3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

Chapter 3 discusses the existing social, economic, and environmental (SEE) conditions for each affected resource within the "Area of Analysis", which is described in Section 3.1.2. The Program's potential environmental consequences are discussed by individual resource and mitigation measures that could be used to avoid or minimize the impacts are presented. This chapter describes the potential impacts of each of the Build Alternatives serving 10 DRTs between Chicago and Detroit with seven DRTs traveling on to Pontiac, Michigan at speeds up to 110 mph (also called the "Build Alternatives") as well as the No Build Alternative in 2035.

3.1.1 Regulatory Requirements

The methodology for conducting the review and evaluation of the SEE resources is in accordance with federal regulations and guidelines, including NEPA (42 USC 4321-4347); FRA's Procedures for Considering Environmental Impacts (Environmental Procedures) (64 FR 28545) [50]; and regulations published by the Council on Environmental Quality (CEQ) on implementing NEPA (40 CFR parts 1500-1508).

The SEE resources addressed in this document, as required by MDOT and FRA's environmental procedures, are listed in Table 3-1.

Table 3-1: List of Social, Economic and Environmental Resources Addressed in this Document

Topic	Section that Covers the Topic
Impacts on all modes of transportation	3.2
Mobility of elderly and handicapped	3.2
Land use	3.3
Impacts on the socio-economic environment	3.5
Environmental Justice	3.6
Public health	3.7
Public safety	3.7
Noise and vibration	3.8
Air Quality	3.9

[50] Federal Railroad Administration. *FRA Procedures for Considering Environmental Impacts*. May 26, 1999. http://www.fra.dot.gov/eLib/details/L02561. Accessed November 25, 2013.

Topic	Section that Covers the Topic
Solid waste disposal	3.10
Site of historical, archeological, architectural, or cultural significance	3.11
Use of 4(f) protected properties (recreation areas and wildlife refuges)	3.12
Recreation areas and opportunities	3.12 and 3.13
Aesthetic environment and scenic resources	3.14
Flood hazards and floodplain management	3.15
Water Quality	3.16
Impacts on wetland areas	3.17
Coastal zone management	3.18
Natural ecological systems	3.19
Impacts on endangered species or wildlife	3.19
Use of natural resources other than energy	3.9, 3.12, 3.13, 3.15, 3.16, 3.17, 3.18, 3.19, and 3.20
Use of energy resources	3.21
Construction period impacts	3.26

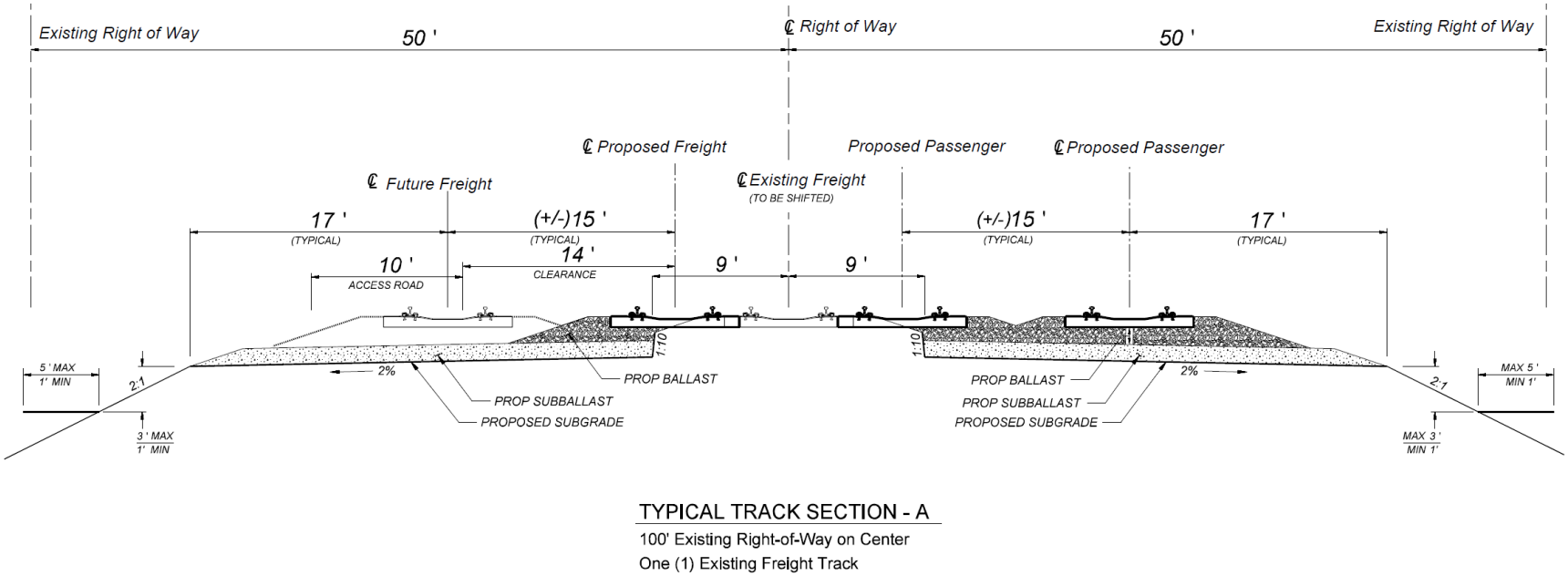
Federal Railroad Administration Procedures for Considering Environmental Impacts. May 26, 1999.

3.1.2 Determining the Program Area of Analysis

The Chicago-Detroit/Pontiac Passenger Rail Corridor Program is approximately 300 miles long, beginning in Chicago, traveling through northern Indiana and southern Michigan, to Detroit/Pontiac (see Figure 1-1). This Tier 1 EIS analyzes multiple reasonable routes through Illinois and Indiana. It includes the existing Amtrak route in Michigan and new stations at locations to be determined in northwest Indiana, Ann Arbor, Michigan and Detroit (in the New Center area) as well as one new maintenance facility in Pontiac, Michigan. Other existing stations along the route may also be improved. Station locations and improvements will be determined during service development planning and during Tier 2 NEPA analysis. See Chapter 2 (Alternatives Considered) for a thorough description of the route selection process and Figure 2-6 for a flow chart summarizing the route selection process. Chapter 2 also contains maps of the alternatives and descriptions of potential improvements.

The railroad right of way along the Chicago-Detroit/Pontiac Corridor is assumed to be approximately 100 feet wide; however, the actual right of way varies in isolated locations, especially urban areas, where the right of way line may show slight irregularities. On the ground, the vast majority of the existing right of way is a uniform 100 feet wide, with the exception in the South of the Lake (SOTL) area of Route 4 where there is a 7-mile stretch that is 66 feet wide. As shown in Figure 3-1, the 100 foot width therefore represents a conservative, reasonable average right of way width.

Figure 3-1: Typical Build Cross-Section within a 100-Foot Right of Way



Source: HNTB Corporation. August 2013.

The Area of Analysis covers 250 feet on each side of the existing rail centerline for a total width of 500 feet for each of the Build Alternatives and the No Build Alternative, which follows the existing Amtrak route. This 500-foot Area of Analysis is expected to accommodate any additional right of way that may be needed for track maintenance and to reduce operating disruptions, including track construction and improvements. This conservatively wide Area of Analysis accounts for the maximum anticipated future right of way needs and therefore overestimates the area that in reality would be directly impacted by the Program. It also allows flexibility in future design to accommodate future design constraints that may be identified.

The boundaries of the Area of Analysis are shown in the series of maps contained in Appendix D. The Area of Analysis comprises nine counties in Michigan (Berrien, Cass, Van Buren, Kalamazoo, Calhoun, Jackson, Washtenaw, Wayne and Oakland), three counties in Indiana (Lake, Porter, LaPorte) and one county in Illinois (Cook).

This Tier 1 EIS is examining a conceptual level of design. More detail about specific affected areas will be examined in Tier 2 NEPA analyses.

Service development planning is also being completed as part of the development of this Tier 1 EIS and includes the development of conceptual site plans for all new stations and the maintenance facility. More detail about the affected areas for stations and maintenance facility needs will be examined more closely in future Tier 2 NEPA analysis if a Build Alternative is selected. The Service Development Plan being prepared for the Selected Program Alternative will also include detailed study of operations, benefits, costs and revenue forecasts. The final Service Development Plan will be adopted after the EIS Record of Decision is issued.

3.1.3 Overview of Alternatives Discussed within Chapter 3

This chapter evaluates the impacts of each of the four Build Alternatives currently under consideration by the Program Sponsors. These include Route 2, Route 4, Route 5 Option 1 and Option 2, and Route 9 Option 1 and Option 2. These alternatives are mapped and fully described in Section 2.2.3.2.

The No Build Alternative will also be discussed within this chapter. Included in the No Build Alternative analysis are a number of improvements that have been committed to be constructed regardless of whether future higher-speed rail service is implemented under this Program. Appendix B includes the list of these improvements.

