	0.0%	20.7%	26.3%	28.5%	4.7%
Total—Civilian Labor Force, Employed	1,559	1,019	354	465	454	341	217	392	432	233

Tract 9553 – Block Group 2 overlaps in Tier 2 Section 3 and Section 4.
CT = Census Tract **BG** = Block Group within Census Tract

Source: U.S. Census Bureau, Census 2000, Summary File 3, Table P50.



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The Year 2000 Census collected data relative to commuting patterns and mode of transportation to work. **Table 4.2-21** presents the data for persons living in the United States, Indiana, Greene County, Monroe County, and the Study Area. Only 44.2% of the people living in the Study Area worked in their county of residence. This is a lower percentage than that for Greene County as a whole (48.6%) and Monroe County (89.1%). The Greene County figure is below the statewide figure of 71.0%, and the Monroe County figure is above the statewide figure. **Table 4.2-22** presents the same data for the Census Block Groups within the Study Area.

Mode of travel for trips to work by persons living in the Study Area is predominantly by car, truck, or van (93.9%). More than 82.5% drive alone while 11.4% carpool. These percentages are comparable with those reported for the state as a whole and each of the counties.

Commuters	Indiana		Greene County		Monroe County		Study Area	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Workers 16 years and over	2,910,612	100.0%	14,928	100.0%	60,423	100.0%	5,480	100.0%
Worked in county of residence	2,065,775	71.0%	7,259	48.6%	53,820	89.1%	2,423	44.2%
Car, truck, or van	2,700,899	92.8%	13,911	93.2%	50,705	83.9%	5,148	93.9%
Drove alone	2,379,989	81.8%	11,729	78.6%	44,462	73.6%	4,523	82.5%
Carpooled	320,910	11.0%	2,182	14.6%	6,243	10.3%	625	11.4%
Public transportation	29,792	1.0%	17	0.1%	1,113	1.8%	4	0.1%
Motorcycle	1,975	0.0%	15	0.1%	92	0.2%	15	0.3%
Bicycle	7,725	0.3%	8	0.1%	956	1.6%	0	0.0%
Walked	69,184	2.4%	376	2.5%	5,173	8.6%	44	0.8%
Other means	17,054	0.6%	106	0.7%	274	0.5%	10	0.2%
Worked at home	83,983	2.9%	495	3.3%	2,110	3.5%	209	3.8%
Mean travel time to work (minutes)	25.5	--	28.7	--	17.5	--	24.3	--

Source: U.S. Census Bureau, Census 2000, Summary File 3, Table P30.



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Table 4.2-22: Commuting Patterns—Study Area, Only

Commuters	Greene County					Monroe County				
	CT 9547			CT 9553		CT 11.03		CT 12		
	BG 1	BG 4	BG 5	BG 1	BG 2	BG 2	BG 3	BG 5	BG 6	BG 7
Workers 16 years and over	1,551	997	354	459	452	351	217	384	482	233
Percent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Worked in county of residence	215	238	71	231	279	301	194	319	354	221
Percent	13.9%	23.9%	20.1%	50.3%	61.7%	85.8%	89.4%	83.1%	73.4%	94.8%
Car, truck, or van	1,470	945	346	423	425	334	202	358	422	223
Percent	94.8%	94.8%	97.7%	92.2%	94.0%	95.2%	93.1%	93.2%	87.6%	95.7%
Drove alone	1,278	826	295	403	389	301	196	319	310	206
Percent	82.4%	82.8%	83.3%	87.8%	86.1%	85.8%	90.3%	83.1%	64.3%	88.4%
Carpooled	192	119	51	20	36	33	6	39	112	17
Percent	12.4%	11.9%	14.4%	4.4%	8.0%	9.4%	2.8%	10.2%	23.2%	7.3%
Public transportation	0	0	0	0	0	0	4	0	0	0
Percent	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	0.0%	0.0%
Motorcycle	0	0	0	8	7	0	0	0	0	0
Percent	0.0%	0.0%	0.0%	1.7%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Bicycle	0	0	0	0	0	0	0	0	0	0
Percent	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Walked	32	0	0	3	0	0	0	9	0	0
Percent	2.1%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%
Other means	0	0	0	4	6	0	0	0	0	0
Percent	0.0%	0.0%	0.0%	0.9%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Worked at home	49	52	8	21	14	17	11	17	10	10
Percent	3.2%	5.2%	2.3%	4.6%	3.1%	4.8%	5.1%	4.4%	2.1%	4.3%
Mean travel time to work (minutes)	27.5	28.4	35.1	26.0	25.7	15.5	14.4	22.4	22.7	25.4

Source: U.S. Census Bureau, Census 2000, Summary File 3, Table P30.



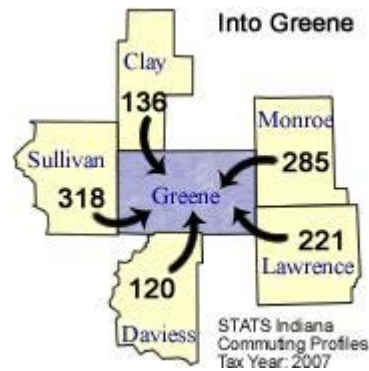
Table 4.2-23 and **Table 4.2-24** show the number of workers commuting to and from Greene and Monroe counties. 1,519 workers commute into Greene County while 7,352 commute out of the county. The county contributing the largest number (318, or 21%) of the commuters to Greene County is Sullivan County. The largest number of commuters out of Greene County go to Monroe County (3,443). 15,859 workers commute into Monroe County, while 5,952 commute out of the county. The presence of Indiana University and education-related businesses/industries contributes to this influx of commuters. Twenty-three percent (23%) of the commuters to Monroe County come from Lawrence County (3,629), while 3,443 come from Greene County and 2,310 come from Owen County. The largest number the commuters leaving Monroe County go to Marion County (1,269), which contains Indianapolis, the largest city and major employment center in the vicinity of the I-69 project.

Table 4.2-23: Greene County, Indiana, Work/Residence Patterns Based on Indiana IT-40 Returns for Tax Year 2007

Top 5 counties sending workers INTO Greene Co.:

Sullivan County	318
Monroe County	285
Lawrence County	221
Clay County	136
Daviess County	120
Total of above	1,082 Workers

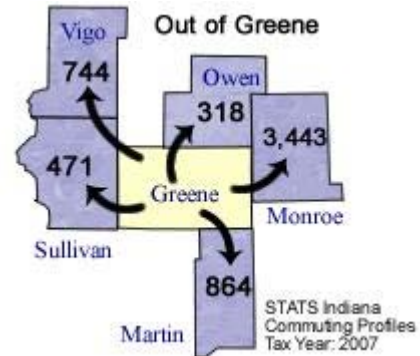
(6.8% of Greene County work force)



Top 5 counties receiving workers FROM Greene Co.:

Monroe County	3,443
Martin County	864
Vigo County	744
Sullivan County	471
Owen County	318
Total of above	5,840 Workers

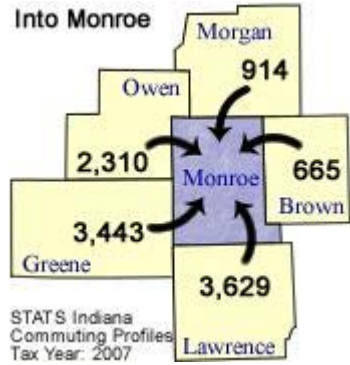
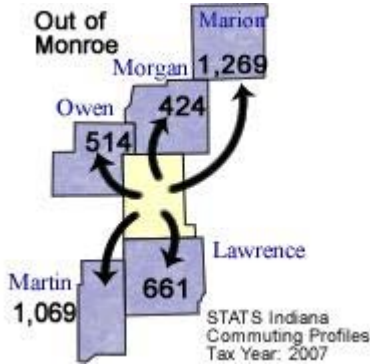
(36.5% of Greene County labor force)



Workers: Number of persons who live in Greene County and work (implied resident labor force)	21,823
Number of persons who live AND work in Greene County	14,471
Total number of persons who work in Greene County (implied work force)	15,990
Commuters: Number of persons who live in Greene County but work outside the county	7,352
Number of persons who live in another county (or state) but work in Greene County	1,519

Source: STATS Indiana, Annual Commuting Trends Profile, <http://www.stats.indiana.edu/commframe.html>. Accessed on March 3, 2010.

Table 4.2-24: Monroe County, Indiana, Work/Residence Patterns Based on Indiana IT-40 Returns for Tax Year 2007

<p>Top 5 counties sending workers INTO Monroe Co.:</p> <table border="0"> <tr> <td>Lawrence County</td> <td style="text-align: right;">3,629</td> <td></td> </tr> <tr> <td>Greene County</td> <td style="text-align: right;">3,443</td> <td></td> </tr> <tr> <td>Owen County</td> <td style="text-align: right;">2,310</td> <td></td> </tr> <tr> <td>Morgan County</td> <td style="text-align: right;">914</td> <td></td> </tr> <tr> <td>Brown County</td> <td style="text-align: right;">665</td> <td></td> </tr> <tr> <td>Total of above</td> <td style="text-align: right;">10,961</td> <td>Workers</td> </tr> </table> <p style="text-align: center;">(13.0% of Monroe County work force)</p>	Lawrence County	3,629		Greene County	3,443		Owen County	2,310		Morgan County	914		Brown County	665		Total of above	10,961	Workers	 <p style="font-size: small;">STATS Indiana Commuting Profiles Tax Year: 2007</p>
Lawrence County	3,629																		
Greene County	3,443																		
Owen County	2,310																		
Morgan County	914																		
Brown County	665																		
Total of above	10,961	Workers																	
<p>Top 5 counties receiving workers FROM Monroe Co.:</p> <table border="0"> <tr> <td>Marion County</td> <td style="text-align: right;">1,269</td> <td></td> </tr> <tr> <td>Martin County</td> <td style="text-align: right;">1,069</td> <td></td> </tr> <tr> <td>Lawrence County</td> <td style="text-align: right;">661</td> <td></td> </tr> <tr> <td>Owen County</td> <td style="text-align: right;">514</td> <td></td> </tr> <tr> <td>Morgan County</td> <td style="text-align: right;">424</td> <td></td> </tr> <tr> <td>Total of above</td> <td style="text-align: right;">3,937</td> <td>Workers</td> </tr> </table> <p style="text-align: center;">(4.7% of Monroe County labor force)</p>	Marion County	1,269		Martin County	1,069		Lawrence County	661		Owen County	514		Morgan County	424		Total of above	3,937	Workers	 <p style="font-size: small;">STATS Indiana Commuting Profiles Tax Year: 2007</p>
Marion County	1,269																		
Martin County	1,069																		
Lawrence County	661																		
Owen County	514																		
Morgan County	424																		
Total of above	3,937	Workers																	
<table border="0"> <tr> <td>Workers: Number of persons who live in Monroe County and work (implied resident labor force)</td> <td style="text-align: right;">74,561</td> </tr> <tr> <td> Number of persons who live AND work in Monroe County</td> <td style="text-align: right;">68,609</td> </tr> <tr> <td> Total number of persons who work in Monroe County (implied work force)</td> <td style="text-align: right;">84,468</td> </tr> </table>	Workers: Number of persons who live in Monroe County and work (implied resident labor force)	74,561	Number of persons who live AND work in Monroe County	68,609	Total number of persons who work in Monroe County (implied work force)	84,468													
Workers: Number of persons who live in Monroe County and work (implied resident labor force)	74,561																		
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Total number of persons who work in Monroe County (implied work force)	84,468																		
<table border="0"> <tr> <td>Commuters: Number of persons who live in Monroe County but work outside the county</td> <td style="text-align: right;">5,952</td> </tr> <tr> <td> Number of persons who live in another county (or state) but work in Monroe County</td> <td style="text-align: right;">15,859</td> </tr> </table>	Commuters: Number of persons who live in Monroe County but work outside the county	5,952	Number of persons who live in another county (or state) but work in Monroe County	15,859															
Commuters: Number of persons who live in Monroe County but work outside the county	5,952																		
Number of persons who live in another county (or state) but work in Monroe County	15,859																		

Source: STATS Indiana, Annual Commuting Trends Profile, <http://www.stats.indiana.edu/commframe.html>. Accessed on March 3, 2010.

4.2.4.4 Local Tax Base

Property taxes in Indiana are levied on two types of possessions. These are real property, including land and the facilities built thereon, and personal property such as campers, mobile homes, machinery, and equipment. The value of property is assessed one year and taxed on that value the following year. In 2002 the basis of tax assessments was changed to “market based value” rather than “true tax value.” Generally, tax rates were lowered while the assessed values went up. There was not necessarily an increase in the amount of taxes levied.

The property tax structure is determined by the State Legislature but is administered by the County Assessor, an elected official. Elected Township Trustees are responsible for assessing



property in each Township. Property taxes are used to fund services of local government including police, fire protection, libraries, parks, and partial school funding. **Table 4.2-25** presents the property tax rates for the County Townships within the Study Area.

Table 4.2-25: Property Tax Rates by Townships Within Study Area		
District	District Name	Tax Rate*
Greene County		
004	Center Township	2.4785
010	Jackson Township	2.4562
019	Taylor Township	2.0245
Monroe County		
007	Indian Creek Township	1.2175
008	Perry Township	1.2657
015	Van Buren Township	1.3306
<i>*The percent used to calculate the amount of taxes to be paid annually per every \$100 of a property's assessed value. For example, if a property in Jackson Township has an assessed value of \$100, the tax on the property would be 2.7006% of \$100 (0.027006 x \$100) = \$2.70.</i>		

Source: STATS Indiana, 2008 Property Tax Rates (Net Tax Rates). Accessed on March 5, 2010.

Table 4.2-26 summarizes the total assessed property values in 1999 for Greene and Monroe counties, shows the percentage of the total assessed value for each type of property, and compares the county and state percentages. Monroe County property is assessed at nearly five times the value of Greene County's property, (\$955 million vs. \$194 million, respectively). Monroe County has a higher percentage of its tax base in residential property (50.3%) as Greene County (35.3%), and has a higher percentage than the State of Indiana (41.5%). Conversely, Greene County has a much higher percentage of its tax base in utilities (10.7%), in comparison with Monroe County (4.0%) and the state (5.6%). Greene County (29.8%) also has a much higher percentage of its tax base in agriculture compared with both Monroe County (4.5%) and the state (9.6%).



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Table 4.2-26: Assessed Property Values—Greene and Monroe Counties

Greene County: Assessed Property Value in 1999 (for taxes payable in 2000)	Value	Rank in State	% of Total Value – County	% of Total Value – State
Total Assessed Value by Property Class	\$193,956,980	66	100.0%	100.0%
Commercial & Industrial	\$46,955,070	70	24.2%	43.2%
Residential	\$68,455,650	68	35.3%	41.5%
Agricultural	\$57,881,030	54	29.8%	9.6%
Utilities	\$20,665,230	40	10.7%	5.6%
Total Assessed Value Per Capita	\$5,820	90		
Monroe County: Assessed Property Value in 1999 (for taxes payable in 2000)	Value	Rank in State	% of Total Value – County	% of Total Value – State
Total Assessed Value by Property Class	\$954,529,570	13	100.0%	100.0%
Commercial & Industrial	\$392,618,910	12	41.1%	43.2%
Residential	\$479,972,250	12	50.3%	41.5%
Agricultural	\$43,304,700	69	4.5%	9.6%
Utilities	\$38,633,710	24	4.0%	5.6%
Total Assessed Value Per Capita	\$8,189	58		

Source: The State Board of Tax Commissioners, Stats Indiana.

4.2.4.5 Tourism

Monroe County is home to several tourism attractions. Foremost among these are Indiana University to the northeast of the Section 4 corridor, Monroe Lake to the east, Butler Winery to the northeast, and Oliver Winery to the northeast. None of these resources will be directly affected by the Section 4 project. However, the proposed project will benefit these attractions by providing improved regional access.

Indiana University is located on east 7th Street in the City of Bloomington. It includes some of the nation’s top educational and athletic programs and the world famous Little 500 bicycle race held each April.

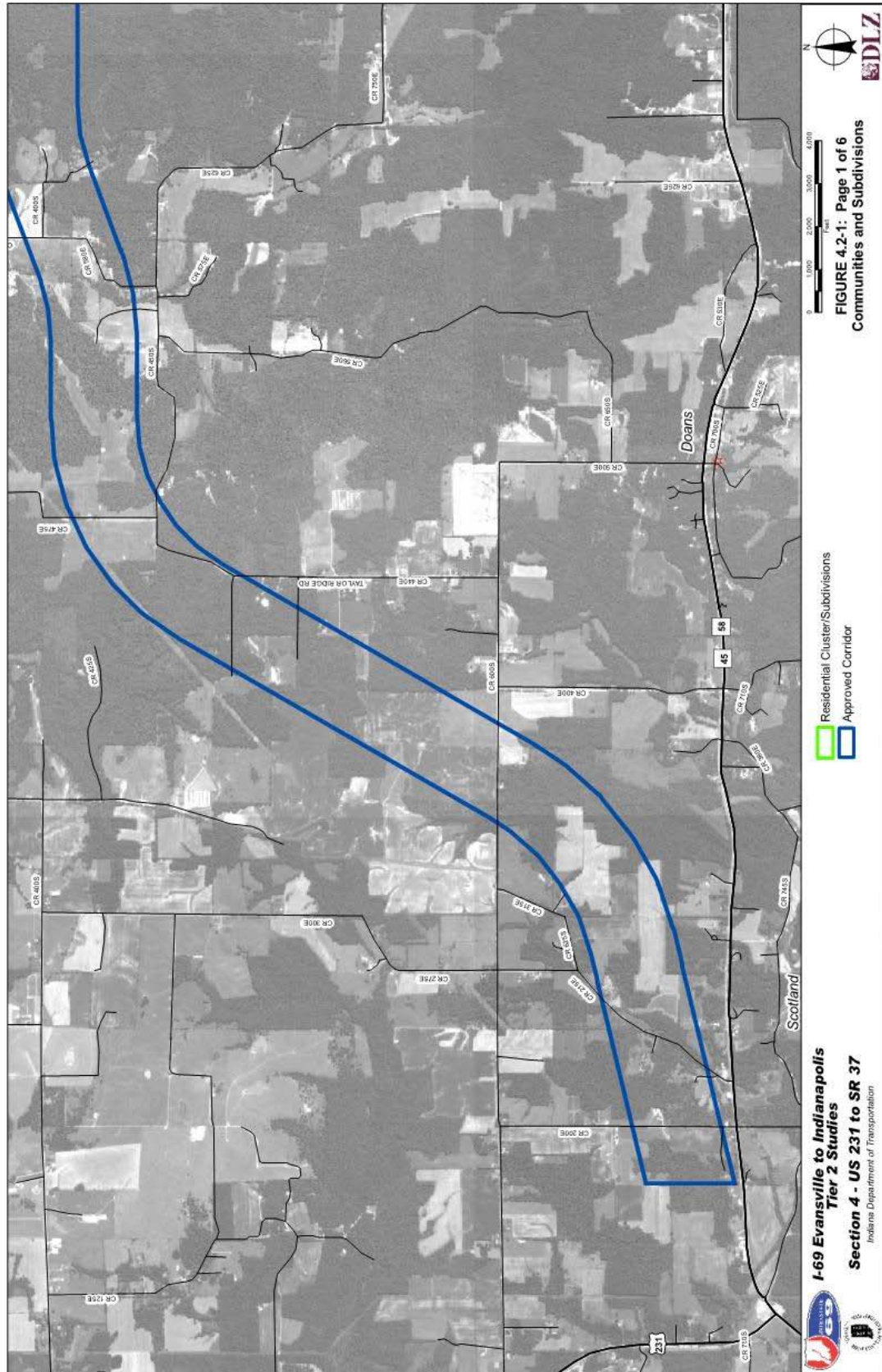
Monroe Lake is located southeast of the City of Bloomington. The 10,750 acre lake and 23,952 acre total recreation area is a destination for boating, camping, fishing, hiking, hunting and swimming. The Monroe Lake area is home to nine boat launch ramps, eight State Recreation Areas, a resort and marina, nature center, two swimming beaches, fishing piers and a gas dock. There are 322 camp sites at the lake.

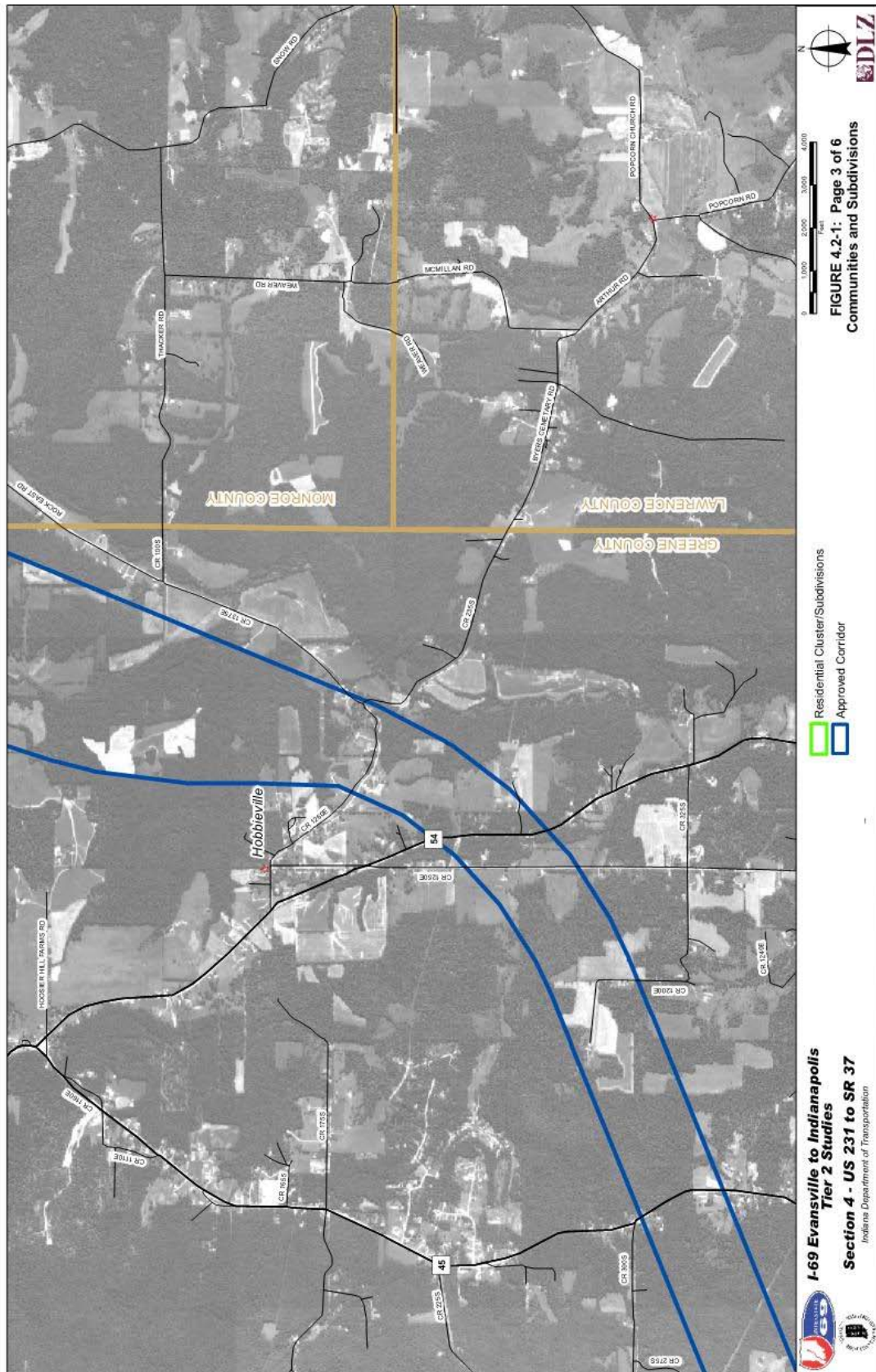
Butler Winery is located northeast of the City of Bloomington on Robinson Road. The winery was established in 1983 and is Indiana’s fourth oldest operating winery. Oliver Winery is located on SR 37 north of the City of Bloomington. Established in 1972 the winery hosts wine tasting events and vineyard tours.



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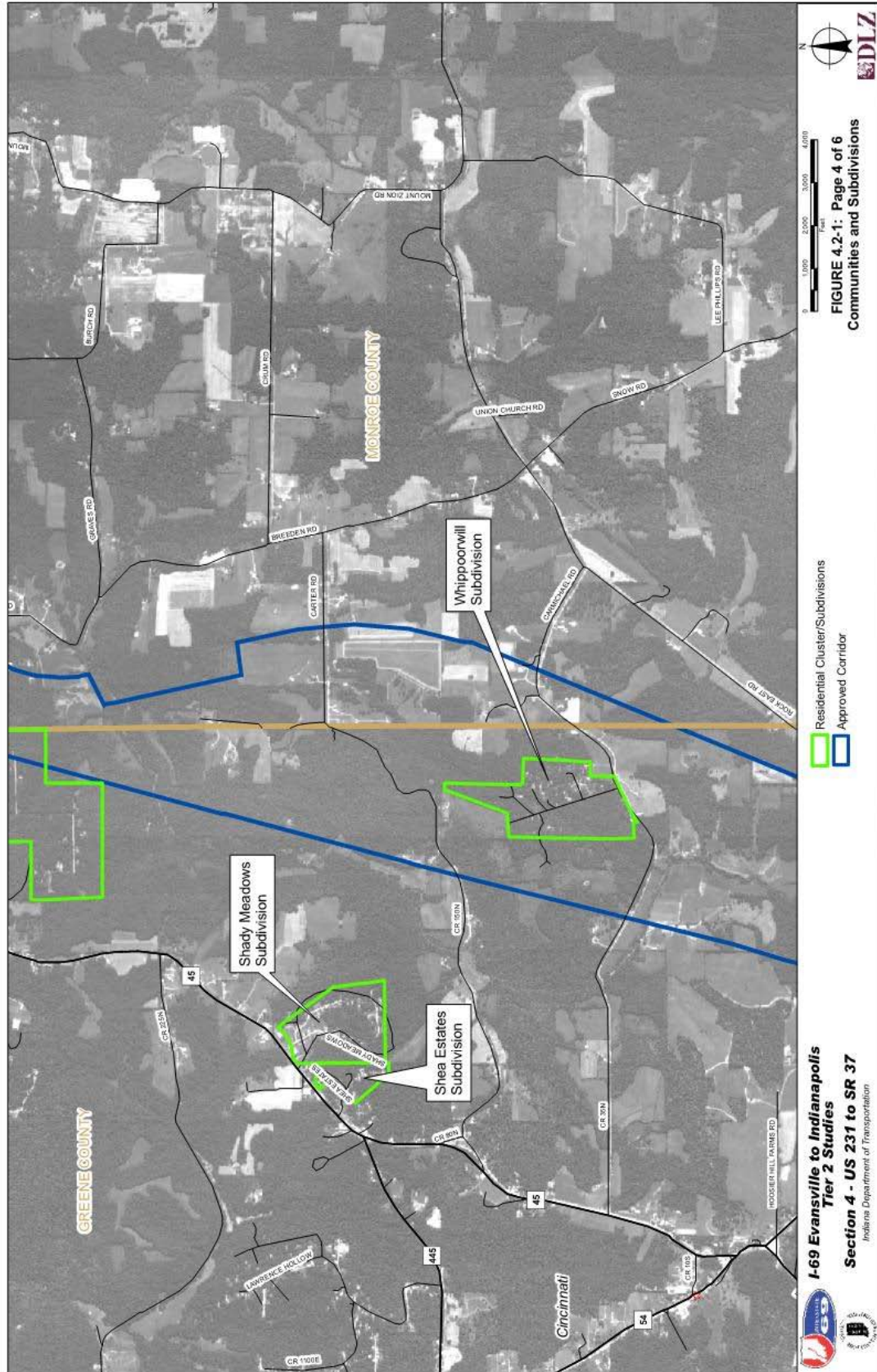
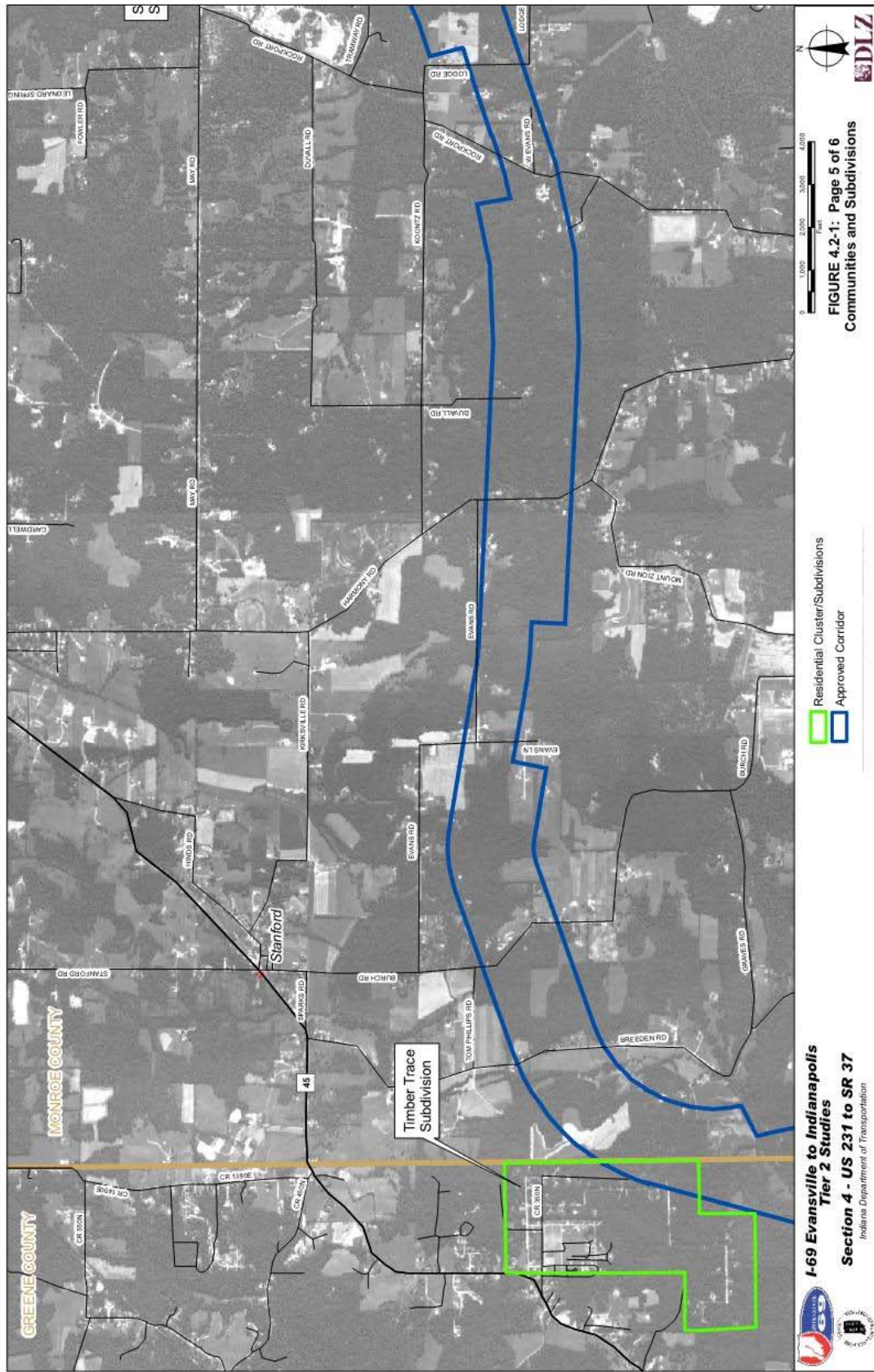
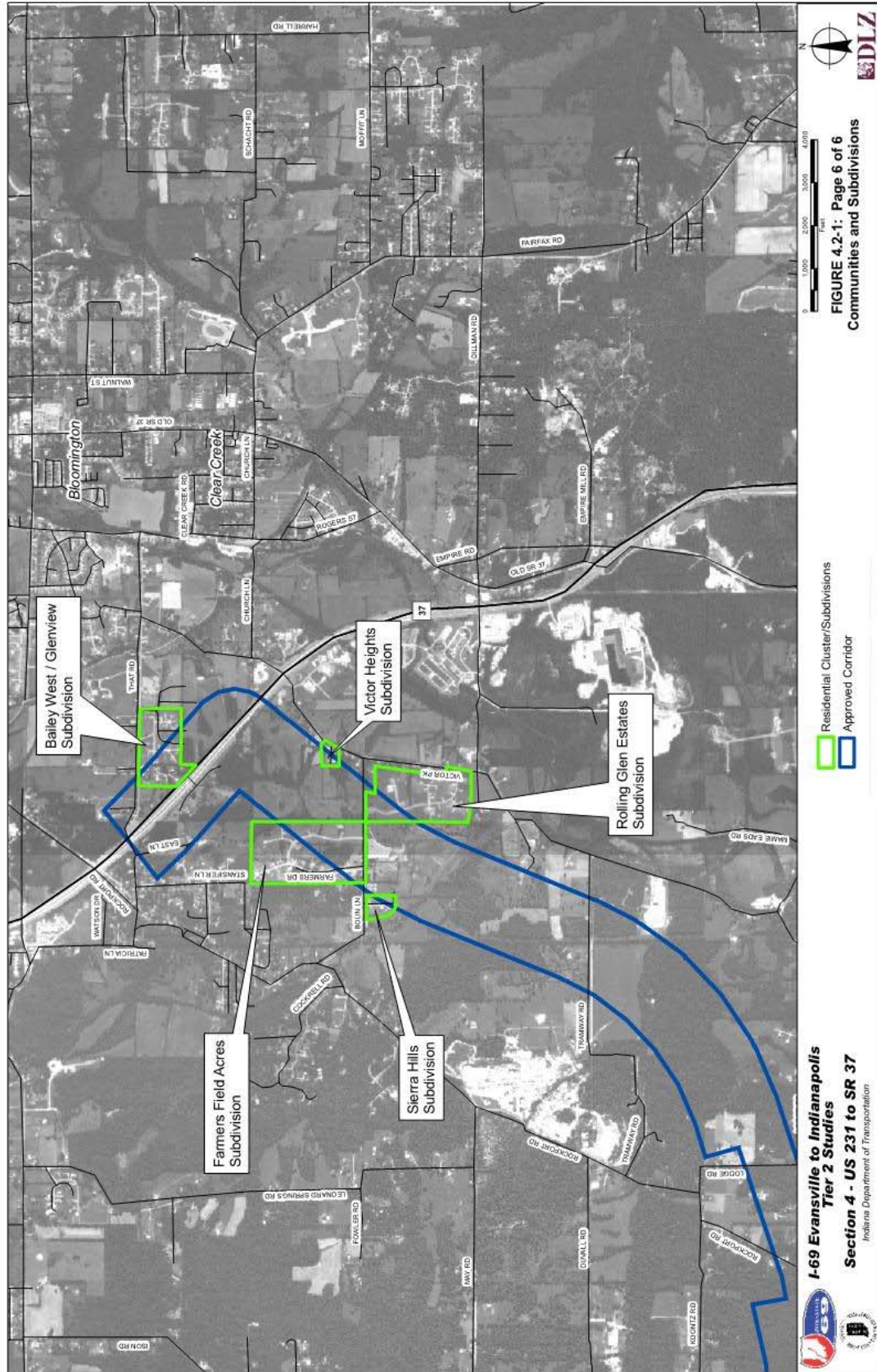


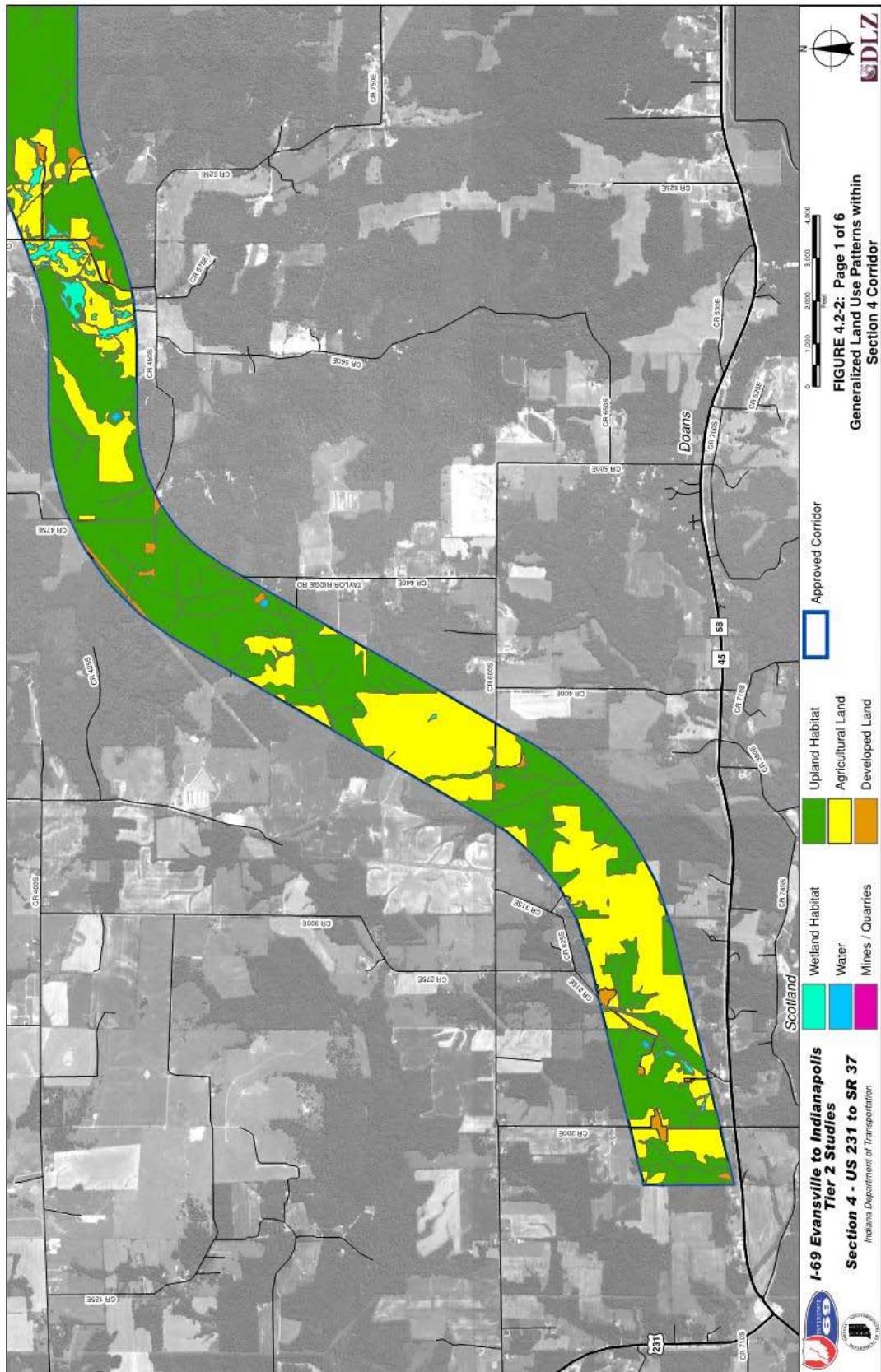
FIGURE 4.2-1: Page 4 of 6
Communities and Subdivisions

