Illinois Department of Transportation

Illinois Route 47 (FAP Route 326)

Approximately 1,650 feet South of Granville Road to Caton Farm Road
Grundy and Kendall Counties, Illinois

Section (109,110)R, R-1, 110BR & BR-1

ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to 42 USC 4332 (2)(c)
by the

U. S. Department of Transportation
Federal Highway Administration

and

Illinois Department of Transportation

May 2012

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May 31, 2012
Date of Approval

For IDOT

June 4, 2012
Date of Approval

For FHWA

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The purpose of the proposed action is to address existing and 2030 transportation needs along Illinois Route 47, from south of Granville Road to Caton Farm Road, a distance of approximately 11.5 miles. The specific needs of the project include improving safety for all users, improving capacity and mobility, and improving the facility condition. The study area is located in Grundy and Kendall Counties, Illinois and within the northern limits of the City of Morris (See Figure 1, Project Location Map). The proposed action includes the reconstruction of Illinois Route 47 to provide two lanes in each direction with a center median throughout the limits of improvement, generally following the existing alignment; reconstruction of the bridges over Valley Run and Saratoga Creek; and intersection improvements with traffic signal installations.

Construction of the proposed action will acquire 164.7 acres of right-of-way, 1.7 acres of permanent easements, and 3.0 acres of temporary easements from 68 parcels, and involve conversion of 165.6 acres of agricultural lands to roadway use. It will include in stream work for replacement bridges at the crossings of Valley Run, which is an Illinois Natural Area Inventory (INAI) site, and Saratoga Creek. Five wetlands will be impacted for a total of 0.21 acres. The following permits will be sought for the project for involvements with the wetland impacts: Section 404/Nationwide Permit 14, and NPDES. The state listed slippershell mussel occurs at the Illinois Route 47 crossing of Valley Run Creek. A commitment was made to IDNR to relocate the mussel population to another area one year in advance of construction at this site.

Illinois Department of Transportation

SECTION I: INTRODUCTION & PURPOSE AND NEED

1. Introduction

The project involves the improvement of Illinois Route 47 (FAP Route 326) from approximately 1,650 feet south of Granville Road on the south, to Caton Farm Road on the north, a distance of approximately 11.5 miles. See Figure 1, Project Location Map. The general scope of work includes reconstructing and widening Illinois Route 47 from 2 lanes to 4 lanes. The existing Illinois Route 47 two-lane pavement will be completely reconstructed with two 12-foot lanes in each direction along with a 32-foot wide raised median and 12-foot outside shoulders. Southern portions of the reconstructed pavement will have curb and gutter with storm sewer along the outside of 12-foot wide paved shoulders. Northern portions of the project will have 12-foot wide shoulders (eight-foot paved and four-foot earth) and an open ditch.

The project study area is located primarily in unincorporated rural areas of Grundy and Kendall Counties, Illinois. At the south project limits, Illinois Route 47 is located within the northern corporate limits of the City of Morris. The approximate populations for the three population areas, based on the 2010 U.S. Census, are City of Morris - 13,636, Grundy County – 50,063, and Kendall County – 114,736.

2. Purpose and Need

2.1 Purpose

The purpose of the proposed action is to address the existing and future transportation needs along Illinois Route 47, from south of Granville Road to Caton Farm Road. The specific needs of the project include improving safety for all users, improving capacity and mobility, and improving the facility condition.

2.2 Project Location

The study area is located in Grundy and Kendall Counties, Illinois and within the northern limits of the City of Morris. The project study limits are along Illinois Route 47 with a south terminus at approximately 1,650 feet south of Granville Road and a north terminus at Caton Farm Road, a distance of approximately 11.5 miles. See Figure 1, Project Location Map.

This section of Illinois Route 47 is part of the National Highway System and is classified as an Other Principal Arterial. The purpose of the National Highway System is to provide an interconnected system of principal arterial routes which serve major population centers, international border crossings, ports, airports, public transportation facilities, and other intermodal transportation facilities and other major travel destinations; meet national defense requirements; and serve interstate and interregional travel.

Illinois Route 47 is designated as a class II truck route. It is primarily rural north of the City of Morris with a posted speed limit of 45 miles per hour (mph) to a point just north of Saratoga Elementary School. The remainder of the project has a speed limit of 55 mph. A set of reverse curves bounded by White Willow Road on the south and Joliet Road on the north have advisory speed signs of 45 mph. There are two bridges and numerous cross road culverts within the project limits. The bridges cross Saratoga Creek (SN 032-0089) just north of Nelson Road and Valley Run Creek (SN 032-0088) just south of Minooka Road.

2.3 Project Background

The roadway was originally constructed in 1930 as an 18-foot wide two lane roadway with 10-foot wide earth shoulders on each side. Over the past 80 years, the roadway pavement has been widened to provide wider travel lanes, resurfaced several times, and the shoulders improved.

Illinois Route 47 is a critical link in the region's transportation network. Between Interstate 80 and Interstate 88 it is currently the only major north-south arterial route in Grundy and Kendall Counties. Illinois Route 47 is already a four-lane roadway from north of the Village of Sugar Grove in Kane County and south through the City of Morris in Grundy County. The Illinois Department of Transportation, District 1 and District 3 are pursuing project improvements within their jurisdictions to widen the remaining sections of Illinois Route 47 which are not yet four-lane roadways. These improvements, which include the proposed action, will complete a vital link in the region's transportation network. See Figure 2, Regional Location Map.

The Kendall County portion of this proposed project is within the planning area of the Chicago Metropolitan Agency for Planning (CMAP), the Metropolitan Planning Organization for Northeast Illinois. Therefore, the Illinois Route 47 improvements have been included in the CMAP planning activities and included in the *GO TO 2040* Comprehensive Regional Plan for the Northeastern Illinois Area.

As such, the Illinois Route 47 project is included in the FY 2010-2015 Transportation Improvement Program (TIP) endorsed by CMAP and the FY 2009-2012 State Transportation Improvement Program (STIP). The conformity analysis performed by CMAP was found to meet the applicable criteria of 40 CFR 51 and 93 and conform to the State Implementation Plan.

2.4 Need for the Proposed Action

2.4.1 Safety

A review of the crash history within the study limits was completed for the five-year study period from 2007 to 2011. The results of the crash analysis are summarized in Table 1. Crash report data and associated Traffic Crash Reports from the state and local police were obtained from the Illinois Department of Transportation (IDOT). A total of 97 crashes occurred within the study limits from January 1, 2007 through December 31, 2011. These crashes occurred along Illinois Route 47 and at the intersections with the signalized and unsignalized intersections. There are no "Five Percent Report" (FPR) locations within the project limits. See Figure 3, Crash Location Map. The FPR is a federal requirement to describe locations exhibiting the most severe highway safety needs (23 USC 148).

Table 1
Summary of Crash Types

Crash Type	2007	2008	2009	2010	2011	Total Crashes	Frequency
Angle	4	6		2	2	14	14.4%
Animal/Hit Deer	3	1	2	2		8	8.2%
Fixed Object - Off Road	8	1	2	3	3	17	17.5%
Head On	1		2			3	3.1%
Hit by Thrown/Falling Object					1	1	1.0%
Other Non-Collision	1	2	1			4	4.1%
Other Object			1		1	2	2.1%
Overturned - Off Road	1	3	1	1	2	8	8.2%
Parked Motor Vehicle		1	2			3	3.1%
Pedal Cyclist						0	0.0%
Pedestrian						0	0.0%
Rear End	2	6	3	3	1	15	15.5%
Sideswipe Opposite Direction		1	2	1	1	5	5.2%
Sideswipe Same Direction		1		1		2	2.1%
Turning	5	1	3	2	4	15	15.5%
Total Crashes	25	23	19	15	15	97	100.0%

The predominant crash types were Fixed Object Off Road, accounting for 17.5 percent of the total crashes. The next most common crash types were Rear End (15.5 percent), Turning (15.5 percent), Angle (14.4 percent) and Overturned Off-Road (8.2 percent).

Of the 97 total crashes, there was one fatal crash and 31 injury crashes (32 percent of all crashes), resulting in 46 injuries. The 31 injury types were as follows: 7-Type A, 18-Type B, and 6-Type C, see Table 2, Description of Crash Injury Types, and Table 3, Summary of Crash Severity. The one fatal crash was a head on type and was alcohol related. It is also worth noting that of the 97 total crashes, 65 crashes (67 percent) involved Property Damage Only (PDO). It should be noted that the reporting of crashes was revised beginning January 1, 2009 with the minimum property damage amount for reporting being raised from $500 to $1,500. This generally resulted in a decrease in the number of PDO crashes reported on IDOT crash data reports in 2009.

Although there were no pedestrian and bicycle related crashes during the study period, the proposed project will provide safer bicycle and pedestrian access by enhancing existing facilities and providing new facilities where appropriate along the project corridor. Additionally, crosswalks are planned at the intersection of Illinois Route 47 and Granville Road when it is signalized.

Table 2
Description of Crash Injury Types

Severity	Description
Fatal	A traffic crash in which at least one person dies within 30 days of the crash.
Type A (Incapacitating injury)	Any injury, other than fatal, that prevents the injured person from walking, driving, or normally continuing the activities he/she was capable of performing before the injury occurred. Inclusions: severe lacerations, broken/distorted limbs, skull injuries, chest injuries and abdominal injuries.
Type B (Non-incapacitating injury)	Any injury, other than a fatal or incapacitating injury, that is evident to observers at the scene of the crash. Inclusions: lumps on the head, abrasions, bruises, and minor lacerations.
Type C (Reported, injury not evident)	Any injury reported or claimed that is not listed above. Inclusions: momentary unconsciousness, claims of injuries not evident, limping, complaints of pain, nausea.
Property Damage	No injuries or fatalities, but damage is caused to either vehicle.

Table 3
Summary of Crash Severity

Severity of Crash	2007	2008	2009	2010	2011	Total	Frequency
Property Damage Only	21	13	11	10	10	65	67.0%
Personal Injury - Type A	0	3	1	1	2	7	7.2%
Personal Injury - Type B	3	5	4	3	3	18	18.6%
Personal Injury - Type C	1	2	2	1	0	6	6.2%
Fatal Crash	0	0	1	0	0	1	1.0%
Total	25	23	19	15	15	97	100.0%
Number of Injuries	6	13	11	8	8	46	
Number of Fatalities			1			1	

No wet weather cluster site was identified for the project area during the five-year study period from 2007 to 2011. See Table 4, Summary of Weather/Road Conditions. Wet and/or icy pavement has likely contributed to the occurrence of several of the crashes within the project limits; however, these occurrences are spread out throughout the study area. No high or abnormal concentrations of wet/icy pavement crashes exist within the project limits. However, new pavement driving surface with improved drainage and new curb and gutters (in the southern section) will help reduce wet pavement conditions and crashes.

Table 4
Summary of Weather/Road Conditions

Roadway Surface Condition	2007	2008	2009	2010	2011	Total	Frequency
Clear - Dry	17	10	9	12	10	58	59.8%
Clear - Wet		1	1	1	1	4	4.1%
Clear - Ice/Snow	1	2	2		1	6	6.2%
Clear - Not Stated	1					1	1.0%
Fog/Smoke/Haze - Dry	1		1			2	2.1%
Fog/Smoke/Haze - Wet			1			1	1.0%
Rain - Wet	1	3	2	1		7	7.2%
Rain - Ice/Snow	1	1			1	3	3.1%
Snow - Dry		1				1	1.0%
Snow - Wet	2				1	3	3.1%
Snow - Snow		2	2	1		5	5.2%
Snow- Ice	1	1	1			3	3.1%
Other Ice					1	1	1.0%
Severe Crosswind - Snow		1				1	1.0%
Not Stated - Ice/Snow						0	0.0%
Not Stated - Not Stated		1				1	1.0%
	25	23	19	15	15	97	100.0%

Rear End, Turning, Angle, and Sideswipe-Same Direction crashes accounted for 47.5 percent of the crashes, supporting a need for additional roadway capacity, auxiliary lanes, and/or intersection improvements. The addition of warranted through and auxiliary lanes allows turning vehicles to separate from the through traffic flow, provides lanes for same direction passing, and increases maneuvering room for crash avoidance.

Similarly, the Fixed Object-Off Road and Overturned-Off Road crashes, accounting for 25.7 percent of the crashes, support a need for the addition of proposed wider paved shoulders and/or curb and gutter with associated posted speed reductions. Wider shoulders and curb and gutter may reduce the probability of these types of roadway departure crashes.

Lastly, Head On and Sideswipe-Opposite Direction crashes accounted for 8.3 percent of the crashes. As mentioned previously, the one fatal crash was a head on type and was alcohol related. This crash history supports the need for raised curb medians, which may reduce the probability of these crash types by increasing the separation between opposing traffic.

The predominant crash types as described above are an indication of crash concerns and the need for safety improvements that warrant further consideration.

2.4.2 Capacity and Mobility

Illinois Route 47 was evaluated for existing 2009 and forecasted 2030/2040 traffic volumes to determine existing and future traffic operations and capacity needs. The 2009 traffic counts and analyses were provided by the Illinois Department of Transportation (IDOT). The 2040 traffic projections were developed by Chicago Metropolitan Agency for Planning (CMAP).

The need for additional Illinois Route 47 roadway capacity and intersection signalization was originally identified based on traffic projections for the year 2030, which were developed based on projected area development and proposed highway improvements, see Figure 4, 2030 ADT and DHV Map. These 2030 projections were coordinated with the CMAP. The Kendall County portion of the project study area is within the planning area of CMAP, which produces traffic projections with a regional travel model using CMAP 2040 socioeconomic projections and assumes the implementation of the *GO TO 2040* Comprehensive Regional Plan for the Northeastern Illinois Area. Although outside of their planning area, CMAP also provided 2040 projections for the Grundy County portion of this project. See Table 5, CMAP 2030 / 2040 ADT Volumes.

Table 5
CMAP 2030 / 2040 ADT Volumes

Intersection with Illinois Route 47	West Leg*	North Leg*	East Leg*	South Leg*
Gore Road	5,000	9,000	N/A	15,000
Granville Road	310 / N/A	18,816 / 8,000	5,400 / 1,000	18,971 / 8,000
Nelson Road	2,000	9,000	N/A	8,000
Airport Road	500	9,000	N/A	9,000
Minooka Road	258 / 500	18,485 / 11,000	2,042 / 1,000	18,313 / 9,000
Sherrill Road	500	12,000	2,000	11,000
White Willow Road	385 / 500	21,147 / 12,000	3,109 / 500	19,953 / 12,000
Joliet Road	2,000	12,000	N/A	12,000
U.S. Route 52	6,847 / 2,000	22,247 / 16,000	5,383 / 9,000	21,044 / 12,000
Lisbon Center Road	500	16,000	N/A	16,000
Plattville Road	N/A	21,213 / 17,000	6,986 / 500	23,154 / 16,000
Newark Road	2,000	17,000	N/A	17,000
Helmar Road	500	17,000	500	17,000
Caton Farm Road	491 / 1,000	16,502 / 20,000	5,593 / 2,000	19,361 / 18,000

* 2030 ADT / 2040 ADT. If only one ADT volume is listed, it is the 2040 ADT.

Reviewing the northern section of the project study area, the CMAP 2040 traffic projection near Caton Farm Road is 18,000 Average Daily Traffic (ADT) compared to the original 2030 traffic projection of 19,361 ADT. In the southern section of the project study area, south of Sherrill Road, the CMAP 2040 traffic projection is 11,000 ADT compared to the original 2030 traffic projection of 18,485 ADT. Comparing 2030 to 2040 projects, the 2030 projects are generally higher; therefore it was decided to use the higher more conservative 2030 volumes for the project study area. Along Illinois Route 47, from south to north, the 2030 ADT ranges from 18,485 to 19,361. Per IDOT Policy for roadway facilities such as Illinois Route 47, the average daily traffic capacity of a two-lane highway for safe and efficient operations is approximately 8,500 to 12,500 vehicles, at which point additional through-lanes are considered. With the increased traffic volumes expected by the 2030 design year, the existing two-lane roadway of Illinois Route 47 will not have adequate capacity to handle the traffic. Projected volumes will exceed the standard capacity of a two-lane roadway and will need a four-lane roadway. Specifically, beginning near the south project limit at Granville Road, the projected ADT on Illinois Route 47 is 18,816, at Minooka Road it is 18,485, at White Willow Road it is 21,147, at U.S. Route 52 it is 22,247, at Plattville Road it is 21,213, and at Caton Farm Road the ADT is 16,502.

2.4.3 Facility Condition

Illinois Route 47 was originally constructed in 1930. An inventory of the roadway corridor condition was completed and found an aging roadway pavement and roadway facility with design elements not up to current standards and requirements.

The original pavement has been widened and overlain numerous times. Although there have been various improvements to maintain the roadway, the pavement is over 80 years old and exceeds its design life. Pavement core information shows that the original concrete pavement is in poor condition and the lower layers of overlay material at some locations are also in poor condition. The existing pavement exhibits distresses and failures such as rutting, cracking along and across the pavement, deterioration along the centerline of the roadway, and cracking and breakup along the edges of the pavement. The existing pavement is approaching a condition that will likely necessitate a major improvement over the short term.

The current roadway typically provides one travel lane in each direction with eight-foot wide shoulder. The travel lane varies in width from 11 to 12 feet. As describe in Section 2.4.2, Illinois Route 47 will exceed the capacity of the two-lane roadway by the 2030 design year and will require additional lanes to accommodate the future traffic safely and efficiently.

The Prologis Parkway intersection is currently signalized and the U.S. Route 52 intersection is four-way stop controlled. All other intersections have stop signs on the side roads. Review of the existing intersections shows that three intersections will warrant installation of new traffic signals before the 2030 design year. The intersections are at Granville Road, U.S. Route 52 and Plattville Road. These three intersections are expected to meet traffic signal Warrant 1, Eight-Hour Vehicular Volume, by the year 2020. Per the Manual of Uniform Traffic Control Devices, this warrant is defined as when minimum threshold traffic volumes are met for each of any eight hours of an average day. The operation of these intersections will experience major congestion and delays if they are not improved and signalized.