3.1.4 General Outline of Chapter 3

In this Tier 1 EIS, the following general outline is used for each affected SEE resource. Where appropriate, the detailed analysis is presented on a state-by-state basis.

Methodology and Regulatory Requirements

This section summarizes the analysis methodology and applicable regulatory requirements, including the government agencies involved in the regulation of each particular SEE resource.

Affected Environment

This section describes the environment of the areas to be affected by the Build Alternatives. Sometimes this is referred to as the "existing conditions". Features and/or demographics currently present in the Area of Analysis are explained. The intent is to define the social, economic, or environmental conditions of each topic analyzed.

Impacts of the No Build Alternative

This section evaluates the potential impacts of the No Build Alternative. The No Build Alternative serves as a baseline for comparison of the Alternatives against not implementing the Program.

Impacts of the Build Alternatives

This section evaluates the potential impacts of the four Build Alternatives that were selected for review in the EIS as they are proposed to be fully implemented. Chapter 2 (Alternatives Considered) describes how these four alternatives were selected for further study. See Figure 2-6 for a summary of the alternatives selection process.

Potential Mitigation Measures

This section describes potential mitigation measures that could be taken to avoid and minimize impacts. For the Tier 1 EIS, mitigation measures include typical measures that can be taken and applied broadly for the overall Corridor and not specific to a particular Build Alternative. It is anticipated that implementation of mitigation measures would the responsibility of each partnering state. Until detailed design plans are available, many specific mitigation measures cannot be identified. Specific mitigation measures would be identified in Tier 2 NEPA analysis. Tier 2 NEPA analysis would be conducted on the Selected Program Alternative (See Chapter 5 – Next Steps).

3.1.5 Qualitative vs. Quantitative Analyses

The impact assessments in this Chapter are quantified for the social, economic and environmental resources where quantitative data are readily available that allow for a numerical comparison of the impacts of the various Build Alternatives. Other resources, for example visual and aesthetic resources, are analyzed qualitatively.

3.1.6 Geographic Information System (GIS) Data

Appendix D contains maps showing the Area of Analysis as well as the resources present within 0.5 mile of the rail corridor. Discussions and analyses are consistent with a Tier 1 level analysis, which does not involve detailed design and field surveys. Analyses in this Chapter use existing GIS data that is readily available within the Area of Analysis. Available GIS data layers were provided by a number of different sources including federal, state and local government agencies. A list of the source maps is contained in the References section. The maps in Appendix D were derived using the most recent GIS data layers available at the time of the analysis. This Tier 1 NEPA analysis did not include independent collection and mapping of new resource data.

3.2 Transportation

This section reviews the existing transportation networks and the Program's effects on the various modes of transportation providing service between Chicago and Detroit/Pontiac, Michigan.

3.2.1 Methodology and Regulatory Requirements

Coordination has taken place with MDOT, INDOT, IDOT, and regional Metropolitan Planning Organizations (MPOs) and Councils of Government (COGs) to obtain readily available long-range transportation plans (including information related to air travel) in the Corridor. A list of sources is included in the References section. Major existing and planned transportation facilities for each transportation mode have been identified, including existing locations with substantial levels of congestion. Information regarding vehicle miles traveled (VMT) for major highways in the Corridor have been collected from MDOT, INDOT, and IDOT. Information regarding intercity bus and passenger rail services has been collected from MPOs, COGs, and appropriate state long-range transportation plans. As appropriate, local transit services have been identified along each of the Build Alternatives, including at potential station areas.

The affected environment as it pertains to the ridership data included in this section includes a "Study Area Zone" presented in Appendix E.

The transportation Area of Analysis includes considerations of all passenger and freight transportation modes of the regional transportation network. The transportation modes discussed below include automobile, air, bus, navigation, and rail.

3.2.2 Affected Environment

The modes of intercity transportation within the Corridor include travel by automobile, airplane, bus and passenger rail. Among all four modes of travel, approximately 104 million trips were made between Chicago and Detroit/Pontiac in 2012. Table 3-2 provides the 2012 total trips by travel mode along the Corridor. These numbers reflect the existing 2012 travel mode split and do not account for any future Build Alternative improvements to passenger rail service between Chicago and Detroit/Pontiac.

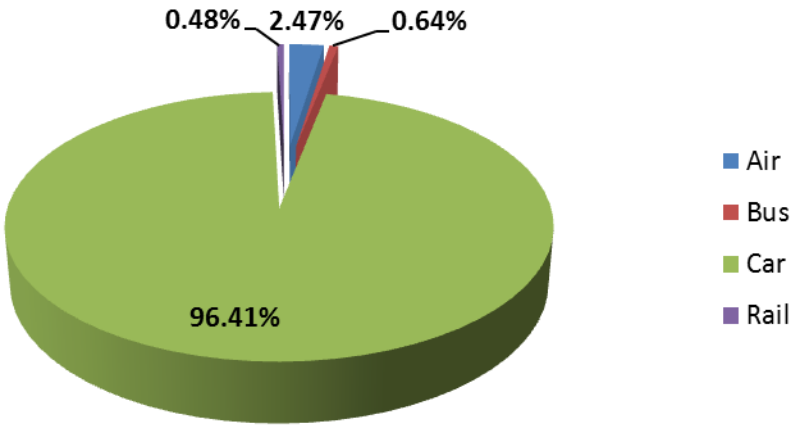
Table 3-2: Total Trips by Mode for the Base Forecasting Model Year 2012

Mode of Travel	Total Trips
Automobile	99,990,000
Air	2,560,000
Bus	660,000
Passenger Rail	500,000
Total	**103,710,000**

Source: TEMS Michigan Passenger Rail Study Ridership and Revenue Forecasts-Preliminary Results, June 2014

As shown in Figure 3-2, cars are the most common mode of travel in the travel market. The source of this data, the *Michigan Passenger Rail Study Ridership and Revenue Forecasts-Preliminary Results* can be found in Appendix E.

Figure 3-2: Travel Market Share by Mode for the Base Forecasting Model Year 2012



Source: TEMS Michigan Passenger Rail Study Ridership and Revenue Forecasts-Preliminary Results, June 2014

3.2.2.1 Automobile Travel (Interstate Highway Network)

In 2035, without improved passenger rail service, nearly 96 percent of all travel within the Corridor is estimated to be by personal automobile. The primary travel route is Interstate 94 or Interstate 90 (Chicago Skyway) between Chicago Union Station and Gary, Indiana, and Interstate 94 from Gary, Indiana to Detroit; and Interstate 75 from Detroit to Pontiac, Michigan. The total distance between Chicago and Pontiac, Michigan is 308 miles by car. A one-way trip by automobile between downtown Chicago to Pontiac, Michigan at posted interstate speeds takes approximately 4 hours, 44 minutes.[51]

[51] www.travelmath.com. Accessed August 23, 2013.

As noted in the Illinois' long-range transportation plan, *Illinois State Transportation Plan 2012,* VMT in the State of Illinois grew 23 percent between 1990 and 2000, and dropped to less than 3 percent growth between 2000 and 2010. The plan attributes the slower rate of growth to a number of factors including a decline in the economy, higher fuel prices, and attitudinal changes toward driving. However, the Plan estimates the annual VMT to grow by 23 percent by the year 2040, based on population growth forecasts for the State of Illinois. Illinois' transportation plan also states that truck traffic is expected to continue growing and will handle 67 percent of all freight traffic in the state by the year 2040.[52]

Indiana's Future Transportation Needs Report states that as of 2010, nearly 78.6 billion vehicle miles traveled are logged annually in Indiana. Indiana has historically experienced high VMT growth, however VMT began leveling off in the early 2000's. Currently, Indiana has seen an increase in VMT as the economy recovers. However, the Report indicates that Indiana does not expect VMT growth to reach high levels such as those experienced from the late 1980's through the 1990's because of fuel prices and weak economic growth. Truck traffic is expected to increase more rapidly than passenger traffic due to a variety of reasons including the increased dispersion of population and employment.[53]

Michigan logged 97.6 billion vehicle miles traveled in 2010. Similar to Indiana, VMT in Michigan leveled off in the mid-2000's before declining in 2008 and 2009.[54] VMT growth increased in 2010 and is expected to continue into the future. Michigan's long range plan, *MI Transportation Plan: Moving Michigan Forward*, indicates that overall employment growth, though at slower than historical rates, is expected to increase VMT. Population growth is expected to place greater demands on Michigan's existing transportation system that may lead to increased congestion and in urban and suburban regions. Additionally, as Michigan's employment continues to decentralize, commute time and distance will likely increase, resulting in increases in VMT and extended peak commuting periods.[55]