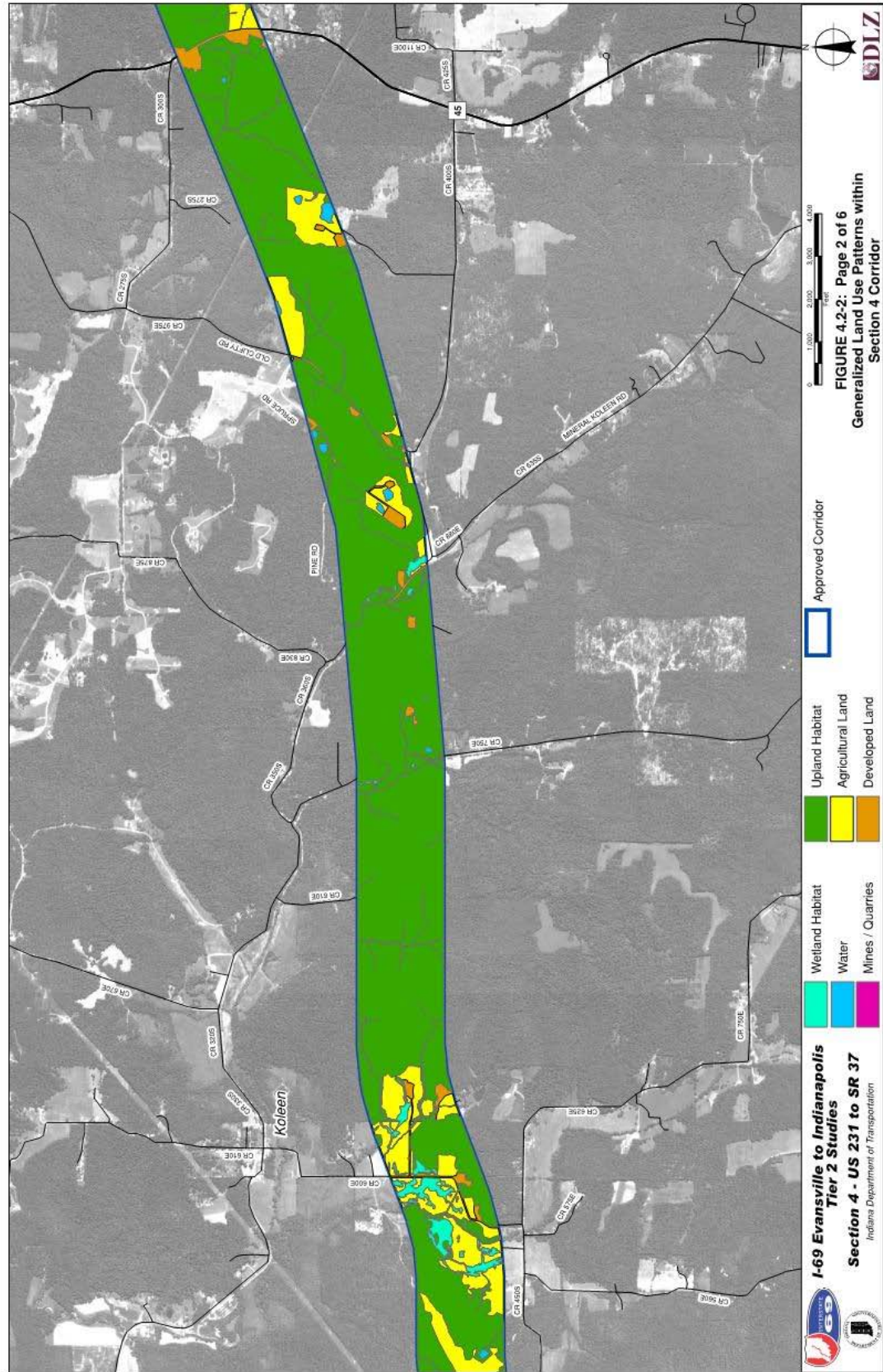
Residential Cluster/Subdivisions
Approved Corridor

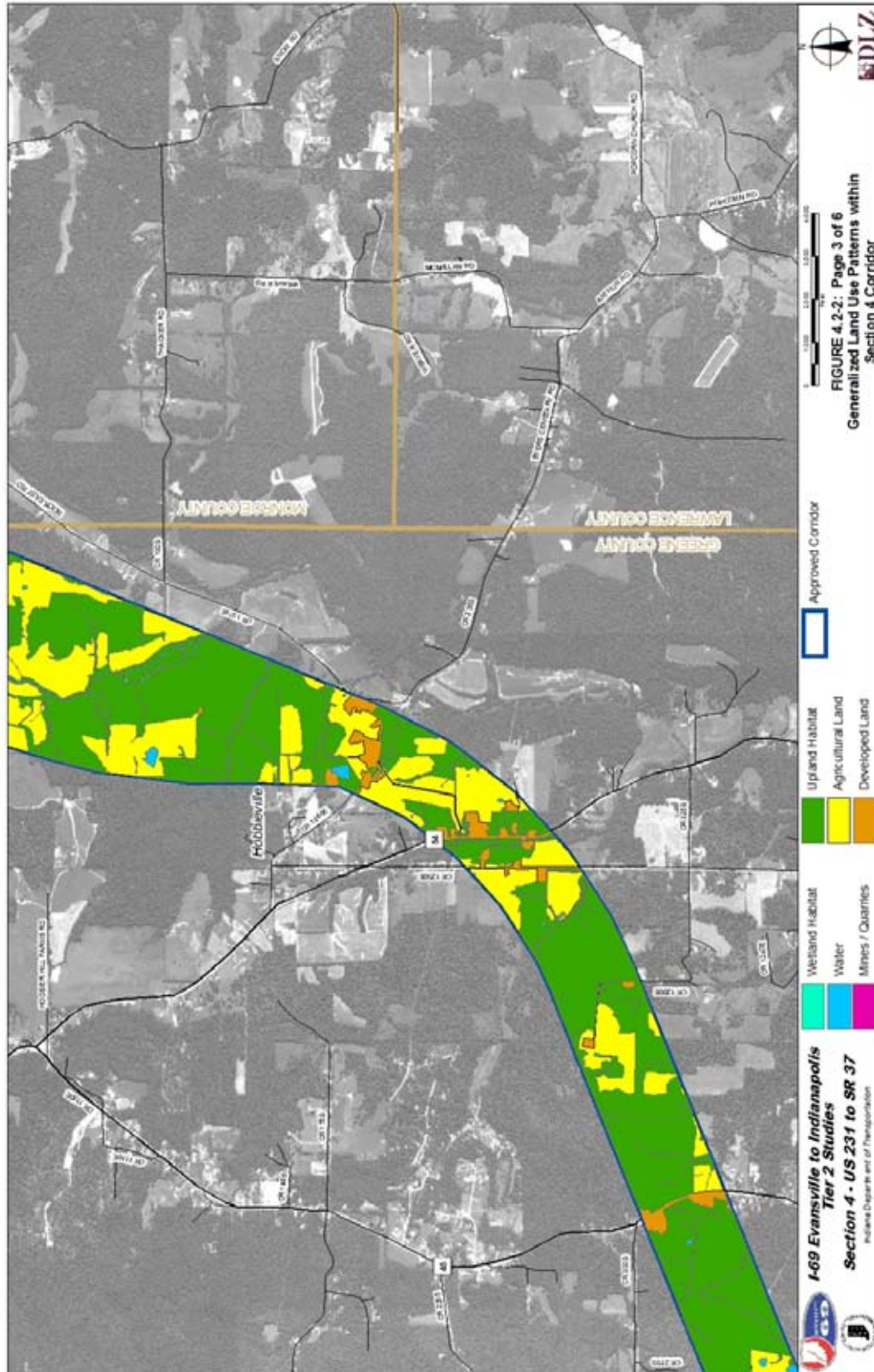
I-69 Evansville to Indianapolis
Tier 2 Studies
Section 4 - US 231 to SR 37
Indiana Department of Transportation

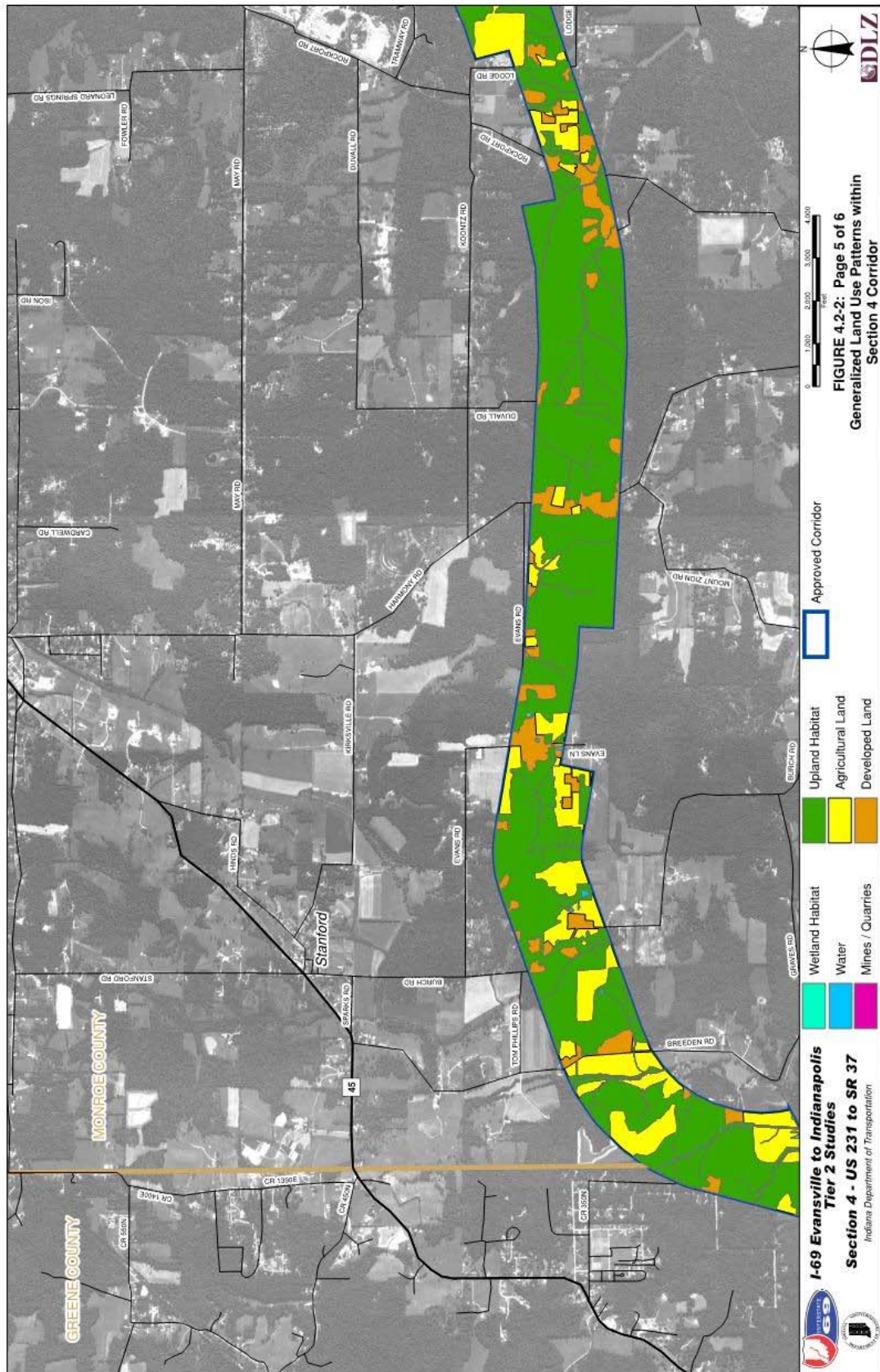


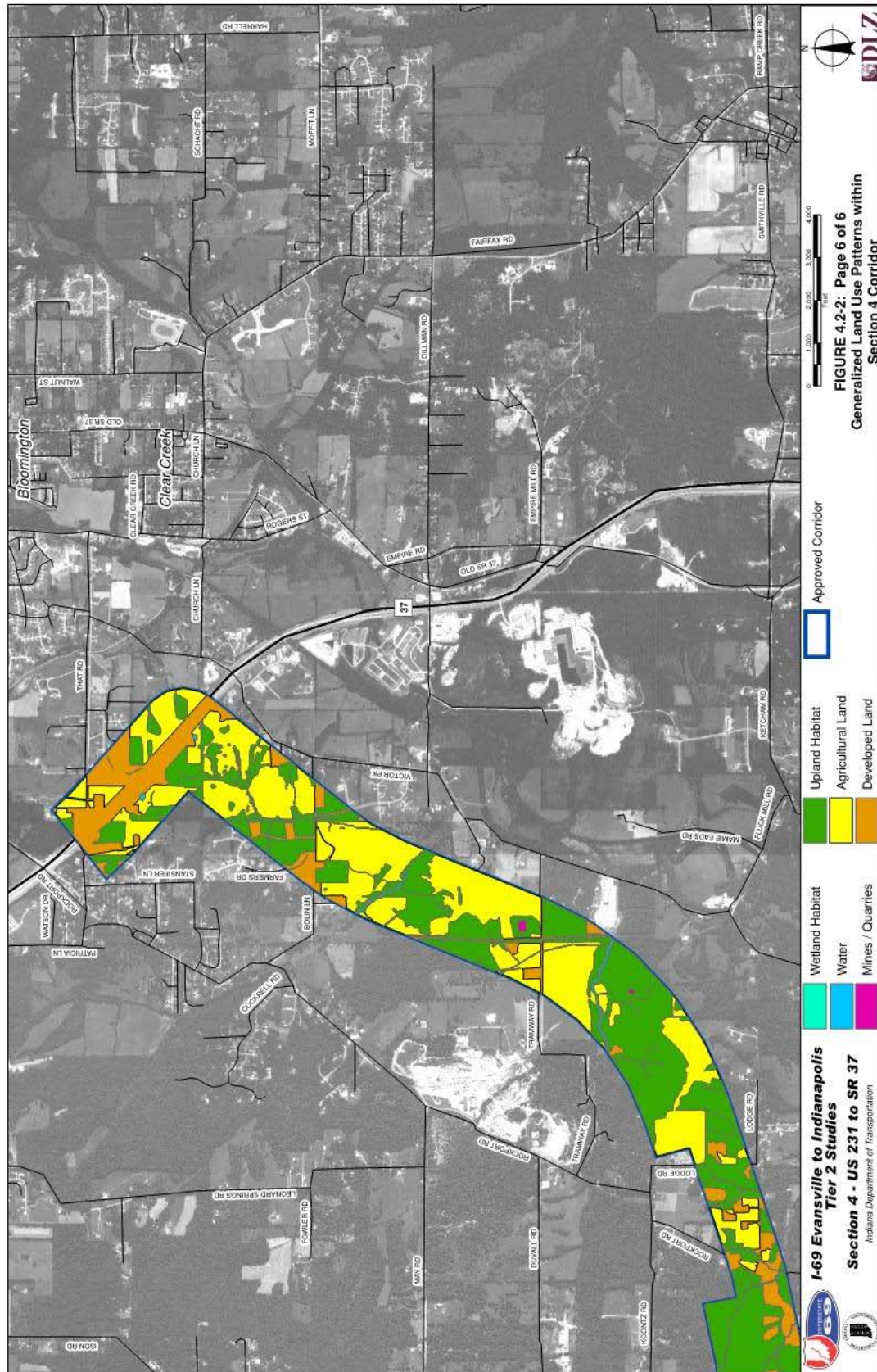


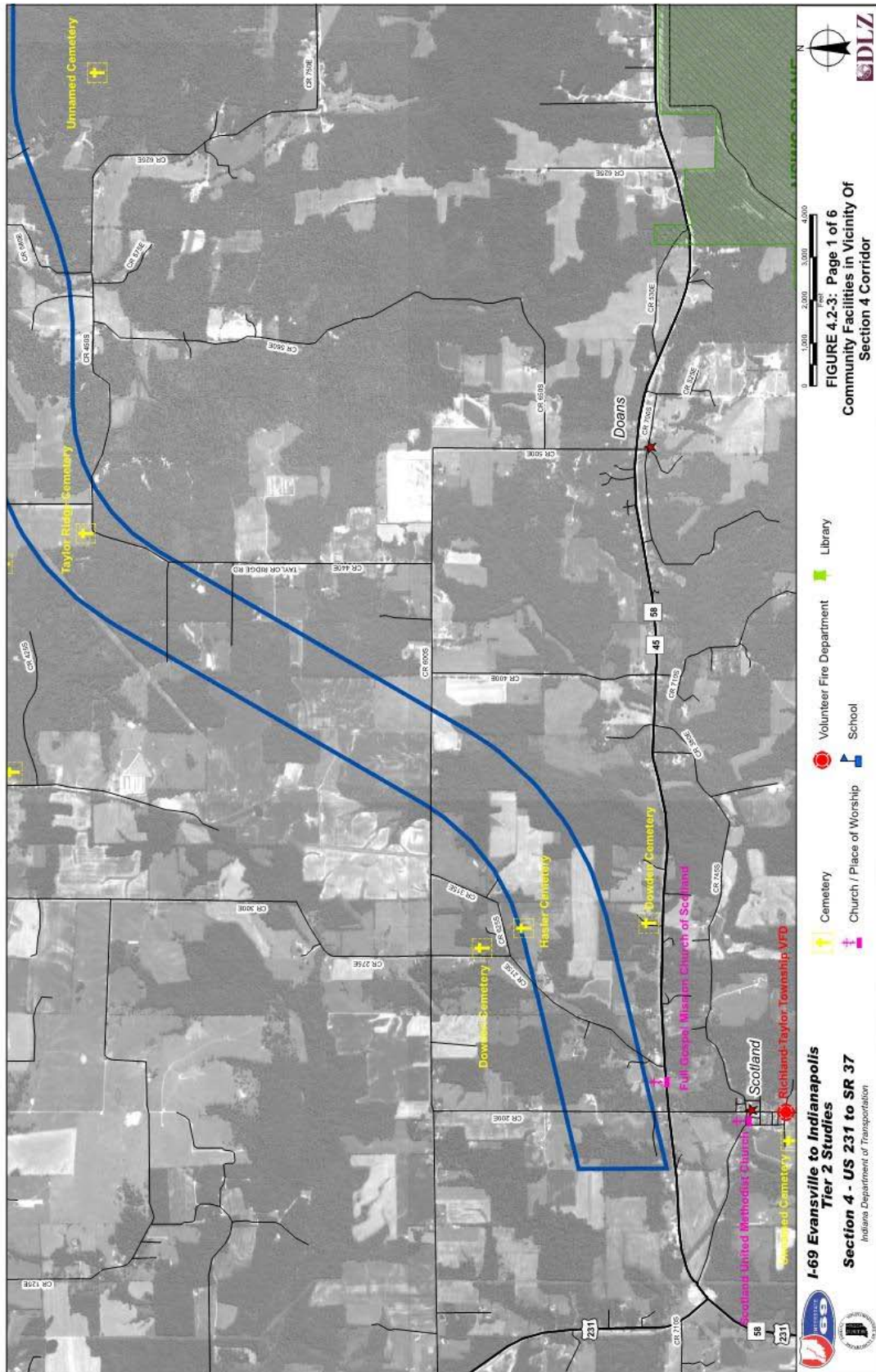


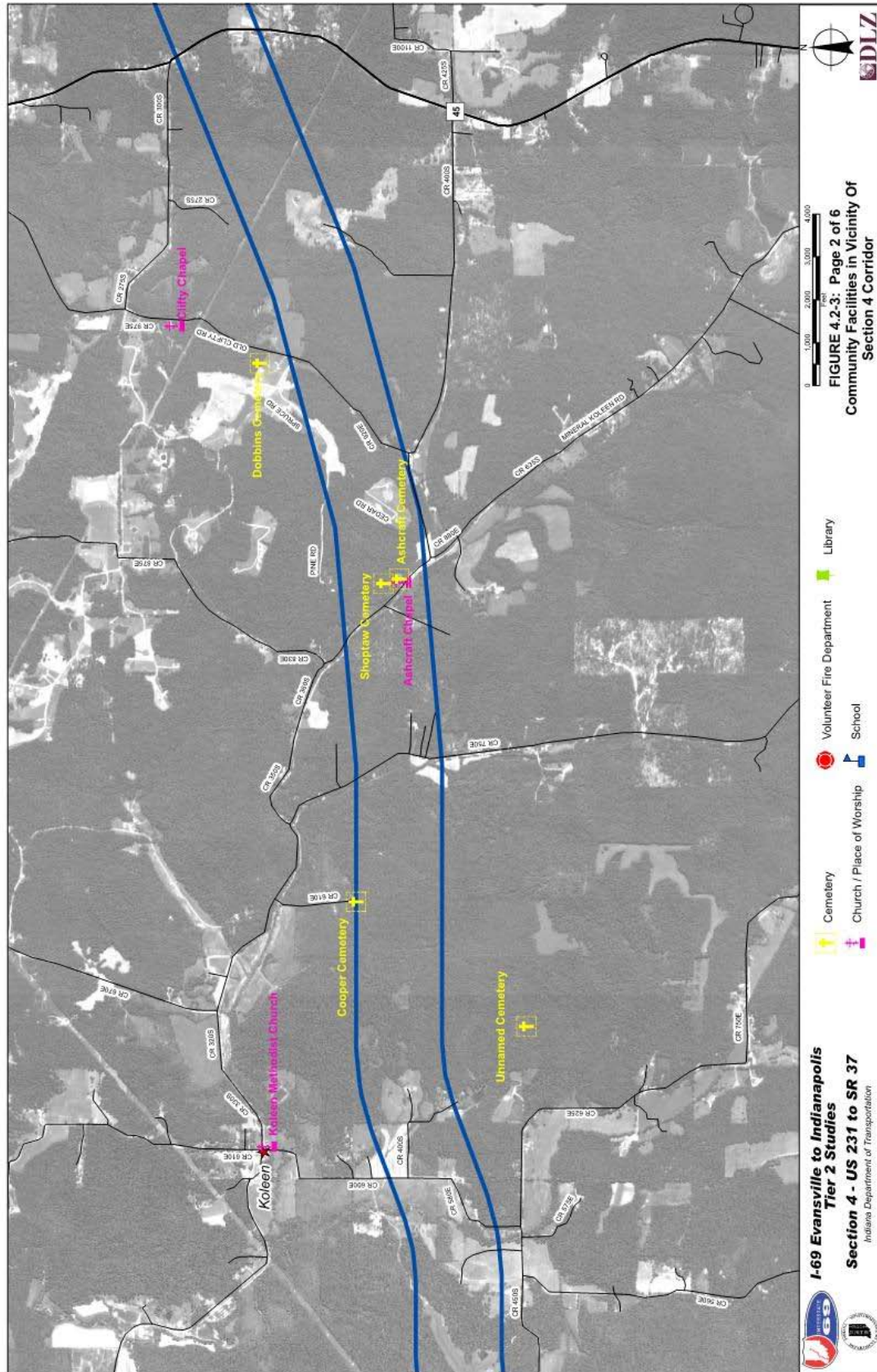








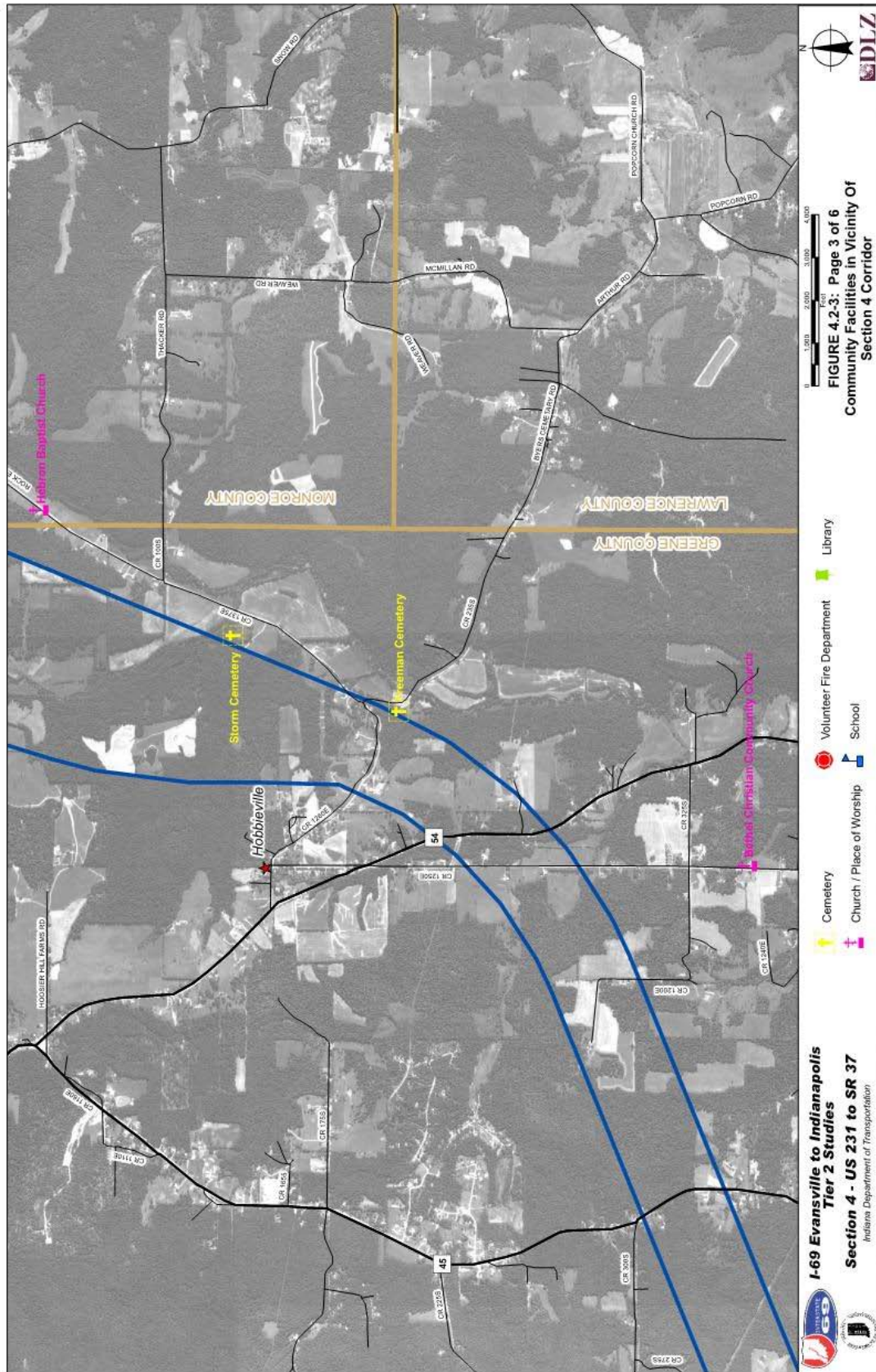


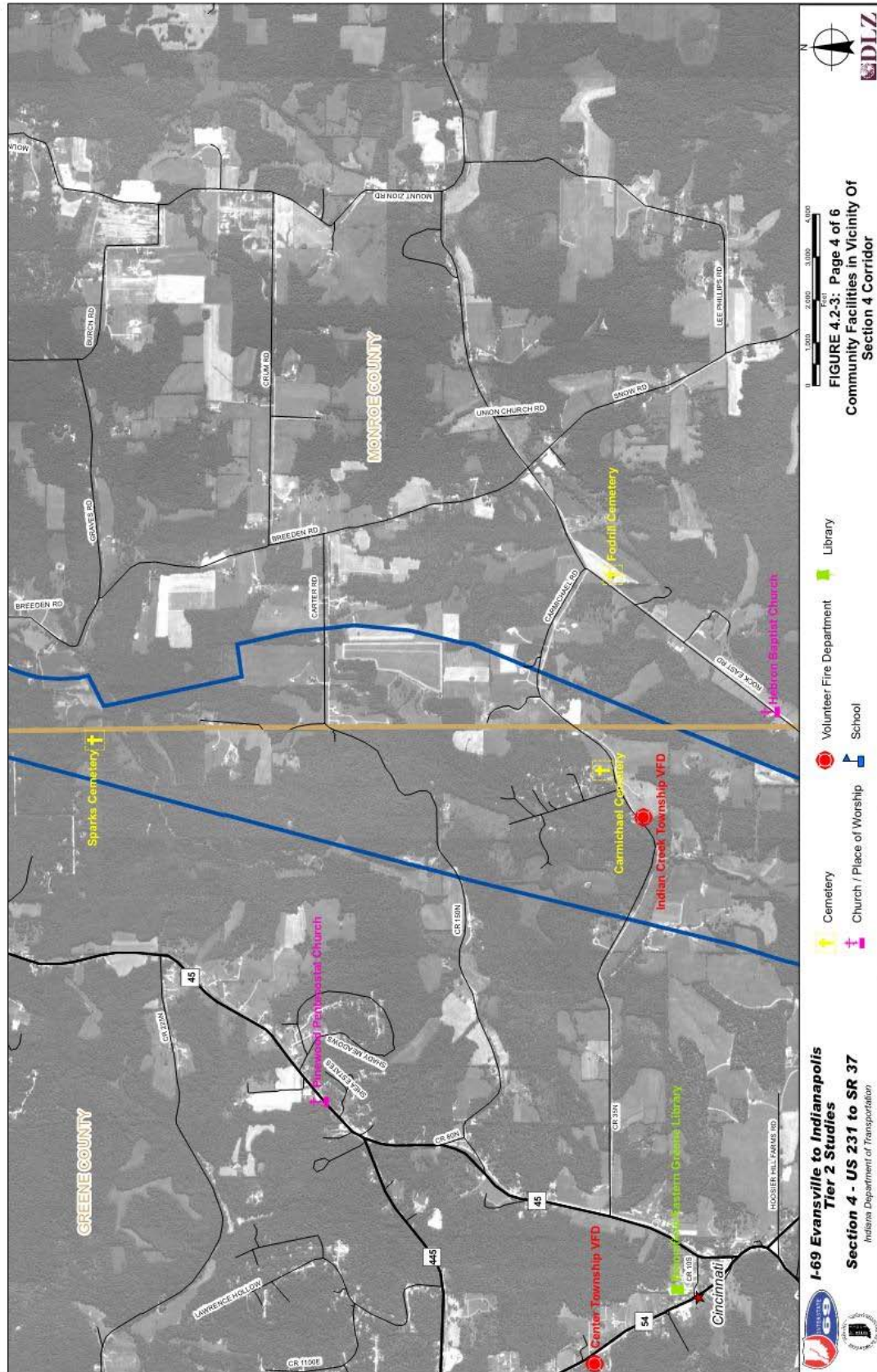


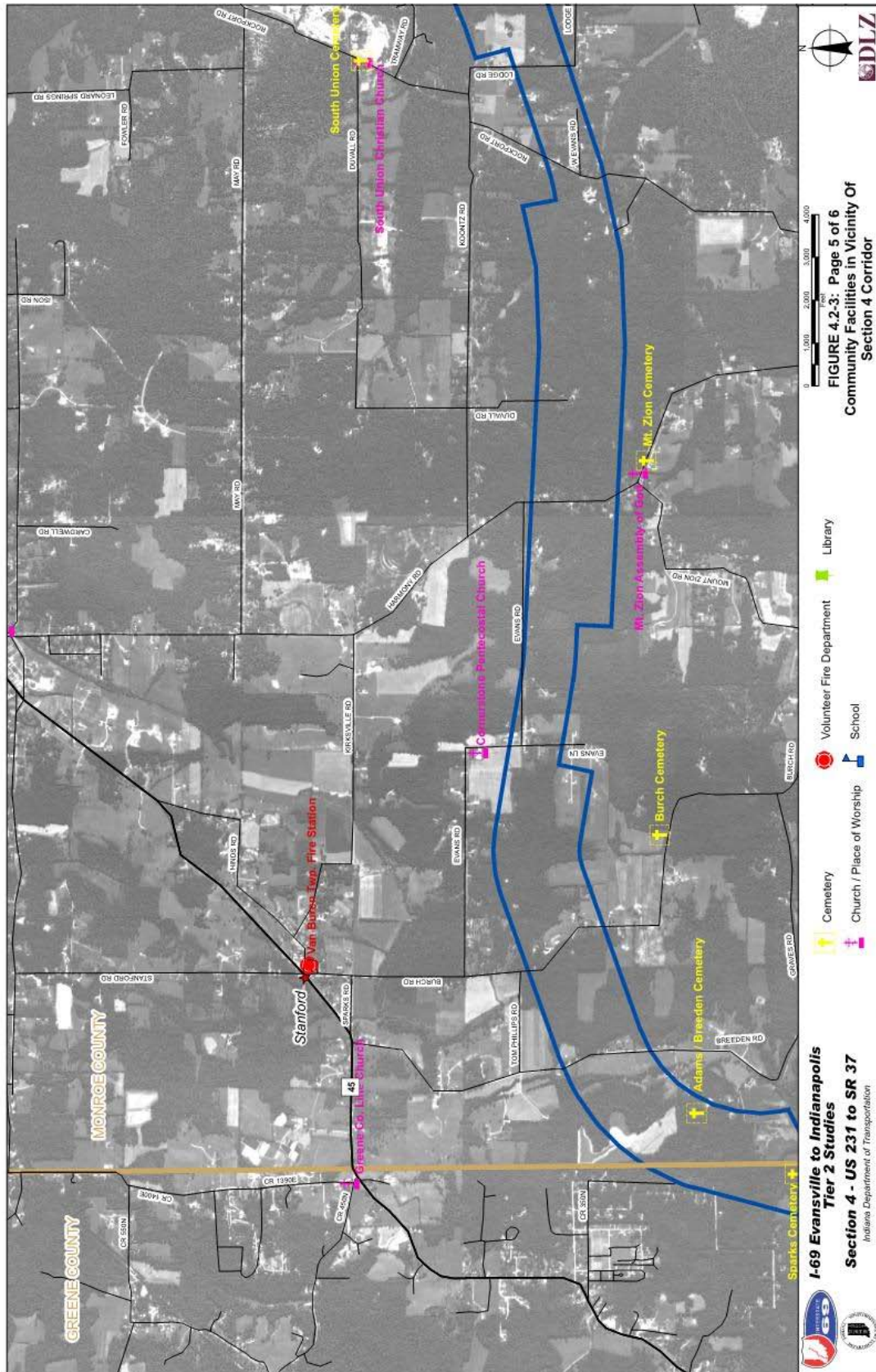
DLZ
 FIGURE 4.2-3: Page 2 of 6
 Community Facilities in Vicinity Of
 Section 4 Corridor

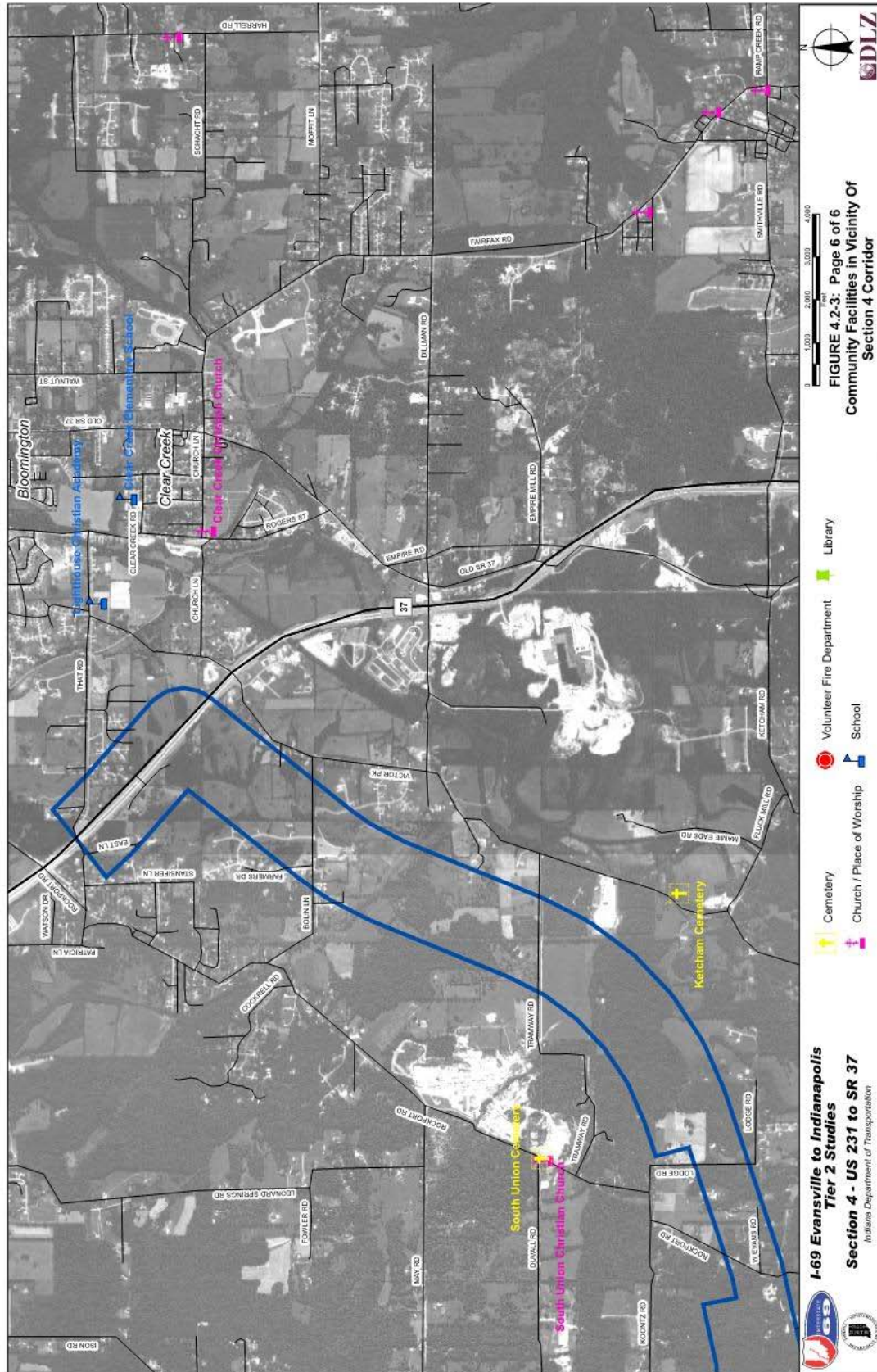
- Library
- Volunteer Fire Department
- School
- Cemetery
- Church / Place of Worship

I-69 Evansville to Indianapolis
 Tier 2 Studies
 Section 4 - US 231 to SR 37
 Indiana Department of Transportation