Review of existing roadway geometry found that nearly all intersection corner radii do not meet current design requirements and cannot accommodate the design vehicle for arterial roadways. As traffic volumes increase; vehicular encroachment on opposing traffic lanes will become less tolerable and may increase the probability for turning movement related crashes. In addition, curves near White Willow Road and Joliet Road do not meet the curve length and roadway cross slope/superelevation requirements, and will need to be improved to meet design policies regarding design speeds if the roadway is reconstructed.

Although auxiliary turning lanes have been constructed at various locations throughout the project corridor, other locations have been identified as appropriate for additional turning lanes. Left turn lanes will be provided on Illinois Route 47 at all proposed median openings to remove turning vehicles from the traffic flow and thereby reduce the probability of rear end crashes while providing a consistent roadway.

SECTION II: AFFECTED ENVIRONMENT TABLE

Environmental Resources/Conditions	Resource/Condition Present?		
	Yes	No	Present But Not Affected
I. Social/Economic			
1. Community Cohesion	X		
2. Environmental Justice and Title VI		X	
3. Public Facilities and Services			X
4. Changes in Travel Patterns and Access	X		
5. Relocations (Business and Residential)	X		
6. Economic Impacts		X	
7. Land Use		X	
8. Growth and Economic Development			X
9. Pedestrian and Bicycle Facilities	X		
II. Agricultural			
1. Farms and Farmland Conversion	X		
2. Prime and Important Soils	X		
3. Severed/Landlocked Parcels		X	
4. Adverse Travel		X	
III. Cultural Resources (Historic Properties)			
1. Archeological Sites			X
2. Historic Bridges		X	
3. Historic Districts		X	
4. Historic Buildings			X
IV. Air Quality			
1. Microscale Analysis			
a. Does project add through lanes or auxiliary turning lanes?	X		
b. Has COSIM 3.0 been used?	X		
2. Air Quality Conformity			
a. Is project in a non-attainment or maintenance area?		X	
3. Is project located in a PM 2.5 or PM 10 non-attainment or maintenance area		X	
4. Construction-Related Particulate Matter	X		
5. Mobile Source Air Toxics	X		
V. Noise			
1. Is this a Type I project?	X		
a. Noise impacts	X		
b. Does abatement meet feasibility and reasonableness criteria?	X		
2. Is this a Type III project?		X	
VI. Natural Resources			
1. Upland Plant Communities			
a. Does the project impact wooded areas (Trees)?	X		

Environmental Resources/Conditions	Resource/Condition Present?		
	Yes	No	Present But Not Affected
b. Does the project impact Prairie?		X	
c. Does the project occur within an Illinois Department of Agriculture quarantine area for an invasive species?	X		
2. Wildlife Resources			
a. Does the project area contain Wildlife Habitat?	X		
b. Does the project area contain breeding habitat for neotropical migrant species of birds?	X		
c. Does the project area contain nesting Bald Eagles?		X	
3. Threatened and Endangered Species			
a. Does habitat exist for Federally listed species in the project area?		X	
b. Did the EcoCAT response from IDNR indicate the presence of State-Listed Species in the project area?	X		
VII. Water Quality/Resources/Aquatic Habitats			
1. Does the project involve a waterbody?	X		
2. Does the project affect the physical features of a stream?	X		
3. Does the project affect the fish and/or mussels within the stream?	X		
4. Does the project affect either the narrative or numeric water quality standards?	X		
5. Does the project occur within an area listed as a navigable stream, nationwide river inventory, ADID stream, or have a rating under the Biological Stream rating system?	X		
6. Is the stream listed by IEPA as impaired and is it subject to TMDLs?		X	
7. Do the project impacts require mitigation?		X	
VIII. Groundwater Resources			
1. Is groundwater the primary source of potable water in the area?	X		
2. Does the project occur within an area of karst topography?		X	
3. Does the project occur within a watershed that has been designated by the IEPA as vital for a particularly sensitive ecological system?		X	
4. Does the project impact a Wellhead Protection Area?			X

Environmental Resources/Conditions	Resource/Condition Present?		
	Yes	No	Present But Not Affected
5. Does the project occur within an area where potable water supply wells are present?	X		
6. Does the project contribute to degradation of the areas Groundwater Quality?		X	
7. Does the project occur within an area designated as a special resources groundwater?		X	
IX. Floodplains			
1. Does the project occur within a 100-year floodplain?	X		
2. Does the project occur within the Regulated Floodway?	X		
3. Is a Floodplain Finding required?		X	
X. Wetlands			
1. Does the project impact Wetlands?	X		
2. Do the wetlands have an FQI of 20 or greater?		X	
3. Are the wetlands listed as an ADID Site?		X	
4. Attach the Wetland Impact Evaluation Form to the document	X		
5. Wetlands Finding	X		
XI. Special Waste			
1. Did project pass Level I screening?		X	
2. Did project pass Level II screening?		X	
3. Was a Preliminary Environmental Site Assessment (PESA) required?	X		
a. Is All Appropriate Inquiry (AAI) required?		X	
b. Were REC(s) identified in the PESA?	X		
4. Was a Preliminary Site Investigation (PSI) required?	X		
XII. Special Lands			
1. Section 4(f)		X	
a. De Minimis, Programmatic, or Individual		X	
2. Section 6(f)		X	
3. Open Space Lands Acquisition and Development (OSLAD) Act Lands		X	
4. INAI Sites	X		
5. Nature Preserves		X	
6. Land & Water Reserves		X	
XIII. Indirect and Cumulative Impacts			
1. Indirect Impacts	X		
2. Cumulative Impacts	X		

Additional Information	YES	NO
XIV. Environmental Commitments/Permits/Certifications Required		
1. Does the project require Section 404 Permit(s)?	X	
a. Is an individual, nationwide, or regional permit anticipated?	Nationwide	
2. Will an individual Water Quality Certification from IEPA be required?		X
3. Will a Coast Guard Bridge Permit be required?		X
XV. Public Involvement	X	
XVI. Agency Coordination	X	

SECTION III: ALTERNATIVES

Introduction

This Section describes the Build Alternative and the No-Build Alternative. The principal feature of each alternative is presented and each alternative is discussed in terms of its ability to meet the purpose and need for the action.

Alternatives Development and Evaluation Process

No-Build Alternative

The No-Build Alternative maintains the existing Illinois Route 47 facility. It includes rehabilitating the existing pavement and other short-term improvements. These improvements would include resurfacing the roadway pavement with minor patching, intermittent curb and gutter and sidewalk repairs, shoulder improvements and possible replacement of damaged drainage structures. The No-Build Alternative can be described as a maintenance type of improvement, providing more short-term fixes than a 20-year design. It does not include intersection improvements, any widening or capacity improvements, or safety improvements.

The No-Build Alternative will not provide any safety improvements to address the safety deficiencies and the predominant crash types occurring along Illinois Route 47 and its intersections. The predominant crash types warrant additional roadway capacity, auxiliary lanes, raised curbed medians, intersection improvements, and wider paved shoulders and /or curb and gutters. It will not provide the additional lane capacity improvements to meet future 2030 traffic volume needs. Lastly, the No-Build Alternative does not provide any improvements to address the aging roadway facility and update the roadway condition to current design standards and requirements.

Consequences resulting from the No-Build Alternative include:

- Increased crash potential as traffic volumes increase without safety, capacity and operational improvements.
- Increased congestion and delays resulting in increased energy consumption and increased vehicle emissions from idling and accelerating vehicles.
- Increased maintenance costs as pavement and bridge structures further deteriorate.

Illinois Route 47 is classified as an Other Principal Arterial and is an important link in the local and regional transportation network. The No-Build Alternative will not provide the necessary improvements to provide the system linkage and continuity needs of the transportation network.

The No-Build Alternative does not address the safety, mobility, and facility condition needs of Illinois Route 47. It is not consistent with the Fiscal Year (FY) 2010-2015 Transportation Improvement Program and the *GO TO 2040* Comprehensive Regional Plan (CRP) which are both endorsed by the Chicago Metropolitan Agency for Planning (CMAP), the Metropolitan Planning Organization for the region in which the project is located. It does not satisfy the purpose and need for the improvement.

Congestion Management Process Alternative

The provisions of 23 CFR 450.320 place restrictions on the use of Federal funds for projects in Transportation Management Areas (TMAs) designated as nonattainment for carbon monoxide and/or ozone. In these areas, Federal funds may not be programmed for any project that will significantly increase capacity for single-occupancy vehicles (SOVs) unless the project is addressed through a Congestion Management Process (CMP). The CMP is required to provide an appropriate analysis of alternatives to the proposal for adding SOV capacity, including all reasonable congestion management strategies. If the analysis demonstrates that other alternatives and/or congestion management strategies cannot fully satisfy the need for additional capacity and that, therefore, the additional SOV capacity is warranted, the CMP must identify all reasonable strategies that will maintain the functional integrity of the additional lanes. All identified reasonable strategies must be incorporated into the project. The CMP for each affected TMA is addressed in materials available from the Metropolitan Planning Organization responsible for the area.

Individual projects involving addition of SOV capacity were evaluated, selected, and prioritized in the course of developing the Fiscal Year 2010-2015 Transportation Improvement Program (TIP) and the long-range *GO TO 2040* Comprehensive Regional Plan (CRP) for Northeastern Illinois. The Northeastern Illinois CMP is documented via various materials that are available through the Chicago Metropolitan Agency for Planning (CMAP). The following are examples:

- Congestion Mitigation Handbook, September 1998
- Congestion Management System for Northeastern Illinois, July, 2006 Annual Status Report
- *GO TO 2040* Regional Transportation Plan for Northeastern Illinois
- Arterials and Streets Infrastructure and Operations for Mobility, Access, and Community in Metropolitan Chicago, January 2009
- Travel Demand Management, Strategy Paper, March 2009
- Congestion Reduction Demonstration for Northeastern Illinois A Proposal for Direct Highway Pricing, Transit, Technology, and Supporting Strategies, December 31, 2007

The development process for the TIP and Regional Transportation Plan constitutes the CMP for Northeastern Illinois. This process documents warranted projects for adding SOV capacity and, as applicable, also documents that regional and/or project-specific alternatives (e.g., Transportation Demand Management measures, High-Occupancy Vehicle measures, Transit Capital Improvements, Congestion Pricing, Growth Management, Incident Management) would not obviate the need for adding SOV capacity. Planned projects resulting from the CMP are documented in the annual CMP status report referenced above. For this project, it has been determined that stand-alone CMP alternatives will not satisfy the project purpose and need and, therefore, this undertaking is a warranted project for adding SOV capacity.

Reasonable project-specific CMP strategies, including Traffic Operational Improvements, Transit Operational Improvements, Non-motorized modes/measures (Pedestrian/Bicycle), Intelligent Transportation System (ITS), and Access Management, have been incorporated into this project to the extent practical. Specific strategies incorporated include adding turning lanes, modernizing signals, signal interconnect, sidewalk accommodations at specific locations, and barrier medians to control access. With respect to Transit Operational Improvements, there are no existing transit services along Illinois Route 47 and none are currently proposed.

As documented in the above information, this project results from the CMP for Northeastern Illinois as a warranted project for adding SOV capacity and all reasonable congestion management strategies have been incorporated into the project to sustain its effectiveness.

Recommended Build Alternative

In general, for the length of the project, the Recommended Build Alternative will widen and reconstruct the existing 2-lane pavement of Illinois Route 47 to provide two lanes in each direction separated by a raised median. The southern section of the project, from the south project limits to Valley Run Creek will have an urban cross section and provide curbs and gutters along the outside and median edges of the roadway. North of Valley Run Creek to the north project limit, Illinois Route 47 will have a rural cross section with 12-foot wide shoulders (8-foot wide paved and 4-foot wide earth) on the outside edges of the roadway and curbs and gutters on the median edges. The improvement will generally follow the existing alignment, but shifts east or west at various locations to minimize and avoid right-of-way needs and impacts to resources. Median breaks will be provided at existing intersections, and exclusive left turn lanes from Illinois Route 47 to all side roads are proposed. The proposed plan and profile sheets are included in the *Project Report* and are available at the Illinois Department of Transportation, District 3 Offices in Ottawa. Additionally, a Value Engineering Study was completed in accordance with 23 CFR 627 and is also available at the Illinois Department of Transportation District 3 Office in Ottawa.

Intersection Improvements

All intersections will be reconstructed to revise approach grades and corner radii to design requirements. Left turn lanes will be constructed on all side road and Illinois Route 47 approaches. The Prologis Parkway intersection will continue to be signalized. There are three proposed traffic signal installations at the intersections with Granville Road, U.S. Route 52 and Plattville Road. The traffic signals will be installed when the warrants are met. It is anticipated that the warrants will be met at these three intersections in 2020. At the Granville Road intersection, the west leg is the entrance to Saratoga School where cross walks will be provided across all four legs and a sidewalk will be provided adjacent to the school to the south project limits.

All other side roads will continue to be stop controlled.

Structures (Culverts and Bridges)

There are two bridges and 6 culverts being improved along Illinois Route 47 to accommodate the roadway widening improvements. The bridge crossings are over Valley Run Creek and Saratoga Creek. The *Bridge Condition Reports* for these structures are available at the Illinois Department of Transportation District 3 Office in Ottawa.

Proposed Cross Section

As described earlier, the proposed cross section provides for two 12-foot lanes in each direction along with a 32-foot wide raised median.

The southern portion of this project lies within the corporate boundaries of the City of Morris. From the south project limit to Valley Run Creek, curb and gutter will be constructed on the inside median and outside edge of the 12-foot wide paved shoulder. The remainder of the project to the north will have curb and gutter along the inside median and outside 12-foot shoulders (8-foot paved and 4-foot earth) with open ditches. Median inlets will convey drainage to outside ditches.

Proposed Alignments and Access Points

Shifts in the alignment have been incorporated to minimize right-of-way needs and to avoid impacts to resources along Illinois Route 47.

The Illinois Route 47 widening south of Granville Road will be shifted to the east to minimize right-of way impacts to the Saratoga Middle School located directly across from Granville Road. Saratoga School is planning modifications to the current student school bus drop off and associated traffic circulation around the school to increase student

safety during bus boarding. These modifications have been incorporated into the proposed Illinois Route 47 improvements.

The Illinois Route 47 widening beyond Granville Road is generally symmetrical and continues north crossing Prologis Parkway which is a relatively new signalized intersection with left turn channelization on Illinois Route 47 and Prologis Parkway.

Continuing to the north, left turn lanes will be provided at the north and south entrances to the Grundy County Fairgrounds. The middle entrance will be right-in/right-out only. Just beyond Nelson Road, the Illinois Route 47 alignment will be shifted to the west to minimize right-of-way impacts to the Morris Airport in addition to avoiding any land acquisition from the property south of the airport which has been identified as an archived Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) site.

The alignment was also shifted to avoid and or minimize impacts to the following sites:

- Saratoga Cemetery
- Ripley House site (eligible for listing on the National Register of Historic Places)
- Grace Lutheran Church
- Identified archived CERCLIS Site (former Crop-Mate) located approximately 800 feet north of Saratoga Creek

Recommended Build Alternative Determination

The proposed improvements of the Recommended Build Alternative address the project need to improve safety by providing additional travel lanes, left turn channelization at key intersections, a raised median, and wider shoulders and/or curbs and gutters along the edges of the roadway. Provision of additional through lane capacity to include four continuous travel lanes and channelization improvements at signalized intersections meets the project need to accommodate 20-year projected traffic volumes. These improvements will allow sufficient traffic volume capacity along Illinois Route 47 through 2040. The proposed improvements will also update the roadway facility to meet current design standards and requirements.

From a regional perspective, the Illinois Route 47 project improves the regional system linkage and continuity by providing a continuous 4-lane cross section for the length of the project study limits. It strengthens the existing local and regional transportation system linkage and network of arterials by providing a safe, efficient and continuous transportation facility. Improvement of Illinois Route 47 within the study limits will complement the existing transportation system linkage and network of arterial roadways, and future improvements currently underway.

The Recommended Build Alternative is consistent with the *GO TO 2040* Comprehensive Regional Plan endorsed by the Chicago Metropolitan Agency for Planning (CMAP), the Metropolitan Planning Organization for the region, and is included in the Fiscal Year 2010-2015 Transportation Improvement Program endorsed by CMAP.

The project will provide a transportation facility that will provide improved safety, capacity, and facility conditions. It meets the project's purpose and need.

SECTION IV: IMPACTS, DOCUMENTATION AND MITIGATION

General

The project area was inventoried for environmental resources. The Environmental Resources Map, Figure 5, identifies all sensitive cultural, natural, physical, and socio-economic resources, in the study area. Resources potentially impacted by the proposed action or that require discussion pursuant to applicable laws and regulations are

addressed in this Section. The affected resources and the mitigation proposed are discussed by environmental discipline.

Part I. Socio-economic

The study area is located in unincorporated south central Kendall County and in unincorporated north central Grundy County, Illinois and is also within the north corporate limits of the City of Morris. The project study limits are along Illinois Route 47 with a south terminus at approximately 1,650 feet south of Granville Road and a north terminus at Caton Farm Road, a distance of approximately 11.5 miles. See Figure 1, Project Location Map.

1. Community Characteristics and Cohesion

Data included and referenced in this Section come from:

- U.S. Bureau of the Census, 2000 Decennial Census
- U.S. Bureau of the Census, 2010 Decennial Census

In most cases critical information and data available from the 2010 Census was used. However, in some instances where 2010 data was not yet available, data from the 2000 Census was used in the analysis.