As indicated in the purpose and need, I-94 between Chicago and Detroit currently experiences high peak-period congestion and capacity issues in the Chicago and Detroit metropolitan areas. By 2040, if no capacity improvements are made, larger sections of the I-94 corridor between Chicago and Benton Harbor, Michigan, Kalamazoo and Battle Creek, Michigan and Ann Arbor and Detroit, Michigan will be experiencing a volume/service flow ratio[56] greater than 0.95 indicating a highly congested highway with stop-and-go traffic conditions in the peak-period.[57]

---

[52] Illinois State Transportation Plan 2012. www.illinoistransportationplan.org. Accessed September 1, 2013.
[53] Indiana's 2013-2035 Future Transportation Needs Report: Keeping Indiana Moving. http://www.in.gov/indot/files/LRP_FutureNeedsReport_041513.pdf. Accessed September 2, 2013.
[54] Michigan Department of Transportation. Michigan and Surrounding States Comparison of Fatalities and VMT. http://publications.michigantrafficcrashfacts.org/2010/10yr_15.pdf. Accessed November 12, 2013.
[55] MI Transportation Plan: Moving Michigan Forward. http://www.michigan.gov/documents/mdot/MDOT_2035MIPlan4approval_398932_7.pdf?20130902201533. Accessed September 2, 2013.
[56] The volume/surface flow ratio represents the relationship between actual traffic volumes and the maximum capacity of the roadway. No roadway congestion is present when the volume/surface flow ratio is 0.0. Roadways are considered congested when the volume/surface flow ratio is between 0.75 and 0.95. A roadway with a

3.2.2.2 Air Service

Air service is currently available between major cities in the Area of Analysis. Commercial passenger air service is provided in Chicago (Chicago O'Hare International Airport and Chicago Midway International Airport), Gary, Indiana (Gary/Chicago International Airport), Kalamazoo/Battle Creek, Michigan (Kalamazoo/Battle Creek International Airport), and Detroit (Coleman A. Young International Airport and Detroit Metropolitan Wayne County International Airport).

As stated in the purpose and need, Chicago O'Hare International Airport is the second busiest airport in the nation in aircraft movements. The airport accommodates nearly 2,400 aircraft movements per day[58] and is ranked among the worst airports in the U.S. for on-time departure performance, with 76.58 percent of departures on-time in 2012[59].

Other major airports near the Corridor include South Bend Airport, Oakland-Troy Airport and Willow Run Airport.

Typical gate-to-gate flight times are presented in Table 3-3. These travel times are the time spent in flight and don't include time spent in processing and waiting at the gate. Airports typically suggest passengers to arrive an additional 60 to 90 minutes at the airport before their flight to get through security and meet their required minimum times to be at the gate to check in.

Table 3-3: Typical Gate-to-Gate Flight times

Service	Gate-to-Gate Flight Time
Chicago to Detroit	65 minutes
Chicago to Kalamazoo/Battle Creek	40 minutes
Kalamazoo/Battle Creek to Detroit	56 minutes

3.2.2.3 Bus Service

This section describes the various bus services that operate within the Area of Analysis. There are regional services for longer trips, shuttle buses that provide service to the major airports, city buses for intra-city travel and dial-a-ride services for curb-to-curb service.

---

volume/surface flow ratio of 0.95 to 1.0 has traffic volumes approaching or equal to the surface flow and is considered to be highly congested, and experiences stop-and-go traffic conditions.

[57] Federal Highway Administration. November 2010. *Freight Facts and Figures 2010*. Retrieved August 27, 2014. http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/10factsfigures/index.htm.

[58] AirportIQ. *Airport Master Records and Reports*. July 24, 2014. Retrieved August 27, 2014. http://www.gcr1.com/5010web/airport.cfm?Site=ORD&AptSecNum=2

[59] U.S. Department of Transportation Bureau of Transportation Statistics. *Table 6 - Ranking of Major Airport On-Time Departure Performance Year-to-date through December 2012*. Retrieved August 27, 2014. http://www.rita.dot.gov/bts/subject_areas/airline_information/airline_ontime_tables/2012_12/table_06

Greyhound provides bus service within the Area of Analysis between downtown Chicago, and Pontiac, Michigan The service features stops in a number of cities in between Chicago and Pontiac along Interstate 94, including stops in Chicago; in Hammond, Indiana; and in Kalamazoo, Battle Creek, Albion, Jackson, and Ann Arbor, Michigan Typical bus service includes seven trips per day from Chicago and six trips per day from Detroit. Typical travel time by bus between Chicago and Detroit ranges from 5 hours and 20 minutes for "Express" service to 8 hours and 15 minutes where numerous local stops are provided.[60] Greyhound offers competitive amenities including Wi-Fi service, power ports at each seat, and on-board restrooms.

Megabus.com, a subsidiary of Coach USA, offers express bus service that operates daily between Chicago and Detroit with stops in Grand Rapids, East Lansing and Ann Arbor, Michigan. Megbus.com provides 8 round-trips per day between Chicago and Detroit. The full one-way trip from Chicago to Detroit takes from 5 hours, 25 minutes to 6 hours, 40 minutes. Megabus.com offers competitive amenities including Wi-Fi service, power ports at each seat, and on-board restrooms. However, Megabus.com does not always provide traditional sheltered station stops. In Chicago, the station stop is located adjacent to Chicago Union Station. In downtown Detroit, the station stop is in the Rosa Parks Transit Center.[61]

Tri State/United Limo, another subsidiary of Coach USA, provides bus service to O'Hare, Midway, and South Bend Airports from Northwest Indiana and the South Chicago Suburbs.

Indian Trails operates bus services for airport transfers and daily scheduled routes throughout Michigan, northern Indiana, and into Chicago, Milwaukee and Duluth. Indian Trails also offers competitive amenities including Wi-Fi service, power ports at each seat, and on-board restrooms.

City buses are also available to existing and proposed stations in the Corridor, in the larger cities including the Chicago and its suburbs, and Hammond, East Chicago, Gary, and Michigan City, Indiana, as well as Kalamazoo, Battle Creek, Jackson, Ann Arbor, Detroit and its suburbs, and Pontiac, Michigan.

Dowagiac and Niles, Michigan have Dial-A-Ride transportation systems. Dial-a-Ride systems provide, typically free of charge, curb-to-curb bus service for residents with special needs. Other Dial-a-Rides include the North Township Dial-a-Ride based in Hammond, Indiana. Pace, a transit provider for suburban Chicago, also has a number of Dial-a-Ride services in both Cook and Lake Counties within the Area of Analysis.

---

[60] www.greyhound.com. Accessed August 23, 2013.
[61] www.megabus.com. Accessed August 23, 2013.

3.2.2.4 Passenger Rail Service

Intercity Passenger Rail

Intercity passenger rail service to Detroit/Pontiac currently includes three daily round trips from Chicago (Amtrak Wolverine Service). In 2011, 503,290 passenger-trips were made between Chicago and Detroit using Amtrak's Wolverine line. The maximum train speed on most of this corridor is 79 mph, with the exception of the 97-mile Amtrak-owned section between Porter, Indiana and Kalamazoo, Michigan, where passenger trains operate at speeds up to 110 mph. Wolverine trains take approximately 6 hours 30 minutes to travel the approximately 300 miles between Chicago and Pontiac, an average speed of 47 mph.

Amtrak's Pere Marquette and Blue Water services operate on the same route as the Wolverine trains, however the services exit the Corridor at Porter, Indiana and Battle Creek, Michigan respectively. The Pere Marquette continues on the CSX Grand Rapids Subdivision from Porter, Indiana to Holland and Grand Rapids, Michigan and provides one roundtrip per day. The Blue Water continues on the CN Flint Subdivision from Battle Creek to Port Huron, Michigan and also provides one daily roundtrip. See the existing Amtrak routes in Figure 3-3. The *Midwest Regional Rail System Executive Report* indicates that under the proposed Midwest Regional Rail System (MWRRS) the Pere Marquette service would be routed through Kalamazoo, Michigan to Grand Rapids and Holland, Michigan, instead of following the existing route along the shore of Lake Michigan.[62] A decision on the preferred route for the Pere Marquette service will be addressed in a separate future MDOT study.

Annual ridership for all of Amtrak's Michigan Services (Wolverine, Pere Marquette and Blue Water Services) in 2010 was 739,398 passengers, an increase of 49.8% from the 493,474 passengers carried in 2000. Comparatively, in a time period where Illinois, Indiana, and Michigan have seen decline or a leveling off in annual VMT, passenger rail has experienced a large increase in ridership within the Corridor. The 29-mile section of Norfolk Southern Railway's Chicago Line between Porter, Indiana, and the Indiana/Illinois state line that is utilized by Amtrak's Michigan Services is the single most delay-prone intercity passenger rail corridor in the country. The primary cause of delay on Amtrak's Michigan Services can be attributed to train interference; track quality and signaling that restrict speed; and equipment malfunctions. Improvements to track and signaling infrastructure between Kalamazoo and Dearborn, Michigan has been funded and is expected to alleviate some delay along the route in the near term as passenger trains will be able to increase speed to 79 to 110 mph along portions of the track. Passenger service on the NS Chicago Line also includes long distance service on Amtrak's Capitol Limited and Lake Shore Limited services. In total, Amtrak's Michigan Services and long distance services account for fourteen daily passenger trains that currently share the NS Chicago Line with NS freight service on one of the busiest freight lines in the country.