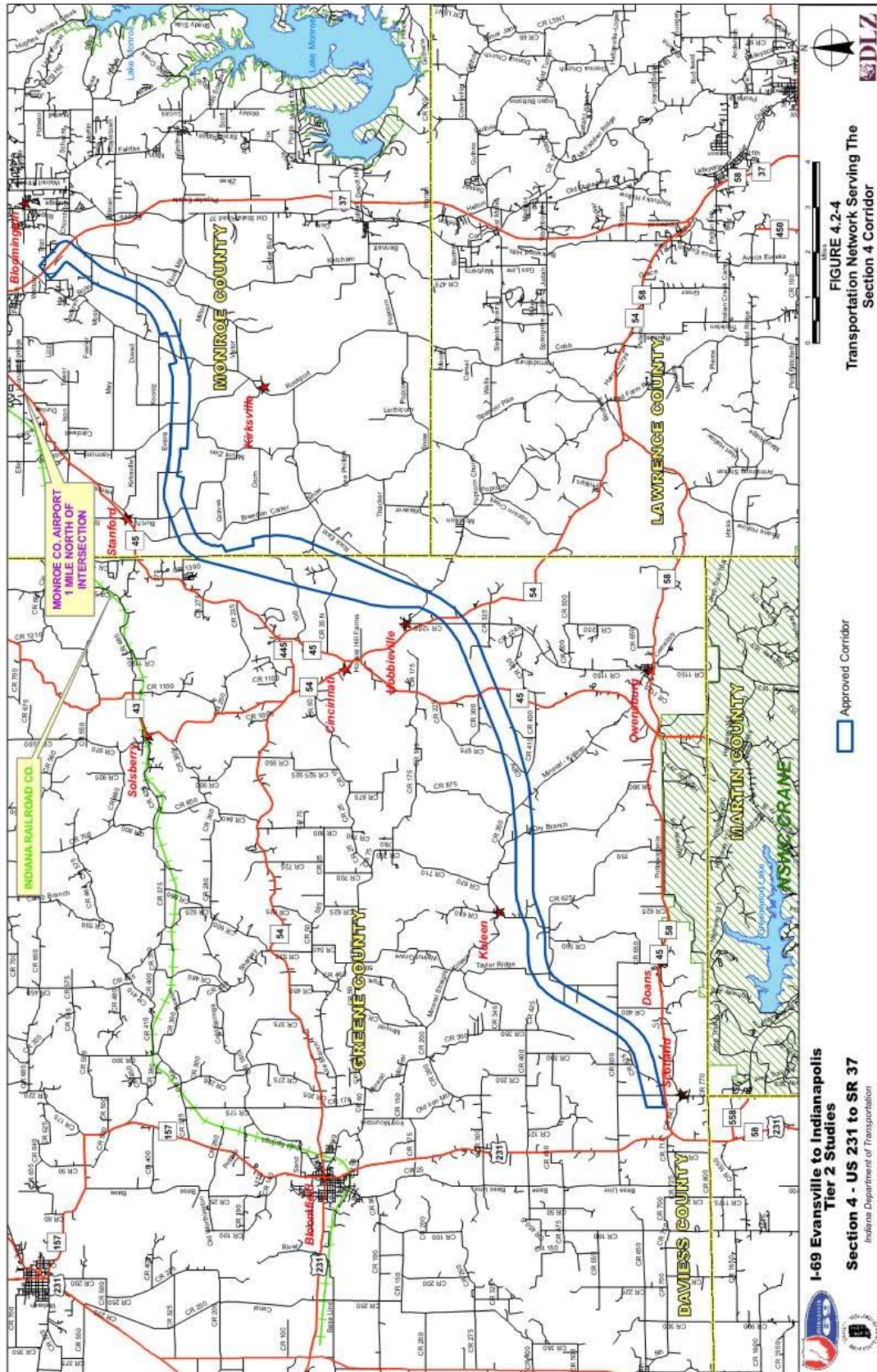


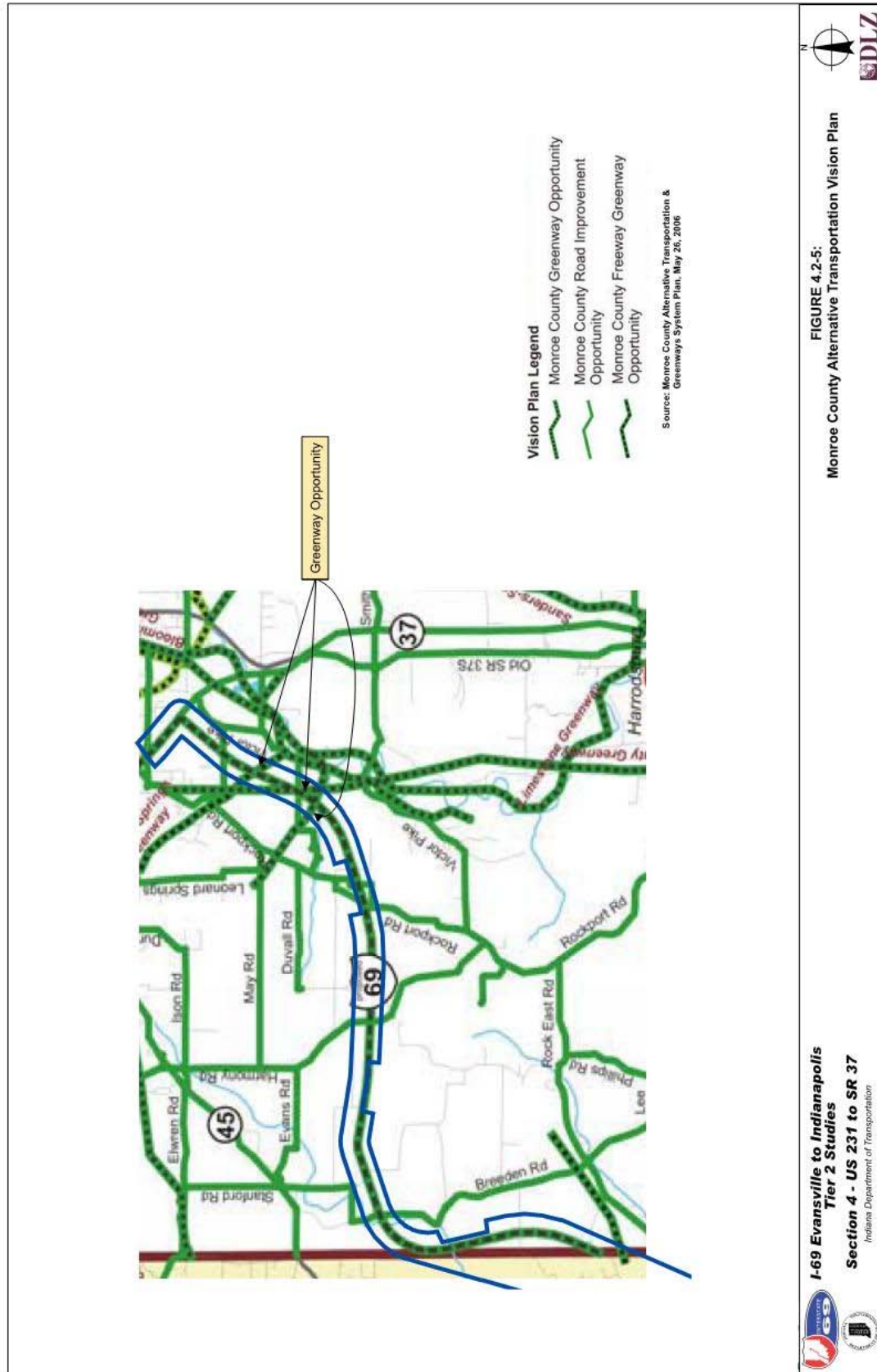




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4.3 Natural Environment

Since the publication of the DEIS, the following substantive changes have been made to this section:

- Section 4.3.1.5 – Updated regarding the presence of abandoned coal mines within the Section 4 Corridor.
- Section 4.3.3.3 – Provided additional details about field work for endangered species, including additional Indiana bat mist netting in August, 2010, which resulted in the identification of an additional Indiana bat maternity colony.
- Section 4.3.3.4 – Provided added details regarding procedures for withdrawing acreage from managed land programs.
- Section 4.3.3.4 – Updated the description of managed lands to indicate that based upon information provided by the property owner, Managed Land Property 19 is accessed via CR 750E, not CR 360S.
- Section 4.3.3.4 – Updated the description of managed lands to indicate that based upon information provided by the property owner, Managed Land Property 37 is not a managed land.

The I-69 Section 4 corridor is located in Southeast Greene County and Southwest Monroe County of Southwestern Indiana. The following sections describe its geology (4.3.1), water resources (4.3.2), and ecosystems (4.3.3).

4.3.1 Geology

4.3.1.1 Physiographic Divisions and Natural Regions

Physiographic divisions are areas that have similar topography and land use. The southerly terminus of the Section 4 corridor is located in the Crawford Upland physiographic division. The corridor extends north and east approximately 24 miles within the Crawford Upland until it reaches the Mitchell Plateau physiographic division, at a point approximately one mile east of Harmony Road, in Monroe County. The remaining approximate three miles of the corridor are within the Mitchell Plateau.

Topography: The Crawford Upland is largely unglaciated and is a rugged highland with considerable relief and varied elevations. From the southerly corridor terminus to the corridor crossing of SR 45, the terrain varies approximately 300 feet in elevation. Valleys within the Crawford Upland are generally v-shaped with sharp ridges or u-shaped with rounded ridges. The Mitchell Plateau is an unglaciated, somewhat flat to rolling plain underlain by Mississippian limestones. This region contains some highly dissected areas along streams. Extensive karst topography is found within the corridor southwest of Bloomington in the vicinity of Tramway Road and to a lesser extent within other areas as described below in Section 4.3.1.7. Refer to Section 4.3.1.7 for a definition of karst topography.



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Land Use: Land use and land cover within the Section 4 corridor is dominated by undeveloped upland and agriculture. Upland habitats, primarily forest, account for about 60% of the land cover. Agricultural lands, primarily pasture, account for approximately 30% of the Section 4 land use. Developed land uses, water, wetland, and quarries comprise the remaining 10% of the corridor. Limestone quarry companies own land within the Section 4 corridor, however no active quarrying is being conducted at this time.

A natural region is defined as “a major, generalized unit of the landscape where a distinctive assemblage of natural features is present. It is part of a classification system that integrates several natural features, including climate, soils, glacial history, topography, exposed bedrock, presettlement vegetation, species composition, physiography, and flora and fauna distribution to identify a natural region. A section is a subunit of a natural region where sufficient differences are evident such that recognition is warranted” (Homoya, et al., 1985). Natural regions are similar to physiographic divisions, but whereas physiographic divisions may give information on predominant land use, natural regions may give more information about the native plant and animal species of an area.

Section 4 begins in the Southwestern Lowlands Natural Region-Glaciaded Section, passes through the Shawnee Hills Natural Region-Crawford Upland Section and Escarpment Section and terminates in the Highland Rim Natural Region-Mitchell Karst Plain Section. **Figure 4.3-1** (p. 4-106) shows the relationship of these regions to the Section 4 corridor.

- The **Southwestern Lowlands Natural Region** has three sections: Plainville Sand, Glaciaded, and Driftless. The Section 4 corridor is only located within the Glaciaded Section, near its eastern limit. The Southwestern Lowlands Natural Region is characterized by low relief and extensive aggraded valleys. Much of the region is nearly level, undissected, and poorly drained, although in some areas the topography is hilly and well drained. Approximately 0.6 miles of the Section 4 corridor is located within the Glaciaded Section of this region.
- The **Shawnee Hills Natural Region** has two sections: Crawford Upland and Escarpment. The majority of the project corridor is located in this natural region. The Shawnee Hills Natural Region is a rugged and generally sparsely populated area containing rugged hills with sandstone cliffs and rockhouses (accessible natural geological formations such as voids between large rocks or recesses under overhangs, that are large enough for a human to enter). The majority of the natural communities are upland forest types, although a few sandstone and limestone glades, gravel washes, and barrens are known. Beginning at the eastern limit of the Southwestern Lowlands Natural Region, the Section 4 corridor runs through the Crawford Upland Section and enters the Escarpment Section at a point approximately 0.6 miles east of SR 45. The Section 4 corridor turns north-northeast and runs essentially along the Greene/Monroe County Line, then turns easterly just south of the Van Buren-Indian Creek Township boundary in Monroe County, and enters the Mitchell Karst Plain Section of the Highland Rim Natural Region at a point approximately 2.2 miles east of Harmony Road.
- The **Highland Rim Natural Region** has two sections: Mitchell Karst Plain and Brown County Hills. The Section 4 corridor enters and terminates within the Mitchell Karst Plain section of this region. The Section 4 corridor is not located in the Brown County Hills



section. The Highland Rim Natural Region is unglaciated in Section 4. The primary feature of the Mitchell Karst Plain Section is the karst plain characterized by visible karst features such as sinkholes and springs. Though described as an area of “low relief” by Schneider (1966) and “relatively level” by Homoya et al., topography can be hilly to rugged in many portions of the section. Beginning at a point approximately 2.2 miles east of Harmony Road, the Section 4 corridor runs northeasterly within the Mitchell Karst Plain Section until it terminates at the SR 37 intersection with That Road southwest of Bloomington.

4.3.1.2 Soils

Glaciation

With the exception of a small area at its southerly terminus, the Section 4 corridor is located within unglaciated terrain. Many of the differences in topography among the physiographic regions in Indiana come from glaciation during the Ice Age, the Pleistocene Period. A glacier is defined as a slowly moving sheet of ice, often containing rocks, pebbles, cobbles, and boulders. The Wisconsinan glacier was the most recent, beginning approximately 70,000 years ago and covering about two-thirds of Indiana. The Illinoian glacier began approximately 125,000 years ago and reached further south in Indiana.

Land that once was glaciated is often very flat with rich soils; while, unglaciated land is often much more hilly. The heavy weight of the glacier acted to scour and compress the land, with soil, rocks, and other debris deposited upon its retreat. It also formed large, expansive shallow lakes, especially in nearby Gibson, Pike, Daviess, and Knox counties. Glaciated lands in Indiana are often excellent farmlands. Low-lying areas often are wetlands. Unglaciated lands in Indiana are often hilly and forested.

Land within Section 4 did not undergo glaciation by either the Wisconsinian or Illinoian glaciations. Evidence for glacial activity within the Section 4 corridor during the Kansan Glacial (455,000 to 380,000 years ago) and Nebraskan Glacial periods (680,000 to 620,000 years ago) is at best poorly understood (Melhorne 1997:18-19). Section 4 begins in Greene County, essentially at the eastern boundary of the Illinoian glaciers estimated to have extended across Illinois and western Indiana from 125,000 to 400,000 years ago. The glaciers experienced at least two fluctuations before receding to the north, and left behind a number of glacial lakes, outwash plains, and lake plains.

The lack of glaciation and glacial deposition within most of the Section 4 corridor results in frequent bedrock outcrops and relatively shallow soil depths in comparison to glaciated terrain. This is important in Section 4, as the prevalent limestone bedrock exhibits karst features at and near the surface, as opposed to glaciated karst terrain where most karst features are more deeply buried. Refer to Section 4.3.1.7 for a more detailed discussion of karst terrain.

Soil Associations

The Section 4 corridor traverses four major soil associations defined for Greene County and two major soil associations defined for Monroe County (IndianaMap:



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<http://inmap.indiana.edu/index.html>: Soil Associations-STATSGO). Soils generally conform to the underlying bedrock configurations across these two counties. The impacted soil associations are described below and shown on **Figure 4.3-2** (p. 4 - 107).

Greene County:

- Ava-Cincinnati-Alford Association (IN081): Deep, nearly level to strongly sloping, moderately well drained, well drained, or poorly drained, medium textured soils formed in loess or glacial till. Most of the area within this association has been cleared for cultivation or hay/pasture. Slope and wetness limits suitability for development. The relative change in soil volume that occurs with changes in moisture content is referred to as shrink/swell potential. The extent of shrinking and swelling is influenced by the amount and type of clay present in the soil. Shrinking and swelling of soils can cause damage to building foundations, roads and other structures. The shrink-swell potential of this association is low to moderate.
- Negley-Parke-Chetwynd Association (IN086): On uplands, soils are deep, gently sloping to very steep, well drained and medium textured, formed in outwash, glacial till or loess. The majority of this association is wooded due to slopes and potential for erosion. However, soils on ridgetops and knolls are suited to cultivation, hay and pasture. Shrink-swell potential is low.
- Zanesville-Wellston-Gilpin Association (IN103): On uplands, soils are deep or moderately deep, very gently sloping to very steep, well drained or moderately well drained and medium textured, formed in loess and in sandstone and shale residuum. The majority of this association is wooded due to slopes and potential for erosion. However, gently sloping to very gently sloping Zanesville soils on ridgetops are suited to cultivation and hay. Shrink-swell potential is low.
- Stendal-Bonnie-Birds Association (IN110): On bottomland, soils are deep, nearly level, somewhat poorly drained to very poorly drained medium textured soils formed in alluvium. Most of this association has been cleared and is currently cultivated or in hay or pasture. Shrink-swell potential is low.

Monroe County:

- Zanesville-Wellston-Gilpin Association (IN103): See above.
- Crider-Baxter-Bedford Association (IN112): On uplands—Soils are deep or moderately deep, gently sloping to moderately sloping, well drained soils formed in loess and residuum from limestone. Soils in this association are generally suited to cultivation, though limited somewhat by slope and the presence of karst features. Steeper slopes are generally wooded. In karst areas the soils are used for hay and pasture. Shrink-swell potential is moderate.

Soil Types

Within a given association, there can be many types of soil. Soils in Section 4 consist primarily of deep to moderately deep, sandstone and limestone derived soils. The western two miles of the



Section 4 corridor located in Greene County have soils that are deep, nearly level to strongly sloping and range from poorly drained to well drained. These soils are medium textured that formed in outwash, glacial till, or loess on uplands (McCarter 1988). The remainder of the Section 4 corridor in Greene County, with the exception of the Black Ankle and Plummer Creek floodplains, is located in a broad area of soils that are deep to moderately deep, very gently sloping to very steep, well drained to moderately well drained, medium textured soils formed in loess and in sandstone and shale residuum on uplands. The soils on the Black Ankle Creek and Plummer Creek bottomlands, are deep, nearly level, somewhat poorly drained to very poorly drained, medium textured soils formed in alluvium (McCarter 1988). Soils in the western half of the Monroe County portion of the Section 4 corridor are deep to moderately deep, nearly level to moderately steep, well drained to moderately well drained, medium textured soils that are formed in loess and colluvium on bottomlands, and in sandstone, siltstone, and shale residuum on uplands. Soils in the eastern half of the Section 4 corridor in Monroe County are deep to moderately deep, gently to strongly sloping, well drained soils formed in loess and residuum from limestone on uplands (Thomas 1981).

The Section 4 corridor does not contain clay soil units, but does have soil units with clay components. However, it is unlikely that lacustrine-derived clays containing a significant percentage of expansive clay are located within the corridor. This material has low load-bearing capacity; and subsidence is a concern when structures (such as bridges) are placed on it (Gray, 1971). Soil borings will give a better understanding of the mineral content of the soil within the corridor. Borings will be conducted during geotechnical investigations for the Preferred Alternative in the design phase of the project.

4.3.1.3 Bedrock

Most of Southwestern Indiana is underlain by Pennsylvanian and Mississippian rock units. The bedrock tends to dip to the southwest at a rate of about 20 feet per mile (Stafford et al. 1988:17). The Section 4 corridor is underlain by both Pennsylvanian and Mississippian rocks (Gray et al. 1987; Gutschick 1966; Thompson 1998).

The western one-fourth of the Section 4 corridor is comprised of Pennsylvanian rocks mostly composed of shales and sandstones with interleaving thin beds of limestone, clay, and coal that comprise the Raccoon Creek Group. Coal beds present in the upper part of the group belong to the Buffaloville Coal Member, while those near its base belong to the Lower Block Coal Member. Eight other intervening coal beds present within this unit have also been named. The Pennsylvanian sequence of bedrock is the product of the deposition of fine-grain marine and coarser-texture sediments along shorelines, on beaches, in swamps, lagoons, and deltas that accumulated to form a sequence up to 1,500 feet (457 meters) thick as the region sank during crustal downwarping that formed the Illinois Basin (Hill n.d.). The Pennsylvanian bedrock rests upon Mississippian sandstones, shales, and limestones (Gray et al. 1987; Thompson 1998).

From about Black Ankle Creek and proceeding east to the Monroe County line is Mississippian bedrock belonging to the Raccoon Creek Group interleaved with the shales, sandstones, and limestones of the Buffalo Wallow, Stephensport, and West Baden groups. The latter three



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groups are 140 feet to 340 feet (43 meters to 104 meters) thick and split into more than 20 formations. Several limestone formations are chert-bearing (Gray et al. 1987; Thompson 1998).

Proceeding east, the shales, sandstones, and limestones of the Buffalo Wallow, Stephensport, and West Baden groups are increasingly replaced by limestones of the Blue River and Sanders groups. This sequence of carbonate rocks is 250 feet (76 meters) to nearly 500 feet (152 meters) thick and has significant amounts of gypsum, anhydrite, shale, chert, and calcareous sandstone. Within the Sanders Group is the Salem Limestone Formation, the thickly bedded limestone known as “Indiana Limestone,” which is traversed by the final approximately three miles of the corridor (Gray et al. 1987; Thompson 1998).

4.3.1.4 Topography

The primary factor influencing topography in Section 4 is the lack of glaciation. Topography in Section 4 ranges from rolling to steep. Elevations in Section 4 range from 520 feet above mean sea level (msl) at the south terminus to 970 feet above msl in the vicinity of Harmony Road in Monroe County. Some of the most severe terrain in the corridor is encountered between Black Ankle Creek and Plummer Creek. In this area, the terrain undulates between three peaks and four valleys. From Black Ankle valley at 520 feet above msl to Plummer Creek valley at 538 feet above msl, three peaks rise to elevations at 773 feet, 788 feet and 749 feet above msl with valleys dropping to 534 feet and 538 feet above msl. In some locations, 200 feet elevation changes over lateral distances of about 1,000 feet may occur.

4.3.1.5 Minerals

Limestone is currently the most important mineral resource in the vicinity of the Section 4 corridor, particularly the eastern portion of the corridor in Monroe County. Within the Indiana limestone belt across Owen, Monroe, and Lawrence counties, the cream-colored Salem Limestone deposits of Mississippian age have been quarried since the early to mid-19th century. Two abandoned limestone quarries are located within the corridor, one north, and one south of Tramway Road (named for its proximity to a tramway which transported limestone). The corridor also crosses a portion of the parcel where the Indian Hill Mill (now razed) was located, where large piles of milled limestone remnants can be seen (see **Figure 4.3-3** (p. 4-108) for maps of active and abandoned limestone quarries, as well as abandoned wells). No active limestone quarry operations are located within the corridor, but quarries operated by Independent Limestone Company and Victor Oolitic Limestone Company are in close proximity to the Section 4 corridor and use local roads near the Section 4 corridor (Rockport Road and Victor Pike) to transport dimensional block, slab, and aggregate limestone products.

In Greene County, coal from deposits of Pennsylvanian age assumed greater importance than sandstone or limestone. Late in the 19th century, several coalfields were present throughout Greene County, particularly concentrated in Richland and Stockton townships west of the Section 4 corridor. Few coalfields existed in Monroe County (Baskin, Forster and Company 1876). It was not until the mid-1880s that coal mining became an economic engine of development in the general region. Underground mining was eventually augmented by strip



mining at the beginning of the 20th century and while it is no longer as productive as it once was, coal mining continues to play a role in the local economy to this day.

Eight abandoned coal mines are reported to be present within the Section 4 corridor, in the area south and west of the Taylor Ridge Cemetery in Greene County (IndianaMap: <http://inmap.indiana.edu/index.html>: Mine Entries). The Indiana Geological Survey (IGS) has indicated that these abandoned coal mining operations have been identified as very old, small, and abandoned shallow surface and slope excavations. The IDNR Division of Reclamation has indicated that these abandoned mines were small volume, short-lived mines used mainly for landowners' personal use. In 2010 and 2001, two field reviews of the area reported to include abandoned coal mines identified such features within the Section 4 Corridor. These areas are outside the right-of-way of Refined Preferred Alternative 2. Geotechnical studies performed during the design phase will define the potential for encountering subsurface extents of such abandoned mine features. No active coal mines are present within the Section 4 corridor.

In addition to limestone and coal, iron ore and kaolin clay were exploited in the vicinity of the Section 4 corridor. Drawing on local iron ores, the site of the earliest blast furnace in Southern Indiana (second oldest iron works in the state) was located in the northwest corner of Indian Creek Township in Monroe County. Randolph Ross and Sons' Virginia Iron Works was established about 1839 and abandoned about five years later (Blanchard 1884). In Greene County, the Richland Furnace, once located east of Bloomfield, produced pig iron for shipment to makers of cast iron products between 1841 and 1859 (Goodspeed Publishing Company 1884). No mining of iron ore for commercial purposes is known to be occurring within the Section 4 corridor.

Kaolin clay was available in limited areas of Greene County, one vein of which stretched across the southern part of the county (Goodspeed Publishing Company 1884). Several pottery kilns were established in Doans and Owensburg. These kilns produced ceramics for the local markets from the mid-19th century to the early part of the 20th century. The name of the unincorporated community of Koleen may have derived from a variation of the word "kaolin." No mining of clay for commercial purposes is known to be occurring within the Section 4 corridor.

Oil and natural gas reserves are located throughout Greene and Monroe counties. Information contained on the IGS Petroleum Database Management System Website was reviewed (<http://igs.indiana.edu>: Wells). No active oil or gas wells are known to be present within the Section 4 corridor. Three abandoned gas wells and one saltwater disposal well are located within the corridor in Greene County (see **Figure 4.3-3**, p. 4-108). These wells are within agricultural fields located north of CR 600S and east of CR 300E. No structures associated with these wells were observed during the pedestrian field surveys.

4.3.1.6 Seismic Risks

Seismic considerations for the I-69 Evansville to Indianapolis studies are based primarily on potential impacts from faults in the New Madrid seismic zone, and to a lesser extent, the Wabash Valley seismic zone. A seismic zone is an area with a geographic and historical distribution of earthquakes. The New Madrid seismic zone is a series of faults beneath the continental crust in a

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weak spot known as the Reelfoot Rift. It cannot be seen on the surface. The New Madrid seismic zone extends more than 120 miles southward from Cairo, Illinois, at the junction of the Mississippi and Ohio rivers, into Arkansas and through parts of Kentucky and Tennessee. The Wabash Valley seismic zone corresponds to a small concentration of earthquakes within the Wabash Valley fault system. This fault system is in Southeastern Illinois, Southwestern Indiana, and Northwestern Kentucky.

In recent history, earthquakes in the New Madrid seismic zone have been more numerous and larger in magnitude than those in the Wabash Valley seismic zone. However, the Wabash Valley seismic zone is considered capable of producing New Madrid-size earthquake events.

Documented earthquakes in the vicinity of Section 4 are:

- January 7, 1916, 3.0 Magnitude: The epicenter was approximately 1.5 miles southwest of Worthington, and approximately 14 miles northwest of the southern corridor terminus.
- January 6, 1931, 5.0 Magnitude: The epicenter was approximately 3.8 miles southwest of Bloomfield in Greene County, and approximately 7.2 miles north-northwest of the southern corridor terminus.
- April 8, 1976, 5.0 Magnitude: The epicenter was approximately 13.1 miles northwest of Bloomington in Monroe County, and approximately 15.2 miles northwest of the northern corridor terminus.

The American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design Specifications address the requirements for seismic design. They divide the United States into four separate seismic zones and give seismic design requirements for these zones rated from 1 to 4, with Zone 1 having the lowest seismic risk. Determination of the seismic zone for a given location in the project corridor is based on acceleration coefficients and site class given in the specifications. Seismic design requirements also depend on the importance category assigned to each bridge by the owner. Three importance categories are identified in the specifications: critical, essential, and other, and the basis of classification, which includes consideration of social/survival and security/defense requirements. Structures within the Section 4 corridor will be designed to seismic design requirements for zones 1 and 2. Appropriate steps will be taken in the design of Section 4 structures to ensure that seismic considerations are incorporated. The design of bridges for I-69 will be in accordance with the latest edition of the AASHTO LRFD Bridge Design Specifications, and the Indiana Department of Transportation will select the importance category for each bridge.

4.3.1.7 Karst and Springs

Karst ecosystems are an important and unique feature of Southern Indiana. The term karst refers to “landscapes characterized by caves, sinkholes, underground streams, and other features formed by the slow dissolving, rather than the mechanical eroding of bedrock” (American Geological Institute, 2001). Karst forms as water dissolves bedrock. Carbonic acid is a weak acid naturally found in water. This acid is formed as water reacts with carbon dioxide in the



atmosphere. The slightly acidic water readily dissolves the mineral calcite, which is found in limestone, marble, and dolomite. These rocks, particularly limestone, are associated with karst terrain.

Groundwater in karst terrains is contaminated easily because surface waters are channeled rapidly into the subsurface at sinkholes and other features. These waters then flow underground without the benefit of filtration or exposure to sunlight, which may remove some organic contaminants or kill some biological contaminants. Eventually the groundwater exits at springs which, in Section 4, can be a considerable distance from the proposed highway location.

Karst terrain represents a physical challenge to highway construction, as the collapse of filled sinkholes and cave passages can compromise adjacent and overlying structures. Such failures can occur without surface expression prior to collapse. Also, impervious surfaces, such as roads, alter the natural patterns of run-off and infiltration. Concentrating and/or redirecting runoff into open sinkholes or sinkholes with no surface expression can result in sinkhole collapse. Unlined retention or detention structures can increase the localized head, which could result in collapse of adjacent sinkholes. Alteration of surface run-off can also increase erosion which can effectively sever recharge features by sedimentation.

Karst features and springs are common within Section 4, particularly in Monroe County. Three distinct areas of karst geology were identified within the Section 4 study area. These areas are described below and depicted on **Figure 5.21-2** (p. 5-731).

Taylor Ridge to SR 54:

Karst in this area extends from Taylor Ridge southwest of Kolen to SR 54. The ridges in this area are mostly sandstone and the valleys are limestone. The sandstone cap rock limits sinkhole development on the ridges. Some recharge occurs along fractures in the sandstone ridges but most of the recharge occurs in swallets and joints in the dry run valleys where limestone units outcrop. In most of this area the Big Clifty sandstone is found on the ridges and springs are developed in the underlying Beech Creek limestone. This area is typical of the Crawford Upland Physiographic Region.

SR 54 to Harmony Road:

Karst in this area extends from SR 54 to Harmony Road, south of Stanford, Indiana. Sinkhole development occurs on the ridges, primarily in the eastern portion. Sinkhole development is limited to the eastern portion because karst-developing limestone beds dip to the southwest, which decreases the surface expression of karst features. Karst features develop in limestones of the Blue River and Sanders Group. Swallets and sinking streams provide the majority of recharge to springs. This area is part of the Crawford Upland Physiographic Region.

Harmony Road to SR 37:

Karst in this area extends from Harmony Road to SR 37 intersection southwest of Bloomington. The karst in this area is exemplified by ridges and valleys that are comprised of limestones of the Blue River and Sanders Group. Sinkhole and swallet development occurs in the cap rock on the ridges and in drainages. The features act as recharge areas during rain events. This recharge provides the water for the springs located in the valleys. The northern limit of this area from



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Bolin Lane to SR 37 transitions to the Bloomington Karst with features in the lower St. Louis Limestone. This area is typical of the Mitchell Plain physiography.

Refer to Section 5.21, *Karst Impacts*, for additional information pertaining to karst features.

4.3.2 Water Resources

4.3.2.1 Groundwater Resources

Aquifers

An aquifer is a reservoir of groundwater. Aquifer formations can be composed of solid rock, which is permeable due to cracks or caverns located within the rock (i.e., a consolidated aquifer), or in formations such as loose gravel, sand, silt, or clay (i.e., an unconsolidated aquifer), from which groundwater can be extracted. Water is available from both consolidated and unconsolidated aquifers in the Section 4 area. The consolidated aquifer systems in the region are bedrock aquifers composed of Mississippian aged limestone and sandstone. The unconsolidated aquifers predominant in the Section 4 study area include surficial sand deposits.

Bedrock Aquifer Systems — The bedrock (consolidated) aquifers in the Section 4 study area are highly variable. On average, wells yield less than 10 gallons per minute (gpm). However, wells that intersect fracture zones and karst conduits can have greater yields. Groundwater is available from consolidated aquifers over the majority of the Section 4 corridor, beginning at Taylor Ridge in Greene County and extending northeast to the north terminus of the Section 4 corridor. From Taylor Ridge to SR 54 in Greene County, the major hydrogeologic units are limestones of the West Baden and Stephensport groups with Beech Creek Limestone being the major hydrogeologic unit. Haney Limestone, Beaver Bend Limestone, and Big Clifty Sandstone serve as minor hydrogeologic units. From SR 54 to Harmony Road in Monroe County, the major hydrogeologic units are limestones of the Upper Blue River, West Baden, and Lower Stephensport groups, which include the Paoli, Beaver Bend, and Beech Creek limestones. From Harmony Road to the north terminus at SR 37, the major hydrogeologic units are limestones of the Sanders and Blue River groups, which include the Harrodsburg, Salem, St. Louis, and Ste. Genevieve limestones.

Unconsolidated Aquifer Systems — The single unconsolidated aquifer in the Section 4 study area consists of medium to fine glacial sands of the Jessup Formation. The aquifer lies in Greene County between US 231 and Taylor Ridge. The aquifer thickness typically ranges from 5 to 150 feet with yield rates of 100 to 2,000 gallons per minute (gpm).

Sole Source Aquifers — A sole source aquifer is an aquifer that has been designated by USEPA as the sole or principal source of drinking water for an area. As such it receives special protection. There is no designated sole source aquifer within the Section 4 study area. The



USEPA Sole Source Aquifer Protection Program¹ lists only one Sole Source Aquifer in Indiana – the St. Joseph Aquifer System in South Bend.

Groundwater Levels

Indiana Geological Survey (IGS) data was used to analyze groundwater in Section 4. The data from the water well records suggest the following:

- Regional groundwater flow is to the west.
- Groundwater flow varies locally as the groundwater drains towards local surface water outlets.

Groundwater Quality

Groundwater quality is generally within recommended drinking water standards established by the USEPA and IDEM.² However, groundwater in the area is generally hard due to high concentrations of dissolved calcium and magnesium. In addition, total dissolved solids levels often exceed the secondary standards for drinking water. The groundwater typically has iron and manganese concentrations greater than the secondary standards for drinking water. Chloride, fluoride, nitrate, sulfate, and pH levels in the groundwater are usually below the secondary standards for drinking water but some areas exceed this level. Some of these contaminants are naturally occurring (Ground-Water Resources in the White and West Fork White River Basin, Indiana, 2002).

The quantity and quality of the groundwater in the White River Basin meet the needs of most users. Groundwater in Indiana generally is very hard with the highest concentrations in bedrock aquifers. The Mississippian carbonate aquifer is near the surface throughout the Mitchell Plain. The Mitchell Plain physiographic unit is a karst plain. Much of the unit has dual porosity, whereby dissolution widened joints and fractures allow rapid transmission of groundwater relative to the bulk volume of the aquifer. The direct hydraulic connection between land surface and the aquifer makes the Mississippian carbonate aquifer highly susceptible to contamination (Schnoebelen et al, 1999). See Section 5.19-3 for more information on groundwater aquifer systems in the Section 4 corridor.

Wellhead Protection Areas

Wellhead protection is “protection of all or part of the area surrounding a well from which the well’s groundwater is drawn.” (www.epa.gov) The Safe Drinking Water Act and the Indiana

¹ Source: USEPA, Website http://www.epa.gov/safewater/sourcewater/pubs/qrg_ssamap_reg5.pdf

² The Safe Drinking Water Act authorizes USEPA “to set standards for maximum levels of contaminants in drinking water, regulate the underground disposal of wastes in deep wells, designate areas that rely on a single aquifer for their water supply, and establish a nationwide program to encourage the states to develop programs to protect public water supply wells (i.e., wellhead protection programs).” (Source: www.epa.gov). IDEM is the Indiana governmental agency responsible for water supply protection programs in the state.

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Wellhead Protection Rule (327 IAC 8.4-1) mandate a protection program for all community public water systems. The program involves delineating a Wellhead Protection Area (WHPA), identifying potential sources of contamination, and creating management and contingency plans for the WHPA. The program also requires communities to implement the plan and report to IDEM how they have protected groundwater resources. A WHPA will vary in size depending on a variety of factors including the goals of the state’s protection program, and local geological features. Coordination with IDEM indicates that there are no Wellhead Protection Areas in or adjacent to the Section 4 I-69 corridor.

Public Water Supply Systems

Three public water supply systems provide drinking water in the Section 4 study area. These are Eastern Heights Utilities, Van Buren Water, Inc., and Southern Monroe Water Company.

Eastern Heights Utilities is located in Bloomfield. This public water supply system provides water to all of the Greene County portion of the Section 4 study area as well as part of Western Monroe County. This utility obtains water from groundwater wells. The Eastern Heights Utilities’ wells are located outside of the Section 4 corridor.

Van Buren Water Inc. serves parts of Van Buren Township and Clear Creek Township located within the Section 4 study area of Monroe County. This public water supply system obtains water from the City of Bloomington. The source for this water is Lake Monroe.

Southern Monroe Water Company primarily serves southern Perry Township and Clear Creek Township in Monroe County. This public water supply system, however, does provide service to properties along Bolin Lane within and adjacent to the Section 4 corridor. This company obtains water from the City of Bloomington. The source for this water is Lake Monroe.

Private Wells

There are 30 private wells located in the Section 4 corridor (Indiana Map: <http://inmap.indiana.edu/index.html>: Water Wells and Boreholes - iLITH Database, 1998) (see **Figure 4.3-4** (p. 4-111)).

4.3.2.2 Wetlands, Lakes and Ponds

Wetlands are highly important ecosystems that include swamps, bogs, marshes, mires, fens, and other wet areas. Wetlands are often transition areas between upland and deepwater habitats. They have a number of important values and functions including nutrient sources and sinks, floodwater storage, protection of coastal areas, water purification, and habitat for a diverse number of plant and animal species.

Since the time of European settlement, the majority of wetlands across the United States have been filled, dredged and drained. USFWS estimated that prior to European settlement Indiana had some 5,600,000 acres of wetlands. Over the past 200 years, Indiana has lost approximately 85% of its wetlands (Dahl, 1990). Among the 50 states, Indiana ranks 4th in proportion of original wetland acreage lost (Dahl, 1990). The vast majority of the wetland losses were due to



drainage for agricultural productions. Because of their important values and large loss, there are several federal and state laws that regulate activities that affect wetlands. The major laws protecting wetlands are the Federal Clean Water Act, the River and Harbors Act, and Indiana's Flood Control Act and Indiana's State Isolated Wetland Law (IC 13-18-22).

In a mid-1980s study by IDNR, Indiana was estimated to have approximately 813,032 acres of wetlands (Rolley, 1991). Of this area, approximately 245,817 acres were located in the 26-county I-69 Tier 1 Study Area. Because of the importance of these ecosystems, federal policy maintains there should be "no net loss of wetlands." For every acre of wetland that is taken as part of this project, mitigation will be completed to replace the wetland losses at various ratios.

National Wetland Inventory (NWI) Wetlands

According to the Indiana Wetland Conservation Plan (1996), the NWI database is the most extensive collection of information on wetland resources in the State of Indiana. In 1974, an inventory of all wetlands in the United States was designed and implemented by USFWS, Office of Biological Services. This inventory was conducted to map the extent and types of wetlands in the country. NWI wetlands were drawn by reviewing existing aerial maps and noting specific wetland areas that appeared to contain wetland characteristics such as dark soil color, ponded water, and/or wetland vegetation. In most cases, they were not field verified through site-specific delineation protocol.