Analysis of the data revealed that the study area is made up primarily of a homogeneous population comprised of mid-age, middle class, White families living in their own single family homes.

Population

According to the U. S. Census, the population of the State of Illinois was 12,830,632 in 2010. This represents a 3.3 percent increase from the State's 2000 population of 12,419,293 (see Table 6). This is a much lower rate of growth than Grundy and Kendall Counties which saw their populations increase 33.4 percent and 110.4 percent, respectively. During the 2000 to 2010 time frame the City of Morris experienced a rate of growth of 14.3 percent which is higher than the State of Illinois, but not as high as the two counties.

Table 6
2000 – 2010 Population Change

Location	2000	2010	Change	
			Number	Percent
State of Illinois	12,419,293	12,830,632	411,339	3.3%
Grundy County	37,535	50,063	12,528	33.4%
Kendall County	54,544	114,736	60,192	110.4%
City of Morris	11,928	13,636	1,708	14.3%

Age

Comparing the State, the County, and the City of Morris, the populations are of similar median ages. In 2010 the median age for the State of Illinois was 36.6, Grundy County - 36.1, Kendall County - 32.9, and the City of Morris – 37.8 years of age (see Table 7).

Table 7
2010 Age Distribution

Age Group	State of Illinois	Grundy County	Kendall County	City of Morris
Under 10	13%	15%	18%	14%
10 to 19	14%	15%	16%	13%
20 to 64	60%	59%	59%	59%
65 Years and older	13%	11%	7%	14%
Total	100%	100%	100%	100%
Medain Age	36.6	36.1	32.9	37.8

Home Ownership and Occupancy

Within the State of Illinois 68 percent of housing units were owner occupied in 2010. This compares to 75 percent of housing units being owner occupied in Grundy County, 86 percent in Kendall County, and 60 percent in the City of Morris (see Table 8). Within the counties of the project study area the rates of home ownership are higher than either the State or the City of Morris.

Table 8
2010 Home Ownership and Occupancy

Characteristic	State of Illinois	Grundy County	Kendall County	City of Morris
Total Population	12,830,632	50,063	114,736	13,636
Total Households (Occupied HU)	4,836,972	18,546	38,022	5,501
Owner Occupied Housing Units	3,263,639	13,930	32,554	3,281
Percent Owner Occupied	68%	75%	86%	60%

Income and Poverty

A review of the median household incomes showed that the two counties and community in the study area had median incomes higher than that for the State of Illinois (see Table 9). Review of poverty levels show that the two counties and community have lower poverty levels than the State of Illinois.

Table 9
2010 Income and Poverty

Characteristic	State of Illinois	Grundy County	Kendall County	City of Morris
Median Household Income (1999)	$46,590	$51,719	$64,625	$44,739
Median Household Income (2010 - Estimate)	$55,735	$64,297	$79,897	$58,681
Poverty Status - Estimate of people below poverty level (2010)	1,616,660	3,454	4,475	709
Poverty Status - Percent of people below poverty level (2010)	13%	7%	4%	5%

Race and Ethnicity

Table 10 presents a comparison of the racial composition of the State of Illinois, Grundy County, Kendall County and the City of Morris. While the majority of the population in each place was White in 2010; the proportion of the population that was White varied between the State of Illinois and the three project communities. In 2010, the White population of the State of Illinois was 71.5 percent; Grundy County was 93.7 percent, Kendall County was 83.6 percent and the City of Morris was 93.2 percent. For the State the next largest race group was Black/African American. For the three project areas, the next largest race group was Some Other Race for Grundy County and the City of Morris, and Black/African American for Kendall County. However, Some Other Race was a close second for Kendall County. The remaining racial groups each surveyed 3.0 percent or less for the three project communities.

Table 10
2010 Racial Composition

Race	State of Illinois		Grundy County		Kendall County		City of Morris	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
White	9,177,877	71.5%	46,933	93.7%	95,891	83.6%	12,702	93.2%
Black or African American	1,866,414	14.5%	605	1.2%	6,585	5.7%	140	1.0%
American Indian and Alaska Native	43,963	0.3%	114	0.2%	316	0.3%	33	0.2%
Asian	586,934	4.6%	327	0.7%	3,467	3.0%	98	0.7%
Native Hawaiian and Pacific Islander	4,050	0.0%	15	0.0%	33	0.0%	4	0.0%
Some Other Race	861,412	6.7%	1,336	2.7%	5,768	5.0%	476	3.5%
Two or More Races	289,982	2.3%	733	1.5%	2,676	2.3%	183	1.3%
Total Population	12,830,632	100.0%	50,063	100.0%	114,736	100.0%	13,636	100.0%

Community Cohesion

The three project areas, Grundy and Kendall Counties and the City of Morris, along Illinois Route 47 have similar characteristics in their racial composition, age distributions, and economic conditions. The project areas' populations are listed in Table 6. Illinois Route 47 is an existing roadway that travels through the project areas. The proposed

improvements maintain the same general alignment and connections to the cross roads. The Recommended Build Alternative will not divide or cause to isolate any of the project area communities or neighborhoods.

These improvements provide a positive effect on the community cohesion for the three project areas by providing:

- A Recommended Build Alternative that meets the transportation needs for all users.
- A Recommended Build Alternative that accommodates the projected traffic volumes.
- A Recommended Build Alternative that updates the current roadway facility to current requirements and standards.

2. Title VI and Environmental Justice

Inventory of Grundy County, Kendall County and the City of Morris did not identify any minority groups. These communities have mostly White populations.

Title VI

"Groups of ethnic, religious, elderly or handicapped people ☐ **are /** ☑ **are not** present within the project area. No groups or individuals have been, or will be, excluded from participation in public involvement activities, denied the benefit of the project, or subjected to discrimination in any way on the basis of race, color, age, sex, national origin or religion."

Environmental Justice

There are three project areas along the project study limits, Grundy County, Kendall County and the City of Morris. The figures provided below are an average of these three areas.

"The project area was evaluated in accordance with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, to determine if there is a potential for disproportionate and adverse impacts to low-income or minority populations. The 2010 Census indicates that residents of the project area are 87.2% white, 4.1% black, and 2.2% Asian. The median family income for the project area is $67,625. Five percent of the residents are below the median family income within the project area. The Health and Human Services 2012 Poverty Guidelines for a family of four is $23,050. Based on this demographic information and field observations of the project area, the project ☐ **will /** ☑ **will not** result in disproportionately adverse impacts to minority or low-income populations."

3. Public Facilities and Services

All public lands, institutions, schools, libraries, churches, and emergency community services located in the project area were inventoried. Figure 5, Environmental Resources Map, illustrate these facilities and services which are within the project study area.

Public Facilities

The following facilities are located along Illinois Route 47:

- Between Granville Road and Nelson Road: Grundy County Farm Bureau, and Saratoga Elementary School.
- Between Nelson Road and Airport Road: Saratoga Township Hall.

- Between Airport Road and Minooka Road: Morris Municipal Airport, Grace Lutheran Church, and Saratoga Cemetery.
- North of Joliet Road: Lisbon Township Garage.

Vehicular access to these identified facilities is from Illinois Route 47. Parking facilities are off-street parking lots. Access to these facilities will not be changed. Access will be enhanced by providing left turn lanes, signalized intersections (when warranted), and marked crosswalks and sidewalks near the Saratoga Elementary School. Median breaks will be provided at existing intersections and exclusive left turn lanes from Illinois Route 47 to all side roads.

Emergency Services

There are no emergency service facilities along Illinois Route 47.

Transit Facilities

There are no transit facilities or services along Illinois Route 47.

4. Changes in Travel Pattern and Access

The center median is proposed for the length of the project limits and requires right-in and right-out traffic movements for some properties, which will create some local adverse travel of a minor nature. Median breaks will be provided at existing intersections and exclusive left turn lanes from Illinois Route 47 to all side roads. Motorists will not be able to make left turns at all locations that are currently available along Illinois Route 47. However, businesses, public facilities and residences will be accessible to passenger vehicles from all directions by legal U-turns at median openings. Loss of direct access is not expected to be a major economic issue for businesses, and commercial delivery trucks will have options for alternative routes to arrive at their destination.

Construction Traffic

Impacts to travel patterns and maintaining traffic during construction is detailed in the *Project Report* and is available at the Illinois Department of Transportation District 3 Office in Ottawa. It is expected that traffic will be allowed to travel along Illinois Route 47 during construction. Access will be provided for the duration of construction. Short-term impacts to travel patterns may occur during temporary day-time lane closures. Driveway replacements will be staged as much as practical to provide access at all times. It will be necessary to temporarily close some legs of intersecting cross roads.

5. Relocations (Business and Residential)

Construction of the transportation project will necessitate the acquisition of full parcels of property and the relocations of 11 residential properties, 7 other buildings (i.e. sheds and/or garages), and one vacant commercial building. The Recommended Build Alternative has strived to avoid and minimize impacts by the project and in cases where the impact cannot be avoided, mitigation measures have been applied (See Section III for additional details of the Recommended Build Alternative). The Department is committed to provide housing of last resort, if necessary. Housing resources are available to all relocatees without discrimination.

Right-of-Way Acquisition

There are 68 parcels of land from which right-of-way will be acquired. A total of 164.7 acres of land will be acquired, plus 1.7 acres of permanent easements, and 3.0 acres of temporary easements. The total acreage sum of land acquisitions (proposed right-of-way, permanent and temporary easements) is 169.4 acres. Temporary construction easements are required for grading, driveway reconstruction, site restoration, and landscaping.

All relocations and property acquisition will be conducted under the provisions of the *Uniform Relocation Assistance and Real Property Acquisition*, as amended, and the *IDOT Land Acquisition Procedures Manual.*

6. Economic Impacts

No businesses will be relocated. Impacts to businesses as it relates to sales tax revenue, access changes, or parking are not expected as a result of the project.

Conversion of lands to roadway use (proposed right-of-way and permanent easements) will result in the loss of property tax revenue. The conversion of 164.7 acres of proposed right-of-way and 1.7 acres of permanent easements equates to approximately $5,000 of loss property tax revenue per year on average for Grundy and Kendall Counties.

7. Land Use

Land Use Plans for the three project areas will not be affected by the proposed transportation project. The project is consistent with the two Counties' and the City of Morris's plans (see Figure 6, Land Use Maps). The land use along the study limits is a combination of open agricultural lands, residential, schools, churches, and commercial. There are open and undeveloped lands along the project corridor. No major changes in local or regional land use plans are expected as a result of the project.

8. Growth and Economic Development

The adjacent land uses within the project study area are mostly undeveloped open spaces. Growth is expected as a result of the project and is consistent with the land use plans of the two counties and city within the project limits. The Recommended Build Alternative will enhance the area's and region's economic stability by providing improved access and mobility, improved access and connections, and improved roadway facilities.

9. Pedestrian and Bicycle Facilities

☐ Project will cause disruption or permanent changes in pedestrian or bicycle acess

☑ Project will not cause disruption or permanent changes in pedestrian or bicycle acess

New sidewalk facilities will be provided along the west side of Illinois Route 47 from the south project limits to the Saratoga School. The proposed project improvements will improve and enhance pedestrian facilities and access at Saratoga School. The project will comply with all American with Disabilities Act (ADA) requirements.

Coordination with the local agencies and bicycle organizations has been completed. Copies of the Bicycle Checklist and coordination letters are included in Appendix A. Kendall County, Grundy County, and the City of Morris have declined funding and maintenance participation for bicycle accommodations along Illinois Route 47. Therefore, minimum 8-foot wide paved shoulders will be constructed as the next highest and best bicycle accommodation per IDOT policy. This is consistent with the Value Engineering Study.

Part II. Agricultural

1. Farms and Farmland Conversion

Agriculture is the primary land use in the study area. In 2007, the number of farms was 450 in Grundy County and 424 in Kendall County. In Grundy County farm acreage increased between 2002 and 2007 while in Kendall County farm acreage decreased. Corn and soybeans are the dominant crops, accounting for around 96 percent of the total farmed area and around 83 percent of the total farm revenues. The remaining agricultural land uses include pasture, seed farming, fruits, vegetables, and greenhouse operations. Livestock operations account for less than three

percent of total farm revenue in Grundy County, but make up a more substantial portion in Kendall County (around eight percent of revenue). Table 11 presents farm characteristics for the counties. In Kendall and Grundy counties the most common farm size is 180 to 499 acres with 99 farms in Kendall County and 82 farms in Grundy County in this size category (2007 Census of Agriculture, USDA 2009).

Table 11
Farm Characteristics for Grundy and Kendall Counties

	Grundy County	Kendall County
Total number of farms (2007)	450	424
Total (acres) in farms (2007)	215,474	166,872
Average size of farms in acres (2007)	479	394
Cropland as percent of total farmland	95.6%	96.2%
Farm revenues (000 dollars in 2007)	$105,171	$103,522
▪ Corn (percent of total revenue)	68.1%	52.4%
▪ Soybeans (percent of total revenue)	27.3%	17.0%
All livestock & products (thousands of dollars in 2007)	$3.0	$7.8
▪ Cattle & calves (percent of total revenue)	1.1%	1.2%
▪ Hogs & pigs (Percent of total revenue)	1.4%	6.1%
▪ Other livestock and products (percent of total revenue)	0.4%	0.3%

Source: 2007 Census of Agriculture, USDA 2009

The No-Build Alternative will not directly affect agricultural resources.

The Recommended Build Alternative will affect a total of 165.6 acres of agricultural soils and 49 farms. These effects include four farm residence displacements and the loss of crop land. There will be no severances, landlocked parcels, or uneconomic remnants. The agricultural land loss represents 0.04 percent of the total land in farms for the two counties. Farms will continue to operate; however, these impacts will reduce total revenue to existing operations. Farm production is an important source of total revenue generated in Grundy and Kendall counties. The reduction in farm revenue may temporarily reduce the total counties' revenues; however, additional development in the area will offset the losses in county revenues.

Farm Operations

The Recommended Build Alternative will affect farming operations in several ways. A farm operation is one or more parcels of land, not necessarily contiguous or under the same ownership, which are farmed as a single operation. Farming operation impacts of the Build Alternative is presented in Table 12.

Table 12
Farm Operation Impacts

	Impacts
Owners and Operators Affected	
▪ Affected Farms (number)	49
▪ Owners Affected (number)[1]	62
▪ Operators Affected (number)[1]	55
Farmstead Displacement (number)	
Total	11
Residences Displaced	4
Other Buildings Displaced [2]	7
Farm Businesses Displaced (number)	
Total	0
Buildings Displaced	0
Agricultural Soils (acres) [3]	165.6[5]
Prime Farmland (acres)	165.6[5]
Farm Operations Affected [4]	
Cropland (acres)	150.7
▪ Orchard/Vineyard (acres)	0
▪ Pasture and Hayland (acres)	0.9
▪ Severed (number of tracts)	0
▪ Otherwise Affected Farm Operations (number by tract)	49
Severance Management Zones	
▪ Acres	0
▪ Number	0
Landlocked Parcels (number)	0
Uneconomical Remnants (number)	0
Adverse Travel	
▪ Farms Affected by Adverse Travel (number)	0
▪ Total Adverse Travel Based on One Round Trip/Yr (miles)	0
Average Annual Farm Revenue Lost from Parcels Purchased for Project (thousands of dollars)	94

[1] If no data was on file for an operation, it was treated as not having an owner or operator as applicable.
[2] Garages, barns, shed (represents other buildings displaced).
[3] Soil areas do not include land within the proposed project right-of-way that is paved.
[4] The total number of affected farms will not equal the sum of severed farm operations by tract and otherwise affected farm operations by tract because farm operations may consist of multiple tracts.
[5] An area of 230.4 acres of agricultural soils was cleared and coordinated with IDOA based on the Phase 1 environmental/planning study area. The 165.6 acres is based on refined design.

Impacts are measured in terms of:

- Number of Affected Farms
- Number of Owners Affected – An owner is an individual, partnership, etc. with whom right-of-way negotiations will be necessary. The number of owners can be lower or higher than the number of affected

farm operations. Some individuals may own more than one farm affected by roadway construction or an operation may have multiple owners.

- Number of Farm Operators Affected – An operator is an individual, partnership, etc. who has one or both the physical and managerial responsibility of a farm, and may share in the expense and income derived from such property. Farms may have multiple operators.
- Farmstead Displacement – This measure includes the number of farmsteads displaced, the number of farm residences displaced, and number of other farm buildings displaced.
- Farm Businesses Displaced – This measure includes the number of businesses displaced and the number of buildings displaced.
- Acres of Agricultural Land Used – This term includes land within the proposed right-of-way, recognizing that other uses of the land, based upon soil types and conditions, could include agricultural production.
- Number of Farm Operations Affected, Severances, and Severance Management Zones – Severed farm operations occur when a new roadway divides a farm either laterally or diagonally, and separates one or more parcels from others within a single farm operation. Severances usually result in adverse travel and operational difficulties for the farm operator. Severance management zones are those areas (measured in acres) within or adjacent to severed parcels used to measure quantitatively the disruption to normal farming operations. Triangular shaped farmland remnants are the basis of many of the problems caused by diagonal land severance and right-of-way takings that are not square with the farmed acreage. Point rows, caused by angular field ends, harvest losses because of excessive turning, and overlapping application of herbicides are consequences leading to waste, additional expense, increased field work time, and additional use of fuel. This condition is taken into account in the severance management acreage. When a new roadway takes farm land on the edge/perimeter of a farm tract, this is not a severance and severance management zones are not associated with this type of impact. This impact is presented as "otherwise affected farm operations."
- Number of Landlocked Parcels – A land-locked parcel is created by the taking of right-of-way for road construction in such a way that remaining land is not accessible by a public road or permanent easement after construction.
- Number of Uneconomical Remnants – Uneconomical remnants are severed portions or landlocked portions of a property where the owner is left with an interest after the partial acquisition of the owner's property, and these acreages may have little or no value or utility to the owner.
- Number of Farms with Adverse Travel and Miles of Adverse Travel – Adverse travel occurs when a new roadway causes additional travel distance from one part of a farm operation to another part. This added travel is typically caused by severance of a farm operation by a new roadway or by a road closure, and is calculated as the extra round trip mileage per field visit. Adverse travel equals the old trip distance minus the new trip distance times two. This represents one round trip per year.
- Farm Revenue Loss – Farm revenue loss occurs when farm land is taken out of production for highway use. Annual farm revenue per acre in the study area's counties was determined by dividing total farm revenue by the number of farm acres in each county. An average annual farm revenue loss was determined by multiplying the average revenue per acre by the acres of farmland used for each alternative.