[62] Midwest Regional Rail System Executive Report. September 2004.

Figure 3-3: Existing Amtrak Service in the Midwest

Source: Amtrak website. http://www.amtrak.com/midwest-train-routes. Accessed December 16, 2013.

The Capitol Limited (Chicago to Washington D.C.) and the Lakeshore Limited (Chicago to Boston/New York) travel along the Amtrak route between Chicago and Porter, Indiana. At Porter, Indiana, both services continue east through northern Indiana. Each service provides one round trip per day. Other Amtrak service that utilizes the NS Chicago Line includes the Hoosier State (Chicago to Indianapolis) and the Cardinal (Chicago to Cincinnati to New York); however, these services travel on the NS Chicago Line only for a short distance in Chicago to access Chicago Union Station.

The Amtrak Illini (Chicago to Carbondale), Saluki (Chicago to Carbondale), and City of New Orleans (Chicago to New Orleans) services are also provided on the CN Chicago Subdivision in Illinois, which is under consideration as a Build Alternative in Route 9 (Option 1 and Option 2).

Other Amtrak services that utilize Chicago Union Station include:

- Lincoln Service (Chicago to St. Louis)
- Texas Eagle (Chicago to San Antonio to Los Angeles)
- Southwest Chief (Chicago to Albuquerque to Los Angeles)
- California Zephyr (Chicago to Denver to San Francisco)
- Carl Sandburg (Chicago to Quincy, Illinois)
- Illinois Zephyr (Chicago to Quincy, Illinois)
- Empire Builder (Chicago to Minneapolis to Portland/Seattle)
- Hiawatha (Chicago to Milwaukee)

The Wolverine Amtrak service offers on-board amenities including food service, quiet cars, and free wireless internet service.

Commuter Rail

Metra, the commuter rail division of the Regional Transportation Authority of northeastern Illinois, operates two commuter rail services in the Corridor. One of the commuter rail services is the Metra SouthWest Service (15 weekday round trips) which utilizes the NS Chicago Line right of way for approximately 2.5 miles from just south of Chicago Union Station to Control Point (CP) 518 in the Canaryville neighborhood on the south side of Chicago, where it switches to Union Pacific right of way and runs further south to NS right of way and then proceeds southwest to Manhattan, Illinois. Metra's SouthWest Service would be relocated from the NS Chicago Line to Metra's Rock Island District under the proposed 75th Street Corridor Improvement Project, a sub-project of the CREATE program. A Tier 1 FEIS for the 75th Street Corridor Improvement Project is anticipated to be published in early 2014 with a Record of Decision in fall 2014. The 75th Street Corridor Improvement Project is not currently funded, however the construction of this project would benefit commuter operations as well as Chicago-Detroit/Pontiac intercity operations by freeing up capacity on the NS Chicago Line and at Chicago Union Station.

Metra's Heritage Corridor (3 weekday round trips) and BNSF Railway (47 weekday round trips) services are also within the Program Corridor and access Chicago Union Station from the south. The Heritage Corridor connects to Amtrak mainlines that run into Chicago Union Station just south of the 21st Street Bridge that crosses the South Branch of the Chicago River. Metra's BNSF Railway service connects to the same Amtrak mainlines just north of 16th Street near the St. Charles Air Line.

The other commuter rail service in the Corridor is the Metra Electric District (174 weekday round trips of various distances), which runs alongside the CN Chicago Subdivision for approximately 30 miles from the St. Charles Air Line (SCAL) in downtown Chicago, south to University Park, Illinois There are no

current plans to extend this service. Metra operates additional trains which serve Chicago Union Station from the north and three additional stations in downtown Chicago.

The Chicago Transit Authority (CTA) also offers heavy rail passenger service, but this service does not operate on or along any of the Build Alternatives under consideration.

The Northern Indiana Commuter Transportation District (NICTD) provides commuter rail service in northern Indiana. NICTD operates 20 westbound and 21 eastbound trains each weekday between South Bend, Indiana and Millennium Station in downtown Chicago during the weekdays. Service is reduced to 10 westbound and 11 eastbound trains on weekends and holidays. Some trains do not run the full length of the system. NICTD is currently investigating a potential reroute of its existing line through Michigan City, Indiana. The route through Michigan City, Indiana presently runs on 11th Street, where tracks are embedded in the street. Potential alternatives for NICTD's new route include running on the existing Amtrak-owned track that currently accommodates the Michigan Services and is the proposed route for all Build Alternatives.[63] Adding NICTD trains to the Amtrak line in Michigan City would limit track capacity for Amtrak service and potentially require reconfiguration of station facilities to accommodate and limit conflicts between both services.

Light Rail/Streetcar

Illinois and Indiana currently do not have existing light rail or streetcar operations and have no plans for future light rail operations.

MDOT is in the process of working with M-1RAIL, a 501c3 non-profit agency, and the Federal Transit Administration to deliver a 3.3 mile streetcar project in Detroit. The streetcar project will provide premium transit service along Woodward Avenue between Congress Street and Grand Boulevard and includes a proposed stop adjacent to the existing Detroit (New Center) Amtrak station. Early construction activities for the project began in 2013. Completion of the entire system and subsequent start of operations is anticipated in late 2016.

3.2.2.5 Freight Rail Service

Freight rail service currently uses the rail corridors that are being studied for the Build Alternatives. In the Corridor in Illinois, freight service is provided by NS, CN, and the Indiana Harbor Belt (IHB). In Indiana, freight service is provided by NS, CSX, and IHB. Along the proposed route in Michigan, freight service is provided by NS, Conrail Shared Assets Organization (CSAO), CSX and CN. Freight traffic varies from

[63] Indiana State Rail Plan. November 2011. http://www.in.gov/indot/files/Rail_JanFinal_Report_011712.pdf. Accessed September 2, 2013.

light to heavy with various commodities, including intermodal containers.[64] The Area of Analysis contains a combination of grade separated and at-grade highway/rail crossings.

The most substantial freight planning effort in the Program Corridor is in Michigan. MDOT's Environmental Impact Study of the Detroit Intermodal Freight Terminal (DIFT) involves consolidating intermodal operations of the CSX, NS, and Canadian Pacific (CP) railroads in southwest Detroit into one yard at the Livernois-Junction Yard.[65] These proposed improvements to freight rail in the Detroit area are intended to provide benefits to intercity passenger rail by improving freight operations that would result in fewer passenger and freight rail conflicts.

3.2.3 Impacts of No Build Alternative

Under the No Build Alternative, the Program would not be implemented. The benefits cited in the project Purpose and Need (see Chapter 1) would not be realized, primarily because trips would not be diverted from other modes of travel (see Figure 3-6). Some safety and reliability improvements, as well as localized reduced conflicts between intercity passenger rail service and freight rail service will be seen in the Corridor. This is due to the implementation of the No Build improvement projects identified above and in Appendix B. The No Build projects are expected to improve passenger and freight operations and address existing problems. The improvements specifically address safety and reliability by reducing conflicts between passenger and freight rail operations by installing track and providing minimum separation distances between freight and passenger rail track centerlines, which helps to promote safety. These related benefits are not anticipated to extend beyond a localized area.

Table 3-4 shows the total number of projected trips by travel mode along the Corridor based on the No Build condition in 2035. These projections show that in 2035, without implementing the full Program, passenger train trips will increase by 550,000 from the 500,000 riders in 2012. The increase in passenger rail trips is a result of the decreased travel time between Kalamazoo and Dearborn, Michigan that will be realized once improvements enabling increased train speeds are constructed. Those improvements are discussed in the description of the No Build in Section 2.4.1.2. Figure 3-4 shows the travel market share in 2035 for each mode under the No Build condition. The passenger rail mode's share in the travel market will increase from 0.48% to 0.78%.