Specific to Indiana, IDNR, Division of Fish and Wildlife (DFW) entered into a cooperative agreement with USFWS in 1985 to share the costs of mapping Indiana's wetlands. Indiana's NWI maps were produced primarily from interpretation of high-altitude color infrared aerial photographs (scale of 1:58,000) taken from 1980 to 1987 during the spring and fall of each year.

The classification system used within the NWI mapping is defined in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979). This classification system was created to define ecological communities that have similar characteristics, to combine appropriately mapped wetlands to aid in resource management, to facilitate wetland area mapping, and to provide a uniform definition of mapped wetland communities. Five major systems are defined in this hierarchical classification program: Marine, Estuarine, Riverine, Lacustrine, and Palustrine. Beneath these five broad systems, subsystems, classes, subclasses, and dominance types exist to further define wetlands.

NWI Wetlands in Section 4

The NWI wetlands identified in the Section 4 corridor were palustrine and riverine wetlands. Palustrine systems are freshwater wetlands and may be affected by extreme flood conditions. They can be isolated areas surrounded by uplands or they can be found at the edge of lakes, rivers, and ponds. Palustrine systems traditionally include marshes, fens, forested swamps, bogs, and wet prairies. Riverine wetlands include all wetlands and deepwater habitats contained within a channel, with two exceptions: wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and habitats with water containing ocean-derived salts in excess of 0.5%. While the NWI mapping indicates possible riverine wetlands in the Section 4 corridor, a

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corridor field reconnaissance and subsequent wetland assessments found no riverine wetlands present within the Section 4 corridor.

NWI data indicated approximately 88 acres of wetlands in the Section 4 corridor. Also, according to NWI data, the total acres of wetlands in Greene and Monroe counties are approximately 11,895 acres and 14,474 acres, respectively. The wetland assessment of the Section 4 corridor identified 122 wetland sites totaling 66.54 acres. Wetland locations within the Section 4 corridor are shown on **Figure 4.3-5** (p. 4-114). The identification and analysis of wetlands in the corridor are discussed in detail in Section 5.19.2, *Surface Waters*. A *Final Wetland Technical Report* has been prepared for the Section 4 corridor and is located in **Appendix F**.

Emergent Wetlands

Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes (plants adapted to living in aquatic environments), excluding mosses and lichens. Emergent wetlands are also known as marshes. The vegetation in emergent wetlands is present for most of the growing season in most years (Cowardin et al., 1979). Emergent wetlands usually are dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed. Bogs and fens are two of the high quality emergent wetlands that occur as thick peat deposits in old lake basins or as blankets across the landscape (USGS, 1998). These two wetlands types are primarily found in Northern Indiana. Plants characteristic of emergent wetlands include soft-stem bulrush, carex, spikerush, and arrowhead. Emergent wetlands are the most common type of wetland in the Section 4 corridor. See **Figure 4.3-6** for an example of an emergent wetland.



Scrub/Shrub Wetlands

Scrub/Shrub wetland areas are dominated by woody vegetation less than 20-feet tall. The species include shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions (Cowardin et al., 1979). All water regimes, except subtidal are

included (USGS, 1998). Many of the scrub/shrub wetlands in the Midwest develop into forested wetlands. Plants characteristic of scrub/shrub wetlands include willows, buttonbush, rose mallow, and spicebush. Scrub/shrub wetlands are the least common wetland type in the Section 4 corridor. See **Figure 4.3-7** for an example of a scrub/shrub wetland.

Forested Wetlands

Forested wetlands are wetlands that are characterized by woody vegetation that is 20 feet tall or taller. Forested wetlands are the most common wetland type in Southwestern Indiana where moisture is abundant particularly along rivers and streams (USFWS, 1979). Forested wetlands normally possess an upper canopy of trees, an understory of young trees and shrubs, and an herbaceous ground layer (USGS, 1998). Plants characteristic of the forested wetlands in Section 4 include silver maple, sycamore, cottonwood, and pin oak. Forested wetlands are the second most common type of wetland in the Section 4 corridor. See **Figure 4.3-8** for an example of a forested wetland.



Figure 4.3-8 – Forested Wetland

Lakes and Ponds

Open water habitat consists of ponds (e.g. stock ponds, detention ponds, etc.), lakes, flooded gravel pits, and other areas that are characterized by standing water. There are no natural open water bodies located within the study corridor; those that exist are man-made. There are 68 open water habitats totaling approximately 25.02 acres within the Section 4 corridor. See **Figure 4.3-9** for an example of an Open water habitat. Open water habitats are also shown (designated as ponds) on **Figure 4.3-5** (p. 4-114).



Figure 4.3-9 – Open Water Habitat

Farmed Wetlands

According to the *USDA National Food Security Act Manual*, 3rd Edition, September 2000, farmed wetlands are “wetlands that were drained, dredged, filled, leveled, or otherwise manipulated before December 23, 1985, for the purpose of, or to have the effect of, making the



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production of an agricultural commodity possible, and continue to meet specific wetland hydrology criteria.” All of these criteria must be met before an area can be considered “farmed wetland.” If an existing agricultural wetland is not cultivated, i.e., is left fallow, for five years or more, it becomes regulated as a wetland and farming cannot be reinitiated without the proper permits. A review of USDA-NRCS records in Greene and Monroe counties revealed there were no areas in the Section 4 corridor that meet the farmed wetland criteria.

4.3.2.3 Rivers, Streams, and Watersheds

The Section 4 study area is located in the Lower White River Watershed (HUC08 05120202) and the Lower East Fork White River Watershed (HUC08 05120208). **Figure 4.3-10** (p. 4-120) shows these two watersheds in relation to the Section 4 corridor. Eight named streams and numerous unnamed tributaries were identified along the Section 4 corridor. The named streams are Dowden Branch, Flyblow Branch, Black Ankle Creek, Plummer Creek, Dry Branch, Little Clifty Branch, Mitchell Branch, and Indian Creek. The Qualitative Habitat Evaluation Index (QHEI) and Headwater Habitat Evaluation Index (HHEI) have been completed on all streams as appropriate. The QHEI/HHEI data and maps are provided in the *Final Stream Assessment Report*, **Appendix M**. The identification and analysis of streams in the Section 4 corridor are discussed in detail in Section 5.19.2, *Surface Waters*.

Surface Water Quality

The Lower White River Watershed (HUC08 05120202)³ drains approximately 1,070,194 acres from all or parts of 16 counties including the western part of the Section 4 corridor. The Lower White River is the primary water body in this watershed. The Lower White River originates from the Upper White River near Gosport then flows southwest through much of southwest Indiana before discharging into the Wabash River.

Water Quality—The Lower White River is included in the State of Indiana’s 2008 Clean Water Act Section 303(d)⁴ List of Impaired Waterbodies. The river is downstream of the Section 4 corridor and is listed as impaired with Impaired Biotic Communities and Fish Consumption Advisories for PCBs and Mercury. Further information on water quality in the corridor is included in Section 5.19.2, *Surface Waters*.

The Lower East Fork White River Watershed (HUC08 05120208) drains approximately 1,120,445 acres from all or part of 22 counties including the eastern part of the Section 4

³ The U.S. Geological Survey (USGS) delineates watershed using a nationwide system based on surface hydrologic features. This system divides and subdivides the United States into successively smaller river basin/hydrologic units. A hierarchical hydrologic unit code (HUC) is used to identify any hydrologic area. The 8 digit units are generally referred to as sub-basins. The average size of an 8-digit unit is approximately 700 square miles.

⁴ Section 303(d) of the Clean Water Act requires states to identify waters that do not or are not expected to meet applicable water quality standards with federal technology based standards alone. States are also required to develop a priority ranking for these waters taking into account the severity of the pollution and the designated uses of the waters. Once this listing and ranking of waters is completed, the states are required to develop Total Maximum Daily Loads (TMDLs) for these waters in order to achieve compliance with the water quality standards.



Corridor. The Lower East Fork White River is the primary waterbody in this watershed. The Lower East Fork White River originates from the confluence of the Upper East Fork White River and Muscatatuck River near Medora then flows southwest before joining the Lower White River near Petersburg and ultimately discharging into the Wabash River.

Water Quality—The Lower East Fork White River is included in the State of Indiana’s 2008 Clean Water Act Section 303(d) List of Impaired Waterbodies. The river is downstream of the Section 4 corridor and is listed as impaired with Fish Consumption Advisories for PCBs and Mercury. Clear Creek, a tributary of Lower East Fork White River, is on the Section 303(d) List of Impaired Waterbodies. While Clear Creek is not within the Section 4 corridor, there are tributaries of Clear Creek within the corridor. Clear Creek is listed as impaired with Fish Consumption Advisories for PCBs. Further information on water quality in the corridor is included in Section 5.19.2, *Surface Waters*.

Table 4.3-1: Impaired Waterbodies in Section 4 – Causes of Impairment

Basin	County	Waterbody Segment Name	Cause of Impairment
Lower White River	Greene	Lower White River	Impaired Biotic Communities, Fish Consumption Advisories (PCBs and Mercury)
Lower East Fork White River	Monroe	Lower East Fork White River	Fish Consumption Advisories (PCBs and Mercury)
Lower East Fork White River	Monroe	Clear Creek	Fish Consumption Advisories (PCBs)

Source: <http://www.in.gov/idem/programs/water/303d/index.html>

Surface Water-Groundwater Interaction

Areas where surface water and groundwater interact have the greatest potential to serve as sources of groundwater contamination, particularly in losing streams, i.e., a section of a stream in which the water table adjacent to the stream is lower than the water surface in the stream, causing infiltration from the stream channel, recharging the groundwater aquifer and decreasing the stream flow (<http://www.ag.arizona.edu/AZWATER/main.html>). The closer the static water level to the ground surface, the greater potential there is for groundwater contamination.

Monitoring wells are often used to identify and document the interaction between surface water and groundwater. Without such documentation, it would be difficult to classify streams in a given locale as “gaining” or “losing” streams. Monitoring wells were not employed in this Tier 2 study in Section 4; therefore, in the absence of documentation, for purposes of evaluating impacts it is assumed that each stream has the potential to affect groundwater.

In the White River Basin, groundwater generally flows into streams through permeable sediments that line the stream channel. Although groundwater typically discharges to streams, the hydraulic gradient may be reversed in some situations and surface water may flow into the aquifer. Water levels in the White River can rise to a point at which gradients are reversed and surface water seeps into the adjacent sand and gravel aquifers (Schnoebelen et al, 1999).



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4.3.2.4 Floodplains

Floodplains are low lands adjoining the channel of a river or stream that have been or may be inundated by floodwater; they are a critical component of the riparian ecosystem. The floodplain should be considered an integral part of the stream corridor. The floodplain is considered part of the stream channel, differing from the main channel only in the amount of time it stores and conveys water. Undeveloped floodplains can moderate flood pulses by providing storage capacity. Floodplains with intact riparian buffers can greatly improve water quality in the stream by trapping sediment and naturally attenuating many pollutants.

A floodplain is defined as the area around a stream or river that frequently floods during heavy rain. The 100-year floodplain was analyzed for this project. This is the area around streams and rivers that will be under water whenever a 100-year flood occurs. Floodplains are composed of two general areas. The first area is the floodway, which is the channel of a river or stream and those portions of the floodplain adjoining the channel which are reasonably required to efficiently carry and discharge the peak flow of the regulatory flood (100-year flood) of any river or stream. The second area is the remaining area of the floodplain, which is often referred to as “backwater.” This “backwater” area is essentially a holding area providing storage of floodwater.

Projects that directly cross or are adjacent to a stream or river impact floodplains to some degree. When a project crosses a stream or river in a perpendicular orientation, it is referred to as a transverse floodplain encroachment. Likewise, when a project is located adjacent to a stream or river it is referred to as a longitudinal floodplain encroachment. See **Figures 4.3-11** (p. 4-91) and **4.3-12** (p. 4-91) for examples of transverse and longitudinal floodplain encroachments. Impacts to floodplains require various permits, which are described in Section 5.25 *Permits*.

The Section 4 corridor is located within the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map Numbers 1804360005A, 1804360006A, 1804360003A, 1804440005B, 1804440003C, and 1801690040C. According to these maps the Section 4 corridor crosses mapped 100-year floodplains at Black Ankle Creek, Plummer Creek, Dry Branch, Mitchell Branch, Indian Creek, and May Creek. No other floodplains within the Section 4 corridor are identified by the FEMA Flood Insurance Rate Maps. Floodplains in and near the corridor are shown on **Figure 4.3-13** (p. 4-121). These data are from the Indiana Department of Natural Resources (IDNR) digitations of the FEMA maps.

In addition to the FEMA mapped floodplains, other drainage features may have jurisdictional floodplains requiring special design considerations relating to flooding. Impacts to floodplains require various permits, which are described in Section 5.25, *Permits*.

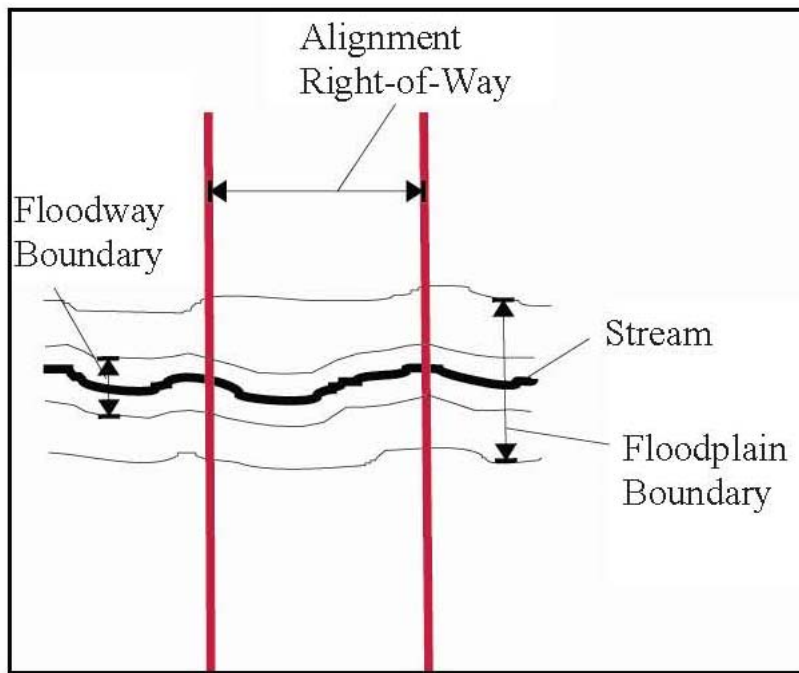


Figure 4.3-11: Transverse Floodplain Encroachment

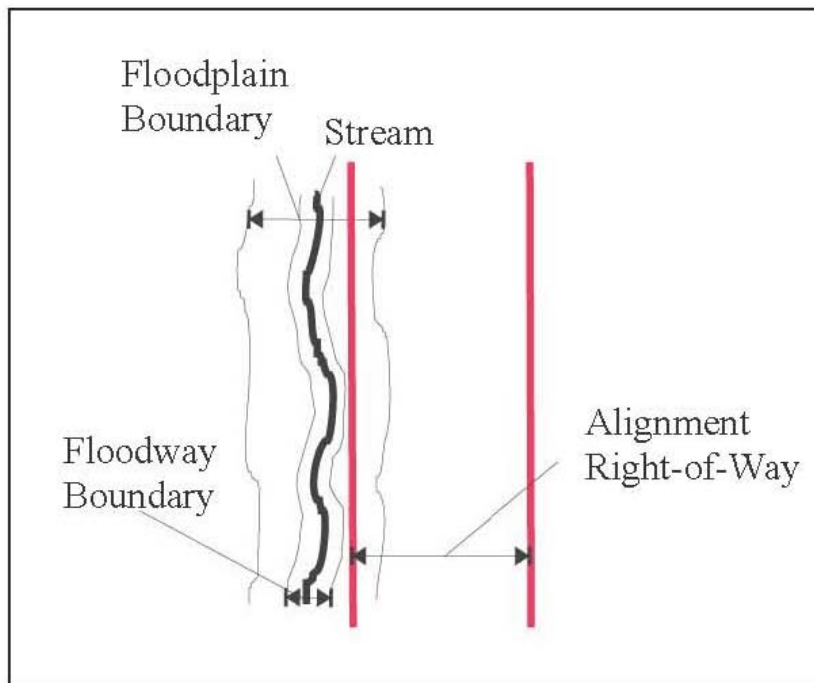


Figure 4.3-12: Longitudinal Floodplain Encroachment



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4.3.3 Ecosystems

Section 4 passes through the Southwestern Lowlands Natural Region-Glaciated Section, the Shawnee Hills Natural Region-Crawford Upland and Escarpment Sections, and Highland Rim Natural Region-Mitchell Karst Plain Section.

The **Southwestern Lowlands Natural Region-Glaciated Section** was shaped and leveled by Illinoian glaciation and shows little topographical relief. Although most of the area was forested, wet prairie and marsh were also common. Lowland forests were common as well, and today's poorly drained flatwoods contain shagbark and shellbark hickory, pin and shingle oak, red and silver maple, hackberry, and green ash. Black ash is more commonly associated with wet, swampy woods of the lake region in Northern Indiana, but some of the flat, poorly drained, glaciated soils of this section provide favorable habitat for this species. Even these hard-to-use wetlands, however, have been drained, so that few remain. It is believed that the greatest amount of prairie occurring south of the Wisconsin glacial border in Indiana was found in this section. Although little remains of these prairies today, in all probability they were very similar in composition to the large expanses of grassland that occurred in the Grand Prairie Natural Region in Northwestern Indiana (Jackson, 1997). Common animal species seen in the Glaciated Section include box turtle and white-tail deer.

The **Shawnee Hills Natural Region-Crawford Upland Section** consists of more rugged hills than lowlands. The section's forest vegetation consists of oak-hickory assortments on the upper slopes, while the coves have a mesic component. Characteristic upper slope species include black oak, white oak, chestnut oak, scarlet oak, post oak, pignut hickory, red hickory, shagbark hickory, and rarely, sour wood. Characteristic cove species include beech, tulip tree, red oak, sugar maple, black walnut, white ash, yellow buckeye, basswood, and hemlock (Jackson, 1997). Common animal species seen in the Crawford Upland Section include white-tail deer and wild turkey.

Terrain in the **Shawnee Hills Natural Region-Escarpment Section** is visually similar to that of the Crawford Upland Section. Various upland forests, especially dry-mesic and mesic are the predominant natural community types. Oak-hickory assortments, composed of pignut, red and shagbark hickories and black, white and scarlet oaks are found on the upper slopes, while lower elevations and coves have a mesic component, where American beech, tulip poplar, sugar maple, black walnut and white ash are common species. The animal species common to this section are the same as those common to the Crawford Upland Section.

The **Highland Rim Natural Region-Mitchell Karst Plain Section** is a landscape of steep topography with narrow ridges and valleys. Forest vegetation consists of mixed forest types of sugar maple, American beech, tulip poplar, northern red oak, and hickory occupying north facing slopes and minor valleys. White, black and scarlet oak, shagbark hickory and red maple are dominant on ridges and south facing slopes. Chestnut oak is found on the driest ridges, and black maple, chinkapin oak and Ohio buckeye are found within areas of limestone soils. Common animal species seen in the Mitchell Karst Plain Section include white-tail deer and eastern chipmunk.

Classification of natural communities within the project corridor into habitat types was completed for Section 4 to facilitate the evaluation of impacts resulting from implementation of the proposed highway. The habitat types listed were developed according to the vegetative characteristics of each community as documented during the field surveys of 2004 and 2005.

Section 4.3.3.1 summarizes the general characteristics of these habitat types and Section 4.3.3.2 identifies the wildlife species that typically rely on these habitat types for food and shelter.

4.3.3.1 Habitat Types

The basic characteristics of ten habitat types within the Section 4 project corridor are briefly described below. These natural habitat types are typical of the Southern Lowlands, Shawnee Hills and Highland Rim natural regions within which Section 4 is located. Refer to **Figure 4.3-6** to **Figure 4.3-9** (pp. 4-86 and 4-87) and **Figure 4.3-14** to **Figure 4.3-19** for representative photographs of each habitat type.

(1) Old Field habitat types (**Figure 4.3-14**) are agricultural lands that, following managed use, lay fallow for several years, eventually reverting to an assemblage of various native and naturalized grasses and forbs. This habitat type typically supports a variety of species.



Figure 4.3-14 – Old Field



Figure 4.3-15 – Early to Mid Successional Forest

(2) Early to Mid Successional Forest communities (**Figure 4.3-15**) resemble a later stage of Old Field, and consist of between 10% and 50% woody plants (seedlings or saplings).

(3) Mesic Floodplain Forest (**Figure 4.3-16**) occur in lower elevation areas within riparian corridors and often have prolonged periods of standing water. Wetland habitat types can sometimes be found within forested floodplains.



(4) **Dry Mesic Forest (Figure 4.3-17)**, one of the most common community types in Indiana, is often found on north-facing and east-facing slopes as well as the transition from floodplain forests to dry upland forests.

(5) **Forest Fragment** habitat types (**Figure 4.3-18**) are generally located between agricultural fields and consist of fencerows, shrubby ditches, and partially forested waterways that lack floodplain. Given the scale and extent of most agricultural landscapes, forest fragments are often the only refuge readily available to wildlife. Thus, they represent a unique and valuable habitat type. Since these tree-covered areas are too narrow or too small to meet the USDA definition of forest, they are not considered as upland forest in the analysis of forest impacts in Section 5.20, *Forest Impacts*.



(6) **Mesic Upland Forests (Figure 4.3-19)** are often characterized by dense canopy and an understory of shade-tolerant species. These areas are typically found on north-facing slopes and level ground with moderately high moisture. Species composition varies according to topography, soil types, moisture, etc. These forests, where extensive, assist in regional climate control, as the dense canopy shades forested wetlands and associated creeks and ephemeral streams.



(7) Emergent Wetlands (Figure 4.3-6, p. 4-86) support erect, largely herbaceous perennial species and permanent water for most of the growing year, during those years of normal precipitation levels. These wetlands maintain the same appearance each year unless extreme climatic conditions cause flooding or other extreme local changes. Emergent wetlands traditionally include marsh, meadow, and fen.

(8) Scrub/Shrub Wetlands (Figure 4.3-7, p. 4-86) support largely woody species less than 20 feet in height. All hydrological regimes are included except sub-tidal. Vegetation includes true shrub species but also young trees, and trees and shrubs that are stunted because of environmental conditions. Scrub/shrub wetlands within Section 4 are broad-leaved deciduous communities consisting of buttonbush, black willow and red osier dogwood.

(9) Forested Wetlands (Figure 4.3-8, p. 4-87) support largely woody species greater than 20 feet in height. They include various hydrological regimes and various layers of vegetation including canopy trees, subcanopy trees, shrubs, and ground layer herbaceous vegetation. Forested wetlands traditionally include bottomland hardwood and swamp communities.

(10) Open Water habitat types (**Figure 4.3-9, p. 4-87**) in the Section 4 corridor consist of lakes and ponds, all of which are constructed (primarily for agricultural or residential uses) rather than naturally occurring.

Approximately 30% of the corridor is agricultural land; however, agricultural areas were not included as a specific habitat type, as these areas typically occur within a matrix of other habitat types and provide little habitat when isolated. Additionally, depending on management intensity or cultivation method, agricultural habitat may vary substantially in structure annually; cultivated agricultural lands are typified by periods of bare soil and harvest as pastures are mowed, hayed, or grazed one or more times during the growing season.

Indiana was divided into four forest survey units during the first Forest Inventory Analysis completed by the U.S. Department of Agriculture (USDA) Forest Service in 1950. Forest survey units have remained consistent throughout the years to more accurately track changes in forests from survey to survey. Each unit contains approximately one-fourth of the state's forests. The Section 4 study area is located within the Lower Wabash and Knobs Units. The Lower Wabash Unit contains many wet sites and bottomlands due to the convergence of the Ohio and Wabash rivers. Trees such as bald cypress and swamp cottonwood are naturally more abundant here than in other parts of the state. The major forest types in this unit are maple-beech (37%), oak-hickory (35%), and elm-ash-cottonwood (20%). The Knobs Unit contains some of the hilliest land in Indiana. Forests of the unit are developed over areas of sandstone and limestone bedrock, resulting in varied tree species and associated shrubs and flowering plants. The major forest types in this unit are oak-hickory (48%), maple-beech (35%), elm-ash-cottonwood (7%) and eastern redcedar-oak-pine (6%) (Tormoehlen et al., 2000).

Two forest inventories have been conducted in Indiana, with similar results. Smith and Golitz (1986) found that Greene County had 105,300 acres of forests accounting for 30.1% of its land area, and Monroe County had 117,500 acres of forest accounting for 44.7% of its land area. Greene County had 101,000 acres of forest in 1950 and 99,500 acres of forest in 1967. Monroe



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County had 132,000 acres of forest in 1950 and 133,800 acres of forest in 1967 (Smith and Golitz, 1986). A survey of Indiana's forests, 1998, published by the USDA Forest Service identified a total of 128,800 acres of forest in Greene County and 136,700 acres of forest in Monroe County (Schmidt et al, 2000).

Approximately 59% of the Section 4 corridor is forested upland. Age classes and species composition vary depending on past land uses, soils and management intensity. Large forest tracts extend across the entire corridor width in many locations. Construction of I-69 will unavoidably sever and fragment some of the area's forested habitat. Physical loss of habitat and habitat fragmentation can affect animal populations such that species diversity can be diminished by isolation and inbreeding and, ultimately, the local survival of species can be threatened. As a result, many biologists recommend incorporating wildlife corridors and crossings with highway projects to provide wildlife with a means of accessing fragmented habitat (Conservation Technology Support Program Newsletter, Web Version, 2006).⁵ Measures to minimize impacts to habitat and provide for habitat connectivity are identified in Section 5.18, *Wildlife Considerations*, Section 5.20, *Forest Impacts*, and Section 7.3, *Mitigation Measures and Commitments*.

4.3.3.2 Wildlife

The general characteristics of wildlife species common to the habitat types occurring in the Section 4 corridor are identified below.

(1) Old Field plant species provide natural food plots, nesting areas, and shelter for a wide variety of birds, butterflies, and mammals. Forage is available for seed-eating birds such as quail, mourning dove, and finches; and insects attract wild turkey, eastern meadowlark and other birds. Rodents feed on the green vegetation and seeds. Predatory birds and snakes, in turn, feed on the rodents. Various flowering plants provide nectar and pollen for butterflies, moths, and bees.

(2) Early to Mid Successional Forest communities provide food and shelter for species that include northern mockingbird, catbird, field sparrow, opossum, cottontail rabbit, quail, and wild turkey.

(3) Mesic Floodplain Forests provide valuable habitat for birds, mammals, amphibians, reptiles, and insects. The dense herbaceous cover provides nesting grounds for waterfowl. Tree snags and cottonwoods provide food and shelter for many species of songbirds (Sullivan, 1995). Also common to this habitat are the northern cardinal, gray catbird, house wren, eastern mole, raccoon, common muskrat, white-tailed deer, and turtles (Sullivan, 1995).

(4) Dry Mesic Forests are often dominated by oaks and hickories; thus, they provide an abundance of food for wildlife. This diverse plant system also provides habitat for many

⁵ Source: <http://www.conservationgis.org/scgis/ScgNews2/ctspsection/ct96craighead.html>



different species of birds, mammals, and amphibians. Typical species using this habitat type include white-tailed deer, gray squirrels, raccoons, eastern box turtles, skinks, and wild turkey.

(5) Forest Fragments harbor a variety of plant species and typically include a younger growth stand with pioneer species. Wildlife species that commonly utilize forest fragments include cottontail rabbit, Virginia opossum, raccoon, white-tailed deer, white-footed mouse, gray squirrel, American robin, blue jay, brown-headed cowbird and grackle.

(6) Mesic Upland Forests provide food chain support for many different wildlife species. For example, many bird species such as blue jay and downy woodpecker use these areas and associated wetlands as a source of food, water, nesting material and shelter. Mammals such as woodchuck, striped skunk, and white-tailed deer are also common to this habitat type.

(7) Emergent Wetlands harbor resident and migratory waterfowl including geese, ducks, herons, and other birds. Depending on hydrology levels, emergent wetlands may also provide habitat for muskrat, snakes, frogs, salamanders, turtles, and various beneficial insects and their larvae.

(8) Scrub/Shrub Wetlands also harbor resident and migratory bird species including common grackles, ducks, herons, American kestrels, northern harriers and other birds. Mammals that utilize these wetlands include muskrat, bats, raccoons, voles and cottontail rabbits. Depending on hydrology levels, emergent wetlands may also provide habitat for snakes, frogs, salamanders, turtles, and various beneficial insects and their larvae.

(9) Forested Wetlands are often seasonally inundated, which provides an ideal habitat for emergence of spring aquatic life. Representative wildlife dependent upon forested wetlands includes wood ducks, great blue heron, green heron, and swamp sparrow; and other wildlife such as turtles, salamanders, frogs, snakes, and mammals.

(10) Open Water can provide breeding, foraging, and resting habitat for a variety of wildlife species including amphibians, birds, mammals, fish, and insects. Although natural open water habitats provide spawning sites, nursery areas, feeding sites, and cover for various species of fish, many man-made features (e.g. stock and detention ponds, flooded gravel pits) do not provide suitable habitat for certain species of fish or other aquatic species.

4.3.3.3 Threatened and Endangered Species

Threatened and Endangered Species (TES) are recognized by federal and state agencies as being in danger of extinction or being sufficiently compromised to potentially become endangered at either the local or national level. The assessment of TES is concerned with the preservation and conservation of such species and their sustainability.

The Endangered Species Act of 1973 (ESA), (7 USC 136; 16 USC 460 et seq.), provides a nation-wide program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. This act prohibits any action, administrative or real, that will result in the taking of a listed species or adversely affecting its critical habitat. In addition, any import, export, interstate, or foreign commerce of listed species is strictly prohibited by the

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ESA. Specifically, federally-listed species are protected under Section 7 of the ESA, which directs all federal agencies to use their existing authorities to conserve TES.

The ESA defines an endangered species as any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the U.S. Department of the Interior to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man. In addition, threatened species is defined by the ESA as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

As previously noted, the ESA prohibits any action that results in the taking of a listed species unless the appropriate permit has been acquired. The term "take," according to the ESA means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

Section 8 of the ESA designates management and scientific authority to the United States Department of the Interior, with the respective functions of each authority to be carried out through the U.S. Fish and Wildlife Service (USFWS). USFWS maintains the list of 410 endangered faunal species, 601 endangered floral species, 163 threatened faunal species, and 146 threatened floral species (as of August 13, 2009). Faunal species include mammals, corals, reptiles, amphibians, fish, clams, snails, insects, arachnids, crustaceans and birds, while floral species include conifers and cyads, ferns and allies, lichens and flowering plants.

In addition to the federal law protecting endangered species, many states have enacted similar laws to protect species on a more local level. Title 14, Article 22 of the Indiana Code provides authority for IDNR to protect and properly manage the fish and wildlife resources of Indiana. This same provision of the Indiana Code also defines an endangered species as any species or subspecies of wildlife whose prospects of survival or recruitment within Indiana are in jeopardy or are likely within the foreseeable future to become so due to any of several factors. These factors include the destruction, drastic modification, or severe curtailment of the habitat of the wildlife; the over-utilization of the wildlife for scientific, commercial, or sporting purposes; the effect on the wildlife of disease, pollution, or predation; other natural or manmade factors affecting the prospects of survival or recruitment within Indiana; or any combination of the aforementioned factors. This definition also includes any species or subspecies of fish or wildlife appearing on the United States list of endangered native fish and wildlife (50 CFR 17, Appendix D) or any species or subspecies of fish and wildlife appearing on the United States list of endangered foreign fish and wildlife (50 CFR 17 Appendix A).

The Indiana Code (IC 14-22-34-5) defines "take" as harassing, hunting, capturing, killing, or any attempt to harass, hunt, capture, or kill wildlife. In addition, IC 14-22-34-10 provides the IDNR authority to prepare a list of those species and subspecies of wildlife indigenous to Indiana that are determined to be endangered in Indiana, giving the common and scientific names by species and subspecies.

In addition to protections provided by the federal and state endangered species legislation noted above, the Migratory Bird Treaty Act (MBTA) makes it illegal for anyone to take, possess,



import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations (USFWS, 2003). The specific migratory bird species protected by the MBTA can be found in 50 CFR 10.13.

In a final rule issued on July 9, 2007, the USFWS removed the bald eagle from the list of threatened and endangered species established under the Endangered Species Act. The bald eagle continues to be protected under the Bald and Golden Eagle protection Act (16 U.S.C. §§ 668-668d) and the Migratory Bird Treaty Act (16 U.S.C. §§ 703-712). In particular, the Bald and Golden Eagle Protection Act prohibits the incidental taking of a bald eagle except as allowed by a permit granted by the FWS.

Bird species were observed during all field survey efforts. Bird species observed were noted to provide a general description of bird diversity in the project corridor and to identify any migratory bird species protected by the Migratory Bird Treaty Act (MBTA). The results are discussed in Section 5.17: *Threatened and Endangered Species*.

An evaluation of impacts on federally-listed species has been carried out in consultation with USFWS under Section 7 of the Endangered Species Act. In Section 7 consultation during the preparation of the Tier 1 EIS, USFWS initially identified six species in the 26-county Study Area that required evaluation. Of the six species evaluated in the Tier 1 DEIS, USFWS identified three species that may be present in the Action Area for Preferred Alternative 3C. Those three species were the Indiana bat, the bald eagle,⁶ and the eastern fanshell mussel.

The Tier 2 biological fieldwork conducted in Section 4 included pedestrian surveys, and mist netting for Indiana bats. A total of 9 Indiana bats were captured at 7 of the 30 mist netting sites established within or adjacent to the Section 4 corridor. Five (5) bat roosts were identified using radio tracking of 3 of the captured Indiana bats. None of the five roosts were located within the Section 4 corridor. As a result of these mist netting efforts, three Indiana bat maternity colonies were identified within Section 4.

Pre-construction mist netting was completed for a portion of Section 4 in August 2010. One male Indiana bat was captured and was radiotagged. This bat was tracked to a primary roost tree that is located within the Section 4 Preferred Alternative 2. Based on the discovery of this primary roost tree, the USFWS has determined that a fourth maternity colony has been identified in Section 4.

A description of the methods and results of the surveys conducted for Tier 2 Section 4 are included in Chapter 5, *Environmental Consequences*, Section 5.17, *Threatened and Endangered Species*.

⁶ Since the USFWS's identification of species to be considered during the Tier 2 studies, the bald eagle has been delisted as a federally threatened species. See Section 5.17, *Threatened and Endangered Species*, for additional information.

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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 eastern fanshell mussels within the corridor. Thus, there has been no re-initiation of formal consultation for the eastern fanshell. No bald eagle nests have been identified within the corridor; however, because the bald eagle has been delisted, no formal consultation under the Threatened and Endangered Species Act would be necessary.

4.3.3.4 Managed Lands/Natural Areas

Managed lands and natural areas include forests, recreation areas, natural areas, and other federal and state lands that are managed for conservation, recreation, resource extraction, or other purposes. Some private lands are also considered “managed lands,” such as those owned by The Nature Conservancy non-profit group. These areas may also be designated for a specific purpose (not necessarily actively managed) or high quality natural areas. These lands may be managed for timber production, wildlife habitat, recreation, education, or other purposes. There are federal and state interests in many of these lands. These include cost-sharing agreements, purchased easements, or property tax reductions. Federal and state funds have been or are being expended on many of these properties.

Federal- or state-owned managed lands in Southern Indiana include Naval Surface Warfare Center-Crane, Hoosier National Forest, Morgan-Monroe State Forest, and many others. Federal, state and municipally-owned managed lands in the vicinity of the Section 4 Corridor include Martin State Forest (IDNR), Naval Surface Warfare Center-Crane (US Department of Defense), Leonard Springs Park (Bloomington Parks and Recreation Department), and County Farm Karst Park (Monroe County). Privately-owned managed lands near the Section 4 corridor include Wayne’s Woods (Sycamore Land Trust) and Cedar Bluffs Nature Preserve (The Nature Conservancy). None of these federal- or state-owned managed lands or natural areas are located within the Section 4 Corridor. A Martin State Forest property known as the Combs Unit abuts the northern edge of the corridor in Greene County, just west of Black Ankle Creek near Koleen.

Privately-owned managed lands include properties enrolled in government cost share programs such as the USDA-NRCS Farm Bill Programs which include Wetlands Reserve Program (WRP), Wildlife Habitat Incentives Program (WHIP), Environmental Quality Incentives Program (EQIP), Conservation Reserve Enhancement Program (CREP) and Conservation Reserve Program (CRP). Other privately-owned managed lands include properties enrolled in the IDNR Classified Forest and Wildlands Program, and the USFWS Partners for Fish and Wildlife Program, among others.

USDA-NRCS Farm Bill Programs

The USDA-NRCS Farm Service Agency Indiana Office (FSA) has just recently begun to enter its information on CRP properties into a Geographic Information System (GIS) platform. The initial data entry has been completed by FSA for all of the counties that comprise the I-69 Tier 2 Study Corridor as of July 2008.



Based on information provided by NRCS, nine privately-owned parcels within the Section 4 corridor are enrolled in USDA-NRCS Farm Bill programs. It should be noted that more than one contract may be in place on a given parcel.

Conservation Reserve Program (CRP) — The program is administered through the Farm Service Agency (FSA), and program support is provided by NRCS, Cooperative State Research and Education Extension Service, state forestry agencies, and local Soil and Water Conservation Districts (NRCS Website, <http://www.nrcs.usda.gov/programs/crp/>.) CRP is a voluntary program for agricultural landowners, through which property owners can receive cost-share assistance to establish long-term, resource-conserving covers on eligible farmland. Participants enroll in CRP for 10 to 15 years. There are 8 properties in the Section 4 corridor enrolled in the CRP.

Environmental Qualities Incentives Program (EQIP) — EQIP addresses locally identified problems with natural resources. High priority is given to assistance where agricultural improvements will help meet water quality objectives. EQIP offers contracts that provide incentive payments and cost sharing for conservation practices, such as manure management systems, pest management, erosion control, and other practices to improve and maintain the health of natural resources (NRCS Website). The NRCS indicated that within Monroe County, there are 2 EQIP contracts (on one parcel) within the Section 4 corridor. No EQIP contracts were reported within the corridor in Greene County.

Other Farm Bill Programs — Based on information provided by NRCS (September 2009), no WHIP, WRP or CREP managed properties are present in the Section 4 corridor.