Surface and subsurface drainage systems, including field tile systems, exist within the project corridor. Drainage patterns in agricultural areas will be maintained by locating existing field tiles and providing alternative drainage routes for field tiles that are broken or removed during construction. The exact location and configuration of these systems will be determined during final design.

2. Prime and Important Soils

Prime and Important Farmland

Over 85 percent of soils in these counties are classified as prime farmland or prime farmland if drained. Highly erodible soils also are found in these counties and comprise five percent of the area of Grundy County and 13 percent of Kendall County.

The *Code of Federal Regulations* (CFR) Title 7, Volume 6, Section 657.5(a) 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. "Prime Farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crop when treated and managed, including water management, according to acceptable farming methods." To be considered prime farmland, the land does not have to be cleared; however, it cannot be urbanized, paved, or permanently under water.

Grundy and Kendall counties are composed of over 80 percent Prime Farmland, with Kendall County having the largest number of prime soil units and the greatest percentage of acres of prime farmland. Grundy County has the greatest number of prime farmland acres (see Table 13).

Table 13
Prime Farmlands in Grundy and Kendall Counties

County	Number of Prime Soil Units of Total Units	Acres of Prime Farmland	Percent of County Prime Farmland
Grundy	43 of 64	238,600	85.7%
Kendall	64 of 88	189,215	91.8%

There are no unique farmland soils in Illinois.

Statewide Important Farmland

Farmland of statewide importance is land other than prime farmland that is considered valuable for the production of food, forage, and oilseed crops (CFR Title 7, Volume 6, Section 657.5 (c)). Important farmland includes prime farmland soils with steep slopes or eroded farmland (CFR Title 7, Volume 6, Section 657.5(c)). Twelve important soil types are in Grundy County totaling 17,530 acres or six percent of farmland. Sixteen important soil types are in Kendall County totaling 10,930 acres or five percent of farmland.

Impacts to Prime and Important Farmland

One hundred percent of the total farmland that will be converted by the Recommended Build Alternative from agricultural use is classified as prime farmland (see Table 14). Zero percent of farmland that will be converted is classified as important farmland.

Table 14
Agricultural Soils Impacts

	Impacts
Prime Farmland (acres)	165.6
Statewide and Local Important Farmland (acres)	0
Other Farmland Soils (acres)	0
Total Agricultural Soils (acres)	165.6

Note: An area of 230.4 acres of agricultural soils was cleared and coordinated with IDOA based on the Phase 1 environmental/planning study area. The 165.6 acres is based on refined design.

Highly Erodible Soils

Highly erodible soils are determined by slope and include soils with slopes of four percent or greater. These soils typically occur near streams and with changes in topography. Highly erodible soils occur near West Aux Sable Creek and Saratoga Creek. Soil classes in the Illinois Route 47 corridor where right of way is being acquired are all considered prime and do not include any soils with such slopes. Soil erosion control measures at the banks of the two streams will be implemented to minimize sedimentation in the stream.

Land Evaluation and Site Assessment (LESA) System

The IDOT and the Natural Resources Conservation Service (NRCS) use the Land Evaluation and Site Assessment (LESA) System to assess the viability of agricultural land for continued agricultural production when such land may be affected by state and federal projects. The results of the LESA evaluation are provided on the NRCS's "Farmland Conversion Impact Rating," Form AD-1006. The form is included in Appendix A. The NRCS evaluates the quality (productivity of the soils that will be affected), while the Illinois Department of Agriculture (IDOA) rates site-specific factors, including:

- The amount of agricultural land required;
- The proximity of the land to be acquired to existing highway right-of-way;
- Off-site land required for borrow materials and wetland mitigation;
- Creation of (a) severed parcels, (b) uneconomical remnants, (c) landlocked parcels and (d) adverse travel;
- Relocations of rural residents and farm buildings; and
- Whether highway design standards will be used that minimize impacts to agricultural land.
- LESA scores of 0 to 175 points indicate a low rating for protection, scores of 176 to 225 points indicate a moderate rating for protection, and scores of 226 to 300 indicate the land should be retained for agricultural use and an alternative alignment should be considered. The higher the LESA score, the more viable the farm land is for long-term agricultural use.

The LESA scores for the Build Alternative reflect the pervasiveness of agricultural land in the study area. The use of agricultural land, minimizing impacts to agricultural operations, and placing improvements in proximity to currently developing areas were all factors considered in the identification of the build alternative. Subsequently, the Build Alternative resulted in a LESA score of 178.

Land Use Plans and Zoning

County zoning maps indicate that the majority of the counties are zoned agricultural except within municipalities or small unincorporated communities. Grundy County has no programs or plans for agricultural protection and preservation other than the designation of agricultural land on its zoning maps. Kendall County's *Land Resource Management Plan* (Kendall County, 2003) includes the following objectives related to agricultural protection and preservation: protect productive farm operations from premature urban encroachment and maintain the most productive agricultural lands for agricultural purposes.

Centennial Farms

To qualify for Centennial Farm status, an agricultural property must have been owned by the same family of lineal (child or grandchild) or collateral (brother, sister, aunt, uncle, niece, nephew, or cousin) descendants for at least 100 years. Based on a March 2012 Centennial Farm Query by county, there are 47 in Kendall County and 85 in Grundy County. Some of the Centennial Farms also are registered as Sesquicentennial Farms, those properties that have been owned by the same family of lineal or collateral descendants for at least 150 years. There are nine Sesquicentennial Farms in Kendall County. One Sesquicentennial Farms is registered in Grundy County.

Two Kendall County Centennial Farms will be affected. On is near the intersection of Illinois Route 47 and Townhall Road. This farm is 158 acres, of which 12.9 acres is expected to be acquired for project right-of-way. The second

Centennial Farm (which is also a Sesquicentennial Farm) was certified in June 2007 by the IDOA. This farm is located on Whitewillow Road and consists of 158.1 acres. Approximately 1.15 acres of this farm is expected to be acquired for right-of-way. No buildings associated with Centennial Farms will be displaced. The locations of these farms are illustrated on the Environmental Resources Map (Figure 5).

3. Severed/Landlocked Parcels

The Illinois Route 47 project corridor travels along the existing Illinois Route 47 roadway. There will be no severed, uneconomical remnants, or landlocked parcels with the No-Build or the Illinois Route 47 Recommended Build Alternative.

4. Adverse Travel

The Illinois Route 47 project corridor travels along the existing Illinois Route 47 roadway and current access will be maintained. There will be no adverse travel with the No-Build or the Illinois Route 47 Recommended Build Alternative.

Part III. Cultural Resources

☑ No Historic Properties Affected - See letter from SHPO

☐ Historic Properties Affected - See below

1. Archeological Properties

☑ Project will not affect Archeological Properties

☐ Project will affect Archeological Properties

See Appendix A for the clearance from the State Historic Preservation Officer.

2. Historic Bridges

☑ Project will not affect a bridge listed in the Illinois Historic Bridge Survey

☐ Project will affect a bridge listed in the Illinois Historic Bridge Survey

3. Historic District

☑ Project will not affect a Historic District

☐ Project will affect a Historic District

4. Historic Buildings

☑ Project will not affect any Historic Buildings

☐ Project will affect Historic Buildings

Review of the project study area identified the six cultural resources that warrant National Register consideration. See Figure 5, Environmental Resources Map for their locations. These structures will be avoided by the proposed improvement. The State Historic Preservation Officer has provided concurrence that the six architectural resources listed below will be avoided by the project and a finding of "No Historic Properties Affected" was made. See Appendix A for the correspondence.

- Ripley House, 15450 Route 47 (Site #148)
- 16296 Route 47 (Site #150)
- 8995 Whitewillow Road (Site# 202)
- Grace Lutheran Church, Route 47 (Site# 192)
- 11230 Route 47 (Site# 197)
- Morris Cemetery (Site #261)

Findings and Avoidance Commitments

Ripley House, 15450 Route 47 (Site #148)
This property was determined eligible under Criterion C due to its stylistic and structural integrity. This property is a part of a farmstead located along Illinois Route 47. The widened right-of-way for the proposed roadway improvements threads between the Ripley farmstead to the east and another farmstead across the roadway. As part of efforts to minimize project impacts to historic properties, the Ripley house has been avoided and will remain in place as the center of an active farm. The edge of the proposed right-of-way will be located 30 feet from the house and there will be a nearly 50-foot space between the house and the outer edge of pavement.

The State Historic Preservation Officer (SHPO) provided concurrence on February 2, 2007 that the proposed widening will have No Effect on the Ripley house. As follow-up, the SHPO issued a refresh clearance on May 10, 2012. See Appendix A for copy of the coordination documents.

16296 Route 47 (Site #150)
This property is part of a farmstead on Illinois Route 47 located approximately 1,000 feet north of Joliet Road. The alignment of the proposed roadway is moving closer to the property. Right-of-way is required along the property frontage for grading purposes. The edge of the proposed right-of-way will be located 50 feet from the building and there will be over 100 feet of space between the house and the outer edge of pavement.

8995 Whitewillow Road (Site# 202)
This property is part of a farmstead in the southwest quadrant of Illinois Route 47 and Whitewillow Road. This property is near the west project limits along Whitewillow Road where the proposed improvements are matching into the existing roadway. Right-of-way is required from the property frontage along Whitewillow Road for grading purposes. The edge of the proposed right-of-way will be located approximately 25 feet from the building and there will be over 60 feet of space between the building and the outer edge of pavement.

Grace Lutheran Church, Route 47 (Site# 192)
This property is located in the northwest corner of Illinois Route 47 and Airport Road. The widened right-of-way for the proposed roadway improvements threads between the church to the west and the Morris Airport across the roadway. As part of efforts to minimize impacts to the property, the church building has been avoided and will remain in place.

A commitment was made to avoid the church building. The commitment letter dated September 13, 2006 to the church indicates the offset from back of proposed curb and gutter to the front of church is approximately 10 feet. The letter and other coordination with the church are included in Appendix A.

11230 Route 47 (Site# 197)
This property is part of a farmstead on Illinois Route 47 located approximately 0.22 miles north of Minooka Road. The alignment of the proposed roadway is moving west away from the property. No right-of-way is required from the property. The edge of the proposed travel way will be approximately 40 feet further west from the existing edge of travel way. The proposed improvement will have no impact on this property.

Morris Cemetery (Site #261)
The property is also known as the Saratoga Cemetery. The proposed improvement will have no impact on this property.

Part IV. Air Quality

The air quality effects of the proposed project were analyzed using the Illinois Carbon Monoxide Screen for Intersection Modeling (COSIM). The "worst case" analysis provided by the COSIM model indicated that the undertaking will not have the potential for contributing to a violation of the National Ambient Air Quality Standard (NAAQS) for carbon monoxide (CO).

1. CO Microscale Analysis

Project Type:

☐ Project does not add Through Lanes or Auxillary Turning Lanes

☐ Project does not involve any sensitive receptors and is not suitable for using COSIM 3.0

☐ Project is subject to COSIM Pre-screen

☑ Project is subject COSIM screening analysis

A COSIM analysis was conducted along the study area. It was a "worst-case" analysis in that the intersections considered had the largest volumes of traffic along their respective routes in 2040. Wind speed, wind direction, and temperature assumptions that will yield worst case CO concentrations also were assumed. CO concentrations are shown in Table 15.

Table 15
Carbon Monoxide Concentrations

Intersection	No-Build Alternative				Build Alternative		
	2012	2014	2024	2040	2014	2024	2040
IL 47 & Granville Rd. – Receptor 1	2.8	2.8	3.2	3.7	3.2	3.4	4.4
IL 47 & Granville Rd. – Receptor 2	2.6	2.6	2.7	3.3	2.8	3.2	3.6
IL 47 & Prologis Prkwy,	2.8	2.8	3.0	3.6	3.4	3.5	4.1
IL 47 & US 52 – Receptor 1	2.9	3.0	3.3	3.8	*Receptor Removed*		
IL 47 & US 52 – Receptor 2	2.6	2.5	2.8	3.0	*Receptor Removed*		
IL 47 & Plattville Rd. – Receptor 1	2.3	2.3	2.4	2.6	2.2	2.2	2.6
IL 47 & Plattville Rd. – Receptor 2	2.3	2.3	2.4	2.8	2.4	2.6	2.8

For the data above, all CO concentrations are presented as parts per million (ppm). The year 2014 was used for the predicted time of completion of the project, the year 2024 is completion year plus ten years, and the year 2040 is the design year. The applicable NAAQS 8-hour CO standard is 9 ppm.

2. Air Quality Conformity

Project Type:

- [x] Project is outside of Nonattainment or Maintenance Area
- [ ] Exempt Project in Nonattainment or Maintenance Area
- [ ] Project is within a portion of a Nonattainment or Maintenance Area where CMAP is the MPO
- [ ] Project is within a Nonattainment or Maintenance area served by an MPO other than CMAP
- [ ] Project is within a Nonattainment or Maintenance area not served by an MPO
- [ ] Regionally Significant Non-Federal project within a Nonattainment or Maintenance Area.

No portion of this project is within a designated nonattainment or maintenance area for any of the air pollutants for which the USEPA has established standards. Accordingly, a conformity determination under 40 CFR Part 93 ("Determining Conformity of Federal Actions of Federal Actions to State or federal Implementation Plans") is not required.

3. PM2.5 and PM10.0 Nonattainment and Maintenance Areas

Project-Type

- [ ] Exempt Project
- [x] Nonexempt project that is not an Air Quality Concern
- [ ] Nonexempt project that is an Air Quality Concern

The project area is entirely within attainment areas for all criteria air pollutants including $PM_{2.5}$ and PM_{10}; therefore hot-spot analysis is not required.

4. Construction Related Particulate-Matter

Demolition and construction activities can result in short-term increases in fugitive dust and equipment-related particulate emissions in and around the project area. (Equipment-related particulate emissions can be minimized if the equipment is well maintained.) The potential air quality impacts will be short-term, occurring only while demolition and construction work is in progress and local conditions are appropriate.

The potential for fugitive dust emissions typically is associated with building demolition, ground clearing, site preparation, grading, stockpiling of materials, on-site movement of equipment, and transportation of materials. The potential is greatest during dry periods, periods of intense construction activity, and during high wind conditions.

The Department's Standard Specifications for Road and Bridge Construction include provisions on dust control. Under these provisions, dust and airborne dirt generated by construction activities will be controlled through dust control procedures or a specific dust control plan, when warranted. The contractor and the Department will meet to

review the nature and extent of dust-generating activities and will cooperatively develop specific types of control techniques appropriate to the specific situation. Techniques that may warrant consideration include measures such as minimizing track-out of soil onto nearby publicly-traveled roads, reducing speed on unpaved roads, covering haul vehicles, and applying chemical dust suppressants or water to exposed surfaces, particularly those on which construction vehicles travel. With the application of appropriate measures to limit dust emissions during construction, this project will not cause any significant, short-term particulate matter air quality impacts.

Lastly, the Department has developed additional construction-related Special Provisions dealing with the use of cleaner diesel fuel, idling reduction requirements for construction equipment, and the installation of emission control devices on contractor vehicles. These Special Provisions are found at the following links:

http://www.dot.il.gov/desenv/pdf/80237.pdf

http://www.dot.il.gov/desenv/pdf/80239.pdf

http://www.dot.il.gov/desenv/pdf/80261.pdf

5. Mobile Source Air Toxics (MSAT)

Project-Type:

- ☐ Project is exempt
- ☐ Project has no meaningful potential MSAT effects
- ☑ Project has low meaning potential MSAT effects and is one of the following types below:
  - ☑ A minor widening project
  - ☐ A new interchange connecting an existing roadway with a new roadway
  - ☐ A new interchange connecting new roadways
  - ☐ Minor improvements or expansions to intermodal centers or other projects that affect truck traffic
- ☐ Project has high potential MSAT effects

For the proposed project, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables (e.g., fleet mix) are the same for each alternative. The VMT estimated for the Build Alternative carried forward is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the preferred action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to USEPA's MOBILE6.2 model, emissions of all of the priority MSAT except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emission decreases will offset VMT-related emission increases cannot be reliably projected due to the inherent deficiencies of technical models.

Regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT

growth rates, and local control measures. However, the magnitude of the USEPA-projected reductions is so great, even after accounting for VMT growth, that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

USEPA Role

The US Environmental Protection Agency (USEPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects." The IRIS can be accessed through the USEPA website. Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Role of Other Organizations

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's "Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents." Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations or in the future as vehicle emissions substantially decrease. See research reports available through the HEI website.

Problems with Modeling Methodologies

The methodologies for forecasting health impacts include emissions modeling, dispersion modeling, exposure modeling, and then final determination of health impacts; each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology, which affects emissions rates over that time frame, because such information is unavailable. The results produced by the USEPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the USEPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of USEPA's guideline CAL3QHC model was conducted in an NCHRP study, available through the USEPA website, which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably

forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

MSAT Toxicity Estimates

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI. As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The USEPA and the HEI have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

Level of Risk

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the USEPA, as provided by the Clean Air Act, to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards (e.g., benzene emissions from refineries). The decision framework is a two-step process. The first step requires USEPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld USEPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Conclusions

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits (e.g., reducing traffic congestion, crash rates, and fatalities plus improved access for emergency response) that are better suited for quantitative analysis.