---

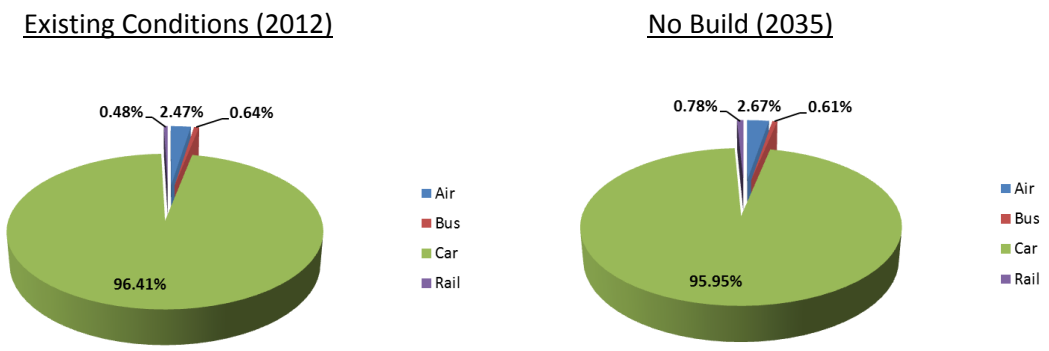
[64] Intermodal freight is a shipping method used to send products from manufacturers to where people buy them. It is called "intermodal" because it employs two "modes," trucks and trains, using special containers or trailers.
[65] Detroit Intermodal Freight Terminal Project Summary. http://www.michigan.gov/documents/mdot/MDOT_07-5493_TerminalLocs_182923_7.pdf?20130902220644. Accessed September 2, 2013.

Table 3-4: Total Trips by Mode Projected to the Year 2035 for the No Build Alternative

Mode of Travel	Total Trips
Automobile	129,820,000
Air	3,610,000
Bus	820,000
Passenger Rail	1,050,000
Total	**135,300,000**

Source: TEMS Michigan Passenger Rail Study Ridership and Revenue Forecasts-Preliminary Results, June 2014

Figure 3-4: Intercity Travel Market Share: Base Year 2012 and No Build in 2035



Source: TEMS Michigan Passenger Rail Study Ridership and Revenue Forecasts-Preliminary Results, June 2014

The No Build Alternative does not meet the stated purpose and need described in Chapter 1, and therefore the following modes of travel would be affected as described in the following sections.

3.2.3.1 Automobile Travel

Under the No Build Alternative, it is expected that travel between Chicago and Detroit/Pontiac would continue to be predominantly by automobiles along the existing Interstate Highway network. The diversion of trips from automobiles to the train would not occur and it is expected that highway congestion and increased safety risks would remain the same or increase along some portions of the highway network. There would be continued travel delays and conflicts with truck freight traffic.

Travel forecasts indicate that under the no-build scenario, annual person trips by automobile within the Corridor will increase from 99,990,000 in 2012 to 129,820,000 in 2035, indicating an increase in congestion if no roadway capacity improvements are constructed. Negative impacts of congestion include motorists time lost, wasted fuel consumption, raised travel costs, increased air pollution, delays for emergency vehicles and increased traffic on parallel road networks as the highway system becomes more congested.

3.2.3.2 Air Service

The lack of a competitive alternative mode of travel could potentially result in greater congestion at airports and higher ticket fares. Without improved intercity passenger rail, the benefits of a reliable alternative travel mode that avoids increasingly congested airports, specifically Chicago O'Hare Airport, would not be realized.

3.2.3.3 Bus Service

It is assumed under the No Build scenario that bus service traveling between Chicago and Detroit/Pontiac may have greater ridership than what would be realized if the Program was implemented. Intercity bus service, such as service between Chicago and Detroit would likely increase as the need for transit between the cities increases as projected. However, local bus service in the No Build scenario along the proposed routes would not benefit from the projected increases in intercity passenger rail ridership that would directly result from the increased need for public transportation to and from stations in the Build condition.

3.2.3.4 Passenger Rail Service

It is assumed that intercity passenger rail services that currently operate within the area, including Amtrak's Midwest corridor service and long distance service as well as Illinois' state-supported service, would continue to operate, but would likely face increased freight rail congestion and increased delay as freight rail traffic is anticipated to grow in the future. Higher rates of freight rail congestion and delay would most likely occur in the SOTL area where the goal of a dedicated double track passenger railroad that would separate freight from passenger traffic would not be implemented under the No Build Alternative.

Projected ridership for Amtrak's Wolverine Service between Chicago and Detroit/Pontiac is anticipated to increase without the implementation of the Program, however at a slower rate. Forecasted ridership for the No Build condition between Chicago and Detroit/Pontiac is projected to reach 1,050,000 passengers in 2035.[66] Detailed information about the ridership projections and methodology can be seen in Appendix E.

3.2.3.5 Freight Rail Service

Under the No Build Alternative it is anticipated that freight rail service would face increased congestion along portions of the existing Amtrak route between Chicago and Detroit/Pontiac as freight traffic continues to grow and passenger trains continue to operate under existing conditions. Specifically, improvements that would reduce congestion by separating freight and passenger rail traffic in the SOTL due to the proposed construction of a dedicated double track passenger alignment would not be realized.

---

[66] Transportation Economics & Management Systems, Inc., June 2014.

Additionally, freight trains permitted to use track between Kalamazoo, Michigan and Pontiac, Michigan would also not benefit from the proposed track improvements needed to run passenger trains at 110 mph. These improvements include enhancements to the physical infrastructure that benefit freight operations as well as passenger trains, such as rail, ballast, ties, and signaling as well as operational improvements that include reconfiguration of the Beaubien and Milwaukee Junction interlockers.

3.2.3.6 Navigation

The existing route crosses the South Branch of the Chicago River and Calumet River in Chicago, the Indiana Harbor Canal in East Chicago, Indiana, and Trail Creek in Michigan City, Indiana at points utilized for major commercial shipping. Under the No Build scenario, commercial shipping at these locations is expected to operate as it currently does today. Vessel traffic at these locations have precedence over railroad operations, therefore navigation on these waterways is not expected to be impacted if the No Build Alternative is selected as the Preferred Alternative. Passenger rail and freight rail traffic using the bridges that cross each river could however be delayed in the event of a vessel passing through.

3.2.4 Impacts of Build Alternatives

3.2.4.1 Impacts Common to all Route Alternatives

The impacts discussed in this section are shared by all of the Build Alternatives and are relevant to all three states.

Ridership and Travel Market Share

Development of the proposed passenger rail service would provide an improved and competitive mode of travel (see Chapter 1 – Purpose and Need). Despite differences between the Build Alternatives being considered in the SOTL area, all of the alternatives have similar impacts to transportation.

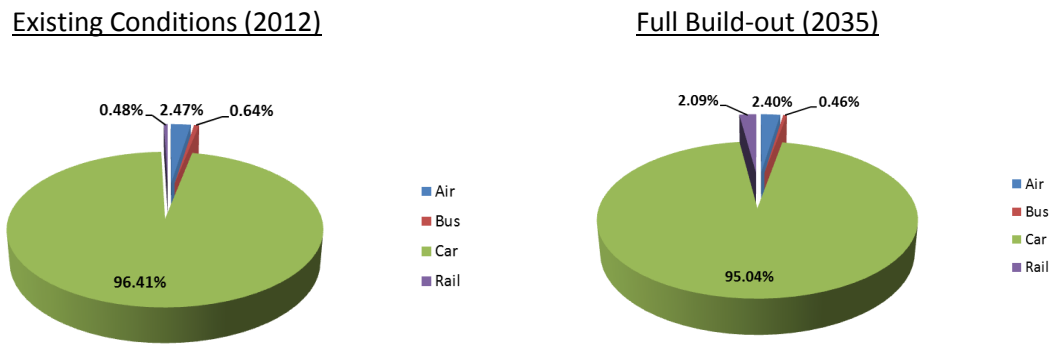
Table 3-5 shows the total number of projected trips by travel mode along the Corridor based on a full build-out of any one of the Build Alternatives. These projections show that in 2035, with the Program implemented, passenger train trips will increase by 2,330,000 from the 500,000 riders in 2012. Figure 3-5 shows the travel market share in 2035 for each mode. The passenger rail mode's share in the travel market will increase from 0.48% to 2.09%.

Table 3-5: Total Trips by Mode Projected to the Year 2035 for all Build Alternatives

Mode of Travel	Total Trips
Automobile	128,740,000
Air	3,260,000
Bus	630,000
Passenger Rail	2,830,000
Total	**135,460,000**

Source: TEMS Michigan Passenger Rail Study Ridership and Revenue Forecasts-Preliminary Results, June 2014

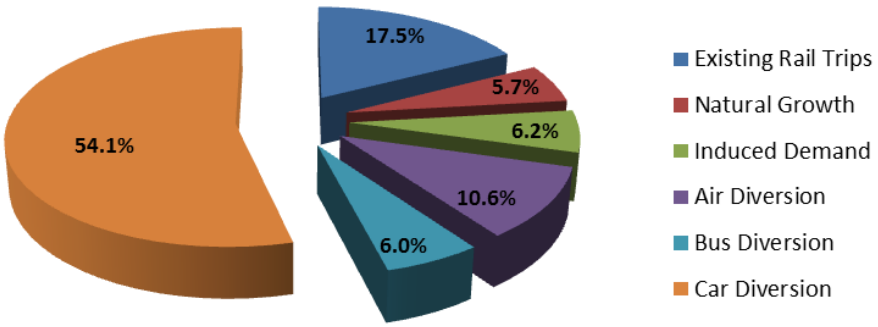
Figure 3-5: Intercity Travel Market Share: Base Year 2012 and Full Build-out in 2035



Source: TEMS Michigan Passenger Rail Study Ridership and Revenue Forecasts-Preliminary Results, June 2014

Travel demand and diversion forecasts for 2035 for the Build Alternatives were performed, as shown in Figure 3-6. A large percentage of the growth in the rail trips are due to diversion from auto, bus, and air trips. With improved intercity passenger rail service, reliability and amenities, it is projected that approximately half of the passengers will divert from cars, 6.0% from bus service, and 10.6% from air service. The Build Alternatives are also expected to induce demand for the service, accounting for 6.2% of all forecasted riders.