IDNR Classified Forest and Wildlands

In addition to properties enrolled in Farm Bill programs, twenty-nine classified forest and wildland tracts exist on privately owned properties in the Section 4 corridor. It should be noted that more than one contract may be in place on a given parcel. This program is available to landowners with at least 10 contiguous acres supporting a growth of native or planted trees, native or planted grasslands, wetlands or other acceptable types of land cover that have been set aside and managed for the production of timber, wildlife habitat and watershed protection. In return for meeting program guidelines, landowners receive property tax breaks, forestry literature and periodic free inspections by a professional forester while the forest is enrolled in the program. The lands are eligible for assessment at \$1.00 per acre and taxes are paid on that assessment. The owner of classified forest and wildland does not relinquish ownership or control of his property and the IDNR Division of Forestry does not become connected in any way with the ownership of the land. Part or all of the classified forest and wildland can be withdrawn from classification at any time by completing and recording the withdrawal forms provided by the district forester upon request. When a part of classified forest and wildland is withdrawn, the remaining area must be a minimum of 10 acres. If it is less than this, the whole tract must be withdrawn. The state forester may also withdraw the land from classification if the requirements of the law are not being met. When withdrawing land from classification, the owner must contact to the county assessor and request that the assessor prepare a report stating the real property taxes that would have been paid had the property not been classified (Project Team coordination with IDNR, 2005). Any liability of the property owner for back taxes and/or



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penalties will be considered by INDOT in its appraisal process. Impacts to the privately owned managed land as a result of the project are described in Section 5.22, *Managed Lands and Natural Areas*.

The relationship of the Managed Lands properties to the Section 4 corridor is depicted on **Figure 4.3-20** (p 4-122). Managed Lands properties are identified by number and shaded in the figures below. Note that there may be overlap of some Managed Lands property boundaries.

Managed Land Property 1 is approximately 38.76 acres in size and accessed via CR 200E and CR 215E in Greene County. The property is enrolled in the IDNR Classified Forest and Wildlands Program, with approximately 26.72 managed acres within the Section 4 corridor.

Managed Land Property 2 is approximately 14.52 acres in size and accessed via CR 315E and CR 600S in Greene County. The property is enrolled in the Conservation Reserve Program, with approximately 3.84 managed acres within the Section 4 corridor.

Managed Land Property 3 is approximately 28.27 acres in size and accessed via CR 315E in Greene County. The property is enrolled in the IDNR Classified Forest and Wildlands Program, with approximately 17.61 managed acres within the Section 4 corridor.

Managed Land Property 4 is approximately 55.01 acres in size and accessed via SR 58/SR 45, in Greene County. The property is enrolled in the Classified Forest and Wildlands Program with approximately 24.66 managed acres within the Section 4 corridor.

Managed Land Property 5 is approximately 34.61 acres in size and accessed via CR 600S in Greene County. The property is enrolled in the Conservation Reserve Program, with approximately 24.21 managed acres within the Section 4 corridor.

Managed Land Property 6 is approximately 3.63 acres in size and accessed via CR 425S in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 2.45 managed acres within the Section 4 corridor.

Managed Land Property 7 is approximately 21.88 acres in size and accessed via CR 450S and CR 475E in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 0.09 managed acres within the Section 4 corridor.

Managed Land Property 8 is approximately 1.29 acres in size and accessed via CR 44E in Greene County. The property is enrolled in the Conservation Reserve Program and is located entirely within the Section 4 corridor.

Managed Land Property 9 is approximately 12.03 acres in size and accessed via CR 440E in Greene County. The property is enrolled in the Conservation Reserve Program, with approximately 1.44 managed acres within the Section 4 corridor.

Managed Land Property 10 is approximately 48.68 acres in size and accessed via CR 450S and CR 475E in Greene County. The property is enrolled in the Conservation Reserve Program, with approximately 34.63 managed acres within the Section 4 corridor.



Managed Land Property 11 is approximately 19.47 acres in size and accessed via CR 440E in Greene County. The property is enrolled in the Classified Forest and Wildlands Program and is located entirely within the Section 4 corridor.

Managed Land Property 12 is approximately 31.14 acres in size and accessed via CR 450S and CR 475E in Greene County. The property is enrolled in the Conservation Reserve Program, with approximately 26.73 managed acres within the Section 4 corridor.

Managed Land Property 13 is approximately 20.49 acres in size and accessed via CR 450S in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 14.69 managed acres within the Section 4 corridor.

Managed Land Property 14 is approximately 23.94 acres in size and accessed via CR 400S in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 16.61 managed acres within the Section 4 corridor.

Managed Land Property 15 is approximately 36.06 acres in size and located to the southeast of Managed Land Property 14, approximately 0.5 mile east of CR 600E in Greene County. The property has no apparent direct access. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 24.31 managed acres within the Section 4 corridor.

Managed Land Property 16 is approximately 65.74 acres in size and located to the east of Managed Land Property 15, approximately 0.75 mile east of CR 600E in Greene County. The property has no apparent direct access. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 23.51 managed acres within the Section 4 corridor.

Managed Land Property 17 is approximately 143.87 acres in size and accessed via CR 610E in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 99.77 managed acres within the Section 4 corridor.

Managed Land Property 18 is approximately 100.38 acres in size and accessed via CR 750E in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 22.98 managed acres within the Section 4 corridor.

Managed Land Property 19 is approximately 40.00 acres in size and accessed via CR 750E in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 29.63 managed acres within the Section 4 corridor.

Managed Land Property 20 is approximately 45.09 acres in size and accessed via CR 750E in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 27.30 managed acres within the Section 4 corridor.

Managed Land Property 21 is approximately 92.57 acres in size and accessed via CR 920E in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 54.80 managed acres within the Section 4 corridor.

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Managed Land Property 22 is approximately 101.90 acres in size and accessed via CR 400S in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 33.42 managed acres within the Section 4 corridor.

Managed Land Property 23 is approximately 72.36 acres in size and accessed via CR 300S in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 42.71 managed acres within the Section 4 corridor.

Managed Land Property 24 is approximately 35.00 acres in size and accessed via CR 300S in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 27.31 managed acres within the Section 4 corridor.

Managed Land Property 25 is approximately 100.00 acres in size and accessed via SR 45 in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 24.27 managed acres within the Section 4 corridor.

Managed Land Property 26 is approximately 80.00 acres in size and accessed via SR 45 in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 79.20 managed acres within the Section 4 corridor.

Managed Land Property 27 is approximately 60.00 acres in size and located to the east of Managed Land Property 25, approximately 0.32 mile east of SR 45 in Greene County. The property has no apparent direct access. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 2.89 managed acres within the Section 4 corridor.

Managed Land Property 28 is approximately 80.31 acres in size and accessed via CR 400S in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 21.14 managed acres within the Section 4 corridor.

Managed Land Property 29 is approximately 58.26 acres in size and accessed via CR 1250E in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 40.75 managed acres within the Section 4 corridor.

Managed Land Property 30 is approximately 30.94 acres in size and accessed via CR 150N in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, and is not located within the Section 4 corridor. This property is located within the area studied for a potential interchange in the vicinity of the Greene County/Monroe County line.

Managed Land Property 31 is approximately 17.49 acres in size and located approximately 0.1 mile north of CR 150N in Greene County. The property has no apparent direct access. The property is enrolled in the Classified Forest and Wildlands Program, and is not located within the Section 4 corridor. This property is located within the area studied for a potential interchange in the vicinity of the Greene County/Monroe County line.

Managed Land Property 32 is approximately 183.94 acres in size and accessed via CR 1375E in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 171.30 managed acres within the Section 4 corridor.



Managed Land Property 33 is approximately 65.54 acres in size and located to the northeast of Managed Land Property 31, approximately 0.17 mile north of CR 150N in Greene County. The property has no apparent direct access. The property is enrolled in the Classified Forest and Wildlands Program, and is not located within the Section 4 corridor. This property is located within the area studied for a potential interchange in the vicinity of the Greene County/Monroe County line.

Managed Land Property 34 is approximately 29.02 acres in size and accessed via CR 150N in Greene County. The property is enrolled in the Classified Forest and Wildlands Program, with approximately 19.38 managed acres within the Section 4 corridor.

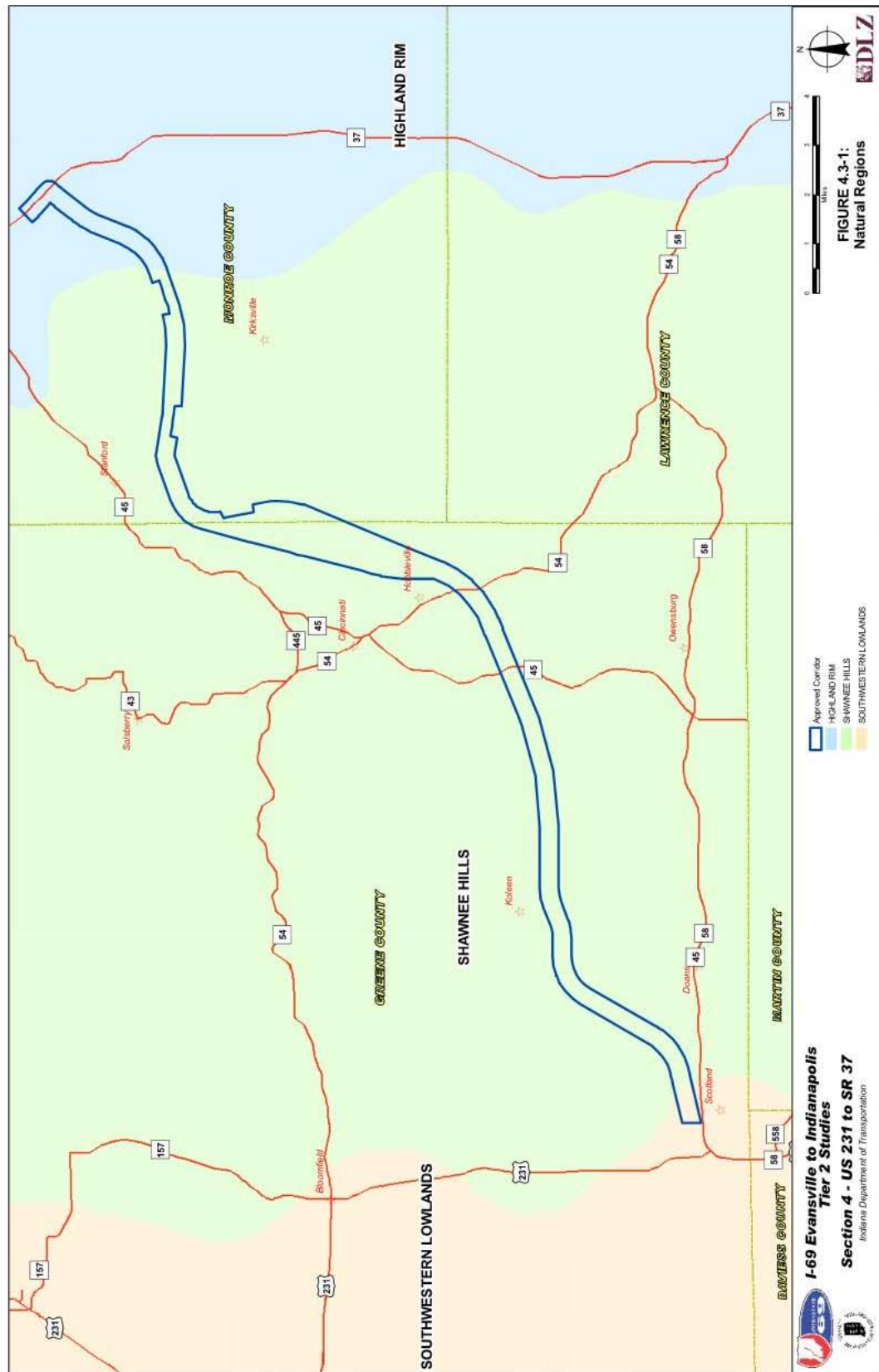
Managed Land Property 35 is approximately 76.71 acres in size and accessed via Carter Road in Greene County. The property is enrolled in the Classified Forest and Wildlands Program and is located entirely within the Section 4 corridor.

Managed Land Property 36 is approximately 28.49 acres in size and accessed via Carter Road in Greene County. The property is enrolled in the Classified Forest and Wildlands Program and is located entirely within the Section 4 corridor.

Managed Land Property 37 was identified in the DEIS as a 78.32 acre managed land enrolled in the Environmental Quality Incentives Program and accessed via Tramway Road in Monroe County. In a written comment received subsequent to the August 26, 2010 DEIS public hearing, the owner of this property informed the project team that this property is not enrolled in any managed land program. Managed Land Property 37 has been removed from **Figure 4.3-20**.

Managed Land Property 38 is approximately 65.49 acres in size and accessed via Victor Pike in Monroe County. The property is enrolled in the Conservation Reserve Program, with approximately 61.66 managed acres within the Section 4 corridor.

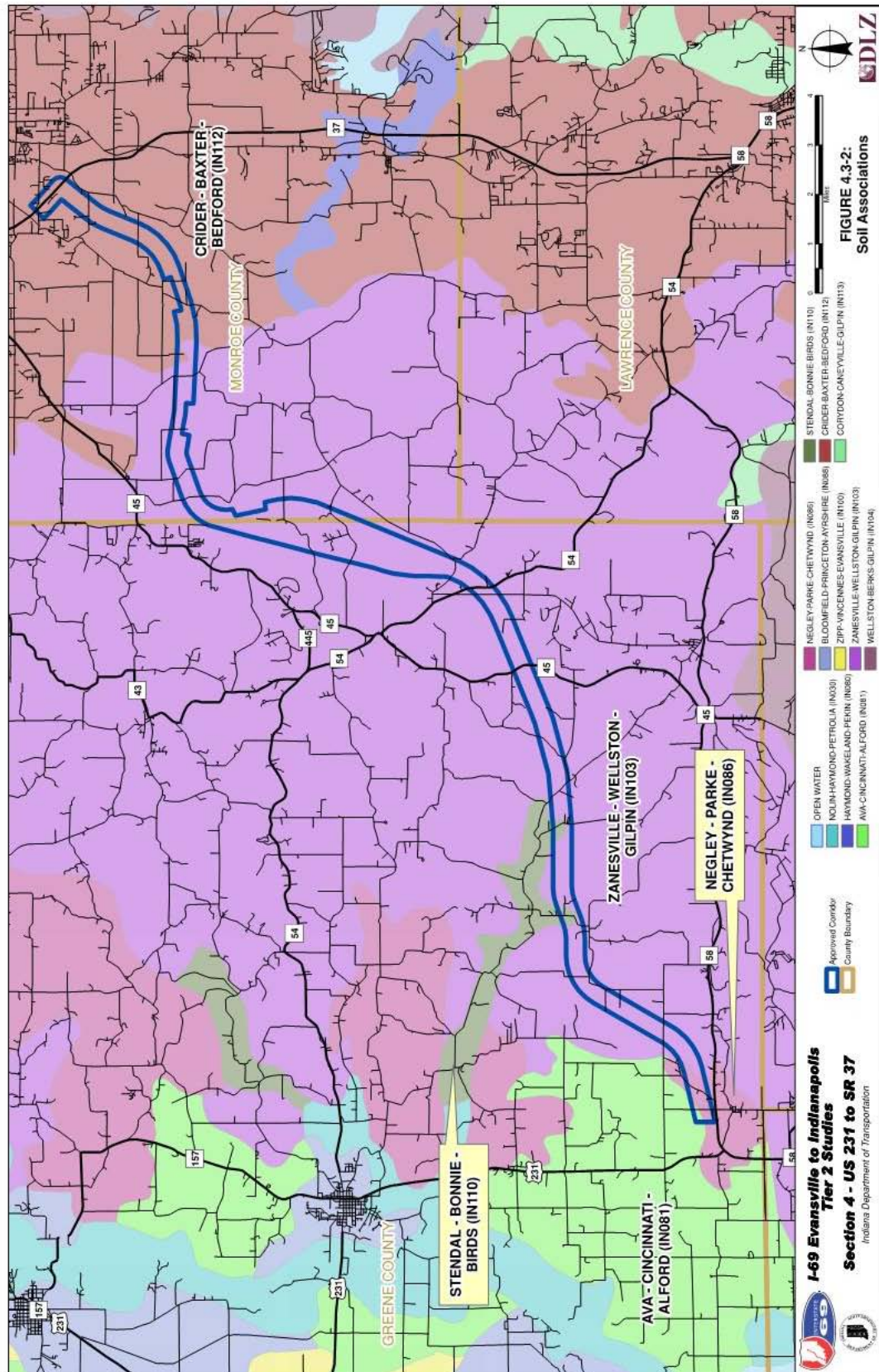
Managed Land Property 39 is approximately 34.24 acres in size and accessed via That Road in Monroe County. The property is enrolled in the Conservation Reserve Program, with approximately 18.57 managed acres within the Section 4 corridor.

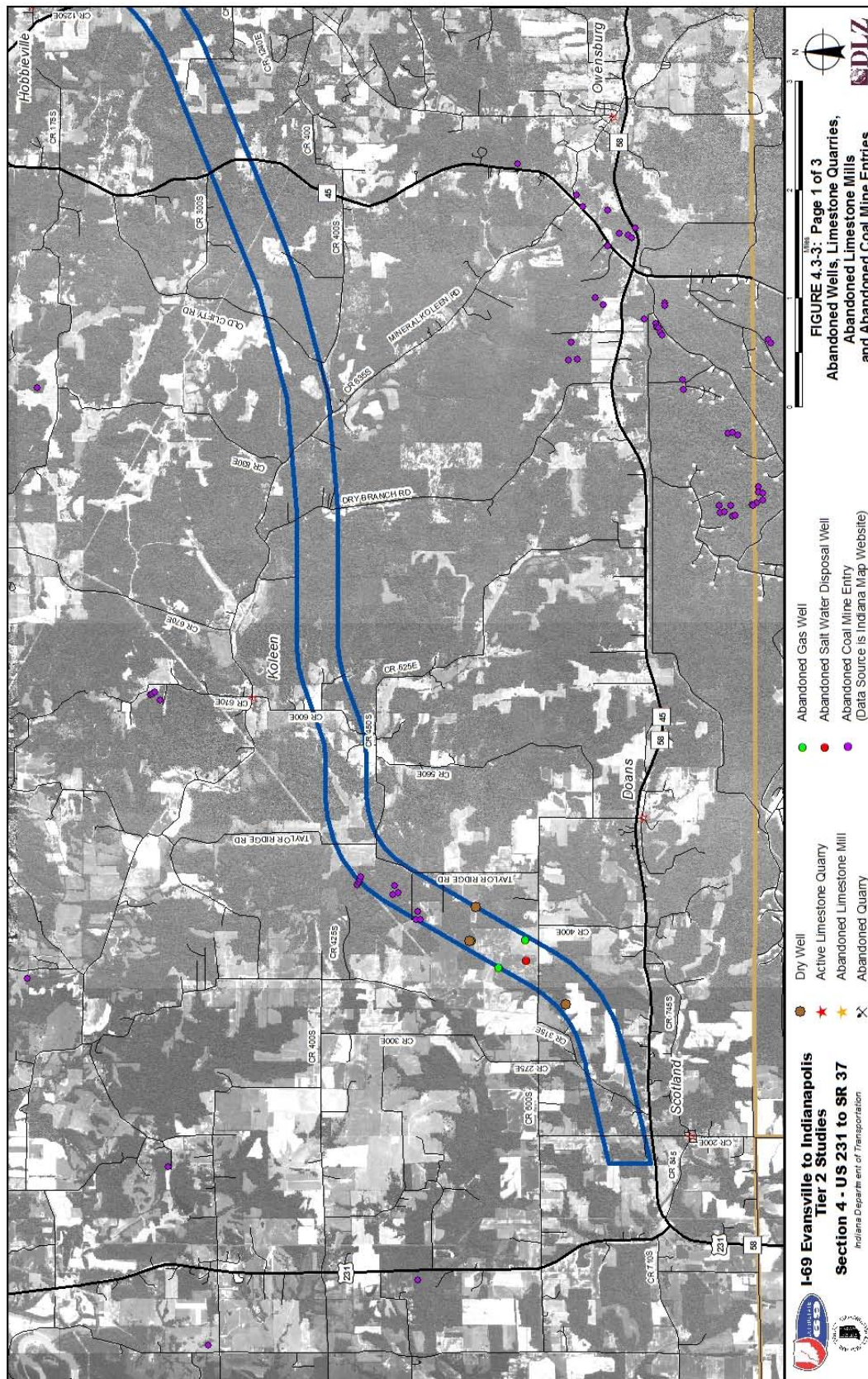




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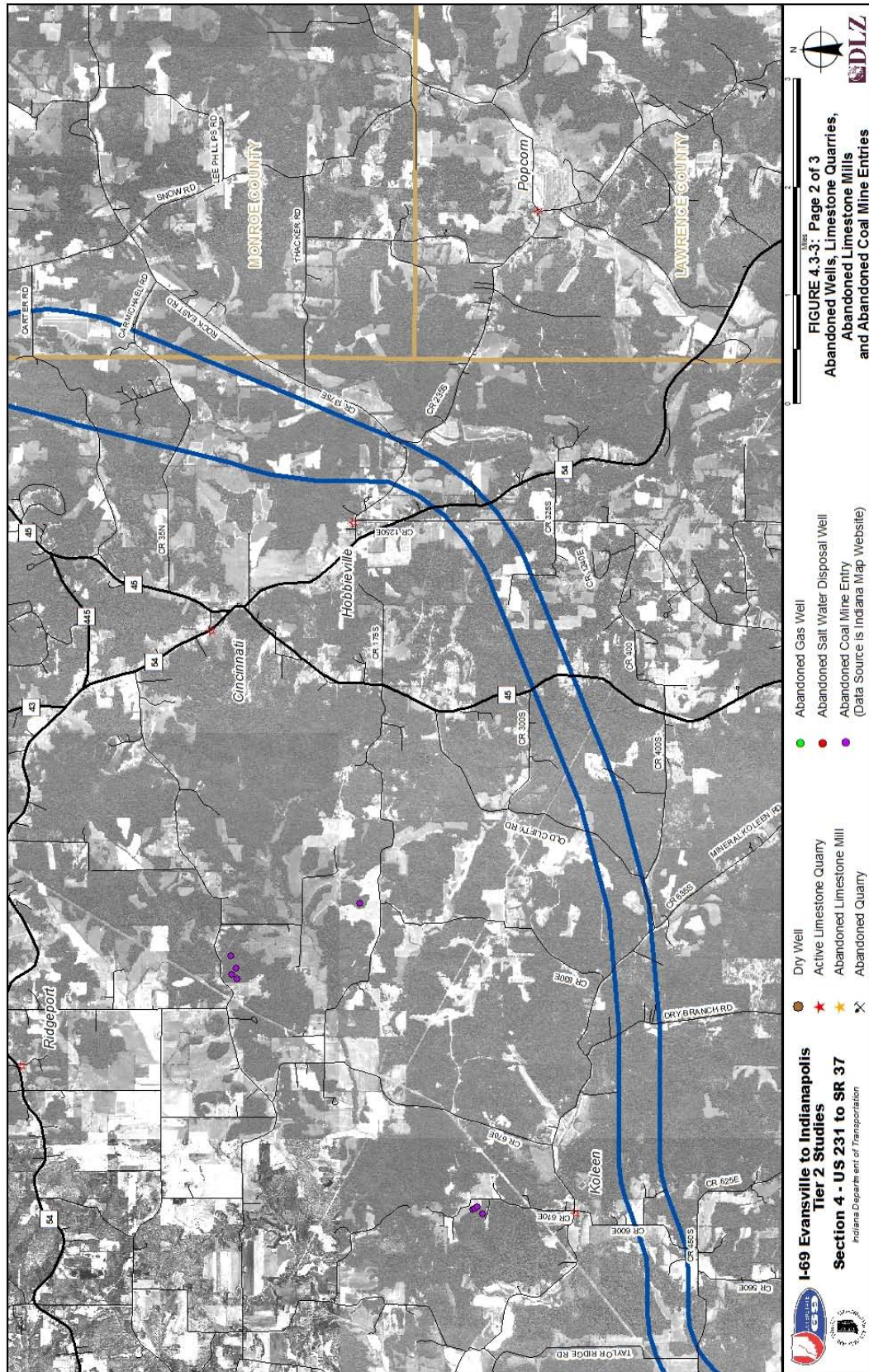


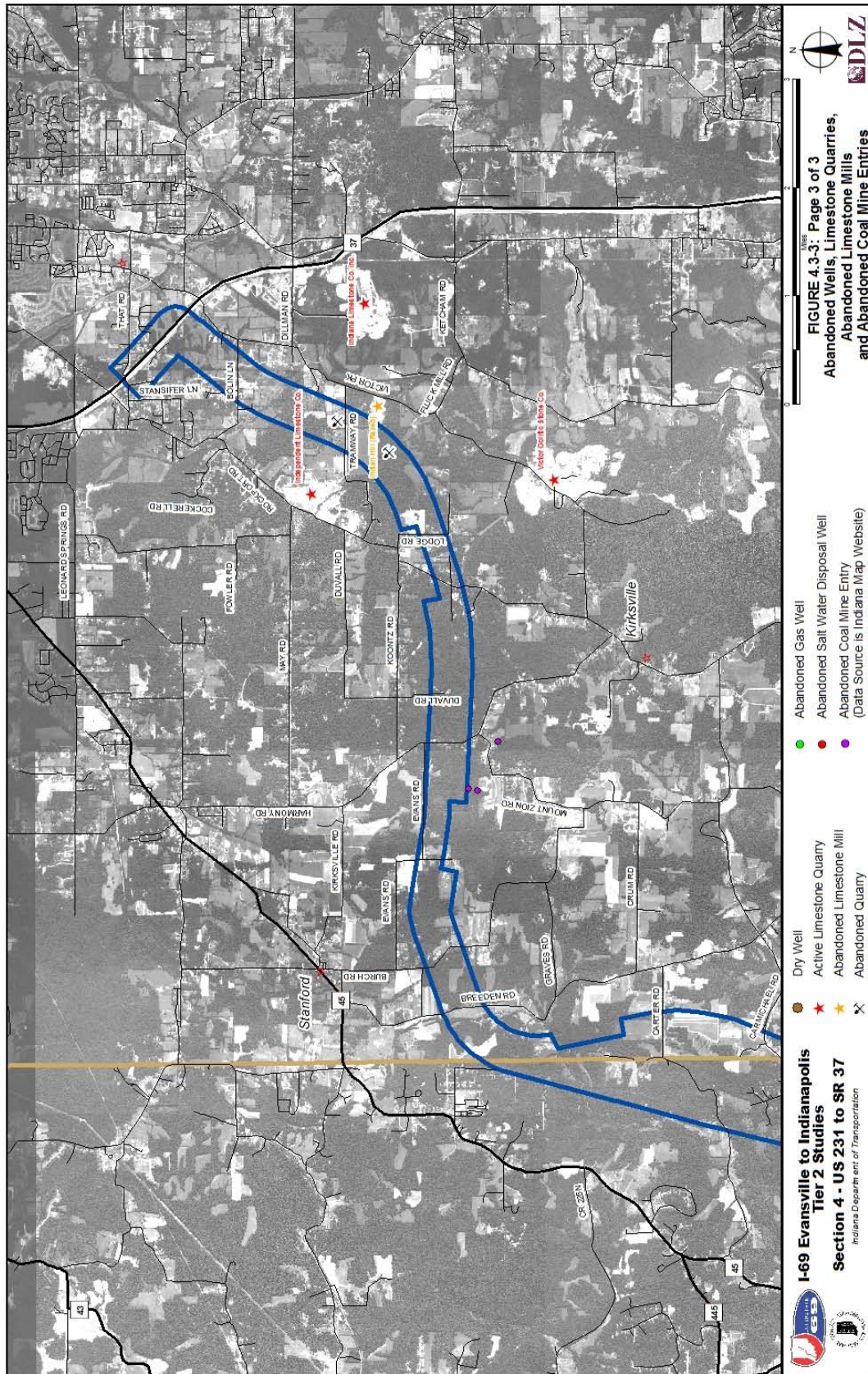


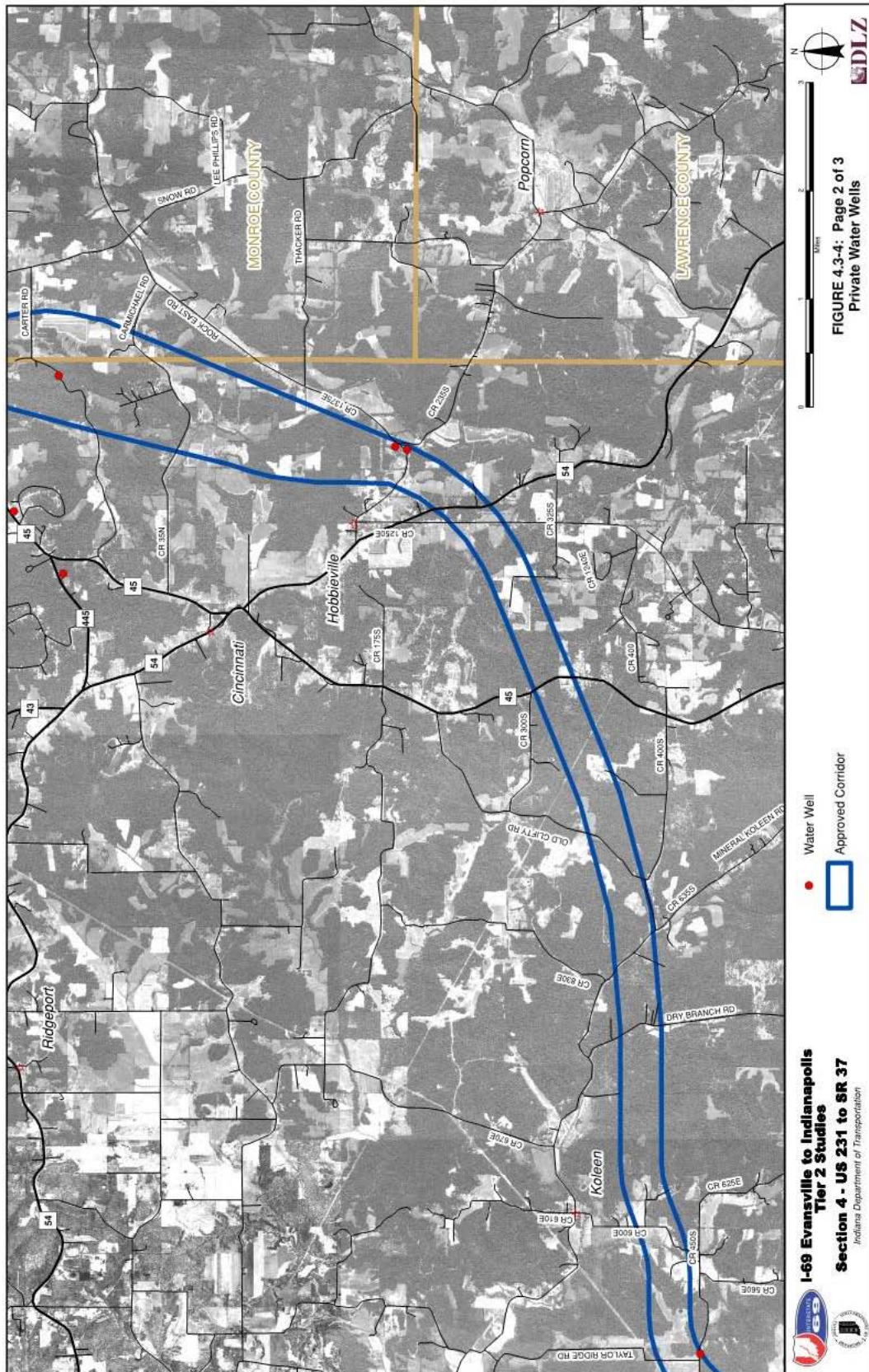


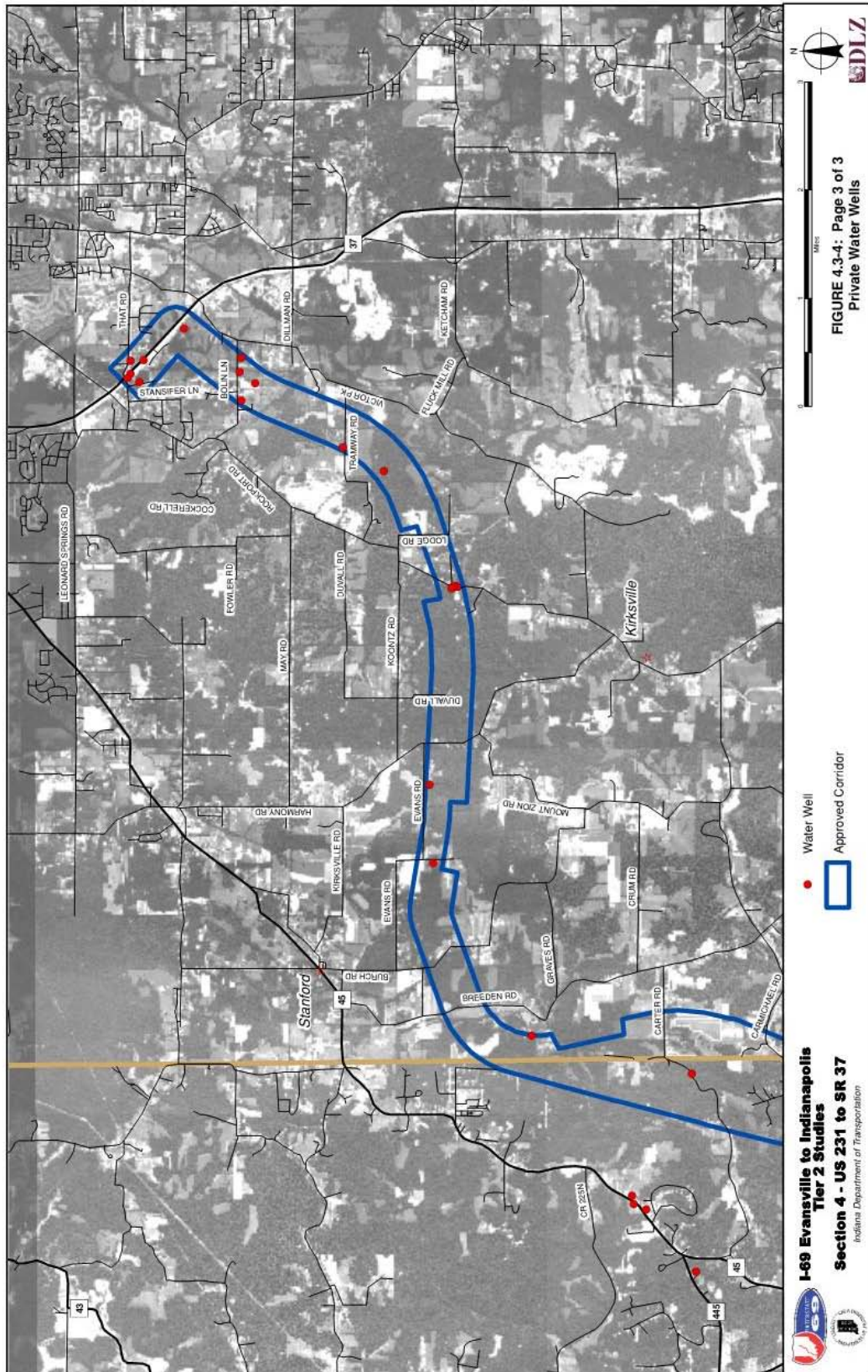
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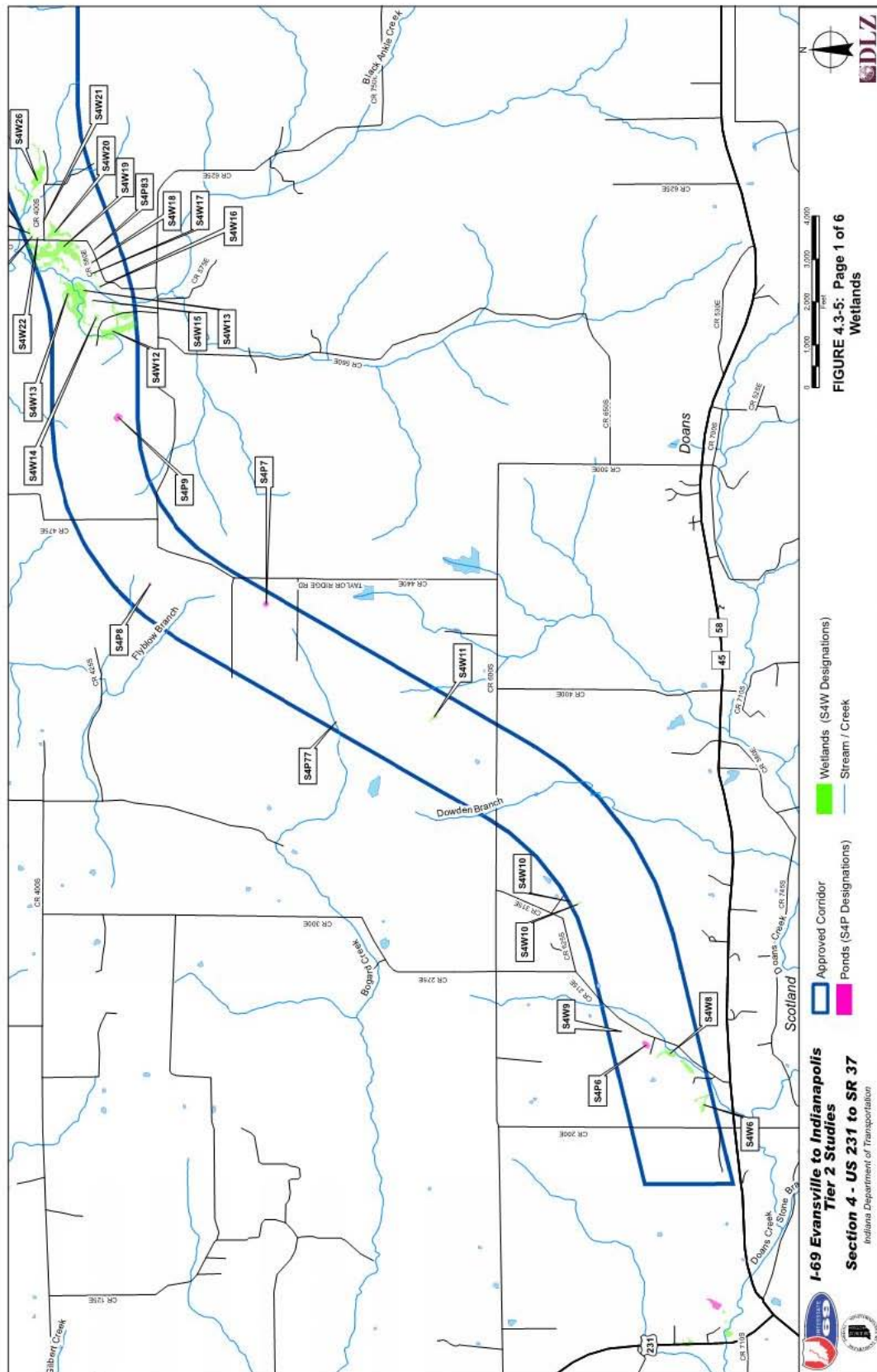
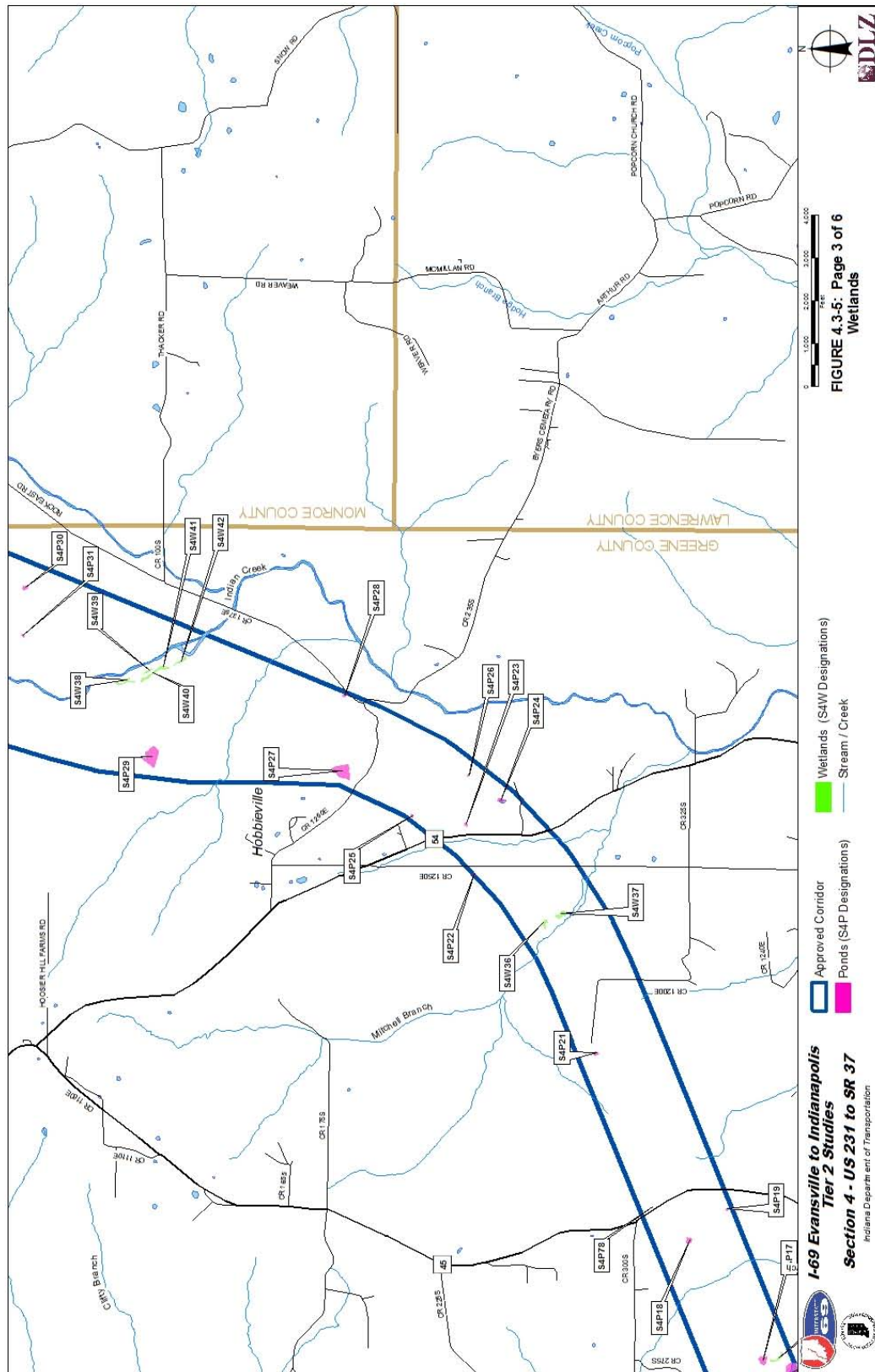