Part V. Noise

☑ Type I Project

☐ Type III Project

This proposed improvement to Illinois Route 47 would be characterized as a Type I noise project as it includes a substantial horizontal alteration and the addition of through-traffic lanes. Therefore, it requires a noise analysis.

The Federal regulations, 23 CFR 772, establish noise abatement criteria (NAC) to establish noise levels where noise abatement should be evaluated. Five separate NAC based upon land use are used by the FHWA to assess potential noise impacts. A traffic noise impact occurs when design year noise levels approach or exceed the NAC or when there is a substantial increase over existing traffic noise levels. See Table 16[1] for NACs. In determining the applicable noise activity category for the study area, existing land use was reviewed. The applicable NAC for all residential noise receptors evaluated is 67 dB(A).

[1] Based on 23 Code of Federal Regulations Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise.

Table 16
Noise Abatement Criteria – Hourly Weighted Sound Level

Activity Category[1]	$L_{eq}(h)$	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	Exterior	Residential.
C	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	---	---	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	---	---	Undeveloped lands that are not permitted.

The Illinois Department of Transportation (IDOT) defines noise impacts as follows:

- Design-year traffic noise levels approach, meet or exceed the NAC, with approach defined as 66 dB(A) for the residential NAC of 67 dB(A).
- Design-year traffic noise levels are a substantial increase over existing traffic generated noise levels, defined as an increase greater than 14 dB(A).

Impacts

Existing (2012), No-Build (2030), and Build (2030) traffic noise levels were predicted for the 26 receptor sites utilizing the Federal Highway Administration approved Traffic Noise Model (TNM), Version 2.5. Table 17 presents the existing (2012) and projected (2030) noise levels for the 26 receptor sites, as well as the anticipated difference in noise levels for these two time periods. See Figure 5, Environmental Resources Map for locations of the noise receptors.

The existing 2012 noise levels range from 50 dB(A) at R47-9 and R47-14 to 69 dB(A) at R47-9 and R47-20. The projected No-Build 2030 traffic noise levels range from 53 dB(A) at R47-5 to 73 dB(A) at R47-20. Generally, receptor noise levels increase between 2 dB(A) and 5 dB(A) from the existing scenario to the No-Build scenario. Any increase in traffic noise levels is due to an increase in traffic volumes.

The projected Build 2030 traffic noise levels range from 55 dB(A) at R47-5 and R18B to 75 dB(A) at R47-7. The projected Build 2030 noise levels either stay the same or increase between one dB(A) and nine dB(A) from the existing condition. Increases in noise levels are due to an increase in traffic volumes and the widening of Illinois Route 47.

Under the proposed 2030 Build scenario, 13 receptor locations approach or exceed the FHWA NAC, and therefore warrant a noise abatement analysis. None of the receptors are considered impacted due to a substantial increase (greater than 14 dB(A) increase) in traffic noise levels.

Table 17
Noise Impact Summary – TNM Modeling Results

Receptor Number	Activity Category/ NAC (dB(A))	Distance from the proposed centerline (ft)	Existing 2012 Noise Level dB(A)	No-Build 2030 Noise Level dB(A)	Build 2030 Noise Level dB(A)	Increase in Build Noise Levels over Existing Noise Levels dB(A)
R47-1	B / 67	117	65	68	**69**	4
R47-2	B / 67	197	60	64	65	5
R47-3	C / 67	132	63	67	**67**	4
R47-4	B / 67	Receptor displaced	69	72	Receptor displaced	---
R47-5	B / 67	1,297	51	53	54	3
R47-6	B / 67	86	64	68	**69**	4
R47-7	C / 67	65	66	70	**72**	6
R47-8	B / 67	164	67	71	**71**	4
R47-8A	C / 67	434	52	56	**56**	4
R47-9	B / 67	632	50	55	**56**	6
R47-10	B / 67	261	55	59	**63**	8
R47-11	E / 67	164	68	71	**69**	1
R47-12	B / 67	212	56	60	**64**	8
R47-13	B / 67	552	54	59	**63**	9
R47-14	B / 67	652	50	55	**57**	7
R47-15	B / 67	112	68	72	**70**	2
R47-16	B / 67	124	66	70	**71**	5
R47-17	B / 67	187	65	69	**66**	1
R47-18	B / 67	Receptors displaced	67	71	Receptors displaced	---
R47-19	B / 67	687	52	57	**57**	5
R47-20	B / 67	172	69	73	**69**	0
R47-21	B / 67	272	63	67	**64**	1
R47-22	B / 67	482	56	61	**60**	4
R47-23	B / 67	167	68	72	**68**	0
R47-24	B / 67	432	62	67	**69**	7
R47-25	B / 67	175	60	65	**68**	8

Boldface indicates the noise levels approach, meet or exceed the NAC in future build condition

Abatement Evaluation

TNM was used to perform the noise wall feasibility and reasonability check for the thirteen impacted receptors. When determining if an abatement measure is feasible and reasonable, the noise reductions achieved, number of residences benefited, total cost, and total cost per residence benefited are considered. In accordance with IDOT policy, noise abatement is considered feasible if it achieves a noise reduction of at least 5 dB(A) for at least one impacted receptors. It is considered reasonable if the following are met:

- It is cost effective (base value $24,000 per benefitted receptor, adjusted for consideration of absolute noise levels, increase in noise levels, and new alignment/construction date)
- It achieves a Noise Reduction Design goal of at least 8 dB(A) for at least one benefitted receptor
- The views of the benefitted receptors have been appropriately considered

Fifteen noise walls were evaluated for the impacted receptors, including two noise wall scenarios at receptors R47-1 and R47-15. All noise walls were modeled along the proposed right-of-way. Twelve of the noise walls could feasibly be built, as each provides at least a 5 dB(A) traffic noise reduction at an impacted receptor. Noise walls at Common Noise Environments (CNEs) R47-11, R47-20, and R47-24 are not feasible, as breaks in the noise walls due to driveways and crossroads prevent the noise walls from achieving the IDOT feasibility criterion.

Ten of the noise walls would be considered acoustically reasonable, as they achieve the IDOT noise reduction design goal of at least an 8 dB(A) traffic noise reduction at one or more benefited receptor locations. Noise walls at CNEs R47-6 and R47-15 (south residence) are not acoustically reasonable, as breaks in the noise walls due to driveways and crossroads prevent the noise walls from achieving the IDOT noise reduction design goal.

The ten noise walls that met the feasibility criterion and the noise reduction design goal criterion were evaluated for cost-effectiveness. Based on the evaluation presented in Table 18 and Table 19, nine of the noise walls are not considered economically reasonable, as the actual costs per benefited receptor exceeds their adjusted allowable cost per benefited receptor as identified in Table 19. These walls are, therefore, not likely to be implemented.

One noise barrier (located at CNE R47-3) is considered economically reasonable. The noise barrier at CNE 47-3 is an approximately 369 foot long noise wall located along the proposed ROW adjacent to Saratoga School. This noise wall would cost approximately $129,150 and would benefit 20 receptors, resulting in an actual cost per benefited receptor of $6,458. This noise wall would be economically reasonable, as the actual cost per benefited receptor is less than the adjusted allowable cost of $24,000 per benefited receptor. Table 18 summarizes the results of the adjusted allowable cost per benefited receptor determination. Table 19 summarizes the results of the noise abatement evaluation.

Table 18
Adjusted Allowable Cost per Benefited Receptor Summary

CNE / Receptor	Benefited Receptors	Adjustment Factor	Adjusted Allowable Cost per Benefited Receptors
47-1[1] (north residence)	1	$0	$24,000
47-1[1] (south residence)	1	$0	$24,000
47-3	20	$0	$24,000
47-6	Does not achieve IDOT's noise reduction design goal		
47-7	1	$3,000	$27,000
47-8	1	$1,000	$25,000
47-11	Does not achieve IDOT's feasibility criterion		
47-15 [1] (north residence)	1	$1,000	$25,000
47-15 [1] (south residence)	Does not achieve IDOT's noise reduction design goal		
47-16	1	$2,000	$26,000
47-17	1	$0	$24,000
47-20	Does not achieve IDOT's feasibility criterion		
47-23	1	$0	$24,000
47-24	Does not achieve IDOT's feasibility criterion		
47-25	1	$1,000	$25,000

[1] The receptors within CNE 47-1 and CNE 47-15 are far enough apart that one continuous wall was not practical and therefore two separate walls within each CNE were evaluated. Note: No values are provided in the table in instances where a noise wall cannot achieve either a 5 dB(A) reduction at an impacted receptor (feasibility criterion) or an 8 dB(A) reduction at a benefited receptor (noise reduction design goal).

Table 19
Noise Wall Cost Reasonableness Evaluation

Barrier / CNE	Benefited Receptors	Length feet	Height feet	Total Noise Wall Cost[1]	Actual Cost per Benefited Receptor	Adjusted Allowable Cost per Benefited Receptor
47-1 (north residence)	1	120	30	$90,000	$90,000	$24,000
47-1 (south residence)	1	456	15	$171,000	$171,000	$24,000
47-3	20	369	14	$129,150	$6,458	$24,000
47-7	1	153	17	$65,025	$65,025	$27,000
47-8	1	535	15	$200,630	$200,630	$25,000
47-15 (north residence)	1	540	11	$148,500	$148,500	$25,000
47-16	1	476	12	$142,800	$142,800	$26,000
47-17	1	898	16	$359,200	$359,200	$24,000
47-23	1	809	21 to 32	$592,475	$592,475	$24,000
47-25	1	666	12	$199,800	$199,800	$25,000

[1] Based on the IDOT policy value of $25 per square foot

An analysis of the cumulative costs per benefited receptor is not justified as all of the not economically reasonable noise walls have actual costs per benefited receptor that exceed their adjusted allowable costs per benefited receptor by a factor greater than two.

Likelihood Statement

Based on the traffic noise analysis and noise abatement evaluation conducted, a highway traffic noise abatement barrier for CNW 47-3 is likely to be implemented based on preliminary design. If it subsequently develops during final design that constraints not foreseen in the preliminary design occur, or public input substantially changes reasonableness, the abatement measure may need to be modified or removed from the project plans. A final decision on the installation of abatement measure will be made upon completion of project's final design and the public involvement process.

Coordination with Local Government Officials for Undeveloped Lands

Areas of planned development within the Illinois Route 47 project corridor were identified based on field reviews, existing comprehensive plans and information gathered from local officials.

The distance from the roadway where the traffic noise levels approached the NAC for residential and commercial land uses in the build condition was estimated for this undeveloped land. Noise level contours were projected for these planned development areas. The contour projections may be used by local jurisdictions to protect future land development from becoming incompatible with anticipated highway noise levels. Letters were sent to the local officials having jurisdiction over the undeveloped lands with an exhibit depicting the approximate distances where the NAC is approached. See Appendix A.

Construction Noise

Trucks and machinery used for construction produce noise which may affect some land uses and activities during the construction period. Residents along the alignment will at some time experience perceptible construction noise from implementation of the project. To minimize or eliminate the effect of construction noise on these receptors, mitigation measures have been incorporated into the Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction as Article 107.35.

Part VI. Natural Resources

1. Upland Plant Communities

The project corridor occurs in the Grand Prairie Section of the Natural Divisions of Illinois (Schwegman, et al 1973). The Grand Prairie Section has level to rolling topography, with streams, river valleys, and glacial moraines providing the greatest relief. The Grand Prairie Section is dominated by loess-derived soils.

Prairie once covered the majority of the project corridor. Within the project corridor, habitat types included prairie in the uplands and bottomland forest, marsh, and seep communities, as well as a complex of savanna, woodland, forest, and glacial drift hill prairies associated with the bluffs and ravines bordering rivers. Fire was a major ecological component that helped maintain the tallgrass prairie, savanna, and open woodland vegetation in the Midwest (Anderson, 1970, 1983, 1990; Axelrod, 1985; Taft, 1997) and the project corridor was no exception (Edwards, editor, 2006).

Eleven cover types occur within the project corridor (Table 20). Approximately 91 percent of the project corridor is cropland and urban land, that provide little natural habitat. Cropland includes those areas that are in row crops (corn and soybeans). Urban/built-up land includes land that has been developed, including residential and commercial areas, farm buildings and their associated lawns. The urban/built up land total acreage also includes existing road surfaces. Non-native grasslands are associated with roadway rights-of-way and grassed waterways which occur within the cropland cover type. Non-native cool season grasses such as fescue, orchard grass, timothy, and Kentucky bluestem usually dominate this cover type. Shrubland includes abandoned pastures, successional fields, and hedgerows. This cover type is dominated by dense to open stands of shrubs and young trees. The forbland cover type is similar to shrubland though with less than 25 percent cover of shrubs and a dominance of perennial non-grass species. Wetland cover types are described in Part X and riverine/pond cover types are described in Part VII.

The Build Alternative will affect 11 vegetative cover types (see Table 20). The dominant cover type affected will be cropland, which makes up approximately 58.7 percent of the acreage affected. Additional losses from urban/built-up land (32.3 percent) and non-native grassland (7.3 percent) make up most of the remainder of the cover type losses. The project will convert these cover types to pavement and vegetated rights-of-way.

Table 20
Existing Cover Types

Land Cover Type	Acres Within the Project Corridor
Cropland	222.5
Forbland	0.9
Pasture and Hayland	2.1
Urban and Built-Up Land	122.5
Forest	1.6
Non-Native Grassland	27.5

Note: The 378.9 total acres is a conservative estimate based on the Phase 1 environmental/planning study area. This number includes land in the existing right-of-way. The proposed right-of-way will continue to be refined. The actual impacts to these cover types will be less based on the final design and land acquisition requirements.

Table 20 (continued)
Existing Cover Types

Land Cover Type	Acres Within the Project Corridor
Shrubland	0.5
Forested Wetland	0.2
Wet Meadow	0.1
Pond	0.3
Riverine	0.7
Total	378.9[1]

Note: The 378.9 total acres is a conservative estimate based on the Phase 1 environmental/planning study area. This number includes land in the existing right-of-way. The proposed right-of-way will continue to be refined. The actual impacts to these cover types will be less based on the final design and land acquisition requirements.

Forested areas are important to the wildlife and aquatic resources within the project corridor. A small (9-acre) wooded area occurs along West Aux Sable Creek and is surrounded by cropland (Environmental Resources Map, Figure 5). The area is highly degraded and consists of regrowth (10 to 20 years) and young (20 to 40 years) forest with a sparse canopy and dense sapling/shrub layer. The stand contains 142 trees per acre and is dominated by wild black cherry, Osage orange, and honey locust. Wild black cherry contains 43 percent of the trees in this wooded area.

A total of 0.5 acres of trees will be removed from this wooded area. Based on a density of 142 trees per acre, a total of 71 trees will be removed from this area.

The project corridor occurs within the Illinois Department of Agriculture Quarantine Zone for the emerald ash borer. This Asian beetle causes ash tree mortality and decline. If not controlled it could wipe out the ash tree in Illinois. Within the project area ash trees are not common and may exist only as yard trees. As such, the project would not conflict with the quarantines restriction on the movement of firewood from the construction sites.

Proposed Mitigation

Tree replacement is based on the IDOT D&E – 18 policy, which recommends the replacement of isolated trees or small groups of trees within the project ROW to the extent practical. If bare root or balled and burlapped trees are used for replacement plantings, a minimum ratio of 1:1 is recommended for the number of trees planted to the number of trees intended to be established. If seedlings are used, a minimum ratio of 3:1 is recommended for the number of trees planted to the number of trees intended to be established. Replacement trees should be planted in suitable locations as close as practical to the removal site.

2. Wildlife Resources

The project corridor can be divided into wildlife habitats that coincide with the major cover types (Table 20). No natural plant communities occur within the project corridor. Approximately 91 percent of the project corridor consists of agricultural land and urban/built-up land. Agricultural and urban/built-up lands are of limited value for wildlife. The remaining cover types (forest, shrubland, pasture/hayland, non-native grassland, wetlands, and aquatic systems) provide some habitat for wildlife, particularly birds and mammals.

Based on a breeding bird survey (USGS 2012), the dominant species of birds within the project corridor are the European starling, common grackle, red-wing blackbird, house sparrow, and American robin, These species are

representative of the major habitats (agricultural/urban built-up) in the project corridor. Some species of birds that pass through or breed in the project corridor are neo-tropical migrants. Neo-tropical migrants spend the winter in the tropics and migrate northward to breed in the United States and Canada. In the project corridor, these species occupy a wide range of habitats from non-native grasslands along roadside and stream corridors, cropland, forbland, pastures and haylands, woodlands, and shrublands. A few of these neotropical migrants (red-wing blackbird, eastern meadowlark, and indigo bunting) are common migrants and summer residents in the project corridor. The project will cause the loss of 27.5 acres of non-native grassland habitat, some of which is used by neotropical migrants for nesting and foraging.

Although most of the project corridor consists of agricultural land, available habitat can support some mammal species. Those species adapted to human and agricultural development, such as Virginia opossum, eastern fox squirrel, coyote, raccoon, and white-tailed deer reside within or pass through the project corridor. The project will cause the loss of wildlife habitat of low quality and cause an increase in the number of animal/vehicle collisions. The loss of this habitat and wildlife mortality on the road will have no effect on the wildlife populations in the area.

3. Threatened and Endangered Species

A. Federally-listed Species

The following federally species are listed as occurring in Grundy and Kendall Counties (March 2012). The eastern prairie-fringed orchid (*Platanthera leucophaea*) occurs within mesic to wet prairies and the Indiana bat (*Myotis sodalis*) occurs within caves and mines (winter habitat) and along small stream corridors with well developed riparian woods (summer habitat). There is no suitable habitat for either of these species in the project area and therefore, the project will have no effect on these two species.