Figure 3-6: Sources of Rail Trips – Build Alternative – 2035



Source: TEMS Michigan Passenger Rail Study Ridership and Revenue Forecasts-Preliminary Results, June 2014

Railroad Crossings

To safely accommodate increased intercity passenger rail service speeds and frequencies, existing at-grade crossings would be closed or upgraded as necessary with gates, lights, median-barriers and other safety devices. Traffic patterns may be altered in areas where existing crossings are closed, and delays at remaining at-grade crossings may become more frequent as additional train frequencies are added to the route. Delays due to passenger rail service would be limited to the time it would take for a passenger train to safely pass through the at-grade crossing.

Grade-separated crossings are proposed in some cases to improve the safety, traffic flow, and efficiency of the transportation system and to meet the FRA safety standards. Existing grade separated crossings would be retrofitted or reconstructed in areas where new track would be constructed. More detailed analysis of infrastructure needs at specific crossings would be provided in Tier 2 NEPA analysis.

Construction activities related to grade crossing improvements could result in temporary impacts on the transportation system, including changes to travel patterns in the area of closures, automobile traffic congestion, delays, detours, disrupted access to properties and neighborhoods, and potential conflicts with construction equipment. During Tier 2 NEPA analysis, there would be further evaluation of the need for crossing closures or grade separations. Specific construction impacts would also be evaluated in more detail in Tier 2 NEPA analysis.

Local Road Networks and Parking

Impact to local traffic patterns at the existing and proposed station locations can be expected as traffic volumes and parking demand increase at the stations. Traffic patterns may also be altered in areas where existing crossings are closed, and delays at remaining at-grade crossings may become more frequent as additional train frequencies are added to the route. Delays due to passenger rail service would be limited to the time it would take for a passenger train to safely pass through the at-grade crossing. Details on such impacts to the local road network and parking facilities would be discussed in future Tier 2 NEPA analysis.

Integrating with Other Rail Transportation

If the proposed higher-speed passenger rail service is implemented, it would need to integrate with the existing and planned Amtrak, commuter rail, and light rail operations at the stations. It would also be beneficial to coordinate schedules with intercity buses and provide common ticketing procedures to provide an efficient and consumer friendly intermodal service.

Increased passenger rail frequency and speed could further congest and increase associated conflicts and delays in freight service on those rail lines that currently carry passenger and freight rail traffic. Conflicts could be minimized through proposed safety upgrades and capacity improvements. These effects would be further addressed in Tier 2 NEPA analysis.

Navigable Waterways

The Build Alternatives cross many rivers and streams, including some notable navigable commercial shipping channels. The maps in Appendix D show the locations of notable navigable commercial shipping channels in the Corridor. All Build Alternatives cross the South Branch of the Chicago River in Chicago and Trail Creek in Michigan City, Indiana.

Shipping channels are used by container ships and require moveable bridges. According to U.S. Coast Guard regulations, (33 CFR 117), vessel traffic on the South Branch of the Chicago River and Trail Creek at the existing bridges have precedence over railroad operations. Therefore, the Build Alternatives are not expected to impact navigation on these waterways. Passenger rail and freight rail traffic using the bridges could however be delayed in the event of a vessel passing through. Construction of new bridges at these locations would be required: to comply with the applicable construction standards set forth in the Code of Federal Regulations and by the U.S. Army Corps of Engineers (USACE) for crossings at commercially navigable waterways; and to obtain permits from the USACE and the Coast Guard for crossings at commercially navigable waterways, if they have not been previously obtained. These permits are discussed further in Section 3.25. There is potential for construction-related delays of vessel traffic at these locations. Potential construction-related impacts would last the duration of construction. Additionally these bridges, if reconstructed as a movable type bridge, pose a constraint to achieving higher speeds and reliability of service within the Corridor. Potential construction-related impacts would last the duration of construction. These impacts would be further assessed and mitigation developed during future Tier 2 NEPA analysis.

In addition to the transportation impacts described above, the following sections, Sections 3.2.4.2 through 3.2.4.7 discuss transportation impacts that are specific to each route.

There are no additional impacts specific to the Michigan part of the Corridor where all Build Alternatives are on the same route. However there are some potential impacts that are route specific in the SOTL area in Illinois and Indiana. These potential effects are discussed by route in the following sections.

3.2.4.2 Route 2 Impacts

Illinois and Indiana

Increased passenger rail frequency and speed could further congest and increase associated conflicts and delays in freight service on those rail lines that currently carry both passenger and freight rail traffic between Chicago Union Station and the Englewood Flyover. On Route Alternative 2, between Chicago Union Station and the Englewood Flyover in Chicago (see Figure 2-13, Map Node A - S), a new parallel track would need to be installed to provide a dedicated double-track passenger route in this area. In addition to the new track and upgrade of the existing track, other improvements associated with accommodating increased intercity passenger service could include upgrades to existing crossings and signals. Such upgrades could also benefit the existing freight rail service along the NS Chicago Line.

From the Englewood Flyover to the Buffington Harbor area (see Figure 2-13, Map Node S - Ab) two new dedicated passenger tracks would be constructed adjacent to existing tracks, within the existing ComEd utility right of way, for approximately 13.5 miles. See Section 2.4.2.2 in Chapter 2 for a complete description of these improvements. Two new dedicated passenger tracks would also be constructed between the Buffington Harbor area and Porter, Indiana (see Figure 2-13, Map Node: Ab - An) within the existing NS Chicago Line right of way, which is a high-density, double-track operation. Providing two new dedicated passenger tracks from the Englewood Flyover through Buffington Harbor to Porter, Indiana will allow for removal of all existing passenger rail traffic from the NS Chicago Line, benefiting NS freight operations. Preliminary analysis assumes that the existing NS Chicago Line right of way can accommodate the existing NS freight tracks, two new dedicated passenger tracks and one future freight track for future growth. Given the assumption that the NS Chicago Line right of way can accommodate up to five total tracks, dedicating two of the five tracks for passenger service could constrain future freight growth on the NS Chicago Line, one of the busiest freight corridors in the country. Norfolk Southern Corporation has stated that their Chicago Line would not support two dedicated passenger tracks as the right of way owned by NS along their Chicago Line is limited and is needed for NS to meet increasing freight capacity needs.[67] Impacts to future freight growth on the NS Chicago Line will be further assessed and mitigation developed during Tier 2 NEPA analysis.

In addition to the crossings of the South Branch of the Chicago River and Trail Creek as described above, Route 2 crosses two other commercially navigated waterways on moveable bridges. The route crosses the Calumet River in Chicago as well as the Indiana Harbor Canal in East Chicago, Indiana. As described under “Navigable Waterways” in Section 3.2.4.1, vessel traffic at these crossings has precedence over the railroad operations. Passenger rail and freight rail traffic using the bridge could be delayed in the event of a vessel passing through. The Route 2 alternative proposes that the existing Amtrak-owned bridge at the Calumet River and the abandoned drawbridge at the Indiana Harbor Canal be reconstructed. Construction of new bridges at these locations would be required to obtain permits as described above under “Navigable Waterways” in Section 3.2.4.1.

3.2.4.3 Route 4 Impacts

Illinois and Indiana

Generally, the impacts of Route 4 are the same as the impacts described for Route 2 with the exception of the area between the Buffington Harbor area and Burns Harbor, Indiana (see Figure 2-14,Map Node: Ab - Am). In this location, Route 2 and Route 4 diverge from each other and use different alignments. Route 4 utilizes the CSX Barr Subdivision and NICTD rights of way between the Buffington Harbor area and Burns Harbor, Indiana and Route 2 uses the NS Chicago Line right of way.

[67] Norfolk Southern Corporation. "Chicago, IL to Detroit-Pontiac, MI Regional Passenger Rail Program Comments on Preliminary Route Analysis." Message to Michigan Department of Transportation. May 21, 2013. Print.