FIGURE 4.3-5: Page 1 of 6 Wetlands





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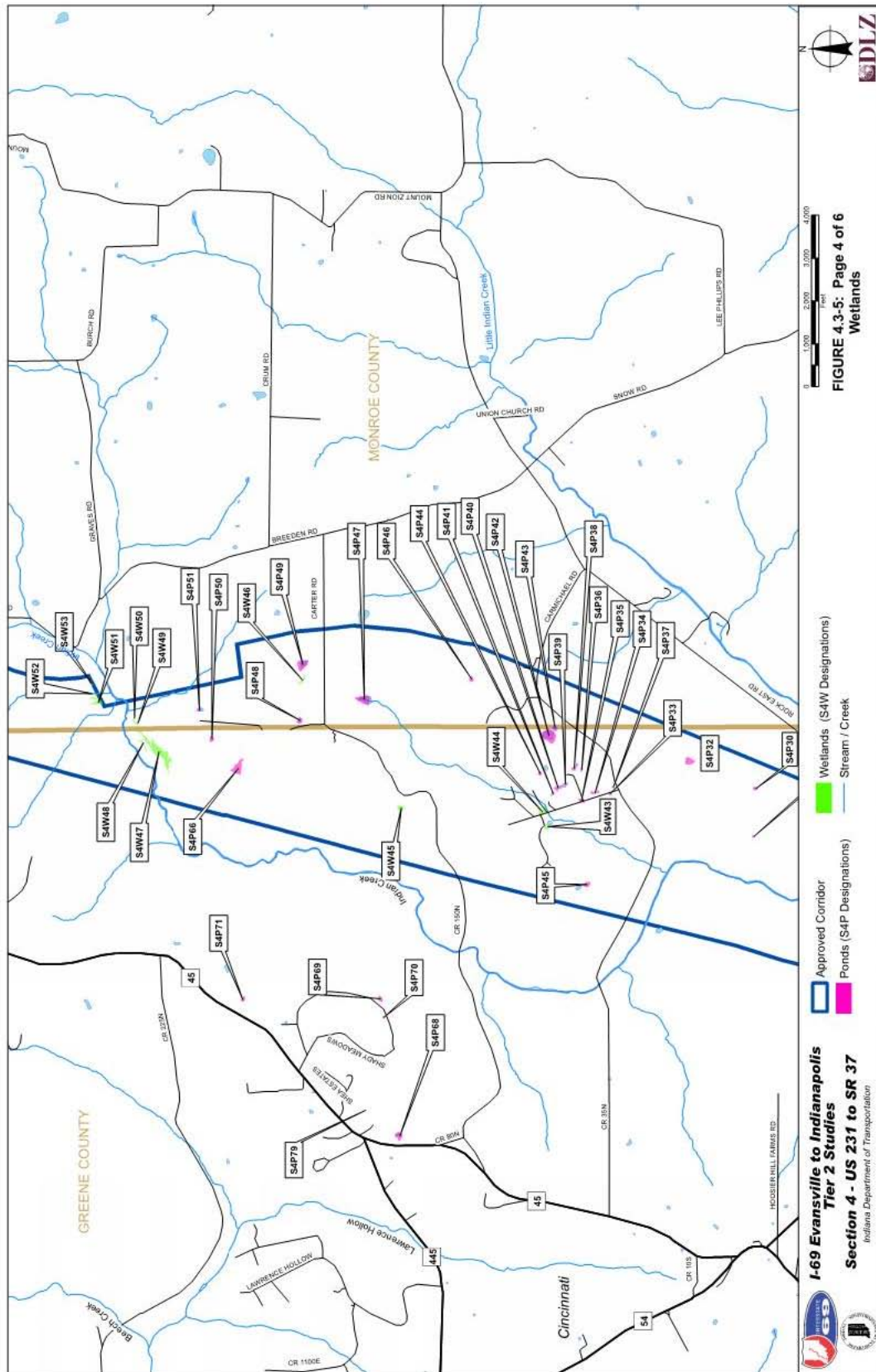
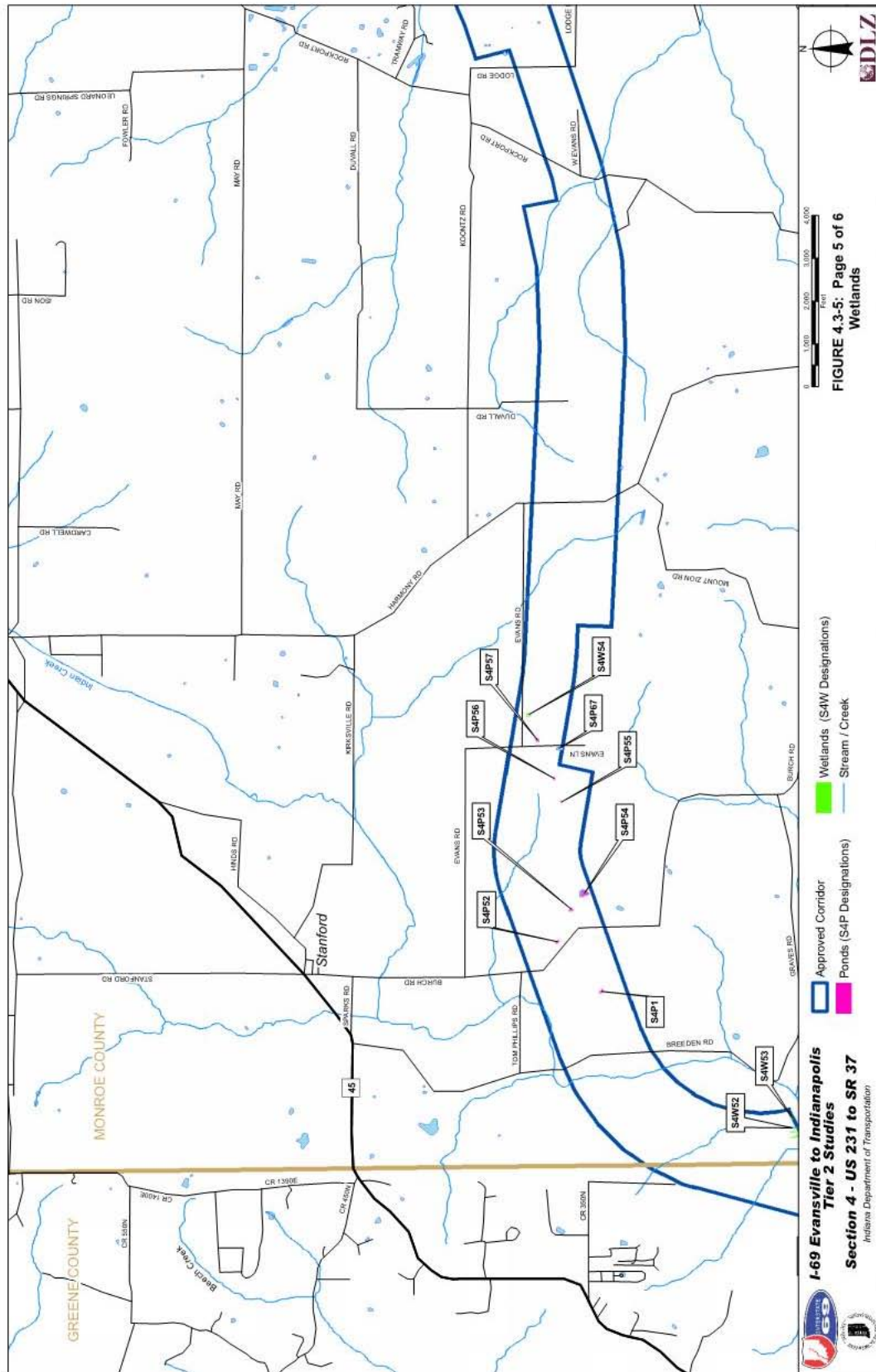
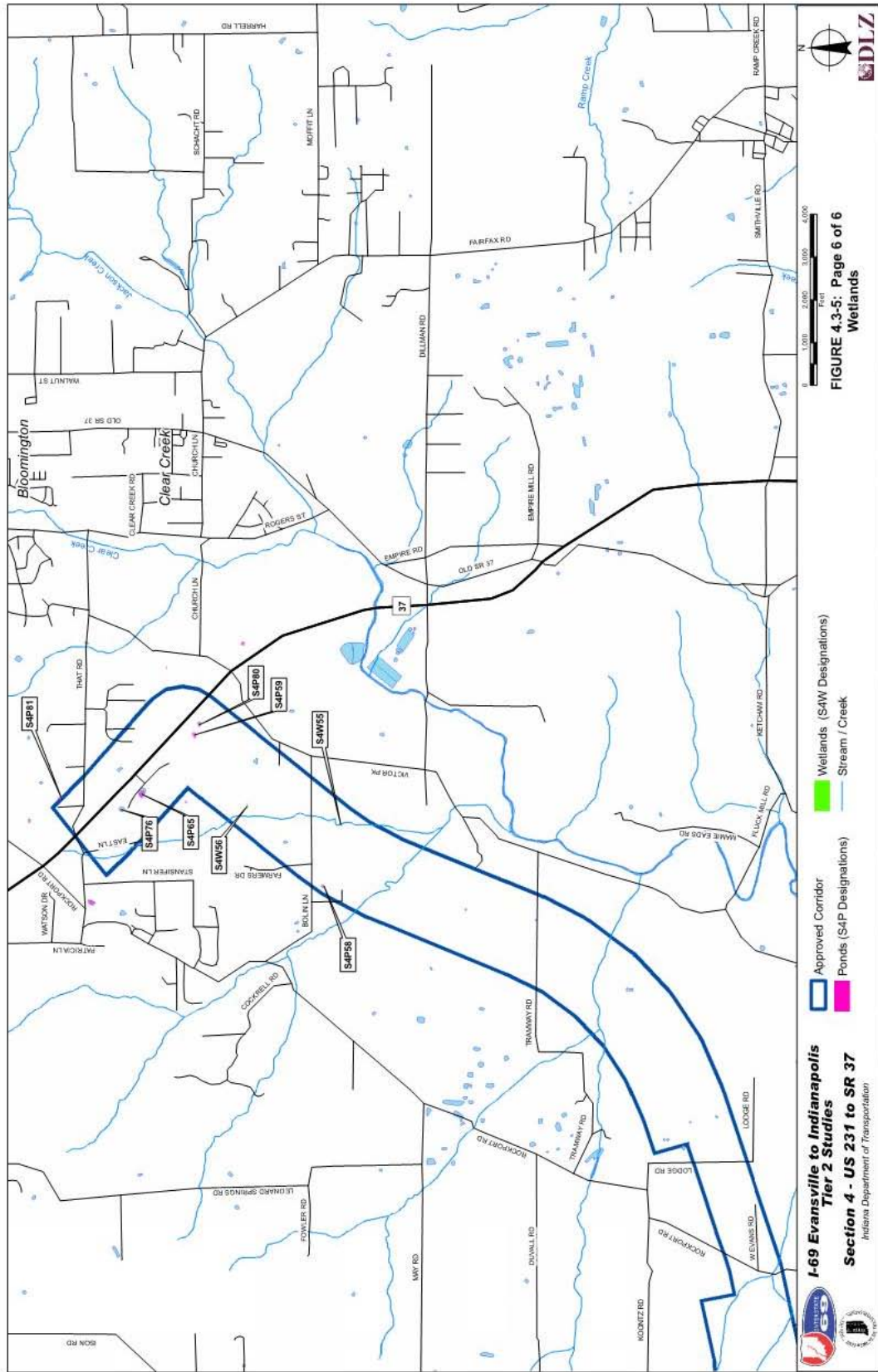


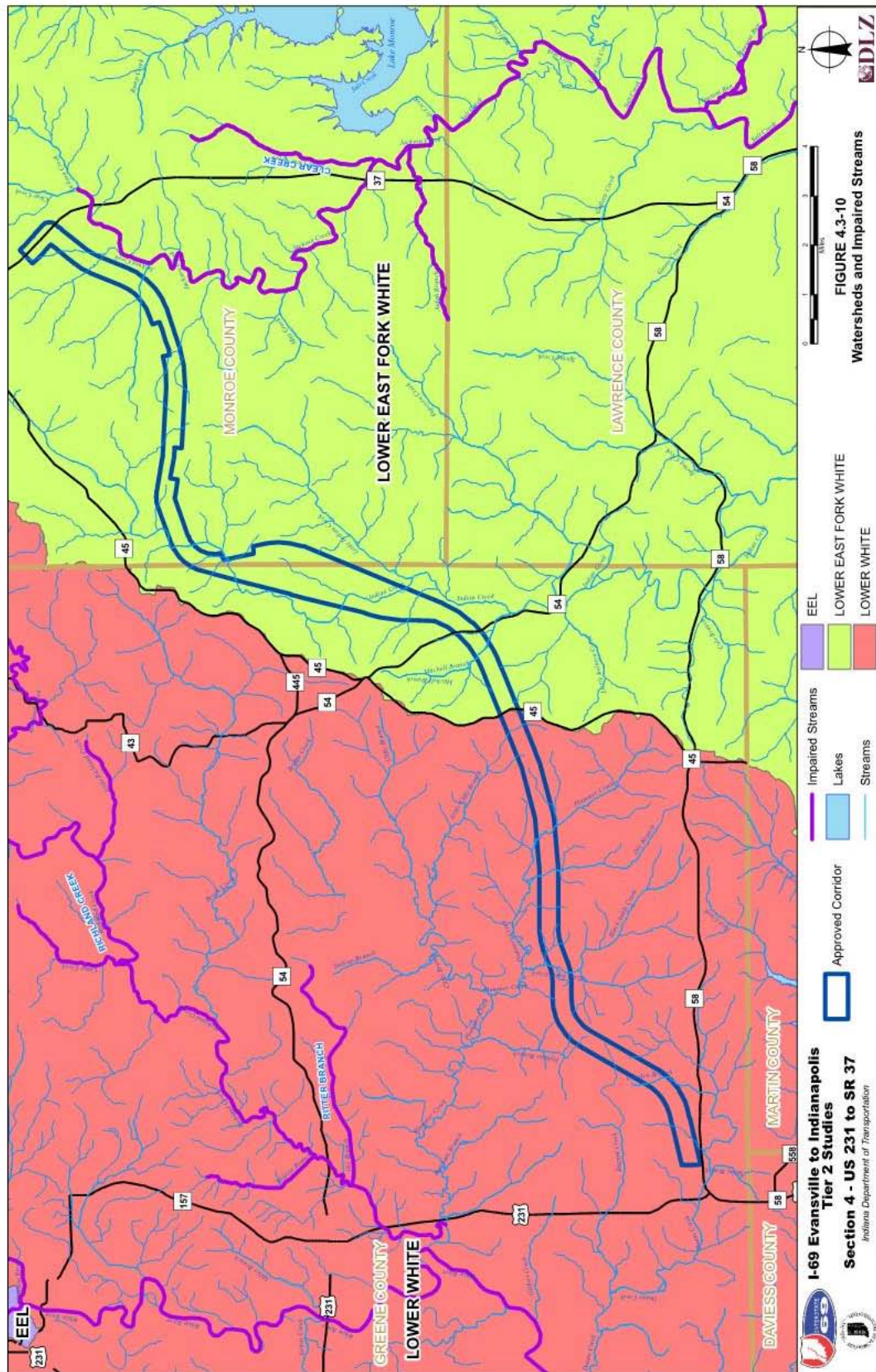
FIGURE 4.3-5: Page 4 of 6 Wetlands

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 Indiana Department of Transportation



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Tier 2 Studies
Section 4 - US 231 to SR 37
Indiana Department of Transportation

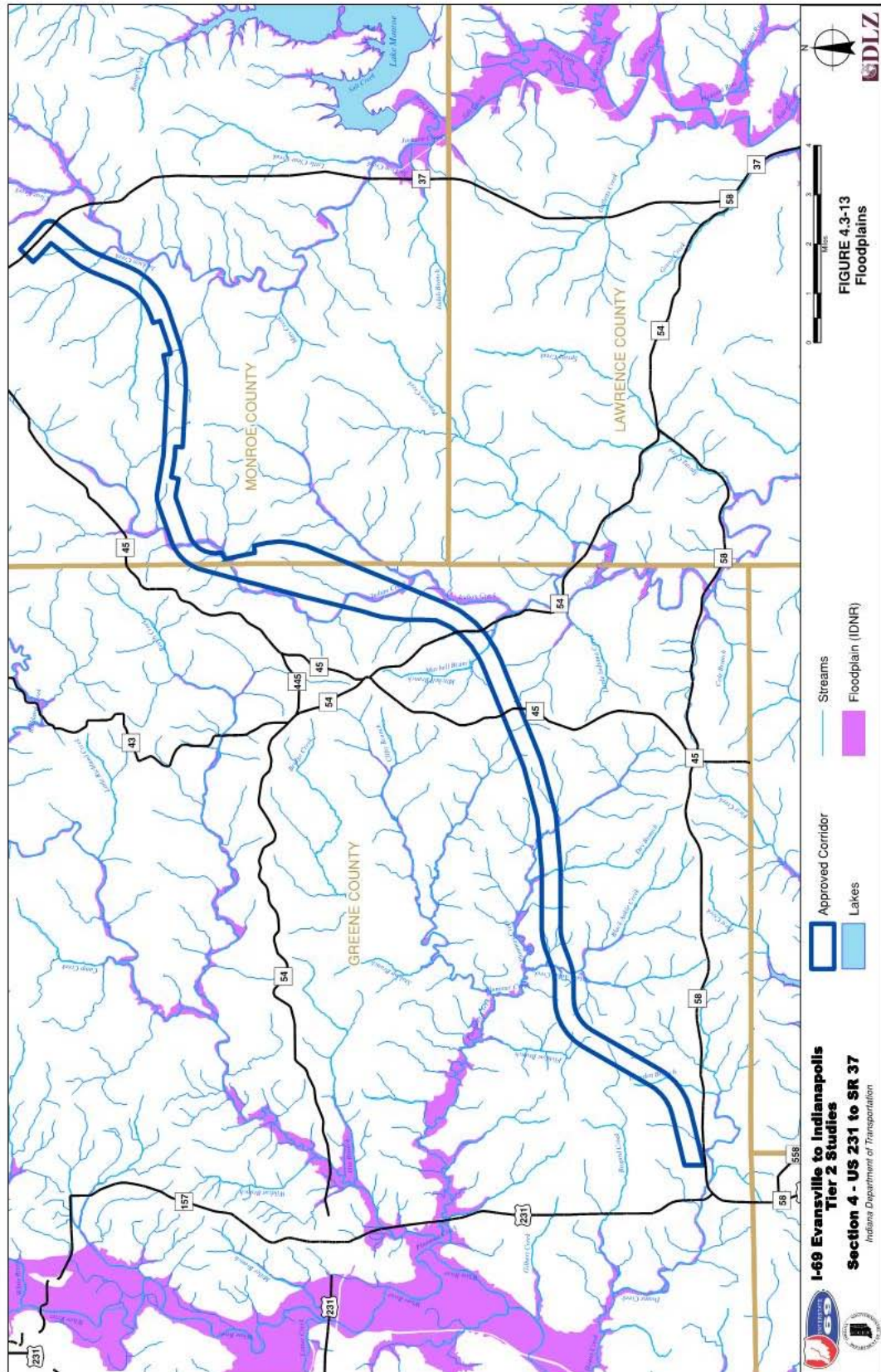






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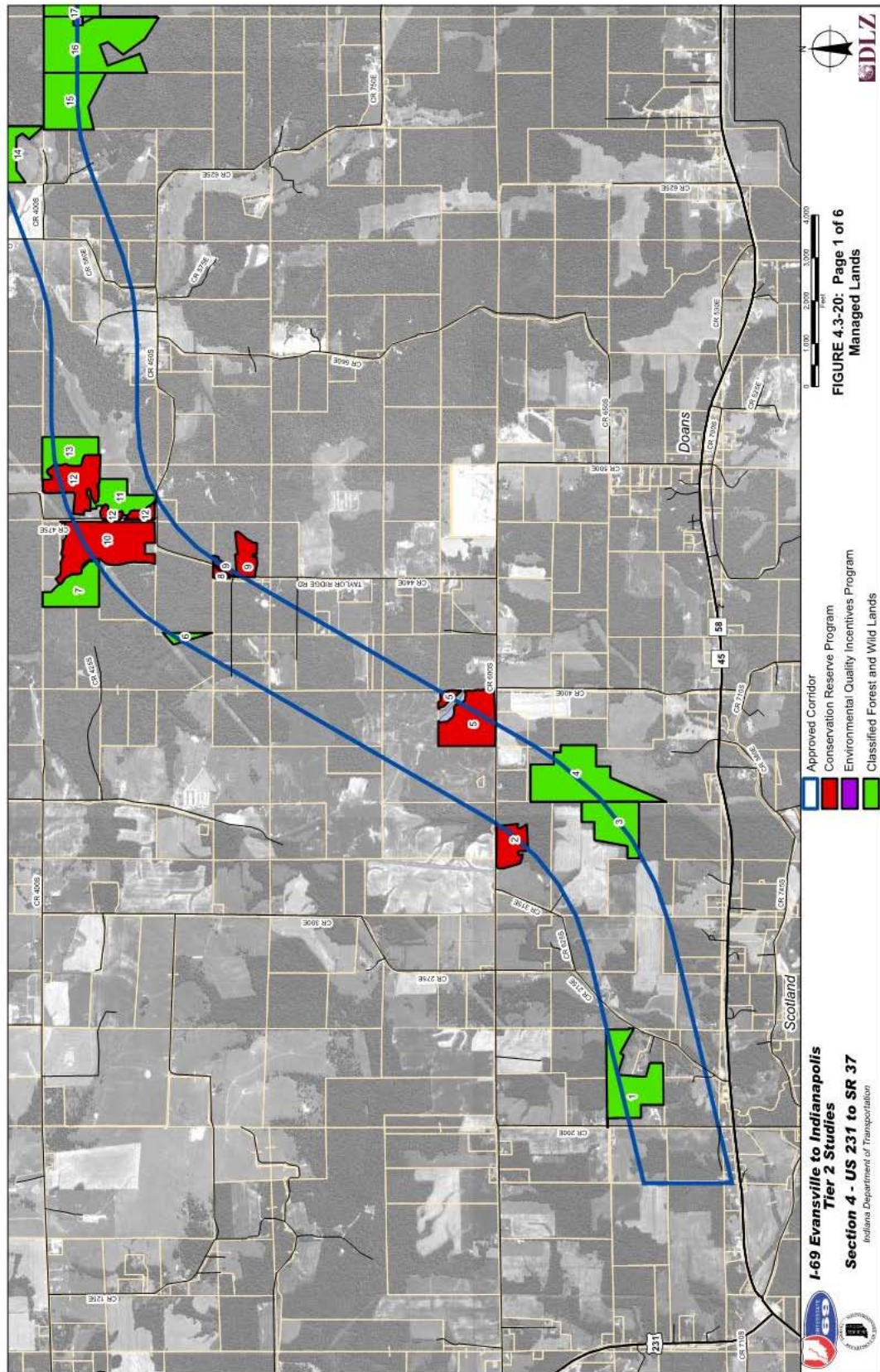
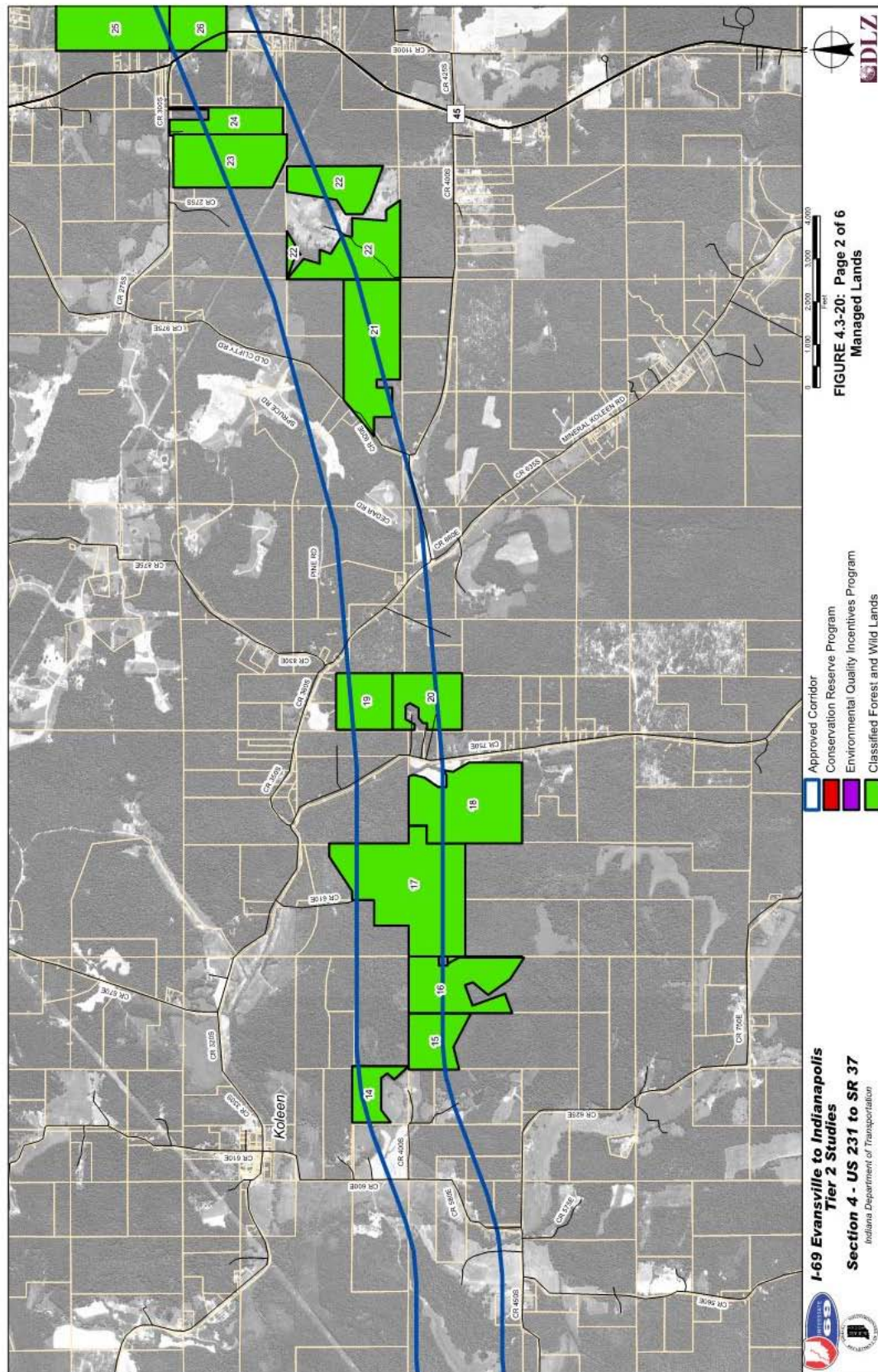


FIGURE 4.3-20: Page 1 of 6
Managed Lands



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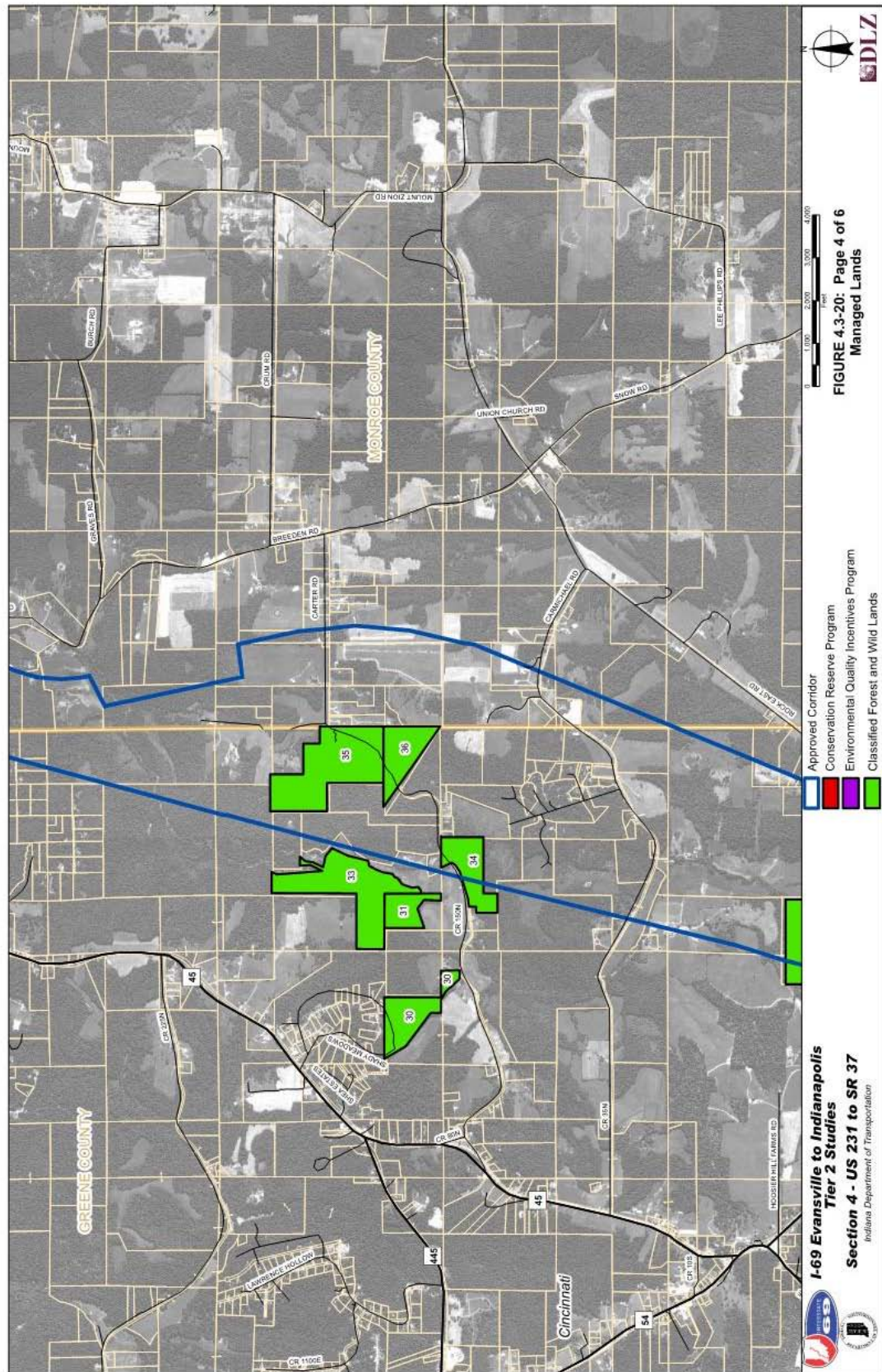
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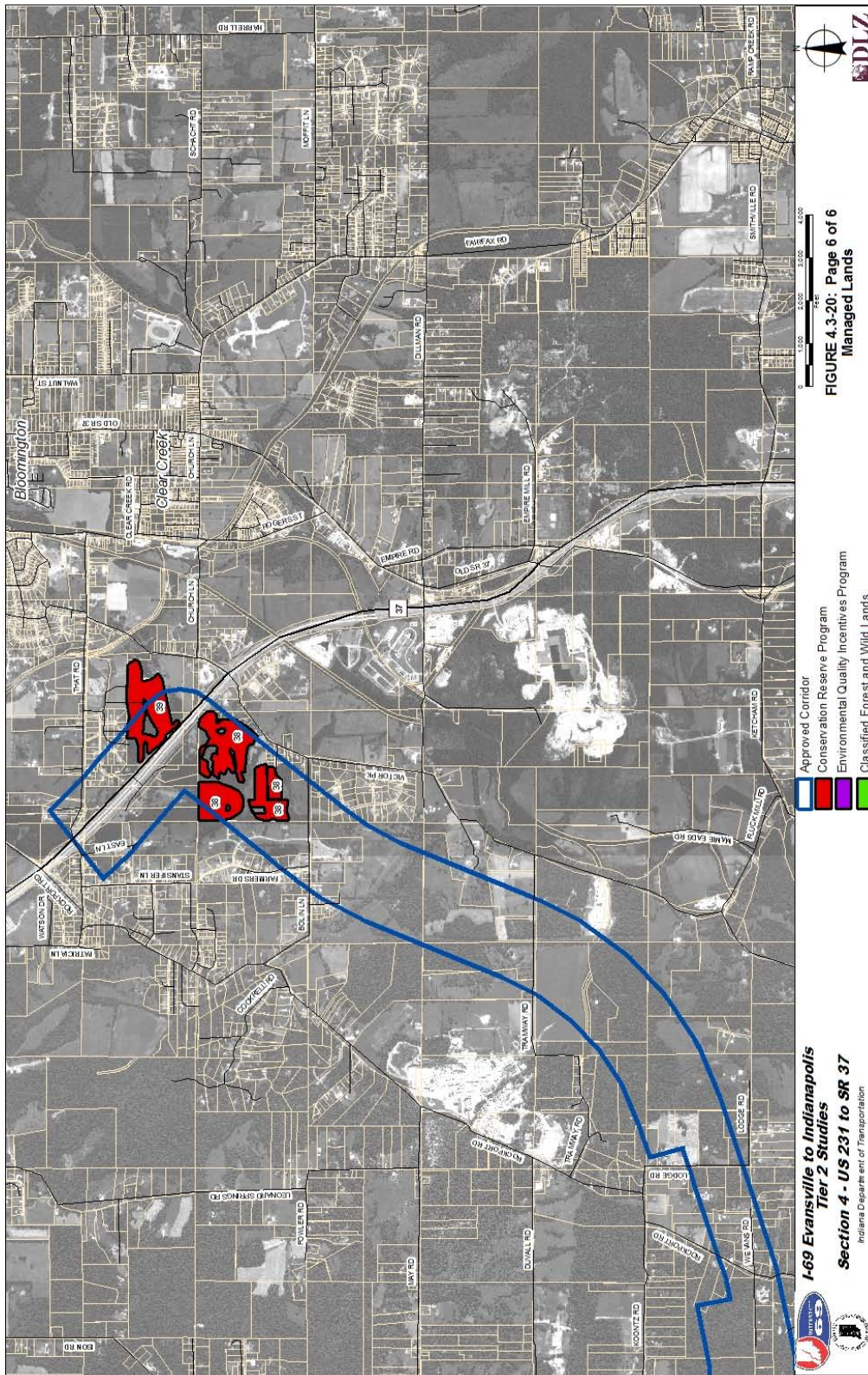




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4.4 Cultural Resources

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

- Section 4.4.2 – Updated table to reflect current NRHP status of aboveground resources.
- Section 4.4.3.2—Updated to indicate completion of Phase Ia archaeological investigations of Refined Preferred Alternative 2’s Area of Potential Effects (APE).
- The total number of previously recorded sites has been revised.

Section 106 of the National Historic Preservation Act (1966), as amended, and its implementing regulations, 36 Code of Federal Regulations (CFR) require the federal government to "take into account" the effects of its proposed actions on historic and archaeological resources before making project decisions. Historic and archaeological sites on or eligible for the National Register of Historic Places (NRHP) are afforded protection under federal regulations. Therefore, in this chapter, an extant property or archaeological site will only be referred to as “historic” if it is either listed in or eligible for listing in the NRHP.

4.4.1 Cultural Overview

The following cultural overview is a synthesis of various sources concerning the cultural periods of Southwestern Indiana, including the Section 4 study area—from prehistoric to historic times. A detailed discussion of these periods is included in the *Phase Ia Archaeological Investigations - Section 4 Literature Review, US 231 to SR 37, August 31, 2005*, prepared for the Tier 2 Section 4 project.