Impacts

- [x] No Effect
- [ ] May Effect
  - [ ] Informal Consultation
  - [ ] Formal Consultation

B. State-Listed Species

Suitable habitat for state threatened and endangered species is present for one listed species, the slippershell mussel (*Alasmidonta viridis*), within the project corridor. Five live specimens of the slippershell were collected during the 2007 survey at the Illinois Route 47 crossing of Valley Run. The widening of Illinois Route 47 at this location will impact the mussel. A commitment has been made to submit an Incidental Take Permit to IDNR and to resurvey the area before construction. In addition to the survey at Valley Run Creek, mussel surveys will be conducted at Saratoga Creek, Lisbon Creek, and West Aux Sable Creek. If the slippershell is present the mussels will be relocated to a site unaffected by the project.

IDNR Consultation results

☐ Closed
Date (xx-xx-20xx)

☑ Open

Incidental Take Authorization

☑ Yes
Species: slippershell mussel (*Alasmidonta viridis*)

☐ No

Part VII. Water Quality/Resources/Aquatic Habitats

Stream Characteristics
The project corridor occurs within the Aux Sable Creek watershed which is a tributary of the Illinois River. The project crosses eight streams (Saratoga, Valley Run, West Aux Sable, Lisbon, tributary to Lisbon near U.S. Route 52, tributary of Lisbon Creek near Plattville Road, tributary to West Aux Sable creek south of Helmar Road, tributary to west Aux Sable at Caton Farm Road). All eight of these streams are tributary to Aux Sable Creek and are further described in Table 21 (Physical Characteristics). Where available, fish and mussel data are from the 2007 field surveys (Wetzel, 2007). Water quality is based on the IEPA use assessment methodology. Stream uses include aquatic life, fish consumption, swimming, boating, and aesthetic quality. Uses are from the Illinois Water Quality Report (IEPA 2012). Biological stream ratings are from IDNR (2008).

Table 21
Physical Characteristics of Streams within the Project Corridor

Stream	Drainage[1]		Flow characteristics[4]	Substrate[2]	Stream Width (feet)[2]	Riparian Vegetation	Riverine Acreage in Right-of-Way
	Area (square miles)	Area Upstream of Crossing (square miles)					
Saratoga Creek	14.6	12.1	perennial	silt, cobble	9.8	grasses	0.62
Valley Run	13.0	9.4	perennial	silt, sand, gravel	8.2	grasses	0.60
West Aux Sable Creek	45.7	15.4	perennial	silt, gravel, sand	0.0-6.6	grasses, trees	0.36
Lisbon Creek	11.4	10.1	perennial	silt	0.0	grasses	0.21
Tributary to Lisbon near U.S. 52	2.8	2.8	intermittent	sand, gravel, silt[5]	6-10[5]	grasses[5]	0.14
Tributary of Lisbon Creek south of Lisbon Center Road	4.2	3.2	perennial	silt, sand, cobble[5]	6-10[5]	grasses[5]	0.22
Tributary to West Aux Sable creek south of Helmar Road	7.6	5.7	perennial	sand, gravel, silt, cobble[5]	6-10[5]	grasses[5]	0.19
Tributary to West Aux Sable at Caton Farm Road	9.9	3.7	perennial	sand, gravel, cobble[5]	6-10[5]	grasses[5]	0.11

1 Source: USGS, 1979, or calculated from storm water estimates
2 Source: Edwards, editor, 2006.
3 Habitat is quantified using an index (mean habitat score) that assigns numerical values to physical parameters, like channel structure, flow, bank vegetation, and substrate (Edwards, editor, 2006). The sum of these values determines the stream categorization (greater than 130 excellent; 129.9-110 good; 109.9-80 fair; less than 80 poor).
4 Determined from U.S. Geological Survey topographic maps (Lisbon and Plattville 7.5-minute Quadrangles)
5 Field observations, May 15, 2012

Saratoga Creek

Saratoga Creek, a 12.2-mile tributary is located mostly in Grundy County. Its headwaters begin near north of U.S. Route 52 near Apakeska Road, from which Saratoga Creek flows to its confluence with Valley Run near County Road 1000 north of Morris. The physical characteristics of the stream are depicted in Table 21. At this location the stream has been channelized and the riparian vegetation is primarily grasses.

Field surveys in 2007 identified 16 species of fish at this site. The dominant species were the redfin shiner, central stoneroller, and the white sucker which represented 22.3 percent, 18.8 per cent, and 18.8 percent of the total catch, respectively. Two intolerant species (southern redbelly dace and hornyhead chub) which are sensitive to siltation represented 2.2 percent of the total catch. Mussel collection efforts yielded no live specimens.

The aquatic life designated use was assessed as being in full support of its use. The remaining designated uses (fish consumption, swimming, boating, and aesthetic quality) of Saratoga Creek were not assessed by the IEPA (2012).

Valley Run Creek

Valley Run Creek, a 16.1-mile tributary is located in Grundy and Kendall counties. Its headwaters begin north of U.S. Route 52 near Bushnell School Road, from which it flows to its confluence with Saratoga Creek near County Road 1000. Valley Run is depicted as a perennial stream on the USGS topographic map.

Valley Run Creek was assessed at the Illinois Route 47 Bridge. The physical characteristics of the stream are depicted in Table 21. At this location the riparian vegetation is primarily grasses which grades into a woody riparian corridor.

The fish collections in 2007 identified 15 fish species. The dominant fish species were the striped shiner, banded darter, and hornyhead chub which represented 29.7 percent, 24.6 percent, and 9.1 percent of the total catch. The intolerant species (hornyhead chub, southern redbelly dace, smallmouth bass, and banded darter) comprised 34.2 percent of the total individuals collected. Five mussel species (14 individuals) were collected. This included five individuals of the slippershell mussel, a state threatened species.

The aquatic life designated use was assessed as being in full support of its use. The remaining designated uses (fish consumption, swimming, boating, and aesthetic quality) of Valley Run were not assessed by the IEPA (2012).

West Aux Sable Creek

West Aux Sable Creek, located in Kendall County, is approximately 14.9 miles long and flows from east of Newark to its confluence with Middle Aux Sable Creek, at which point these two streams become Aux Sable Creek. West Aux Sable Creek is depicted on the USGS topographic map as having permanent flow. Table 21 summarizes the physical characteristics of the stream.

In 2007, a site approximately two miles downstream of the 2005 location on West Aux Sable Creek was assessed at the east side of Illinois Route 47. Nine fish species were collected, with the cheek chub and orange throat darter being dominant at 47.3 percent and 15.8 percent of the total catch, respectively. No intolerant fish species were collected. No mussels were found at this site.

West Aux Sable Creek achieves full support for the aquatic life designated use, but has not been assessed by IEPA for the fish consumption, swimming, boating, and aesthetic quality designated uses (IEPA 2012).

Lisbon Creek

Lisbon Creek, a seven-mile long tributary is located in Kendall County. Its headwaters begin near the junction of Lisbon Road and Lisbon Center Road from which it flows to its confluence with West Aux Sable Creek near U.S. Route 52. The Lisbon Creek watershed includes two unnamed tributaries (North and South Unnamed Tributaries),

which are also within the Illinois Route 47 corridor. Lisbon Creek is a permanent flow stream according to the USGS topographic map. Table 21 summarizes the physical characteristics of the stream; however stream width and depth represent low flow conditions.

In 2007, 12 species of fish were collected at this site. The dominant species were the creek chub, common shiner, and central stoneroller, which represented 37.2 percent, 19.6 percent, and 15.3 percent of the catch, respectively. No fresh water mussels were found during this survey.

The designated uses (aquatic life fish consumption, primary contact, secondary contact, and aesthetic quality) of Lisbon Creek were not assessed by the IEPA (2012).

Lisbon Creek South Tributary near U.S. Route 52

Lisbon Creek South Tributary, a 2.8-mile tributary to Lisbon Creek is located in Kendall County. Its headwaters commence in farm fields west and north of U.S. Route 52 and flow towards Illinois Route 47. The tributary crosses Illinois Route 47 and then merges with Lisbon Creek. This tributary is intermittent prior to crossing Illinois Route 47 (USGS topographic map, Plattville Quadrangle). Table 21 summarizes the physical characteristics of this tributary.

The creek is six to ten feet wide and relatively shallow at one foot deep. The banks are steep, vegetated primarily with reed canary grass and rise approximately five to seven feet above creek level. The substrates are firm, composed of sandy gravel with thin veneers of silt. Some scattered small cobble is present. The creek shows some small degree of meandering through the farm fields at this location.

No collections of fish, mussels, or benthic species occurred at this location. The stream was not assessed for designated uses by IEPA (2012).

Lisbon Creek North Tributary near Lisbon Center Road

Lisbon Creek North Tributary, a 5.6-mile tributary to Lisbon Creek is located in Kendall County. The tributary is a headwaters stream that arises in farm fields west of Illinois Route 47 and flows east-southeasterly through a series of farm ditches to Lisbon Creek. The tributary crosses Illinois Route 47 approximately 1400 feet south of Lisbon Center Road. This tributary is depicted on the USGS topographic map as a perennial stream (USGS topographic map, Plattville Quadrangle).

The creek is six to ten feet wide and relatively shallow at one foot deep. The banks are steep, vegetated primarily with reed canary grass and rise approximately eight feet above creek level. The substrates are soft, composed of silt and silty sand. Some scattered small and large cobble is present on the portion of the creek west of Illinois Route 47. Large clumps of filamentous algae are present in the creek east of Illinois Route 47. The creek shows some small degree of meandering through the farm fields at this location.

No collections of fish, mussels, or benthic species occurred at this location. The stream was not assessed for designated uses by IEPA (2012).

West Aux Sable Creek Tributary south of Helmar

West Aux Sable Creek Tributary, a 6.9-mile tributary to West Aux Sable Creek in Kendall County. Its headwaters begin west of Illinois Route 47 and north of Helmar Road and flow to its confluence with West Aux Sable Creek. The stream crosses Illinois Route 47 south of Helmar Road at which point the stream changes from an intermittent flow pattern to a perennial stream (USGS topographic map, Plattville Quadrangle).

The riparian areas adjacent to the stream consist of grasses with adjacent agricultural fields. Table 21 summarizes the physical characteristics of the stream. The creek is six to 12 feet wide and relatively shallow at one to two feet deep, with clear flowing water during a site visit on May 15, 2012. The banks are steep, vegetated primarily with reed canary grass and rise approximately eight to ten feet above creek level. The substrates are firm, composed of sandy

gravel with some patches of sandy silt. Some scattered small and large cobble is present. The creek shows some small degree of meandering through the farm fields at this location.

Fish, mussels, and benthic species were not collected at this site. The stream was not assessed by IEPA for designated uses (2012).

West Aux Sable Creek Tributary at Caton Farm Road

West Aux Sable Creek Tributary is a tributary to West Aux Sable Creek located in Kendall County. Its headwaters begin west of Illinois Route 47 near Caton Farm Road and flows 7.8 miles to its confluence with West Aux Sable Creek. This tributary is depicted on the USGS topographic map as a perennial stream at the crossing of Illinois Route 47 (USGS topographic map, Plattville Quadrangle).

The physical characteristics of the stream include riparian areas consisting of grasses with adjacent agricultural fields. Table 21 summarizes the physical characteristics of the stream. The creek is six to ten feet wide and relatively shallow with a depth of one to two feet. The banks are steep, vegetated primarily with reed canary grass and rise approximately eight feet above creek level. The substrates are firm, composed of sandy gravel with scattered cobble present.

Fish, mussels, and benthic species were not collected at this site. The stream was not assessed by IEPA for designated uses (2012).

Construction Impacts to Surface Water

Illinois Route 47 is being widened from two to four lanes resulting in two 12-foot lanes in each direction along with a 32-foot wide raised median. The existing bridges and culverts on Illinois Route 47 will be replaced. There will be minor temporary in stream work in Saratoga Creek and Valley Run to remove the existing bridges. There will also be minor in stream work to construct the abutments for the replacement bridges, line the creek with rip rap, and shape the creek bottom for a wider bridge crossing. The new bridges will be single span bridges and there will be no piers in the streams. Typical construction activities associated with bridges, culverts, and roadway widening involve grading, filling, and excavation. These activities will increase erosion potential because of the reduction in vegetative cover and increased impervious areas caused by compaction of soils by heavy equipment. Structure placement in the streams will cause increases in turbidity and sedimentation at the construction site and may temporarily alter downstream substrate conditions. The increases in turbidity and sedimentation could have minor, temporary impacts on downstream aquatic systems.

The potential result of increased sedimentation during construction will be the covering of natural substrate thereby eliminating necessary habitat conditions for some species of fish and macroinvertebrates. The magnitude of the impact will vary according to site specific conditions, such as the type of crossing structure, bank profile, stream size, soil type, and stream substrate. Studies indicate suspended solids may temporarily increase five to 12 times over background (Wheeler et al, 2003) during road construction depending upon implementation of erosion control measures, storm events, and site specific conditions. The Wheeler study evaluated a variety of case studies that included sites with erosion control methods. IDOT has implemented a variety of erosion control measures since 2003 to reduce sediment to streams. Although temporary reductions in fish and benthics have been observed, long term changes in fish diversity and abundance were not observed for 41 bridge/culvert projects in Tennessee (Wellman et al, 2000).

Two bridges and six culverts will be used to cross the streams and their tributaries in the project area. Illinois Route 47 has existing structures in place that will be removed and expanded to accommodate widening to Illinois Route 47.

Culverts will be used as the primary crossing structure because of the small size of the streams in the area of the project corridor. These culverts will vary in size based upon width of the stream crossing. Table 22 presents the structures to be used and loss of stream bottom at each crossing.

Table 22
Crossing Structure and Stream Bottom Loss

Stream	Structure Type	Culvert Size	Structure Length (ft)	Stream Bottom Loss (sq ft)
Saratoga Creek	bridge	NA	100	NA
Valley Run	bridge	NA	114	NA
West Aux Sable Creek	double box culvert	9 ft x 8 ft	156	1,400
Lisbon Creek	double box culvert	9 ft x 5 ft	177	1,593
Tributary to Lisbon near US 52	double box culvert	10 ft x 5 ft	153	1,530
Tributary of Lisbon Creek south of Lisbon Center Road	double box culvert	9 ft x 5 ft	177	1,593
Tributary to West Aux Sable south of Helmar Road	double box culvert	10 ft x 8 ft	159	1,590
Tributary to West Aux Sable at Caton Farm Road	double box culvert	6 ft x 4 ft	177	1,062

Highly erodible soils are in close proximity to West Aux Sable Creek and Saratoga Creek. Soil erosion control measures in these areas will involve special consideration to minimize sedimentation in the stream during construction. River and stream banks disturbed by construction will be revegetated immediately following construction. Raw banks will be mulched or protected with blankets until the vegetation is established.

Operational Impacts to Surface Waters

The operational impacts of the Build Alternative will include the accumulation of pollutants on highway surfaces, median areas, and adjoining rights-of-way as a result of highway use, natural contributions, and deposition of air pollution. These pollutants will include solids, heavy metals (lead, zinc, and copper), oil and grease, and nutrients. The concentrations of these pollutants are highly variable by site and are affected by numerous factors such as traffic characteristics, climate, maintenance activities and adjacent land uses.

Highway runoff pollution could affect water quality of receiving waters through shock or acute loadings and through chronic effects from long term accumulation within the receiving waters. The significance of these impacts is very site specific, and will depend heavily on the characteristics of the receiving water. Research (Young et al, 1996; Dupuis, et al, 1984; Dupuis and Kobriger, 1985) indicates that there are few substantial impacts for highways with less than 30,000 average daily traffic (ADT). Potential impacts generally will be short-term localized acute loadings from temporary water quality degradation and with few, if any, chronic effects.

The estimated ADT in 2030 for the proposed project at Lisbon Creek, Saratoga Creek, Valley Run, and West Aux Sable Creek is 16,500 to 23,000. The potential for substantial water quality impacts will be low in these areas based upon these traffic volumes.

Incremental changes in stream concentrations associated with the full length of the Build Alternative were estimated for each watershed utilizing the procedure developed by Driscoll et al (1990) and Driver and Tasker (1990). Table 23 presents the estimated concentrations for each tributary prior to the implementation of stormwater management practices.

Table 23
Results of Pollutant Loading Analysis Before Implementation of BMPs

Stream	Total Copper (mg/L)	Total Lead (mg/L)	Total Zinc (mg/L)	Total Suspended Solids (mg/L)	Chloride, Daily Max. (mg/L)
Saratoga Creek	0.01	0.01	0.05	99	33
Valley Run	0.03	0.02	0.09	117	62
West Aux Sable Creek	0.02	0.02	0.08	97	48
Lisbon Creek	0.02	0.02	0.08	69	46

The pollutant loading analysis indicated that all stream concentrations prior to the implementation of any best management practices (BMPs) meet the General Use Water Quality standard. The pollutant concentrations of representative roadway pollutants, lead, zinc and copper, as shown in Table 23, will be further reduced where vegetated ditches are implemented in areas such as Valley Run, Lisbon Creek, and West Aux Sable Creek. All General Use Water Quality standards for the heavy metals and chlorides related to highway contributions will be achieved.

Maintenance (Deicing Chemicals) Impacts

In the winter, salt will move through the environment adjacent to the Recommended Build Alternative as runoff into streams, runoff that percolates into the soil profile, splash, and spray. The three-year average deicing application rate in Grundy and Kendall counties is 18.7 and 21.2 tons per lane mile.

Deicing salt, along with plowing and sanding are seasonal tools for highway snow and ice control. Deicing salt produces public mobility and safety benefits by rapidly and reliably providing more drivable and less hazardous road conditions during the winter months. The benefits are difficult to quantify but are widely acknowledged to be valuable to society (Transportation Research Board, 1991). It is acknowledged that deicing salt (sodium chloride) has unintended side effects. These effects are summarized in Jones and Jeffery (1992) and the Transportation Research Board (1991). The only generalization that can be made on the basis of the literature is that road salt impacts tend to diminish rapidly with distance from the roadway.