Preliminary engineering analysis indicates that the existing double-tracked CSX Barr Subdivision right of way between the Buffington Harbor area and Miller (see Figure 2-14, Map Node: Ab - Aj) can continue to accommodate the existing freight tracks, construction of two new tracks and one future freight track for future growth. The CSX Barr Subdivision is a high-density freight operation with nearly 50 freight trains per day. [68] Using right of way owned by CSX, and adding dedicated passenger service could constrain their future freight rail growth on the busiest CSX line in the Chicago area. Constraining future freight growth along the CSX Barr Subdivision may result in a less efficient freight operation as the lack of freight capacity will require CSX to re-route trains and potentially invest in a less direct route to and from the Chicago terminal area. CSX has stated that they require any passenger train operating at speeds above 90 mph be on its own dedicated tracks and right of way, separated by at least 30 feet from freight rail service.[69]

As described in Chapter 2, Route 4 would require construction of a new track in the NICTD corridor between Miller (see Figure 2-14, Map Node: Aj - Am) and Burns Harbor, Indiana. The existing commuter service would comingle with the proposed intercity passenger rail operation. The current NICTD operations run over 40 passenger trains per day plus additional local freight service in this location. The existing volume of passenger rail traffic and its strict scheduling could cause scheduling conflicts. Route 4 would require close coordination of schedules so as to avoid such conflicts between the proposed intercity service and the existing NICTD and freight operations that utilize the line if this alternative were carried forward for further evaluation.

Route 4 crosses the Calumet River in Chicago and the Indiana Harbor Canal in East Chicago, Indiana. See the "Navigable Waterways" discussion in 3.2.4.1 for details about potential construction and operational impacts.

3.2.4.4 Route 5 Option 1 Impacts

Illinois and Indiana

Generally, the analysis of impacts for Route 5 Option 1 is the same as those impacts described in Route 2. However, between the Buffington Harbor area and Porter, Indiana, Route 5 Option 1 utilizes the NS Sugar Track, the abandoned IHB Dune Branch, and CSX Porter Subdivision rights of way to construct two new dedicated passenger tracks instead of the NS Chicago Line right of way, minimizing the amount of impact to future freight growth on these lines. Preliminary analysis assumes that the existing single-track NS Sugar Track and CSX Porter Subdivision rights of way can accommodate the existing freight track, the two new dedicated passenger tracks and also accommodate up to two future freight tracks for future growth. Using right of way for a dedicated double-track passenger service could constrain future

[68] FRA Grade Crossing Inventory. http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/crossing/xingqryloc.aspx. Accessed June, 2012.
[69] CSX Transportation. "CSX feedback to the proposed "Chicago-Detroit/Pontiac Passenger Rail Corridor Program." Message to Michigan Department of Transportation. May 20, 2013. Email.

freight rail growth on these lines. However, these two lines currently see approximately three freight trains per day. Route 5 Option 1 uses the abandoned IHB Dune Branch. As such, it would not have an impact on existing freight operations in the area of the abandoned track since it is not currently in operation.

Construction of a flyover at Willow Creek in Portage, Indiana could also benefit freight traffic on the CSX Barr and Porter Subdivisions. The flyover at Willow Creek would carry the existing CSX Porter Subdivision freight track, two passenger tracks and space for one future freight track over the CSX Barr Subdivision. Grade separating the existing diamond could eliminate the potential for rail conflicts and slowdowns as crossing rail traffic would not have to be dispatched allowing greater efficiency on both lines by decreasing congestion. A flyover that would carry two passenger tracks over the NS Chicago Line would also be constructed at Porter, Indiana so as to not interfere with NS freight operations.

Route 5 Option 1 also crosses the Calumet River in Chicago and the Indiana Harbor Canal in East Chicago, Indiana. See the "Navigable Waterways" discussion in Section 3.2.4.1 for details about potential construction and operational impacts.

3.2.4.5 Route 5 Option 2 Impacts

Illinois and Indiana

Route 5 Option 2 would have the same impacts as described in Route 5 Option 1 with the exception that it would not utilize the abandoned IHB Dune Branch. The route would utilize the CSX Porter Subdivision for approximately 1.5 miles more, and not take advantage of the abandoned IHB Dune Branch that is currently not in operation. Freight traffic on the CSX Porter Subdivision along this 1.5 mile stretch of track is very light and accommodates approximately 3 freight trains per day. Conflicts with freight operations are anticipated to be relatively minimal. However, by not utilizing the abandoned IHB Dune Branch, Route 5 Option 2 would be subject to addressing safety concerns at seven more grade crossings than Route 5 Option 1.

Route 5 Option 2 also crosses the Calumet River in Chicago and the Indiana Harbor Canal in East Chicago, Indiana. See the "Navigable Waterways" discussion in Section 3.2.4.1 for details about potential construction and operational impacts.

3.2.4.6 Route 9 Option 1 Impacts

Illinois and Indiana

From Chicago Union Station, a new St. Charles Air Line (SCAL) bridge across the South Branch of the Chicago River in Chicago is proposed to be constructed to provide a better connection to the CN Chicago Subdivision. Construction of a new SCAL bridge would require grade separating the existing 16th Street Junction where the SCAL and the Metra Rock Island Division currently cross at-grade on the east side of the South Branch of the Chicago River. Grade separating the existing diamond could eliminate the potential for rail conflicts and slowdowns as crossing rail traffic would not have to be dispatched,

allowing greater efficiency on both lines by decreasing congestion. Construction of a new SCAL could also potentially cause the abandonment of the CN Freeport Subdivision between 21st Street and 16th Street Junctions. Conceptual engineering indicates that the existing CN Freeport connection at 16th Street will be eliminated under the preliminary design concept. Currently this section of the CN Freeport Subdivision is used to shuttle freight trains between CN yards and as a relief route for Amtrak's Carbondale, Illinois and City of New Orleans services when the existing SCAL cannot be used. The impacts of this improvement would need to be analyzed in Tier 2 NEPA analyses.

From the SCAL Bridge to Kensington Junction the two new tracks would be constructed within currently unused CN right of way for approximately 13 miles within the CN Chicago Subdivision. It would then follow the IHB Main Line, the abandoned IHB Dune Branch, and previously discussed CSX Porter Subdivision rights of way. Preliminary analysis shows that the existing rail rights of way from the SCAL Bridge to Kensington Junction are wide enough to accommodate two new passenger tracks with enough space remaining for one future freight track. Space would exist for only one additional freight track, using right of way owned by CN, IHB, and CSX for a dedicated passenger service, which could constrain future freight growth. Constraining future freight growth along each of these freight railroads may result in a less efficient freight operation as decreasing freight capacity will require routing trains and potentially investing in a less direct route to and from the Chicago terminal area. The IHB Main Line is the most heavily used freight railroad along Route 9 and therefore is expected to have the most difficulty in accommodating an additional two passenger tracks as portions of the IHB are triple tracked within 100 feet of right of way. The CN Chicago Subdivision currently has double track along the route and space for two additional tracks within 100 feet right of way. The CSX Porter Subdivision provides the best opportunity among the three railroads to provide two dedicated passenger tracks as it currently accommodates one freight track within 100 feet of right of way, therefore the greatest amount of right of way for future freight growth in comparison to the other railroads.

Route 9 would require structures to separate passenger and freight service, while providing benefits to existing freight operations at certain locations. Flyovers would need to be constructed at Hammond Diamonds over NS track in Hammond, Indiana, Ivanhoe over CN track in Gary, Indiana, and at Willow Creek over CSX track in Portage, Indiana. At each of these diamonds a flyover would be constructed to carry the existing freight track(s), two passenger tracks and space for one future freight track over the crossing freight-railroad. Grade separations at these locations could eliminate the potential for rail conflicts and slowdowns as crossing rail traffic would not have to be dispatched and enable greater efficiency on all tracks by decreasing congestion. Flyovers would also be constructed at Gibson Junction over the IHB Railroad in Hammond, Indiana and at Porter, Indiana over the NS Chicago Line. The flyovers would carry two passenger tracks over the crossing freight railroad so as to not interfere with freight operations.

Additionally, the construction of two new dedicated passenger tracks between the SCAL and Porter, Indiana will reduce passenger rail traffic on the NS Chicago Line, benefiting NS freight operations.

3.2.4.7 Route 9 Option 2 Impacts

Illinois and Indiana

The analysis of Route 9 Option 2 is the same as those impacts described in Route 9 Option 1 with the exception that it would not utilize the abandoned IHB Dune Branch. The route would utilize the CSX Porter Subdivision for approximately 4.75 miles more, and not take advantage of the abandoned IHB Dune Branch that is currently not in operation. Freight traffic on the CSX Porter Subdivision along this 4.75 mile stretch of track is very light and accommodates approximately 3 freight trains per day. Conflicts with freight operations are anticipated to be relatively minimal. However, by not utilizing the abandoned IHB Dune Branch, Route 9 Option 2 would be subject to addressing safety concerns at 10 more grade crossings than Route 9 Option 1.