Cultural Period	Sub Period	Date Range	Cultural Phase	Diagnostic Artifacts
Paleo-Indian		11500-8000 B.C.		Clovis Cluster, Cumberland
Archaic	Early Archaic	8000-6000 B.C.		Dalton Cluster, Kirk Cluster, Thebes Cluster, Large Side Notch Cluster points, and Bifurcate Cluster
	Middle Archaic	6000-3500 B.C.		Raddatz and other side-notched points
	Late Archaic	4000-1500 B.C.	French Lick	Matanzas, Brewerton, Karnak, Ledbetter Points
	Terminal Archaic	1500-1000 B.C.	Riverton	Trimble, Merom, and Robeson points, Turkey Tail Cluster
Woodland	Early Woodland	1000-200 B.C.	Marion Adena Crab Orchard	Kramer, Dickson, Adena, Motley, Robbins points, Marion and Crab Orchard ceramics



Table 4.4-1: Cultural Periods and Sub-Periods

Cultural Period	Sub Period	Date Range	Cultural Phase	Diagnostic Artifacts
	Middle Woodland	200 BC–500 A.D.	Havana Hopewell Mann Allison-LaMotte	Snyders points, Steuben Expanded Stem, Lowe Flared Base, Havana ceramics Lowe points, Stoner and Embarras Series ceramics
	Late Woodland	A.D. 500-1050	Albee Phase	Triangular points, Raccoon Notched, Jack's Reef Corner Notched, and Albee ceramics
Late Prehistoric		A.D. 1050-1720	Oliver Vincennes Mississippian	Madison, Fort Ancient, Levanna triangular points, subglobular, grit-tempered ceramics ceramic pipes, and celts Triangular points, plain and cordmarked, shell tempered ceramics
Historic		Ca. 1720-Present		Ironstone, Undecorated whiteware, Transferware, Hand-painted whiteware, Redware, Yellowware, Pearlware, Creamware, Albany slip stoneware, Amethyst glass, straw glass

Early Human Occupation—The earliest known evidence of human occupation in Southwest Indiana includes stone tools and blades, often fluted, of the **Paleo-Indian** period (prior to 8000 B.C.). As the glacial ice sheets retreated at the end of the last Ice Age, the aboriginal hunters of this time are thought to have followed the huge herds of game into the area along the glacial sluiceways that carved the wide flood plains of today's rivers. These hunters found a cool, humid environment covered with dense forests of hemlock and pine. These forests were inhabited by a myriad of game including mega-fauna such as giant beaver, great elk, caribou, and perhaps woolly mammoths.

As warmer and drier climatic conditions prevailed and the mega-fauna became extinct, the **Archaic** period (8000-1000 B.C.) ensued. The lifestyle of this period was based primarily on hunting, fishing, shell fishing, and plant collection, and was characterized by large broad bladed dart points, ground and polished stone tools and ornaments, and bone and antler tools. The larger sites of these peoples tend to be found on river terraces and on higher ground around marshes and wetlands; however smaller sites are common on uplands as well.

The process of adaptation to the local environment and further utilization of available resources continued with the introduction of pottery, marking the transition to the **Woodland** period (1000



B.C. – circa (ca.) A.D. 1050). Long distance trade networks thrived during this time period, bringing exotic goods and knowledge to local peoples, especially along the major rivers. Specialization developed with this trade, and local tribes incorporated many of the new technologies from the south, as well as some of the cultural and religious practices of their distant neighbors. The bow and arrow replaced the spear as the primary hunting tool, and the construction of burial mounds and other earthworks flourished. Cultivation of domesticated plant species increased throughout the Woodland period; however hunting game such as elk, deer, and smaller mammals as well as fishing, shellfish collection, and seasonal nut and berry harvesting remained important in subsistence economy.

The **Late Prehistoric Period** (ca. A.D. 1050-1720) follows the Woodland and extends to Euro-American contact (ca. A.D. 1720). The Oliver Phase (ca. A.D. 1150-1500) and Vincennes Culture are distinct Late Prehistoric cultures identified in Central and Southwestern Indiana respectively. The **Mississippian** culture (ca. A.D. 1000-1650) is characterized by large fortified villages along major rivers with outlying maize fields and farmsteads, temple mounds, a socially stratified chiefdom, and an organized labor force.

Protohistoric/Early Historic Period—Protohistoric settlement of Native American peoples along the lower Wabash and Ohio Valley region is generally associated with the Piankashaw, and related Wea and Miami groups (Callender 1978a). French incursions into the region began during the closing years of the seventeenth century, with a permanent post, Vincennes, being established during the early eighteenth century. The trading center was occupied by the British in 1763 after their conquest of the French and was captured by the Americans in 1779.

Early settlement of the general Section 4 study area appears to have been limited by its remote location with regard to areas actively contested by the French and British and the active trade routes of the era. Although the British took control of the region following their victory in the French and Indian War over the French in 1763, their tenure was limited by the beginning of the Revolutionary War in 1775. Additionally, partly as a concession to the local Native American groups the British officially discouraged settlement west of the Alleghenies. Despite the Proclamation of 1763 some westward migration did take place, although it was limited in scope. With the onset of the Revolutionary War, the British refurbished and manned the western forts. The only significant military engagement in the region took place at Vincennes when George Rogers Clark defeated the British garrison there. Following the Revolutionary War, other lands in Daviess and Knox counties were awarded to those who had settled there prior to 1783 and assisted in the Revolutionary War campaign of George Rogers Clark (Historic Landmarks Foundation of Indiana 1987).

In the 1800s, a series of treaties with the Native Americans progressively opened the area for settlement. Following the War of 1812, the American occupation of Southern Indiana increased dramatically, and by 1819, approximately 7,000 people were living in the area around southern Indiana (Janzen, 1971). River ports in particular grew steadily as the result of the transportation of goods via the Ohio River. New settlers to the Midwest prompted the need for a formalized government. The Land Ordinance of 1785 imposed order on the land through surveys intended to facilitate settlement. The establishment of base lines and range lines defined properties with the assurance that land titles would be protected. Many fields and roads conformed to the regular

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grid of base lines and range lines; some roads continued to follow streams and to wind through the lowlands. In addition, pre-survey land grants, such as those given by the French government and those provided to George Rogers Clark's men for their part in the Revolutionary War, deviated from the regular grid established by the survey (Blythe, 1980).

Nineteenth and Twentieth Century Euro-American Period

In 1800, Indiana's population was 5,641. Despite continued threats from Native Americans in the very early part of the nineteenth century, a land office was established at Vincennes in 1807, and land purchases proceeded (Madison 1982). Settlers arrived in Greene and Monroe counties in the early nineteenth century. Settlement proceeded north from the more established settlements in present-day Pike and Dubois counties. Permanent settlement in Greene County did not occur until 1806. Monroe County, located north of Greene County, was settled considerably later than Greene County due to Native American occupation. Monroe County was bifurcated by an "Indian Boundary," north of which were the traditional tribal lands of the Miami and Delaware nations. In the fall of 1812, Arthur Henrie and William Harris prepared for white settlement south of this line by conducting a federal survey of lands south of the boundary line.

Lacking good overland transportation routes, the principal waterways were employed for ingress along the valleys into the area. Thus, population centers were established principally along the Ohio, Wabash, and White rivers until the mid-nineteenth century. From the Mid-Atlantic states of New York and Pennsylvania people crossed the Appalachians and traveled down the Ohio River. Those from the South came through Kentucky and crossed the river at Louisville. Most settlers in the early nineteenth century were from the rural Upland South (i.e., eastern Kentucky, Tennessee, North Carolina, and Virginia) (Dodd 1993; Madison 1982; Steinson 1994). They were farmers seeking better opportunities and more land for crops and livestock.

1816 - 1850

The years from 1816 to 1850 cover the pioneer era in Hoosier history. People living in and coming to the newly founded state of Indiana went about the business of establishing farms and communities, increasing and improving transportation routes, and developing commerce and industry, all as part of the process of creating a civilized place out of the wilderness. During these years, the state saw marked increases in population and a general shift northward of both influence and affluence. Settlement had begun to trickle into Monroe and Greene counties in the early 1800s, followed by the formal establishment of each county in 1818 and 1821, respectively.

Town development soon followed with the establishment of Scotland in Taylor Township of Greene County (Baber, 1875). The area that became the town of Koleen in Jackson Township originated when several families established their residences near a crossroads as early as 1839 or 1840. Taylor Ridge was another fledgling community, located just south of Koleen in Jackson Township, within the APE (Lynch, nd). In Indian Creek Township of Monroe County, the community of Palestine was recorded by 1850 (Chamberlain, 1970). The last remaining building associated with Palestine, the John May House (Monroe, 45062), was destroyed by fire in the fall of 2007.



During this period the Indiana General Assembly worked to improve roads, canals, and railroads. Worthington is a significant town that arose at the junction of the Wabash and Erie Canal with the Central Canal. The effect of this new and improved infrastructure would not be realized until after the Civil War.

The change in the landscape of Southwestern Indiana during this era was tremendous. The first settlers wrote of traveling along American Indian traces beneath a canopy of trees so dense they did not see the sun for days. Once the initial concerns of shelter, livestock, and first crops were in place, settlers focused upon improved housing and commercial structures, some of which remains visible on the landscape today. By 1850, land clearing and road improvements had progressed and trains were traveling daily from the Ohio River to the state capital.

Iron ore was mined with great fervor in the region. Both the Virginia Iron Works and the Richland Furnace (outside the APE) chose locations in proximity to the ore as well as sources of block coal suitable for fuel and limestone for the flux. Throughout this period many tools and household implements, such as hoes and kettles, were forged at these furnaces for local markets. Furnaces of this type as also produced pig iron for shipment to distant markets (Blanchard, 1884).

In addition to the iron ore deposits, the Study Area boasts a large, high quality belt of Salem limestone. The earliest settlers in the region were aware of the limestone but paid little attention to it, beyond where the stone outcroppings broke the surface and made the plowing of their newly established fields difficult. Homes and some outbuildings were constructed of locally quarried blocks of limestone. Organized quarrying efforts began in 1827. By the end of the first-half of the nineteenth century, the entire stone district included only fifteen quarries, most situated alongside eroded streambeds. One of the issues that slowed the early development of the limestone industry was the inherent difficulty in moving the large blocks of stone (McDonald, 1995).

1851–1880

The period between about 1851 and 1880 is known as the “Civil War era.” No event so dominated the history of Southwestern Indiana, the entire state, and the nation, as did the Civil War. The period preceding the war was filled with tension and debate over the meaning of nation and republic. The nation was consumed by war news; death tolls staggered the imagination and touched nearly every segment of society. Even Indiana, a state that experienced only a few minor skirmishes within its borders, was focused on its contribution to the war effort. Moreover, the effect of the war was felt beyond the years of the actual conflict.

In the post-war world Hoosiers faced a financial boom and then panic. At the same time, farmers were selling surplus crops and looking for ways to increase production. As one might expect, the Civil War halted most building projects and changed the function of some sites, structures, and buildings to fit wartime needs. Men left widows and children, increasing the need for care by the state and private groups, such as a relief aid society for the benefit of soldiers’ families.

Railroads became a functional part of the transportation landscape during this era, allowing towns and villages in southwestern Indiana to grow as centers for importing goods and exporting



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agricultural surplus, coal, and limestone to regional markets. Track mileage in the state grew from an initial 228 miles in 1850 to 2,163 miles by 1860, and reached 6,471 miles by 1900 (Historic Landmarks Foundation of Indiana, 1987). In Monroe County, workers from the New Albany and Salem Railroad populated the village of Clear Creek in Perry Township. The small community of Koleen in Jackson Township of Greene County was formally platted as a railroad stop by the Bedford, Springville, Owensburg and Bloomfield Railroad, which had been completed to Bloomfield in 1877 (Simonds and Parker, 1997). This railroad expanded its narrow gauge line from Bedford to Switz City, to intersect with the standard gauge Indianapolis and Vincennes Railroad. In Monroe County, the New Albany and Salem Railroad had expanded to become the Louisville, New Albany, and Chicago Railroad, serving major stone quarrying industries in Bloomington with access to wider markets. Both lines would eventually become part of the Monon Corporation, the most significant railroad conglomerate in Indiana (Lynch, nd).

Farmhouses underwent a transformation during this era. In the 1850s and 1860s, the log shelters of the frontier era continued to be replaced by larger and better crafted log buildings. Log structures were later covered with clapboards. Traditional housing forms of the region, such as the Single pen, Double pen, Double pile, Hall and parlor, Central passage, Dog-Trot, and the I-house continued to be popular during this era. Toward the end of this era, the lighter and less expensive balloon-frame construction began to be used, especially in additions (Peterson, 1986). Extant vernacular homes from this era usually have undergone some renovation, which may include but not be limited to: room additions, fenestration changes, new windows, replacement siding, and porch replacement. There are few extant examples of complete or unaltered farmstead complexes or other vernacular traditional housing types from the years prior to 1880 within the Study Area.

Quarrying prior to this era within the Indiana limestone belt across Owen, Monroe, and Lawrence counties was undertaken strictly with muscle power provided by both men and draft animals and employed simple tools, such as stiff-leg derricks. In 1853, the arrival of the railroads began to change the industry. Initially, the industry grew to supply railroads with materials for rail construction. Later, the railroad brought investors and entrepreneurs and the industry continued to grow. By 1868, fifteen quarries were located in northwest Monroe County though production continued to be limited (Hawes, 1989). It was not until 1855 that steam power was introduced to the stone industry. Steam driven machinery such as the gang saw, the channeling machine and derricks, combined with platform elevators and hod-hoisting machines dramatically increased quarry production (McDonald, 1995). During this era, Indiana limestone was an important building material locally, and for major construction projects nationally. Rising demand for the limestone resulted in the opening of several new quarries in the region during the 1870s (Dyer, 1949).

Commerce during this era was highly dependent on transportation and a stable currency supply. The proliferation of rail lines made distant markets more accessible. A locus of every small town was the general store, which stocked everyday domestic staples, farm products, commercially manufactured goods and some luxury items. Even with improved access to markets, it was not until the decade after the Civil War that a building boom occurred on main



streets in the region brought by increased commercial interaction (Sieber and Munson, 1992). The Greene and Monroe county seats of Bloomfield and Bloomington grew during this time period. By 1879, the town of Scotland was thriving. Commercial buildings of the era were predominantly of the Italianate style, and travelling salesmen conducted business from the Italianate Scotland Hotel (Greene, 56002) (Stone, et. al. 1986). The hamlet of Palestine, completely bypassed by the rail lines, remained small. The Greene County seat of Bloomfield managed to retain vitality during this era despite being bypassed by the Indianapolis and Vincennes rail line.

Within the APE in Greene County, the villages of Jonesboro (later known as Hobbieville) in Center Township and Koleen in Jackson Township were growing and the town of Scotland in Taylor Township continued to flourish. In the areas of Monroe County within the APE, the village of Clear Creek was formed in Perry Township along the New Albany and Salem rail line, while Palestine in Indian Creek Township appeared to consist of a cluster of homes. The Monroe County seat of Bloomington experienced great expansion in the postbellum decades (Hiestand, 2004). Due to the increased availability of milled lumber and ease of construction, false-front commercial structures became popular in the cities and towns of Greene and Monroe counties during this time period. As most false-front commercial structures were of frame construction and later altered or demolished to make way for larger commercial establishments, none from this time period are known to survive in the Section 4 APE. Buildings constructed of brick are seen in rare examples (Historic Landmarks Foundation of Indiana, 2000). These substantial structures became more common in the postbellum era. The Koontz House is an extant example within the Section 4 APE.

Protestant churches continued to figure prominently during this era (Phillips, 1968). Three Protestant churches from this era remain within the Section 4 APE; the NRHP-eligible Clifty Church (Greene, 50008), the Koleen Union Church (Greene, 50044), and the South Union Christian Church (Monroe, 40073). An early Catholic congregation in the Study Area formed in Bloomington and by 1868, became established as an independent parish (Uland, 1986). Twelve cemeteries established in this era are extant in the APE. As their names suggest, cemeteries in the Section 4 APE denote family or social connections as opposed to religious communities.

By the end of the period the Civil War's stagnating effects on building projects and community development in the region were waning. Scotland was a thriving town. The country as a whole was caught in the midst of a postwar boom as the survivors sought to return to normal life. Normal life included adjustment to the gradual industrial growth of the state, increased transportation and consumption choices, and the mechanization of farming (Blachard 1884).

1880-1920

The period between about 1880 and 1920 is known as the “golden age” and was a time for growth, innovation and reform for much of Indiana and at least part of the area within the APE. Generally, farms grew in size and productivity as more of the operations were mechanized. The landscape was altered as transportation shifted from impermanent roads to railroads and paved highways. Coal mining and quarrying became important industrial occupations in Greene and Monroe counties, and cities and towns such as Bloomington and Clear Creek grew as commercial enterprises expanded. Other communities, such as Hobbieville and Koleen, located

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in hilly remote areas, did not enjoy the same kind of growth (Phillips, 1968). Farming remained the leading industry in Greene County, while farming ranked behind quarrying and manufacturing in Monroe County. The Scotland Hotel (ca. 1879) and the Blackmore Store (ca. 1895), are representative of commerce of Greene County during this period.

As the rail system had expanded and the number of coal-fired trains increased during the 1870s and 1880s, coal mining became a mainstay of the local industrial economies in Southwestern Indiana. The expansion of the iron industry and the increased use of coal for home heating during the same period also increased the demand for coal. Effects of the coal-mining boom, however, were not fully felt in the region until the expansion of rail systems in the area during the 1880s. Towns tied to the coal industry boomed with the discovery of more coal veins in the region. Coal mining in the region expanded from strictly underground operations with the beginning of strip mining in Southwestern Indiana in 1904, an activity that was spurred in the Section 4 vicinity by the 1906 discovery of a 4.5-foot thick vein of coal in Northern Daviess County (Phillips 1968; Rader 1985).

The 1880s also saw a major push to build rail lines through the area (Historic Landmarks Foundation of Indiana 1987).

With expansion of the rail system, as well as improvements in quarrying and milling equipment and technology during this period, the limestone industry became the leading industry in Monroe County by the early 1900s. Although relocated to the Section 4 APE from Warren County, the Harris Ford Bridge (ca. 1887) is representative of the type of through truss bridge construction associated with railroad development during this period.

1921-1945

The period from 1921 to 1945 was marked by prosperity, depression, and war. The 1920s ushered in a period of depressed agricultural prices that presaged the beginning of the Great Depression with the stock market crash of October 1929. There was also a downturn in the local coal mining industry during the Depression. Despite economic problems associated with the Great Depression regionally, the agricultural underpinnings of the local economy (for market and subsistence) within the Section 4 APE somewhat buffered the effects of the Depression.

After World War I there was a greater supply of coal than demand. Towns dependent on the coal mining industry, such as Linton in Greene County, declined as the scale of underground mining shrank. Not until the end of World War II did the demand for coal return. (Frye, 1966).

New Deal programs such as the Civilian Conservation Corps (CCC), Works Progress Administration (WPA), Public Works Administration (PWA), Civil Works Administration (CWA), and Resettlement Administration put together by the Roosevelt administration in the 1930s brought vital improvements, jobs, and improved morale to Greene and Monroe counties (Lynch, nd). One likely example of a WPA project was identified in the Section 4 APE in Greene County; a ca. 1939 culvert under CR 75.

The local economy improved with the advent of World War II and the post-war economic boom. Statewide manufacturing employment increased 40% between 1939 and 1942. In the Study Area



and adjoining regions, Monroe County garnered 34 military contracts and Daviess County was awarded 29, while Greene County supplied workers to manufacturing centers in those neighboring counties (Madison, 1986). In Greene and nearby Martin counties, Crane Naval Surface Warfare Center (Crane NSWC, then called Crane Naval Ammunition Depot) was established in 1940 as a site for testing ammunition and equipment (Holt, 1953). The base acted as an economic catalyst in the town of Scotland in Greene County by offering jobs to area residents during the war and by buoying commerce.

1945-1961

The period from 1945 until 1961 saw returning veterans, a baby boom, and the beginning of a new wave of construction. Many of these changes affected Monroe County more so than Greene; fewer homes were constructed in the Greene County portion of the APE than in Monroe County during this period of time.

During World War II, wartime needs required a better homefront infrastructure, one that was more flexible than the predetermined routes of rail lines. As federal and state funds poured into highway construction, railroads continued to serve communities with freight service, but passenger numbers continued to plummet. This ultimately led to some lines completely halting service to smaller communities.

By the 1950s, the automobile and the truck had become the first choice for transportation, while rail service was limited to major population centers. In 1956, President Eisenhower signed the bill that formally created the Interstate System, and the second “Golden Age” of the highway program began (Massey and Maxwell, 2008).

The World War II naval military facility, Crane NSWC, continued to employ area residents in the postwar world (Barnes 2008). These residents with disposable income helped sustain merchants in Scotland, which was no longer in the view of motorists after SR 58 was routed less than a mile north of the town (Milton-Pung interview 2004).

Linear suburban development, instead of town or subdivision development, defined much of the project area from 1945 to 1961 with Ranch-style dwellings being constructed on small acreage plots, first along major roadways and then along gravel, remote roads. The Serviceman’s Readjustment Act of 1944 (GI Bill) provided the impetus for this by making loans available to veterans for housing purchases; this act put home ownership within the reach of more people (Hope 2007) and spurred building.

The popularity of limestone veneer for the Ranch-style homes and for office and classroom buildings allowed limestone to regain status as a major industry in Monroe County during the 1950s and 1960s. Returning soldiers took advantage of educational opportunities provided by the federal government, so much so that Indiana University, a major employer in Monroe County, underwent a major expansion with the construction of numerous buildings. Many of these are constructed of limestone (Chronology of Indiana University History, nd). Overall, limestone’s resurgence as a building material peaked in 1955 and sales continued to slow through the 1960s (McDonald 1995).



The “Historic Property Report” included in **Appendix N**, *Section 106 Documentation*, provides a detailed discussion of the historical development of Greene and Monroe counties from 1740–1956. It describes representative types of extant aboveground resources in the study area, in addition to resources that likely existed but that no longer survive. The Additional Information Document, which updates the history of Greene and Monroe counties through the 1960s provides an overview of this era (see **Appendix N**).

4.4.2 Historic Setting

The Section 4 Study Area, located in Southwestern Indiana in Greene and Monroe counties, is an area of early Hoosier settlement. Within approximately one mile of the 2,000-foot-wide corridor identified in Tier 1, there are 153 properties that were previously documented in the *Monroe and Greene County Interim Reports*, the *City of Bloomington Interim Report*, or the Tier 1 Study. In addition to these 153 previously documented properties, historians in 2004 inventoried 48 previously unidentified properties (a total of 201 inventoried properties) within the APE established for the Tier 2 study. In 2009 historians inventoried 21 contributing properties within the APE that were constructed between 1954 and 1967. Refer to Section 5.13 for a description of the APE as it has been defined for this undertaking. See the Section 106 documentation in **Appendix N**, including the *Historic Property Report* and *Additional Information Report*, which provides information regarding all properties surveyed.

In addition to the NRHP-listed Scotland Hotel, the Historic Property Report (2006) identified seven properties within the APE that are eligible for listing in the NRHP, including the Blackmore Store, the Clifty Church, the Koontz House, the John May-Ada Wilson House, the Stipp-Bender Farmstead, the Harris Ford Bridge and the Philip Murphy-Jonas May House. Since that 2006 report was issued, the Philip Murphy-Jonas May House and the John May-Ada Wilson House are no longer extant; the former has collapsed and the latter was a victim of fire. In addition, two bridges, Greene County Bridge No. 311 and Monroe County Bridge No. 83 have been determined eligible as a result of the INDOT Historic Bridge Inventory (Mead and Hunt, 2009) and one property (the Maurice Head House at 4625 South East Lane, in Bloomington) has been recommended eligible as the result of an Additional Survey for recent past properties conducted in the summer of 2009. Of these, only the NRHP-eligible Maurice Head House is within the corridor. See **Figure 4.4-1** (p. 4-144) for the locations of aboveground resources on or eligible for the National Register. See **Table 4.4-2** for a summary of aboveground resources on or eligible for the National Register. **Table 4.4-2** also lists some select properties that were evaluated, but found to not be eligible for the National Register. See Section 5.13, *Historic Resource Impacts*, for additional discussion of these resources.



Table 4.4-2: Eligibility of Selected Aboveground Properties

Survey No.	Property Name	Address	Property Type	County	NRHP Status
105-115-45062	John May- Ada Wilson House	6530 Duvall	Single pen/Hall and parlor	Monroe	NRHP Eligible
105-607-45005	Koontz House	7401 Mt. Zion Road	Greek Revival/ Italianate	Monroe	NRHP Eligible
105-115-35104	Harris Ford Bridge	N side Church, Clear Creek Trail	Pratt Through Truss	Monroe	NRHP Eligible
105-115-35055	Stipp-Bender Farmstead	5075 S. Victor Pike	I-house/ Greek Revival	Monroe	NRHP Eligible
105-115-40051	Philip Murphy- Jonas May House	Ida Lane, Rockport Road	Hall and Parlor/ I- House	Monroe	NRHP Eligible
105-115-35064	Monroe County Bridge No. 83	Dillman Road and Clear Creek	Warren Pony Truss Bridge	Monroe	NRHP Eligible
AD 10	Maurice Head House	4625 South East Lane	Ranch	Monroe	NRHP Eligible
055-576-56002	Scotland Hotel	NW corner of Main Street and Jackson Street	Commercial Italianate	Greene	NRHP Listed
055-324-50008	Clifty Church	W side of CR 920E/Old Clifty Road, N of CR 415E	Gable Front/ Log Structure	Greene	NRHP Eligible
055-576-56001	Blackmore Store	E. side of Main Street, N. end of town	Commercial Italianate	Greene	NRHP Eligible
055-607-45041	Greene County Bridge No. 311	CR 100S/Thacker Road - Crossing Indian Creek	Warren Pony Truss Bridge	Greene	NRHP Eligible
12Mo158	Virginia Iron Works	Northcentral Indian Creek Township	Cultural Landscape	Monroe	Not NRHP Eligible as aboveground resource; NRHP Archaeological District



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Survey No.	Property Name	Address	Property Type	County	NRHP Status
105-115-40073	South Union Christian Church	6510 Rockport Road	Classical Revival	Monroe	Not NRHP Eligible
105-115-35061	Indian Hill Stone Company	Victor Pike	Functional	Monroe	Not NRHP Eligible as aboveground resource: Included in NRHP Archaeological District
105-115-40076	Shawnee Tramway	S side of Tramway Road, W of Victor Pike	Bridge Piers for former Quarry tramway	Monroe	Not NRHP Eligible as aboveground resource: Included in NRHP Archaeological District
055-324-50044	Koleen Union Church	SE corner of CR 330S and CR 610E	19th Century Functional Ecclesiastical	Greene	Not NRHP Eligible
NA	Maryland Ridge Historic District	Monroe and Greene county border	Cultural Landscape	Monroe and Greene	Not NRHP Eligible
NA	Limestone Quarry/ Mill Historic District	Tramway & Victor Pike	Mining district	Monroe	Not NRHP Eligible as aboveground resource: Included in NRHP Archaeological District
055-576-55042	Dowden Farm	W side of CR 215E, N of Hwy 58	Gable Front & Farmstead	Greene	Not NRHP Eligible
055-607-45042	Greene County Bridge No. 35	CR 1375E - Crossing Indian Creek	Pratt Pony Truss Bridge	Greene	Not NRHP Eligible

The Scotland Hotel (1879 Italianate), located in Scotland, is the only property in the APE that is currently listed in the NHRP. The Scotland Hotel is set in a small town in rural Greene County with other properties of the same age, which embody the themes of commerce and architecture during the late nineteenth and early twentieth century. The Blackmore Store (ca. 1895 Nineteenth Century Commercial Italianate), located on a lot adjacent to the Scotland Hotel, is an excellent example of commercial architecture in the town of Scotland.

Since the Philip Murphy-Jonas May House and the John May-Ada Wilson House are no longer extant, there are no NRHP-eligible properties that date to the settlement era. Cemeteries alone bear testimony to that era. While cemeteries are generally not eligible for the NRHP, 25 cemeteries meeting the minimum age requirement for consideration were identified in the Section 4 APE. Thirteen of these are pioneer cemeteries established in the first half of the nineteenth century. Interments dating from the twentieth century were noted in 14 cemeteries. The log church, Clifty Church, bears the appearance of a settlement-era church but was actually constructed around the Civil War.



Settlement patterns within the vicinity of the Section 4 APE followed the developing overland transportation routes and were influenced by political, industrial and entrepreneurial needs. Bloomfield (Greene County) and Bloomington (Monroe County) developed as their respective county seats. Industrial and quarrying interests helped them establish prominence. Outside of these and other towns, residences associated with family farms were scattered across the rural landscape. This scattered development was noted by the historians in their investigations of an area known as Maryland Ridge within portions of southwest Monroe County, southern Owen County, and northeast Greene County. Maryland Ridge is comprised of approximately 25,000 acres and extends for several miles roughly parallel to the border between Greene and Monroe counties.

A large, high quality belt of Salem limestone runs from the northeast to the south central portion of Monroe County. In the Section 4 APE, a cluster of extant and abandoned limestone quarry and mill-related features exists near the junction of Perry, Van Buren, Indian Creek and Clear Creek Townships (north and south of Tramway Road) that is evocative of the historic limestone era. Within the Section 4 corridor, included in this cluster of features are two abandoned quarries, piles of limestone tailings associated with the Indian Hill Stone Company property, and the ruins of the Shawnee Tramway.

Limestone was used as a fluxing agent in the production of pig iron, which was another early nineteenth century industry in the vicinity of the Section 4 APE. The Virginia Iron Works was located within the Section 4 APE in the north-central portion of Indian Creek Township. Ruins of the blast furnace which produced iron for about five years beginning in 1839 are still visible but are not discernible as intact aboveground resources.

Within the Section 4 APE there are some extant examples of Indiana's era of agricultural affluence. Constructed ca. 1865, the year the Civil War ended, the Koontz House is a side-hall Greek Revival dwelling with Italianate influences. The house was constructed on 200 acres of land by noted Virginian farmers John and Sara Koontz. Constructed in 1876 in the Greek Revival style and embellished with an Italianate-style porch, the Stipp-Bender Farmstead was the home of George Stipp, one of Monroe County's most successful farmers.

Transportation-related resources have contributed to the historic setting of Section 4's APE. While the Harris Ford Bridge has been moved to this area to serve a modern function along the Bloomington Parks and Recreation Department's Clear Creek Trail, Greene County Bridge No. 311 (ca. 1905) and Monroe County Bridge No. 83 (ca. 1910) illustrate the move to improve bridges and roads after the turn of the twentieth century. Road improvements would ultimately lead to people moving to towns and cities in the 1920s and then settling once more in rural areas as residents began purchasing small tracts of land along these roads on which to construct suburban homes after World War II. This began a process of altering the face of the historic setting that is still evident today.



4.4.3 Archaeological Resources

4.4.3.1 Previously Recorded Archaeological Sites

Phase 1a literature review was performed to identify previously documented archaeological sites within the Section 4 corridor. None of the previously documented sites extend beyond Section 4 to overlap with either the Section 3 or Section 5 corridor. Twenty-four previously documented sites were identified through Phase 1a literature review. Of these, nineteen sites are prehistoric and four are historic. Information on previously recorded archaeological resources in the Section 4 study corridor is presented in **Table 4.4-3**.

State Site Number	Cultural Period	Site Type	County
12Gr744	Archaic	Lithic Scatter	Greene
12Gr945	Early Archaic	Undetermined	Greene
12Gr1055	Early-Middle Archaic	Undetermined	Greene
12Gr1057	Archaic	Undetermined	Greene
12Gr1095	Unidentified Prehistoric	Undetermined	Greene
12Gr1224	Paleoindian	Camp	Greene
12Gr1606	Unidentified Prehistoric	Rock shelter	Greene
12Gr1713	Historic	Cemetery	Greene
12Gr1714	Unidentified prehistoric	Lithic Scatter	Greene
12Gr1715	Unidentified prehistoric	Isolated Find	Greene
12Gr1727	Unidentified prehistoric	Lithic Scatter	Greene
12Gr1728	Unidentified prehistoric	Lithic Scatter	Greene
12Gr1729	Unidentified prehistoric	Lithic Scatter	Greene
12Gr1730	Historic	Artifact Scatter	Greene
12Mo81	Unidentified prehistoric	Undetermined	Monroe
12Mo126	Unidentified prehistoric	Undetermined	Monroe
12Mo583	Unidentified Prehistoric	Lithic Scatter	Monroe
12Mo584	Paleoindian	Lithic Scatter	Monroe
12Mo588	Early Archaic	Lithic Scatter	Monroe
12Mo776	Unidentified prehistoric	Undetermined	Monroe
12Mo778	Unidentified prehistoric	Undetermined	Monroe
12Mo869	Unidentified prehistoric	Undetermined	Monroe
12Mo1192	Historic	Farmstead	Monroe
12Mo1195	Historic	Cemetery	Monroe

The previously recorded sites were primarily recorded through cultural resources management projects undertaken for transportation, local utilities projects, and the Indiana University database enhancement projects. The literature review documented thirteen previous archaeological surveys in the Section 4 Study Area.

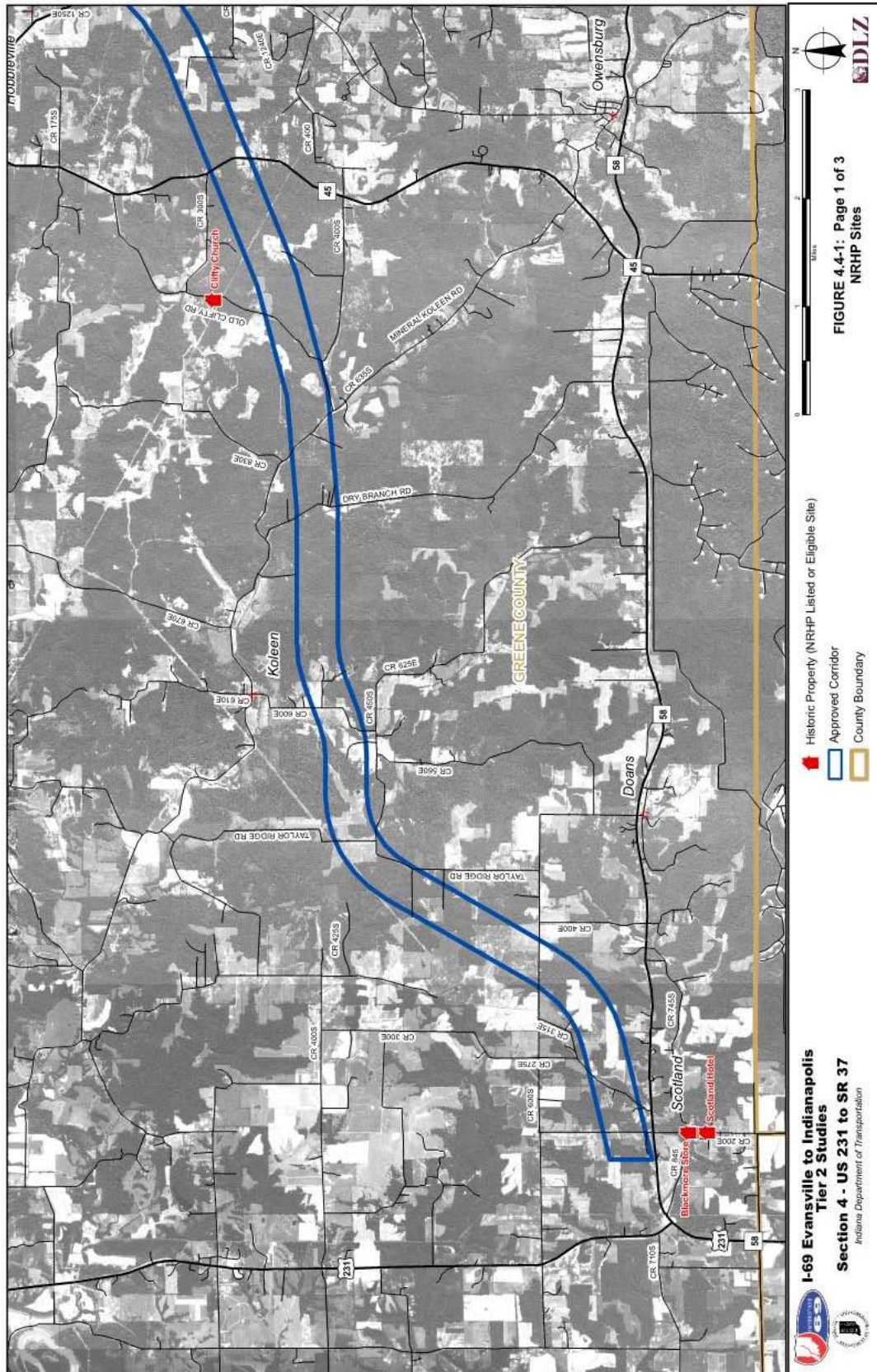


4.4.3.2 Tier 2 Archaeological Investigations

As part of the Tier 2 investigations, Refined Preferred Alternative 2's APE was investigated through shovel probing, surface collection/survey, and visual inspection as outlined in the "Guidebook for Indiana Historic Sites and Structures Inventory-Archaeological Sites." These Phase Ia investigations verified locations of previously recorded archaeological sites within the APE, identified additional archaeological sites, and facilitated preliminary NRHP evaluations and recommendations for those sites. In addition, a context study was prepared for the Virginia Ironworks and Limestone Quarry District and resulted in recognition of a discontinuous archaeological Virginia Ironworks District and a discontinuous archaeological Victor Limestone District.

The results of the archaeological surveys and studies are summarized in Section 5.14, Archaeology Impacts, and documented in technical reports submitted to the SHPO. Summaries of the Phase Ia archaeological investigation reports are provided in **Appendix N**, *Section 106 Documentation*.