Deicing salt is applied to roadways to lower the freezing point of water and to free the snow and ice from the pavement. Salt is applied to roadways during and after snow and/or ice storms. Most of the salt used is plowed along with snow and ice to the shoulder and adjacent right-of-way. Salt moves through the environment as runoff, splash, and spray. As the snow or ice melts, the salt moves through to the drainage system until it enters a stream as runoff or percolates into the soil profile. Salt also is transported by splash or spray generated by moving vehicles coming in contact with brine or slush. Studies (Frost, et al, 1981; Diment, et al, 1973; Lipka and Aulenback, 1976; Sucoff, 1975) indicate that 60 to 80 percent of the salt runs off into the surface water, 15 to 35 percent occurs as splash, and up to 3 percent occurs as spray. Chloride infiltration is estimated at 25 to 50 percent and 10 to 60 percent depending upon the roadway drainage design and site characteristics (McConnell and Lewis, 1972; Environment Canada, 2001).

Surface Runoff

Surface runoff is the primary mode of road salt removal (60 to 80 percent). Runoff from the roadway and adjacent right-of-way will be directed to the highway drainage system before outletting into a stream. Potential impacts of deicing salt from highway runoff include effects on stream water quality and aquatic biota. Infiltration will reduce the peak concentrations reaching the stream via groundwater discharges; however, infiltration into the groundwater table has the potential to affect wetland communities relying upon groundwater.

Salt impacts on soils are usually confined to areas within 15 feet from the roadway, although impacts across greater distances have been reported. Long-term salt accumulation in soil increases soil density and diminishes permeability and fertility, which could adversely affect moisture retention and soil structure characteristics that are important for plant growth and erosion control. The accumulation of salt in soils depends on many factors including soil type, precipitation, and topography (Transportation Research Board, 1991).

There are many laboratory studies of salt (sodium chloride) on aquatic biota, including acute and chronic toxicity studies; summaries can be found in USEPA, 1987. Field studies indicate that salt does not have substantial deleterious impacts on aquatic biota (fish, invertebrates, aquatic plants) in large or flowing bodies of water where dilution takes place quickly (Jones and Jeffrey, 1992). In the project corridor most of the streams are categorized as perennial or flowing streams with the exception of the small tributaries of West Aux Sable Creek that merge into the main stream.

In Illinois, the General Use Water Quality Standard for chloride is 500 milligrams per liter (mg/l) per Chapter 35 *Illinois Administrative Code* Section 302. There is no standard for sodium. Based on the methodology of the U.S. Geological Survey, increases in chloride concentrations were projected for each stream. The results indicated that the maximum chloride concentrations will remain within the water quality standards in all streams crossed by the Build Alternative (See Table 23 Chloride levels).

Measures to Minimize Harm

Design, construction, and operational features will be included in the Recommended Build Alternative to minimize highway runoff on receiving streams. Drainage from the right-of-way will be collected and either directly discharged to streams or directed through vegetated ditches prior to discharge. Additionally, a mussel survey will be conducted in Valley Run, Saratoga Creek, Lisbon Creek, and West Aux Sable Creek prior to construction to protect the slippershell mussel.

Ditches vegetated with grass or other suitable vegetation provides natural conveyance and at the same time filters pollutants and allow for modest infiltration. Their pollutant removal effectiveness is very dependent on vegetation type and height. Native prairie grasses are preferred over conventional turf grass. Removal rates of suspended solids and metals are typically between 30 percent and 70 percent. Anticipated removal rates in the project corridor, based upon available water quality literature including the FHWA's "Evaluation and Management of Highway Runoff Water Quality" are 67 percent for lead, 63 percent for zinc, 46 percent for copper, and 83 percent for suspended solids.

Part VIII. Groundwater Resources

Groundwater is the primary source of potable water in the project corridor. This groundwater occurs in one of four aquifer systems in northeastern Illinois according to the ISGS (Hughes et al. 1966). The aquifers are sand and gravel deposits in glacial drift; shallow dolomite limestone formations; the Cambrian-Ordovician or deep sandstone aquifer; and the Mt. Simon aquifer. Groundwater recharge potential varies in the project corridor according to geological characteristics. The area of highest potential for recharge occurs along Illinois Route 47 from south of U.S. Route 52 to the Kendall-Grundy County line. Coinciding with groundwater recharge zone descriptions is the assessment of potential for contamination based upon the geology of the area.

The project corridor lies within a wide range of susceptibility to potential contaminants. There is low potential of contamination associated with relatively impermeable bedrock overlain by silt or clay deposits in the south (former Lake Wauponsee in southern Grundy County) to areas of high potential contamination of deposits associated with permeable bedrock, or sand/gravel at or within 20 feet of ground surface in portions of Grundy and Kendall counties. These regions of higher susceptibility are primarily related to river channels, such as Aux Sable Creek, (ISGS, 2006).

Section 1424(e) of the Safe Drinking Water Acts defines a sole source aquifer (SSA). There are no Sole Source Aquifers, as designated under Section 1424(e) of the Safe Drinking Water Act, within the project area. There are no karst formations or Class III Special Resources Groundwater zones within the project area. Additionally three of the four watersheds, Lisbon Creek, Saratoga Creek, or West Aux Sable Creek, do not contain any IEPA designated sensitive ecological systems. Valley Run is rated B for integrity and diversity and contains the state threatened slippershell mussel. There are no community wellhead protection recharge areas near the project corridor. The project does cross a non-community water supply phase 1 wellhead protection recharge area. The wellhead protection area is associated with a well at the Morris Airport and Illinois Route 47 crosses it from approximately 1,250 feet south of Airport Road to approximately 770 feet north of Airport Road. Illinois Route 47 comes within approximately 65 feet but does not cross a non-community water supply phase 1 wellhead protection recharge area associated with the Grundy County Fairgrounds. There are no seeps within the project area.

Private wells provide the potable water supply for residents in the project corridor. The ISGS (2006) has identified 10 private wells within 200 feet of the Illinois Route 47 right of way, although additional private wells could exist. All wells within the proposed right-of-way and along the Recommended Build Alternative will be properly capped and abandoned in accordance with Illinois Department of Public Health regulations (Illinois Water Well Code 771AC920). The Build Alternative will not have any measurable effect on the total groundwater supply for the project area. A slight reduction in recharge area will be caused by the road pavement; however, the effect will not be measureable for public or private well operation.

The potential for contamination of groundwater supply wells is determined by proximity to sources, well construction, geological conditions, and management of stormwater. The Illinois Groundwater Protection Act (Chapter 415 Illinois Compiled Statutes Section 55) establishes setback zones for the location of potential sources of pollution, such as underground storage tanks and stockpiles of deicing chemicals. Setback zones will be considered in the siting of maintenance facilities and in the operation of dry wells with the proposed project. The minimum setback zone around a community water supply well is 1,000 feet for protection of groundwater and 200 feet for private wells.

Because all wells along the project will be properly capped and abandoned, the Recommended Build Alternative will not create any potential new "routes" for groundwater pollution movement or any new "sources," as defined in the Illinois Environmental Protection Act (415 ILCS 5/3, et seq.). Accordingly, the Build Alternative is not subject to setback zones requirements for community water supplies or private wells, as set forth in 415 ILCS 5/14, et seq. Groundwater quality is not expected to be measurably affected by the Build Alternative. Impacts to wells in the project area will be unlikely because of their distance from the highway, the silt clay layers, the controlled drainage pattern of the highway, and the dilution of runoff. However, wells within 200 feet of the roadway that are shallow, improperly cased, or hydraulically connected directly to highway runoff could show increased levels of deicing chemicals and other roadway contaminants.

Proposed Mitigation

No impacts to groundwater resources are anticipated as part of the proposed project.

Part IX. Floodplains

Floodplains within the project corridor typically consist of farmland. Floodplains are extensions of waterways where water rises and expands into additional overbank storage areas. Within vegetated areas, floodplains provide an opportunity for infiltration and water quality treatment through filtering of nutrients, sediment, and impurities. Beneficial values of floodplains include, but are not limited to, the moderation of floods, water quality, groundwater recharge, fish and wildlife habitat, open space, and recreational value.

There are three (3) floodplains within the project area (Figure 5, Environmental Resources Map). The floodplains are associated with Saratoga Creek, Valley Run Creek, and West Aux Sable Creek. All three floodplain areas are

identified as Zone A (no base floodplain elevations determined.) The existing roadway crosses these floodplains at a transverse angle.

The three creeks generally flow from west to east under Illinois Route 47 within the project area. The floodplain (Zone A) for the Saratoga Creek is approximately 160 feet wide at the Illinois Route 47 bridge. The Valley Run Creek floodplain (Zone A) is approximately 220 feet wide at the Illinois Route 47 bridge, and the West Aux Sable Creek floodplain (Zone A) is approximately 540 feet wide at the Illinois Route 47 box culvert.

The two proposed bridges over Saratoga Creek and Valley Run Creek are single span structures. No in-stream work is anticipated for the construction of these bridges. The proposed culvert at the West Aux Sable Creek is a double-box culvert. In-stream work is anticipated for the construction of this culvert. Based on the Location Drainage Study these proposed encroachments were found not to require compensatory storage.

Floodplain Finding if significant encroachment

☑ No

☐ Yes

The proposed project is not expected to cause an increase in flood heights and flood limits. As such, the improvements are not expected to result in adverse impacts on the natural and beneficial floodplain value; they will not result in any notable change in flood risks or damage; and they do not have potential for interruption or termination of emergency service or emergency evacuation routes.

Due to the width and configuration of the floodplains associated with the three creeks, avoidance of floodplain impacts is not practical. As required under Executive Order 11988 and 23 CFR 650, Subpart A, it has been determined that there is no practical alternative to development within the floodplain. The project will conform to state and local laws concerning floodplain encroachments. Additionally, because there will be work within the floodway, a permit will be required for construction within the floodway through the IDNR – Office of Water Resources.

Part X. Wetlands

Wetlands are defined by the U.S. Army Corps of Engineers (USACE) and the United States Environmental Protection Agency (USEPA) as:

> "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Title 33 Code of Federal Regulations Section 328.3 (b) and Section 404 of the Clean Water Act).

Wetlands in the project corridor falling under the jurisdiction of the USACE were determined based on the presence of hydrophytic vegetation (adapted to grow in saturated soil), hydric soils (characterized by considerable moisture), and wetland hydrology. These three criteria are used to assess sites as wetlands or non-wetlands. As this is a state sponsored project, the Illinois Interagency Wetland Policy Act (IWPA) will be applicable. The IWPA requires mitigation of all wetland impacts, regardless of size.

Nine jurisdictional wetlands (Sites 1, 2, 3, 4, 5, 7, 8, 9, and 10) were identified within the project corridor. The total area of jurisdictional wetlands within the project corridor is approximately 1.96 acres. The wetlands range from 0.01 acres to 1.21 acres in size. The wetlands are located adjacent to Saratoga Creek (Site 9), Valley Run (Site 5), West

Aux Sable Creek (Site 4), Lisbon Creek Tributary 2 (Site 3), Lisbon Creek Tributary 1 (Site 2), and West Aux Sable Creek Tributary 2 (Site 1). Site 7 and Site 8 are hydrologically connected to Saratoga Creek via conveyance through agricultural fields. Site 10 is hydrologically connected to the East Fork Nettle Creek Tributary via conveyance through a constructed roadside conveyance swale.

Wetland Characteristics

Table 24 presents the site number, plant community type, National Wetland Inventory (NWI) classification, dominant vegetation, soil type, hydrologic indicator, size, Floristic Quality Index (FQI), and stream association. The FQI is an index derived from floristic inventory data and calculated from the number of species that occur in the plant community and the species coefficient of conservatism (C). C Values are assigned to individual plant species, range from 0 to 10, and represent an estimated probability that a plant is likely to occur in a landscape relatively unaltered from what is believed to be a pre-settlement condition. The aggregate conservatism of all the plants inhabiting a site is used to determine its FQI.

Wetland determinations were conducted using the 1987 Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0) (USACE 2010). The location of Sites 1, 2, 3, 4, 5, 7, 8, 9, and 10 are shown on the Environmental Resources Map (Figure 5). The wetlands in the project corridor are near or along streams or ditched channels.

Table 24
Wetlands Characteristics in the Project Corridor

Map No.	Plant Community	NWI Classification[1]	Dominant Vegetation[2]	Size acres[3]	FQI	Direct Connection to Stream
Site 1	Wet Meadow	None	Reed Canary Grass (h)	0.02 t	4.1	West Aux Sable Creek Tributary 2
Site 2	Wet Meadow	None	Reed Canary Grass (h), Broad-leaved Cattail (h)	0.01 t	3.5	Lisbon Creek Tributary 1
Site 3	Wet Meadow	None	Reed Canary Grass (h), Sandbar Willow (s)	0.05 t	8.3	Lisbon Creek Tributary 2
Site 4	Wet Meadow	None	Reed Canary Grass (g), Hairy-fruited Lake Sedge (h)	0.02 t	7.6	West Aux Sable Creek
Site 5	Wet Floodplain Forest	PFO1A	Silver Maple (t), Spotted Touch-me-not (h), Clustered Black Snakeroot (h)	0.02 t	9.0	Valley Run

1 P – palustrine, FO – forested, UB – unconsolidated bottom, A – temporarily flooded, G - intermittently exposed, 1 – broad-leaved deciduous, x – excavated
2 t – tree, sa – sapling, sh – shrub, h – herb, g – grass,
3 c – acreage within project corridor, t – total wetland acreage

Table 24 (continued)
Wetlands Characteristics in the Project Corridor

Map No.	Plant Community	NWI Classification[1]	Dominant Vegetation[2]	Size acres[3]	FQI	Direct Connection to Stream
Site 7	Marsh	None	Red Top (h), Narrow-leaved Cattail (h)	0.4 t	4.9	Saratoga Creek via conveyance through agricultural fields
Site 8	Marsh	None	Common Reed (h)	0.07 t	2.7	Saratoga Creek via conveyance through agricultural fields
Site 9	Wetland Pond	PUBGx	Red-rooted Spike Rush (h), Reed Canary Grass (h), Sandbar Willow (s)	1.21 t	9.8	Saratoga Creek
Site 10	Wet Meadow	None	Narrow-leaved Cattail (h)	0.16 t	6.0	East Fork Nettle Creek Tributary via conveyance through a constructed roadside conveyance swale

1 P – palustrine, FO – forested, UB – unconsolidated bottom, A – temporarily flooded, G - intermittently exposed, 1 – broad-leaved deciduous, x – excavated
2 t – tree, sa – sapling, sh – shrub, h – herb, g – grass,
3 c – acreage within project corridor, t – total wetland acreage

In Illinois, the FQI is applied to the vegetation of each wetland site. The general interpretation of the FQI value is that sites with values of 20 or more have at least some evidence of native character and may be considered environmental assets. Sites with FQI values between 10 to 20 are considered fair quality, FQI values of less than 10 indicate low natural quality.

Wetland Impacts

Of the nine delineated wetlands within the project corridor, five would be directly affected (Sites 1, 4, 5, 7, and 10). These wetland sites occur adjacent to the highway and will be filled for roadways and grading for drainage and storm water conveyance and storage. Wetland impacts related to roadway construction will include vegetation removal, placement of clean fill, and changes to the wetland. The impacted wetlands are shown in Table 25.

The project corridor would affect 0.21 acres of wetland.

Table 25
Wetlands Affected and Their Characteristics

Site No.	Plant Community	Impact Build Alternative (acres)	Size (acres)	Floristic Quality Index	Stream/ Major Watershed	U.S. Army Corps of Engineers District
Site 1	Wet Meadow	0.001	0.02	4.1	West Aux Sable Creek Tributary 2/ Illinois River	Rock Island
Site 4	Wet Meadow	0.004	0.02	7.6	West Aux Sable Creek/ Illinois River	Rock Island
Site 5	Wet Floodplain Forest	0.006	0.02	9.0	Valley Run/ Illinois River	Rock Island
Site 7	Marsh	0.143	0.4	4.9	Saratoga Creek/ Illinois River	Rock Island
Site 10	Wet Meadow	0.057	0.16	6.0	East Fork Nettle Creek/ Illlinois River	Rock Island

Proposed Mitigation

☐ On-site

☑ Off-site

☑ Wetland Bank

Description

When impacts to wetlands cannot be avoided, minimization of these impacts is necessary. The resulting impacts are then subject to mitigation in accordance with state and federal policy.

Mitigation for wetland impacts will follow the IDOT's *Wetland Action Plan*, as approved by the IDNR. State mitigation ratios are determined by the size of the impact (over or under 0.5 acres) and the location of the mitigation site (on-site, off-site, out-of-basin). The project corridor is being processed as a Programmatic Action and requires a wetland compensation plan and coordination with the IDNR. The compensation plan for this proposed project will be to purchase or utilize credits from wetland banks.

Wetland impacts resulting from the project will be mitigated at the IDOT Morris Wetland Bank or other local wetland banks dependent upon the availability of wetland mitigation credits.

Wetland sites 1, 4, 5, 7, and 10 occur within the Illinois River Basin in the Rock Island District. Off-site mitigation ratios (1.5:1) are required. A total of 0.21 acres will be affected, requiring 0.32 acres of mitigation.

Part XI. Special Waste

A Preliminary Environmental Site Assessment (PESA) was completed for the Illinois Route 47 project on March 30, 2012 by the Illinois State Geological Survey (ISGS) in accordance with the Manual for Conducting Preliminary Environmental Site Assessments for Illinois Department of Transportation Infrastructure Projects (Erdmann et al. 2012). The PESA evaluated 72 sites for the potential presence of special wastes. Each of these 72 sites would be impacted with the construction of the proposed Illinois Route 47 project. The majority of these sites were agricultural. Thirty-six of the 72 sites had identified Recognized Environmental Conditions (RECs) that may be indicative of releases or potential releases of hazardous substances on, at, in, or to the proposed project. Twenty-four of the remaining sites were associated with de minimis conditions, and 12 sites did not contain RECs or de minimis conditions. De minimis represents conditions that generally do not present a threat to human health or the environment.

Hazardous Waste

The PESA (March 30, 2012) completed for the project indicated that no sites in the project area are currently listed in the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS). One site, a vacant lot on the east side of Illinois Route 47 between Airport Road and Nelson Road (Site 2561-59) is an Archived CERCLIS site; the site once contained anhydrous ammonia above-ground storage tanks (ASTs) that have since been removed. A CERCLA site investigation found that soil impacts are not probable at this site.

Non-Hazardous Waste

The PESA (March 30, 2012) listed the following numbers and types of RECs within the project corridor:

- 24 above-ground storage tank (AST) sites;
- 12 chemical use sites;
- Five spill sites;
- Five former or potential underground storage tank (UST) sites;
- Four drum sites;
- Three former UST sites with documented releases;
- Three sites with volatile organic compounds (VOCs);
- One pesticides sites;
- Two dumping sites;
- One possible landfill site;
- One monitoring well site;
- One petroleum pipeline site (three pipelines within one larger agricultural site)

Many sites have multiple REC listings. The majority of the REC sites are agricultural areas. Three pipeline areas (Site 2564-1) extend under Illinois Route 47. One pipeline is a natural gas pipeline located 0.5 mile south of White Willow Road. The second area has three natural gas pipelines located 0.5 mile south of Sherrill Road. The third is a petroleum pipeline crossing Illinois Route 47 50 feet north of Nelson Road.

Two of the REC sites are agricultural/chemical/AST sites (the Elburn Co-Op, Site 2464-9, and Grainco Farm Service, Site 2464-15). The Grainco site could only be observed from publicly accessible areas due to an “employee only” restriction at the site. The Elburn Co-Op had an UST removed in 2000, at which time benzene was found in five of the soil samples above regulated levels. This site also had pesticides detected in soil samples collected in 2006. Additional preliminary testing will be conducted if grading, excavating, or utility relocation will occur on these sites.

Two REC sites are township garages with ASTs (Lisbon Township Garage, Site 2464-32 and Saratoga Township Garage and Town Hall, Site 2464-62). Both garage sites had documented VOC detection in prior ISGS testing; if grading, excavating, or utility relocation would occur on this site, then additional preliminary testing will be conducted.

One REC site (site 2561-43) is Hogan Walker Service, on the east side of Illinois Route 47 between Sherrill and Minooka Roads. IEPA files indicate this site was a generator of 100 to 1,000 kg/mo of ignitable waste in 1993, and has been a RCRA generator since at least December 1985. Soil testing on this site did not reveal VOCs significantly above background levels.

One REC site (site 2561-12) is a farmstead in the southeast corner of Illinois Route 47 and Plattville Road. At this site, a diesel fuel AST leaked approximately 100 gallons of fuel on the ground in November 2008. The tank was pumped out and a plan for the affected soil was to be determined. Clean-up activities for the spill, and the exact location of the AST could not be confirmed during the PESA, and the property owner could not be contacted.

One REC site (site 2561-21) is a vacant building on the east side of Illinois Route 47 between Caton Farm and Helmar Roads. IEPA records show three gasoline USTs and one waste oil UST were removed from the site in 1997, with evidence of releases that were cleaned by covering with sand and then removing the sand. According to IEPA files, this site was a one-time generator of less than 100 kg/mo of non-acute hazardous waste in August 2003, and no further information was present.

One REC site (site 2561-41) are residences at 11930 and 11960 Illinois Route 47. A diesel fuel spill occurred on this site in 1998 that affected 100 cubic yards of soil. The impacted soil was removed. Soil testing at this site did not find VOCs significantly above background levels.

Morris Airport (site 2561-56) is an REC site was found to have former USTs with documented releases. All USTs have been removed from the site, remediation has occurred, and subsequent soil testing did not find any VOCs significantly above background levels.

The Saratoga School (site 2561-67) at Illinois Route 47 and Granville Road formerly had USTs and ASTs. This is a RCRA site; according to IEPA files, the site's bus maintenance facility generated between 100 to 1,000 kg/mo of ignitable waste in 1992. No additional information was present.

Warehouses on the west side of Illinois Route 47 at the southern project limits (site 2561-71) appear on the USEPA RCRA list and have several recorded spills. According to the IEPA, the site generated less than 100 kg/mo of non-acute hazardous waste in December 2009. Additionally, approximately 5 cubic yards of diesel-impacted soils were previously hauled off-site. The site has several recorded fuel spills.

It is the responsibility of Phase II to determine if any of the sites with Recognized Environmental Conditions (RECs), or right-of-way adjacent to the RECs, will be impacted with the proposed work. Additionally, it is the responsibility of Phase II to determine if any right-of way or easement will be required at any of the REC locations. Any acquisition or easement will be discussed with the Bureau of Land Acquisition prior to responding to the PESA to request further studies.

Further environmental studies will be conducted if the proposed improvements require excavation adjacent to a property identified with a REC or requires excavation, including subsurface utility relocation, on a property with an easement. In some cases, the portion of the project that involves the REC can be risk managed and not require additional assessment. If the affected property containing the REC is a full take, then the property is ineligible to be risk managed. If risk managing is not possible, further environmental study is required, specifically, a Preliminary Site Investigation (PSI), to determine the nature and extent of possible contamination.

Special waste issues that may arise in the construction phase will be managed in accordance with the "IDOT Standard Specifications for Road and Bridge Construction and Supplemental Specifications and Recurring Special Provisions."

The proposed Illinois Route 47 project will require the purchase of right-of-way from parcels containing RECs, and the use of these parcels cannot be avoided. Preliminary Site Investigations will be conducted if grading, excavation, or utility location will occur at any of the REC sites. Once the nature and extent of involvement are known and the areas of contamination are determined, those soils found to be contaminated will be managed and disposed of in accordance with applicable federal and state laws and regulations and in a manner that will protect human health and the environment. The quantities to be disposed of are not expected to have a substantial effect on landfill capacity.

The PESA indicated that many buildings in the project area may contain asbestos-containing material (ACM); if building modification or demolition will occur due to the project, ACM testing should be performed.

Part XII. Special Lands

1. Section 4(f)

- ☐ DeMinimis
- ☐ Programmatic
- ☐ Individual

No involvement.

2. Section 6(f)

No involvement.

3. Open Space Lands Acquisition and Development (OSLAD) Act Lands

No involvement.

4. Illinois Natural Area (INAI) Sites

Valley Run is a part of the Aux Sable Creek INAI site in Grundy and Kendall Counties which includes the main stem of Aux Sable Creek. The project corridor crosses Valley Run south of Minooka Road. The designated area consists of approximately 32 miles of stream. Its natural area status is based on the presence of the slippershell mussel and the greater redhorse (state listed species) and 17 native species of mussels and 48 species of fish (high quality stream). Valley Run is rated under the Biological Stream Rating System as B stream for both diversity and integrity.

The expansion of existing Illinois Route 47 from two to four lanes will convert a small portion of the natural area (stream and adjacent riparian corridor) to highway uses. The Build Alternative will also impact the slippershell mussel, a state listed species, at this location. In addition to the expansion and the replacement of the current Illinois Route 47 bridge at Valley Run there is proposed ditch realignment and grading along both sides of Minooka Road. The existing ditches currently discharge into Valley Run Creek (INAI site) and will continue to do so after this improvement is constructed. There will be in stream work along the east side of Valley Run Creek for this ditch work. The existing bridge at Minooka Road over Valley Run will remain and there will be no in stream work at the bridge.

5. Nature preserves

No involvement.

6. Land & Water Reserves

No involvement.

XIII. Indirect and Cumulative Impacts

Land Use and Conversion of Agricultural Land

The existing land use in the project area is shown in Figure 6. Agriculture is the primary land use in the Illinois Route 47 area between Morris and Yorkville. Morris and Yorkville have been experiencing increased development, and have expanded their municipal boundaries over time to accommodate the growth into formerly agricultural lands. The area's development pattern is consistent with suburban development in the Chicago Metropolitan Area, as suburban development has been spreading outward from Chicago over time. This growth pattern was well-established in the study area prior to the development of the Illinois Route 47 project.

The future planned land uses for the Illinois Route 47 area show a continuation of these trends. Both Morris and Yorkville plan for continued urban development and continued expansion into areas that are currently undeveloped or agriculture land. However, although both communities plan for continued growth, the extent of the planned growth is constrained to the contiguous areas around the communities, and the agricultural land between the communities is planned to remain in agricultural use until at least 2030.

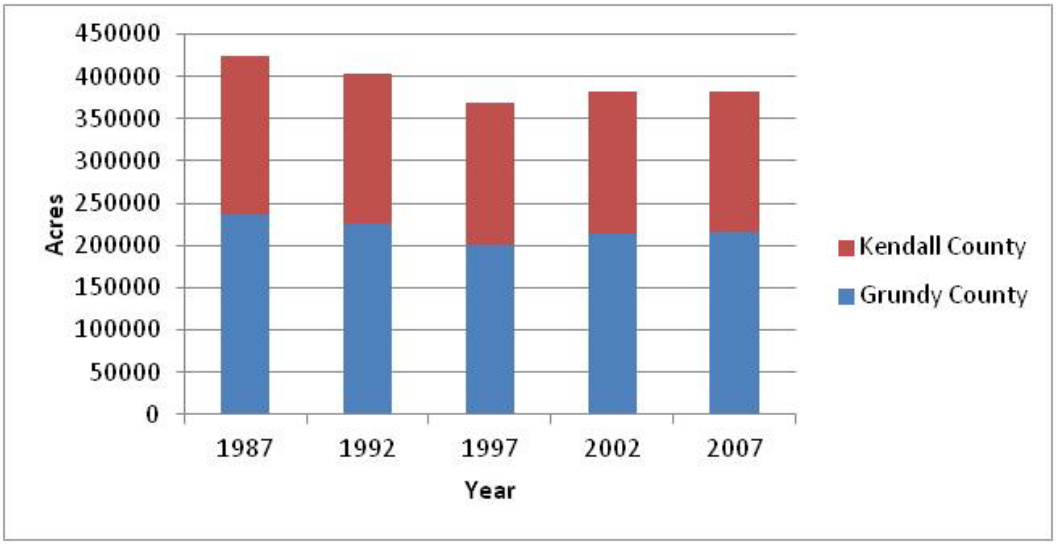
Table 26 and Chart 1 present farm characteristics in Kendall and Grundy counties from 1987 to 2007. Between 1987 and 2007, the number of farms declined by 21 percent in Kendall and 25 percent in Grundy County. This decline is consistent with statewide trends. During this time, farm size increased by as much as 21 percent, and the total acres farmed declined by nine or ten percent in both counties. These statistics indicate a trend towards larger farms and also a trend of converting farmland to non-farm uses. Total farm area in Grundy County was at its lowest for this time period in 1997 and has since been increasing slowly; however, the overall trend of declining farmland area is expected to continue into the future.

Table 26
Trends in Farming for Grundy and Kendall Counties

	1987	1992	1997	2002	2007	Percent Change: 1987 to 2007
Number of Farms						
Grundy County	598	533	463	407	450	-25%
Kendall County	535	500	441	412	424	-21%
Land in Farms (acres)						
Grundy County	237,092	225,506	201,452	213,467	215,474	-9%
Kendall County	186,440	178,222	167,486	168,082	166,872	-10%
Average farm size (acres)						
Grundy County	396	423	419	524	479	21%
Kendall County	348	356	359	408	394	13%

Sources: USDA, National Agricultural Statistics Service, 1987, 1992, and 1997, and Illinois Department of Agriculture, 2005 and 2009.

Chart 1
Acres of Land in Farms, 1987 to 2007



Sources: USDA, National Agricultural Statistics Service, 1987, 1992, and 1997, and Illinois Department of Agriculture, 2005 and 2009.

The indirect impacts of the Illinois Route 47 project pertaining to land use and agricultural land conversion will be twofold. These impacts are expected to result from the increased mobility the Illinois Route 47 project will provide through the project area and for Grundy and Kendall counties. First, the improved area mobility is expected to increase the potential for development in areas not planned for development in area comprehensive plans. Second, the project could induce planned development at a faster rate than planned. These concepts are explored in detail below.

The Illinois Route 47 project will increase the potential for induced land development due to improved mobility in the project area. Future project-induced development is development that would have occurred elsewhere in the Chicago Metropolitan Area without the project (No-Build Alternative). Examples of indirect impacts in the project study area are land used by induced development that otherwise would have remained in farmland (the predominant land use in the study area) or as a natural landscape. Indirect effects can positively affect communities by increasing the availability of housing and employment opportunities. Cumulative impacts result from the project, induced development, and other reasonably foreseeable development that will occur with or without the project. No other major public or private projects are foreseeable in the study area other than development and associated or programmed public services and transportation facilities.

The Illinois Route 47 project could induce planned development to occur at a faster rate than planned. Land development is dependent upon the real estate market and demand for housing, goods, and services; however, the improved mobility provided by the Illinois Route 47 improvements could make the nearby planned growth areas more attractive for development, and therefore these areas could become a target for private investment and development. Residential developments would benefit from improved mobility and travel times to major employment centers, and business developments would benefit from the exposure to increased traffic volumes on Illinois Route 47.

Environmental Features and Water Resource Change

Most of the study area consists of cropland, urban land, or barren land that provides little natural habitat. A few small remnants of prairie remain in the project area, although much prairie has been converted in Grundy and Kendall Counties over time. Pre-settlement prairie in Illinois was estimated to be over 22 million acres or approximately 60 percent of the land area of the state. Statewide, more than 99 percent of all prairies have been converted to other uses. Nearly all of the remaining prairie acreage documented for Grundy County is at Goose Lake Prairie State

Park. This park originally included only 240 acres of remnant native prairie. Overall, in northeast Illinois, prairie acreage may grow slightly as restoration work continues at the Midewin Tall Grass National Preserve. Unlike wetlands, there is no regulatory protection for remnant prairies in the state or affected counties, unless they are considered to be jurisdictional wetlands or are in parks, nature preserves, or INAI sites. In that case, Section 404 and an ordinance in Kendall County serve as protecting agents. Small isolated remnant prairies will therefore continue to be affected by land development.

Environmental Commitments

- One residential structure, Ripley House, 15450 Route 47 (Site #148) is eligible for the National Register of Historic Places and is adjacent to Illinois Route 47. The right-of-way for the widening of Illinois Route 47 will come no closer than 30 feet to the footprint of the structure. Efforts will be made to minimize the taking of trees associated with the residence.

- One year in advance of construction in the area of Valley Run Creek, the stream will be resurveyed for the presence of the state threatened slippershell mussel. The survey will confirm the presence of the slippershell mussel or other protected species. In addition to the survey at Valley Run, mussel surveys will be conducted at Saratoga Creek, Lisbon Creek, and West Aux Sable Creek. If the mussel is present, the Department will apply for an Incidental Take Permit with a recommendation to relocate the mussels to another suitable site.

- A Preliminary Site Investigation (PSI) will be conducted: 1) prior to acquisition of any contaminated parcel, and/or required temporary or permanent easements, and, 2) if the proposed improvements require excavation on or adjacent to a property identified with a Recognized Environmental Condition or requires excavation, including subsurface utility relocation, on a property with an easement.

Permits/Certifications Required

The following permits are anticipated:

Section 404/Nationwide Permit 14 for Stream and Wetland Impacts

The project will qualify for a Nationwide Section 404 permit from the U.S. Army Corps of Engineers, Rock Island District.

Section 401 Water Quality Certification

The Illinois Environmental Protection Agency has given water quality certification for Nationwide Permit 14 with regional and general conditions. The proposed project is in compliance with these conditions and therefore will not require an individual certification.

National Pollutant Discharge Elimination Systems (NPDES)

It is anticipated that this project will result in the disturbance of one or more acres of total land area. Accordingly, it is subject to the requirement for a National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges from the construction site. Permit coverage for the project will be obtained either under the IEPA General Permit for Stormwater Discharges from Construction Site Activities (NPDES Permit No. 1LR10) or under an individual NPDES permit. Requirements applicable to such a permit will be followed, including the preparation of a Stormwater Pollution Prevention Plan. Such a plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges from the construction site. It shall also describe and ensure the implementation of practices that will be used to reduce the pollutants in discharges associated with construction site activity and to assure compliance with the terms of the permit.

Public Involvement

Several meetings have been held with project stakeholders. Minutes of the meetings are included in Appendix A.

Coordination with the public will be provided through an Open House Public Hearing anticipated for June 2012.

Agency Coordination

Coordination has been made with the following agencies and copies of the coordination documents are included in Appendix A:

- U.S. Army Corp of Engineers
- U.S. Department of Transportation – Federal Highway Administration
- U.S. Department of Transportation – Federal Aviation Administration
- U.S. Environmental Protection Agency
- U.S Fish and Wildlife Service
- Illinois Department of Agriculture
- Illinois Department of Natural Resources
- Illinois Environmental Protection Agency
- Illinois Historic Preservation Agency
- Illinois Natural History Survey
- Illinois State Geological Survey
- Chicago Metropolitan Agency for Planning
- City of Morris
- Grundy County
- Kendall County
- Morris Airport
- Saratoga School

Coordination efforts have occurred with several resource agencies regarding clearances for biological resources (threatened and endangered species), wetlands, and cultural resources. In addition, two FHWA/IDOT Coordination Meetings have been held. Minutes of these meetings are also included in Appendix A.

SECTION V. COMMENTS

Comments received from the Public Hearing will be included when they are available.

SECTION VI. APPENDICES

Appendix A

SECTION VII. REFERENCES

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