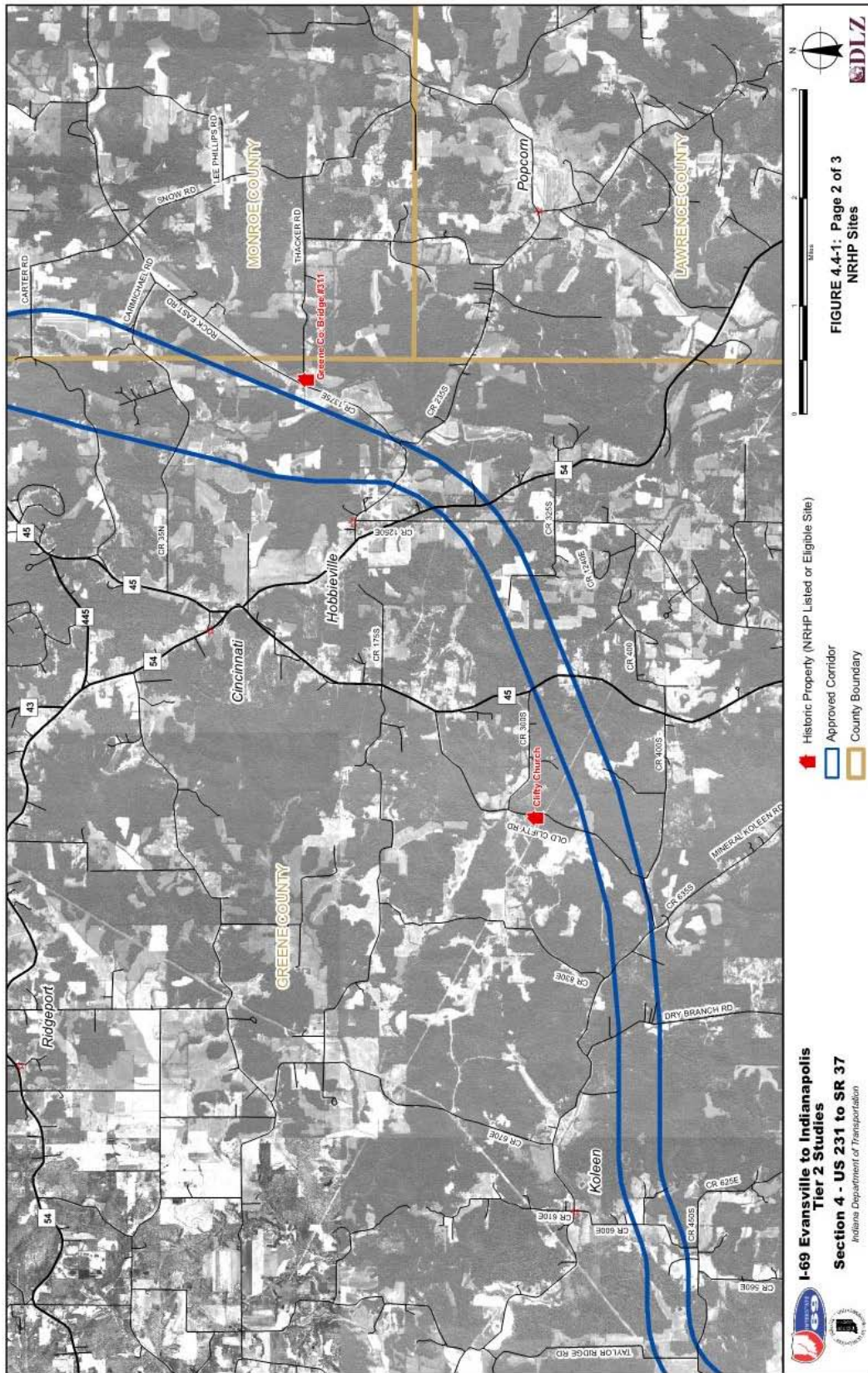
All recommended additional archaeological investigations, Phase Ic, Phase II, and if necessary Phase III archaeological work for sites within the APE will be conducted, as provided for in the Section 106 Memorandum of Agreement (MOA) for this project. **Appendix N** contains this project's approved MOA.





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4.5 Hazardous Materials

Since the Draft Environmental Impact Statement (DEIS), no substantive changes have been made to this section.

4.5.1 Introduction

Hazardous waste sites are regulated by the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). During the Tier 2 process, the locations of permitted and non-regulated hazardous waste sites have been identified. The INDOT Potential Hazardous Waste Site Assessment Form has been being used during the Tier 2 EIS process. Known or potential waste sites are identified and located on a map showing their relationship to the alternatives under consideration. If a known or potential hazardous waste site is impacted by an alternative, information about the site, the potential involvement, impacts and public health concerns of the affected alternative(s) and the proposed mitigation measures to eliminate or minimize impacts or public health concerns are discussed. Government databases used for identification of potential sites include:

1. **CERCLIS** (Comprehensive Environmental Response, Compensation and Liability Information System)—The U.S. Environmental Protection Agency (USEPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) listing tracks sites that have come to USEPA's attention as having potential for releasing hazardous substances into the environment. CERCLIS listings contain sites listed on the National Priorities List (NPL) and sites that have been proposed for possible inclusion to the NPL.
2. **NPL** (National Priority List)—USEPA's NPL is a subset of the CERCLIS database. The NPL list includes sites designated under the Superfund Program.
3. **NFRAP** (USEPA Comprehensive Environmental Response, Compensation, and Liability Information System Archived Sites—No Further Remedial Action Planned)—Sites listed in this database are those for which, to the best of USEPA's knowledge, assessment has been completed and no further remedial action is planned. These sites are considered no longer eligible for inclusion on the NPL.
4. **RCRIS TSD** (USEPA Resource Conservation and Recovery Information System Treatment, Storage, and Disposal Facilities)—This database lists facilities that treat, store, or dispose of hazardous wastes.
5. **RCRIS COR** (USEPA Resource Conservation and Recovery Information System Corrective Action Sites)—The USEPA CORRACTS database identifies hazardous waste handlers undertaking corrective action as directed by USEPA under RCRA (Resource Conservation and Recovery Act).
6. **RCRIS GEN** (USEPA Resource Conservation and Recovery Information System Large and Small Quantity Generators)—This database contains listings for sites that generate hazardous waste or meet other RCRA requirements.



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7. **ERNS** (USEPA Emergency Response Notification System)—The USEPA ERNS serves to store information on releases of oil and hazardous substances into the environment. The USEPA National Response Center is the origin of the data included in ERNS listings.
8. **State Sites**—The Indiana Department of Environmental Management (IDEM) list of all hazardous waste inventory sites as maintained by the Office of Environmental Response.
9. **SWL** (State Solid Waste Landfill List)—The IDEM database listing of landfills and transfer stations as maintained by the Office of Solid and Hazardous Waste Management.
10. **REG UST** (State Registered UST Listing)—The IDEM database listing of all registered underground storage tanks (USTs) as maintained by the Office of Environmental Response Underground Storage Tank Section.
11. **Leaking UST**—The IDEM database listing of all leaking underground storage tanks as maintained by the Office of Environmental Response Leaking Underground Storage Tank (LUST) Section.

There are no database sites located within the corridor in Section 4. There are three UST database sites and one LUST database site adjacent to the Section 4 corridor that may be affected by interchange improvements. General information on these four sites is as follows. See Section 5.16, *Hazardous Waste Sites*, for details about each.

REG UST Sites

- **Sunmart Food Store** (HM-1) is located in the northeast quadrant of the intersection of SR 37 and Victor Pike in Monroe County. The site has four active USTs ranging in size from 6,000 to 8,000 gallons in capacity. This site is located near the proposed SR 37 interchange.
- **Hasler Junction** (HM-2) (a service station) is located at the intersection of US 231 and SR 45/58 in Greene County. The site has four active USTs ranging in size from 6,000 to 10,000 gallons. This site is near the site of the US 231 interchange in Section 3, and was considered in the Final EIS for Section 3, published in December 2009. That FEIS showed a tight-diamond interchange design as the preferred interchange design at US 231. This design avoided impacts to this service station and its USTs. See Section 3 FEIS, Section 5.16 for more details.
- **Petro-Plus & Crossroads Café** (HM-3) is located along the north side of SR 45 at the intersection of SR 45 and SR 445. The site is located near the South Connector Corridor for the proposed Greene/Monroe County Line interchange. The site has two active USTs ranging in size from 8,000 to 10,000 gallons.

REG LUST Site

- **Pinewood Village** (HM-4) is located along the north side of SR 45, just east of the intersection of SR 45 and SR 445. The site is the location of a Marathon Gas Station and a separate car-wash facility. The gas station has two active USTs ranging in size from 6,000 to



8,000 gallons. A release from the UST's at this facility was reported to IDEM on September 16, 2009. The site is located near the South Connector Corridor for the proposed Greene/Monroe County Line interchange.

Other Hazardous Materials Sites

A review of the Indiana Petroleum Database Management System identified the presence of the following sites within the corridor that may have the potential to represent environmental concern. General information on these two sites is as follows. See Section 5.16 *Hazardous Waste Sites*, for details about each.

- One dry well located south of CR 600S in Greene County. This well is located near both Subsection 4A alignments.
- Three abandoned gas wells located along the north side of CR 600S and just west of CR 400E in Greene County. These wells are located near the Subsection 4B-1 alignment.
- Two dry wells located north of CR 600S in Greene County. These wells are located near the Subsection 4B-1 alignment.
- One abandoned salt water disposal well located along the north side of CR 600S and just west of CR 400E in Greene County. This well is located near the Subsection 4B-1 alignment.

A site reconnaissance of the Section 4 corridor identified three sites located within the corridor that have the potential to represent environmental concern. General information on these three sites is as follows. See Section 5.16 *Hazardous Waste Sites*, for details about each.

- **Lumber Yard/Mill (HM-5)** – A small lumber yard/mill was identified near the intersection of Rockport Road and West Evans Lane in Monroe County. This site is located near the Subsection 4G-2 alignment.
- **Open Dump/Auto Graveyard (HM-6)** – A combination open dump and auto graveyard was identified at 7699 Evans Road, approximately 4,100 feet west of the intersection of Evans Road and Harmony Road in Monroe County. The site was the location of large piles of tires, automotive parts, vehicles, and other debris items that were scattered throughout the property. This site is located near the Subsection 4G-2 alignment.
- **3-D Stone, Inc. (HM-7)** – A manufacturing facility that specializes in cutting and fabricating of limestone for commercial and residential use. The site is located at 6700 South Victor Pike. This site is located near the Subsection 4H-3 alignment.

The locations of the UST database sites, the Petroleum Database Management System sites, and the two sites of potential environmental concern are shown on **Figure 4.5-1** (p. 4-151).



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In addition to these sites, numerous rural residences and farms were identified within the corridor. These properties, especially farms, typically have the potential for above ground storage tanks (AST's) and USTs to be present that may be used for the on-site storage of chemicals associated with pesticides and herbicides and fuel for equipment. No specific sites were identified at this time.

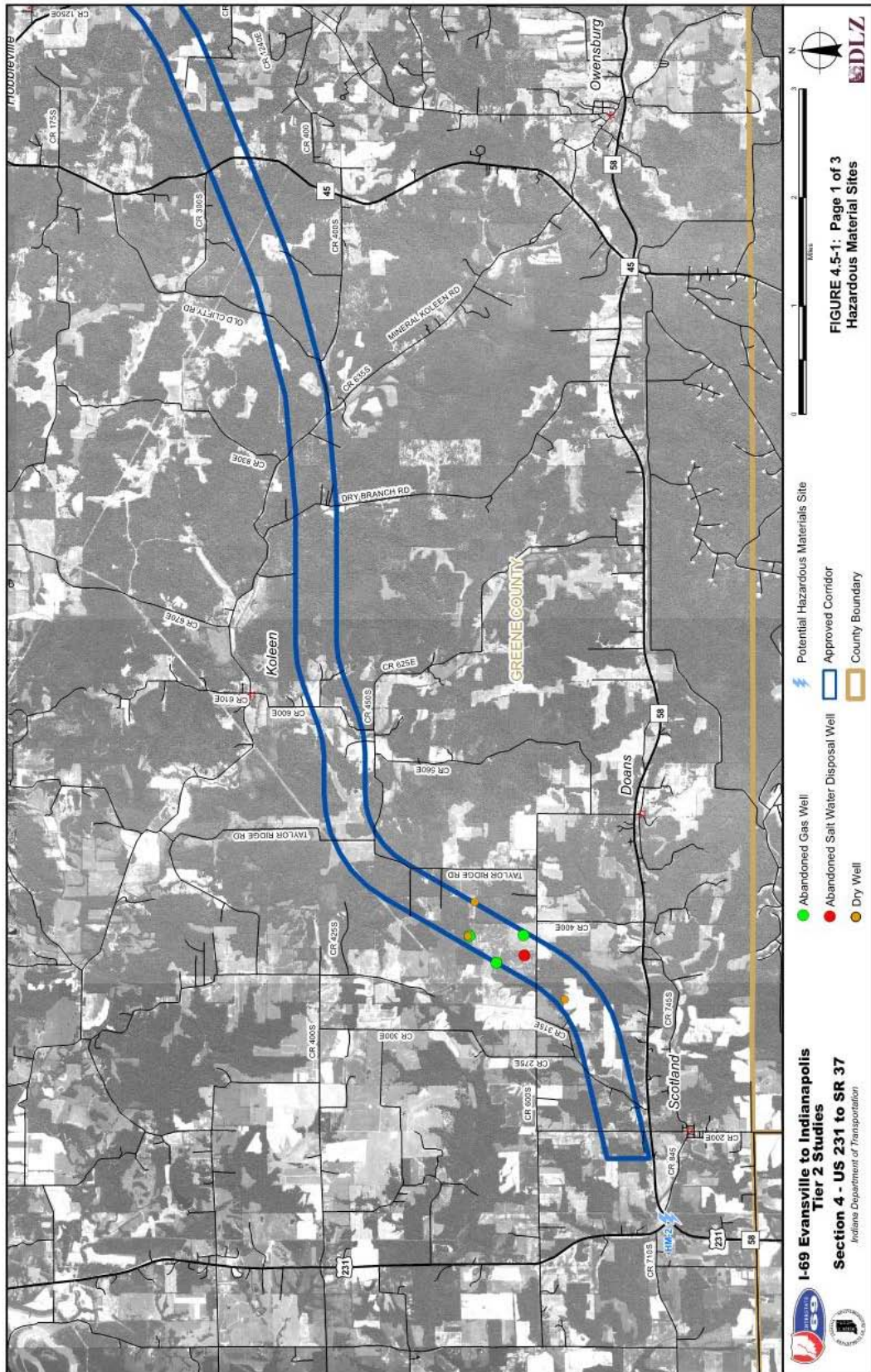
4.5.2 Sites of Special Concern

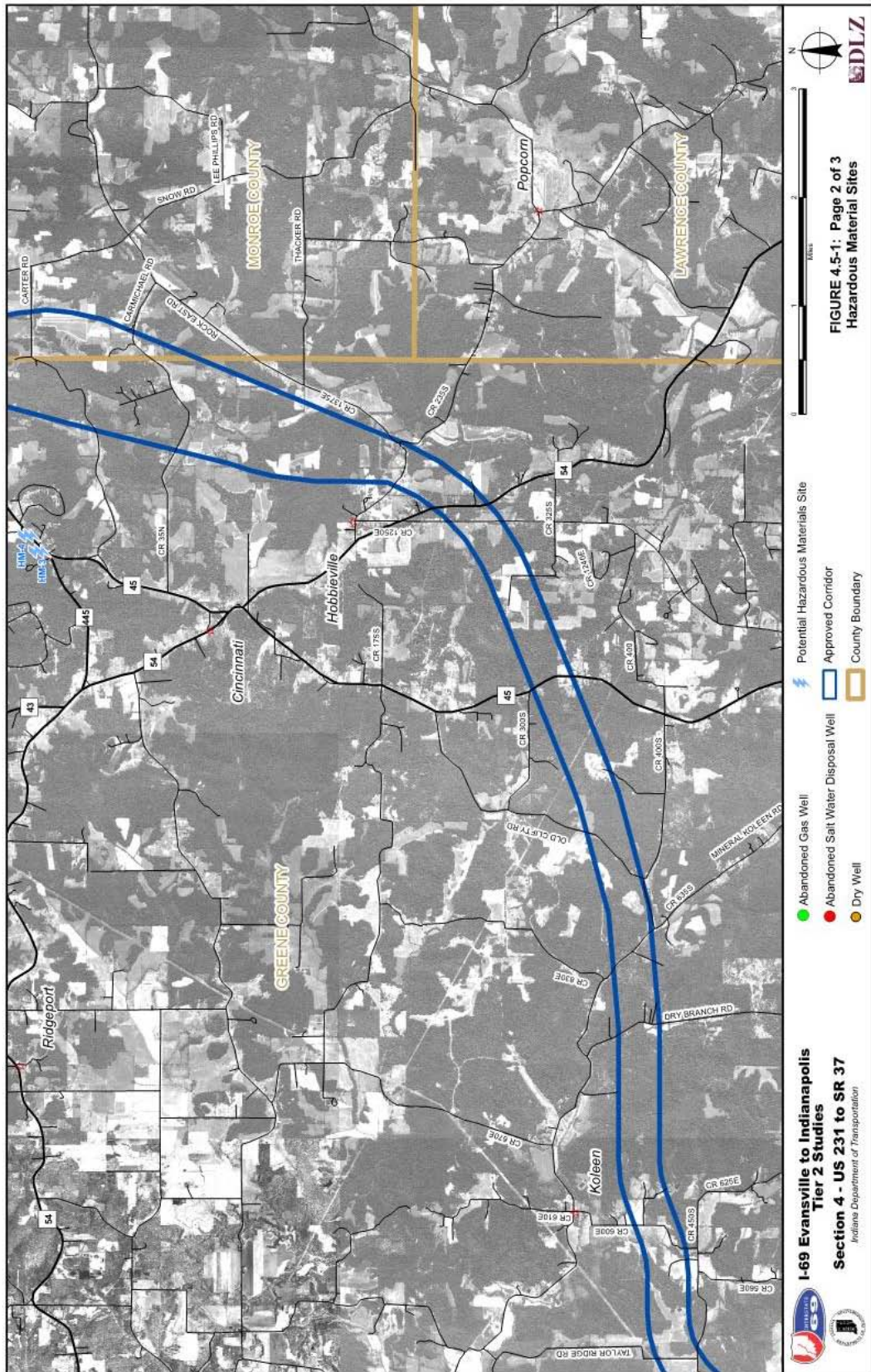
There are no known hazardous materials sites within the Section 4 project corridor that are classified as sites of special concern as a result of the size, impacts to the environment, or large number of a particular type of site.



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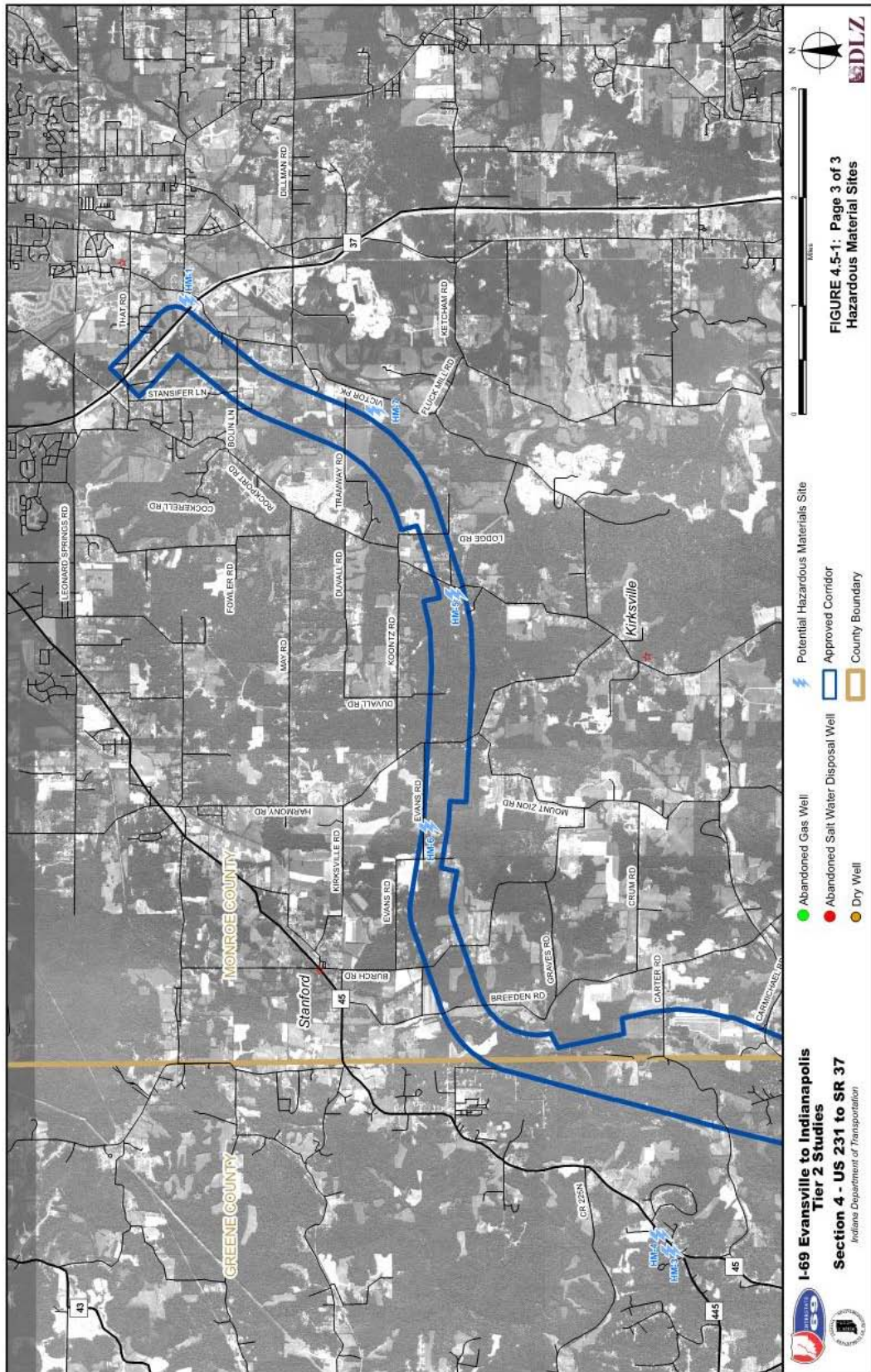






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4.6 Air Quality

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

- The results of the recently completed conformity analysis for Greene County has been added.

The Clean Air Act (CAA) and the 1990 Clean Air Act Amendments requires the USEPA to establish National Ambient Air Quality Standards (NAAQS) for pollutants that are considered to be harmful to the public health and environment. USEPA set forth standards for six principal pollutants – particulate matter (PM), sulfur dioxide (SO₂), carbon monoxide (CO), ozone, nitrogen dioxide (NO₂), and lead. When levels of pollutants do not exceed the standards, an area is considered in attainment of the NAAQS. An area that does not meet the NAAQS for one or more pollutants will be designated by the USEPA as a “nonattainment area.” Areas that were formerly in nonattainment and now meet the NAAQS may petition for redesignation to attainment. The State must submit, and USEPA can approve, a maintenance plan which covers a 10-year period. These are called “maintenance areas” and the CAA calls for the State to update the maintenance plan for another 10 years for a total period of 20 years. Under the CAA, each state is required to establish a plan to achieve and/or maintain the NAAQS in nonattainment and maintenance areas. This plan is known as the State Implementation Plan (SIP).

The Clean Air Act Amendments (CAAA) of 1990, linked transportation funding to air quality actions. Specific requirements aimed at transportation may include vehicle inspection and maintenance, reformulated fuels, alternative-fuel vehicles, and transportation control measures (TCMs). Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) funding is available for projects that benefit air quality.

The FHWA, in consultation with Indiana Department of Environmental Management (IDEM), USEPA, and INDOT, is responsible for ensuring transportation conformity as part of the National Environmental Policy Act (NEPA) process for the Section 4 corridor, which is located in Greene and Monroe counties. Greene County is in attainment with the NAAQS and is a maintenance area for 8-hour ozone. Greene County was designated nonattainment for the eight-hour ozone standard on April 30, 2004. This designation was based on monitoring data from 2001-2003. On July 15, 2005, Indiana requested that USEPA re-designate Greene County to attainment based on more recent monitoring data (2002-2004). USEPA agreed and re-designated Greene County to attainment “maintenance” for 8-hour ozone on December 29, 2005. Monroe County is in attainment for all NAAQS.

Because of the maintenance designation, the I-69 project (Sections 3 and 4) in Greene County is subject to transportation conformity requirements found in 40 CFR Part 93 as amended. The USEPA determined that Greene County can use the motor vehicle emission budgets from the 8-hour ozone redesignation request and maintenance plan for future conformity determinations, effective November 4, 2005.



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INDOT has adopted a long-range transportation plan that includes the approved Section 4 project corridor. A conformity analysis for volatile organic compounds and oxides of nitrogen was conducted in 2010, and FHWA has determined (after all required reviews by EPA and IDEM) that changes in emissions due to Section 4 of the proposed I-69 freeway are in conformity with the State Implementation Plan emissions budget and that the transportation conformity requirements as found in 40 CFR Part 93 have been met. Section 5.9, *Air Quality* and **Appendix MM**, *Greene County Air Conformity*, of this Final Environmental Impact Statement (FEIS) provide details of the conformity analysis and determination for Greene County.

In addition to demonstrating conformity in nonattainment and maintenance areas for the NAAQS at the regional-level, transportation conformity requirements also require project-level hotspot analyses for carbon monoxide (CO) and/or particulate matter (PM) in nonattainment and maintenance areas for CO and/or PM. Since Greene County and Monroe County are attainment for both CO and PM, these hotspot analyses were not required to demonstrate conformity, but a CO hotspot analysis was conducted to demonstrate that there are no local air quality impacts under NEPA. Mobile source air toxics (MSAT) issues are to be addressed in project-level decision making within the context of NEPA. Section 5.9, *Air Quality*, describes the methodology and results of the air quality analysis conducted for Section 4 at both the regional-level and the project-level.



4.7 Highway Noise

Since the Draft Environmental Impact Statement (DEIS), no substantive changes have been made to this section.

Typically a new freeway results in higher noise levels along its route, particularly where it traverses relatively quiet rural forested and agricultural areas, such as I-69 will through most of the Section 4 corridor. However, where traffic is diverted from local roads to I-69, highway-generated noise along those local roads would be expected to decrease.

Noise generally can be defined as unwanted sound. It is a vibrational energy form that causes pressure variations in elastic media such as air or water. The human ear perceives these pressure variations as sound, and can discern different levels of loudness as the intensity of the pressure variations fluctuate. These pressure differences are commonly measured in decibels (dB). A level of zero decibels corresponds to the lowest limit of audibility, while a level of 140 decibels represents the threshold of pain.

Since the hearing sensitivity of the human ear is non-linear with respect to frequency, a weighting scale (“A-weighted” scale) is used to define how loud a sound is for all frequencies. Sound levels measured using the A-weighted scale are often expressed as dBA. For the purposes of this study, all references to sound levels will reflect dBA measurements. In addition, all referenced noise levels represent exterior levels only. No noise measurements will be conducted on the interior of buildings or other structures. The noise levels of many common appliances and events are listed below for reference (<http://www.nonoise.org/library/household/index.htm> Accessed on March 24, 2010). All sounds are measured at the distance that a person would typically be from the source.

- | | |
|---------------------------------|-----------|
| • Refrigerator | 40-43 dBA |
| • Typical Living Room | 40 dBA |
| • Forced Hot Air Heating System | 40-52 dBA |
| • Normal Conversation | 55-65 dBA |
| • Dishwasher | 63-66 dBA |
| • Clothes Washer | 65-70 dBA |
| • Telephone Ringing | 66-75 dBA |
| • Lawn Mower | 88-94 dBA |

Noise monitoring procedures established by FHWA provide for conducting noise analyses using the L_{eq} noise descriptor. The L_{eq} descriptor has been adopted in the INDOT Traffic Noise Policy for all federally-funded highway noise analyses in the state. The hourly L_{eq} is defined as the equivalent, steady state sound level, which, in a given period of time (one hour), contains the same acoustical energy as the time-varying sound level during the same time period. Generally, a 3-dBA L_{eq} change is the average minimum change necessary to be perceived by most people. The L_{eq} noise descriptor was used in this study because of its ease to monitor and compare with FHWA's noise abatement criteria (NAC) standards.



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Within and near the Section 4 corridor, the roadways that serve as primary sources of highway noise are SR 45/58, SR 45, SR 445, SR 54 and SR 37. The measured ambient sound levels along state highways ranged between 57 dBA $L_{eq}(h)$ and 66 dBA $L_{eq}(h)$. The county roads within and near the corridor are located in low density, rural settings and do not generally carry a substantial amount of traffic. Measured ambient sound levels along county roads ranged between 33 dBA $L_{eq}(h)$ and 57 dBA $L_{eq}(h)$. See **Figure 4.7-1** (p. 4-157) for noise meter locations.

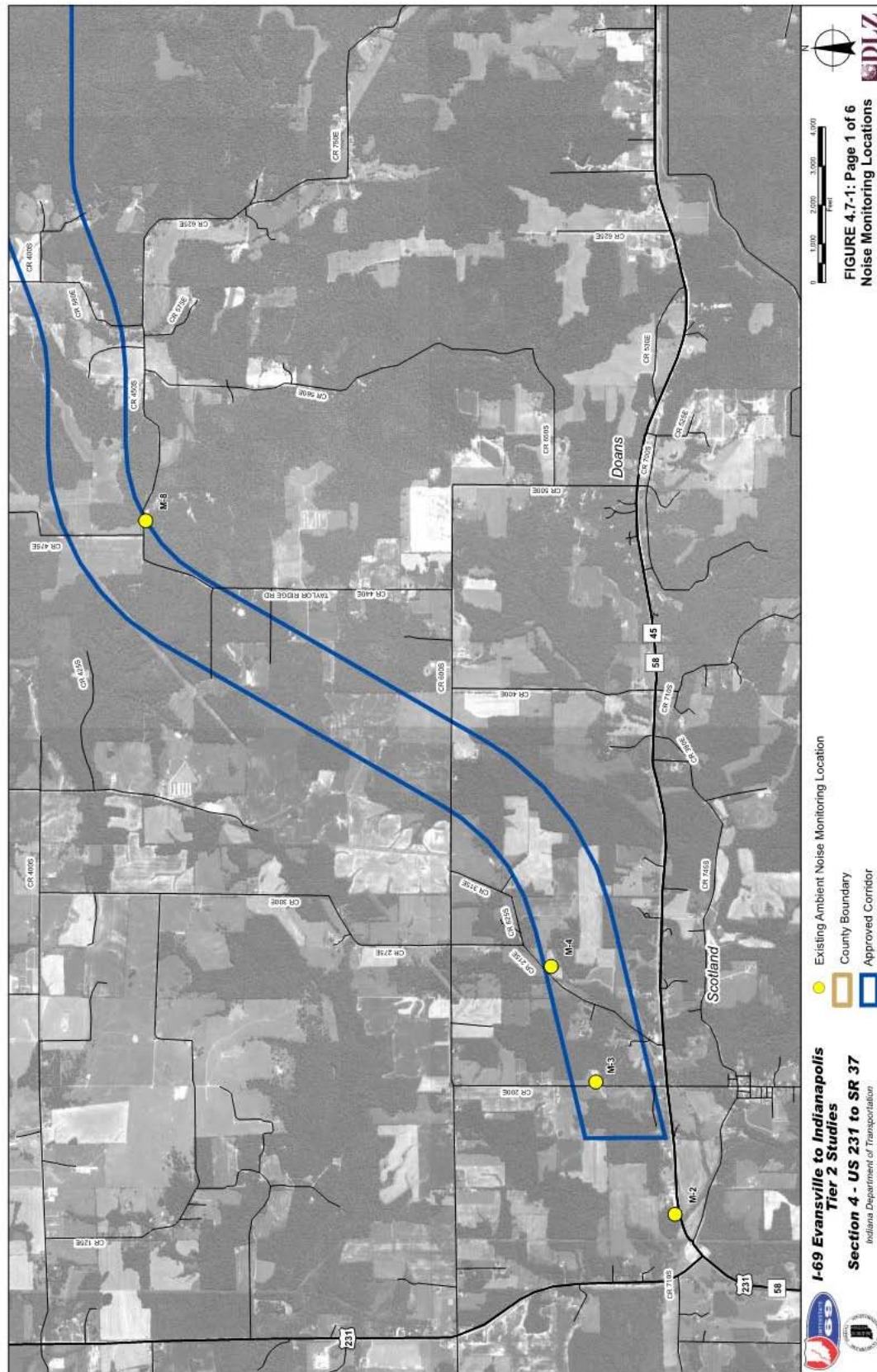
Per the INDOT *Noise Analysis Procedure*, a residence has highway noise impacts if the measured sound level approaches or exceeds 67 dBA $L_{eq}(h)$. One residence (Category B) located adjacent to the SR 45 right-of-way just south of the SR 445 junction has an existing sound level of 66.1 dBA $L_{eq}(h)$. The source of the noise in this area can be attributed to traffic along SR 45. There are no other existing traffic noise impacts with the Section 4 corridor.

Section 5.10, *Highway Noise*, describes the methodology and results of the noise impact analysis conducted for Section 4.



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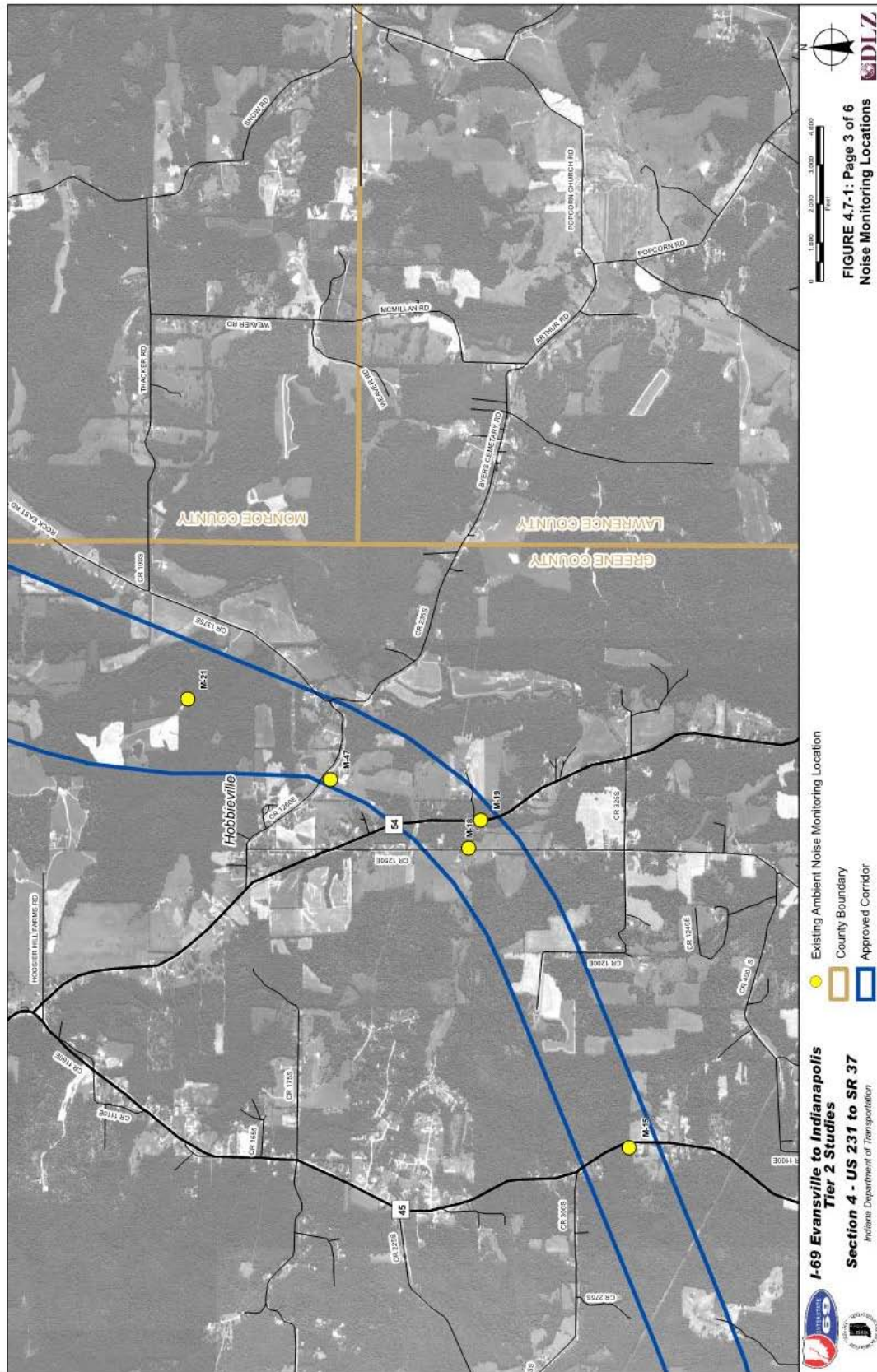
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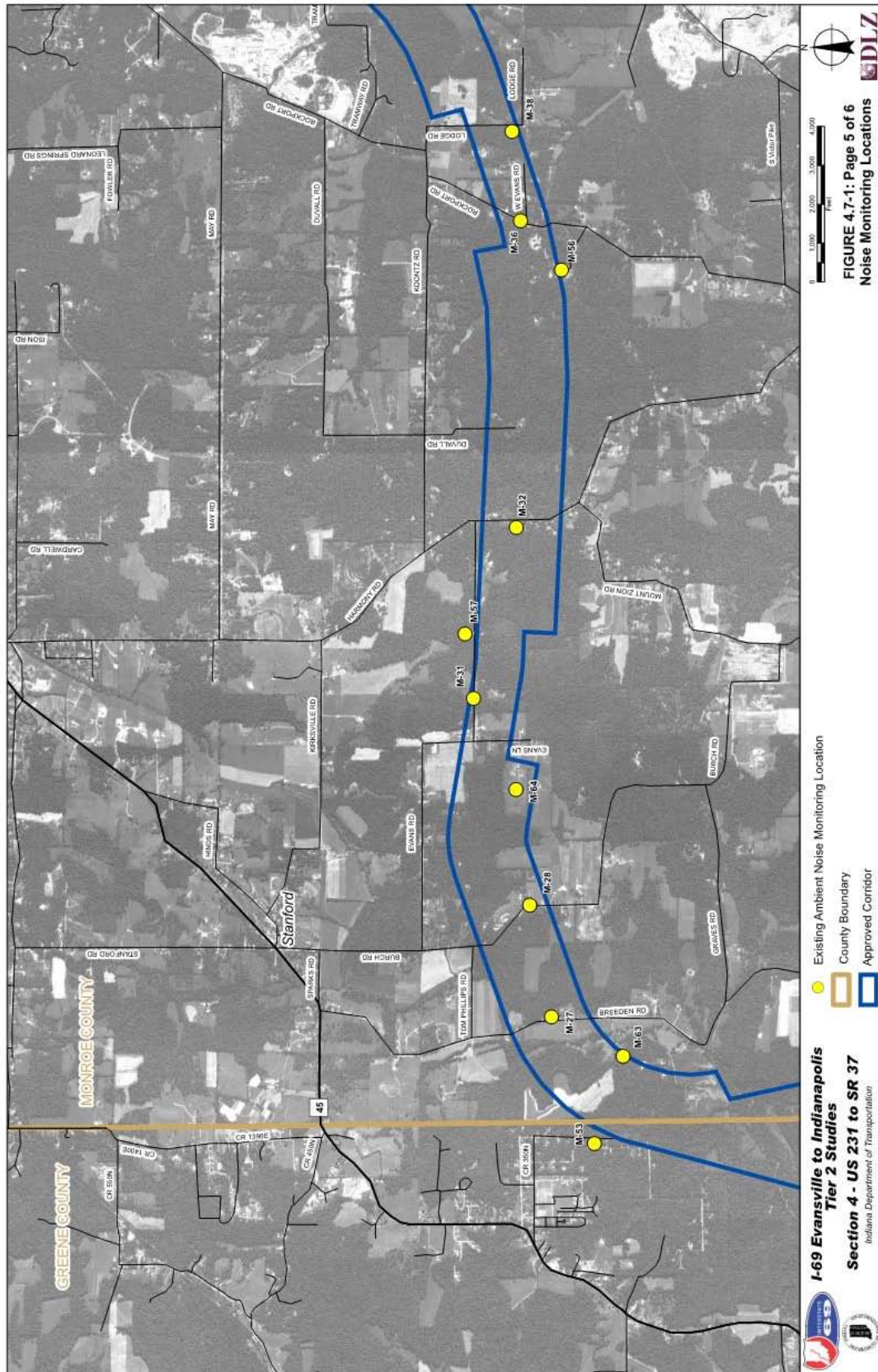


FIGURE 4.7-1: Page 5 of 6
 Noise Monitoring Locations