3.2.5 Potential Mitigation Measures

Within the SOTL, the Program goal is to provide two tracks dedicated for passenger service, which could avoid many potential conflicts and delays associated with mixing passenger and freight rail service. The construction of proposed flyovers at diamonds with large amounts of freight activity could also improve safety and freight and passenger operations at those locations. Additionally, conceptual engineering efforts will continue to assume the need to accommodate one additional freight track in all freight owned right of way as to not preclude future freight growth.

The Build Alternatives are all largely within existing and former passenger and freight rail corridors, minimizing the impact on surrounding residential, commercial and industrial development as well as the surrounding natural environment. Respective state Departments of Transportation would be responsible for implementing the following mitigation measures.

- East of Porter, Indiana where passenger rail service would continue on the existing Amtrak alignment and share the facility with freight, signal upgrades and infrastructure improvements would be made to decrease passenger and freight conflicts. Upgrades to at-grade road crossings would also be necessary to improve safety for rail and motorized travelers.
- Prior to construction at grade crossings, a construction stage traffic control and safety plan would be typically developed for implementation during construction. The plan would include measures such as alternate routes, detours, portable message signs, and public outreach to shift roadway traffic away from the work zones during construction periods. This could minimize construction-related delays on all modes of transportation.
- Impacts to existing freight and passenger rail can be expected during construction of track improvements. Typical mitigation measures include coordinating with freight and passenger rail operators and performing construction activities at off peak times.
- Permits related to any construction on bridges over navigable waterways would be required as set forth in Section 3.25 (Permits). This would include permits from U.S. Army Corps of Engineers, the

U.S. Coast Guard and the various state agencies that regulate work in wetlands and navigable waterways.

- During Tier 2 NEPA study, planning and design of the station improvements will consider potential traffic and parking impacts in the vicinity of stations and will develop potential mitigation measures as needed to provide a safe environment and address potential traffic congestion issues.
- Specific Program mitigation measures, to the extent required will be identified in the Tier 1 Final EIS. Specific project mitigation measures to the extent required will be identified in future Tier 2 NEPA analysis.

3.3 Land Use

The assessment of land use includes consideration of the Program's impact on existing and future land uses and potential areas of property acquisitions where additional right of way may be required.

3.3.1 Methodology and Regulatory Requirements

FRA's Environmental Procedures Section 14(n)(15) states that an EIS should assess the impacts of each alternative on local land use controls and comprehensive regional planning as well as on development within the affected environment, including, where applicable, other proposed Federal actions in the area. This Tier 1 assessment of land use impacts focuses on areas where the existing use is converted to transportation land use, specifically where new facilities are anticipated. Other land use changes are also discussed here and in Section 3.24 – Indirect and Cumulative Impacts. The impacts on local land use controls and comprehensive regional plans would be evaluated during Tier 2 NEPA analysis.

The statutory framework pertaining to relocations of residents and businesses is the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

For this Tier 1 EIS, the land use data collection was limited to available statewide satellite land cover data in GIS format and was supplemented by aerial and satellite photography. Relevant land use planning maps in a usable GIS format and public zoning data from regional Metropolitan Planning Organizations (MPOs) and Council of Governments (COGs) would be reviewed more thoroughly in Tier 2 NEPA analysis. Land uses were separated into the general categories of agricultural, rural-undeveloped, rural-residential, and urban-developed categories. The Program's compatibility with existing and proposed land uses along each Build Alternative and adjacent to existing and proposed station locations was evaluated.

3.3.2 Affected Environment

The Area of Analysis is a long-established passenger and freight rail corridor. In 1852, the rail line span between Detroit and Chicago was first completed. Historically, the introduction of railroads into an area would spur development that took advantage of the faster, safer means of transportation that railroads provided. Many of the lands surrounding the Build Alternative routes have existing land use pattern that were heavily influenced by the location of the rail lines, stations and industrial access points.

Today the Corridor traverses three states, 13 counties, and 61 cities, villages and townships over approximately 300 miles. The Corridor passes through all types of land uses from urban-industrialized to agricultural. An aerial view of the Area of Analysis is shown in the map book in Appendix D. Different land uses are readily identifiable in the aerial photographs. Throughout the Area of Analysis, there is a full range of land use types, patterns, and densities. Within urban areas, the predominant land use types are residential, industrial and commercial. Within rural areas, the predominant land use type is undeveloped and agricultural, with a few scattered rural residences. There are also natural areas including forests, wetlands, and grasslands/prairies.

Illinois

In Illinois, the western terminus of the Corridor includes the urban-industrialized areas of Chicago including Chicago, Calumet City and Burnham Village. The predominant land uses in this area are urban-industrial, commercial, and to a lesser extent, urban.

Indiana

The Indiana portion of the Area of Analysis consists of rural communities and mid-to-large cities. There are a few commercial and service uses with modest concentrations of residential uses. The mid-to-large cities include Gary and Hammond. The Area of Analysis also borders the Lake Michigan shoreline, which includes the Indiana Dunes State Park and Indiana Dunes National Lakeshore.

Michigan

In Michigan, much of the Area of Analysis is located within rural, agricultural, and undeveloped areas. The route will intersect with a number of small, medium and large cities, and stations are proposed to be located in these existing urbanized areas, at existing station locations. The eastern end of the Corridor traverses the highly developed urban/suburban metropolitan areas of Detroit and Pontiac. See Section 3.5 (Socioeconomic Resources) for population data of the impacted communities.

3.3.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program would not be implemented. There would be no impact to existing or future land use. Any currently planned and/or programmed changes to land use would continue with the exception of the Program. Economic and transportation opportunities and associated benefits that are expected to be gained from any development around station locations would not happen.

3.3.4 Impacts of the Build Alternatives

The Build Alternatives utilize existing rail corridors that serve established communities. Mainline improvements would occur within or close to existing right of way in areas of new parallel tracks and spurs. Improvements are needed at existing stations to accommodate higher speed trains and increased frequencies and ridership, as well as the construction of a new station in northwest Indiana and a new maintenance facility in Pontiac, Michigan. As a result, direct changes in land use are anticipated as areas

of right of way are converted from their existing uses to transportation uses. Larger areas of acquisition would occur to accommodate a new station, maintenance facility, and associated parking facilities. Land acquisition is also anticipated in areas where new connections would need to be made between two separate railroad rights of way and for the construction of major infrastructure improvements, such as flyovers, see Section 2.4.2.2. A Tier 2 NEPA analysis will be conducted to determine specific impacts.

The indirect impact on land use and development would be a function of: land available for development or redevelopment; regional and local markets; and the plans, zoning ordinances, and economic development programs of local government. These types of changes in land use would most likely occur in each of the cities where there would be a station stop for high-speed rail service, see Section 3.24 (Indirect and Cumulative Impacts).

The improvements in reliability and travel time could indirectly affect land use by providing a stimulus to new development, particularly in the vicinity of stations that are located within a reasonable commuting time of employment centers and on sites where it would be feasible to construct a railroad spur. See Section 3.5 (Socioeconomic Resources) for a discussion of the anticipated economic benefits of the Program, and Section 3.24 (Indirect and Cumulative Effects) for a discussion of potential indirect and cumulative effects resulting from construction of Program-related infrastructure.

The specific routes and potential impacts on existing land uses are discussed in the following sections.

3.3.4.1 Impacts Common to All Route Alternatives

Common impacts for this topic are relevant only to the portion of the Area of Analysis in Michigan.

Michigan

Track improvements proposed to implement the Program would be largely within the existing rail corridor. The improvements required would be determined as design details are developed; however, it is anticipated that such improvements would not fundamentally change any land use patterns. The Program proposes using existing stations in New Buffalo, Niles, Dowagiac, Kalamazoo, Battle Creek, Albion, Jackson, Ann Arbor, Dearborn, Detroit, Royal Oak, Troy/Birmingham and Pontiac. Within the Area of Analysis through Michigan, no major changes in land use patterns are expected.

The potential new station location in northwest Indiana and the maintenance facility properties may need to be rezoned through the local development process. Existing stations that are approved for the Program during final site selection may need rehabilitation and/or upgrading to provide modern amenities and to meet accessibility requirements. For the most part, improvements to stations would be limited to the existing station's boundaries. However, additional property may need to be acquired for maintenance facility and station area parking or other improvements. Impacts of the use adjacent to stations and maintenance facility would be analyzed further during Tier 2 NEPA analyses, when more specifics are known about the station areas and station plans. The maintenance facility location, size, and other Program needs would be defined during Tier 2 NEPA analysis.

3.3.4.2 Route 2 Impacts

Illinois

Route 2 travels through Illinois on the existing Amtrak route to Detroit/Pontiac. Anticipated track improvements, most of which are currently planned to be completed under other projects or within the existing right of way, are not expected to result in a change in land use. The portion of the Corridor between Englewood and Buffington Harbor would include construction of two new tracks in the Com Ed right of way next to the NS tracks. However, because Route 2 would follow the same rail corridor and be parallel and adjacent to the existing line, no land use changes are expected in surrounding areas.

Indiana

In Indiana, Route 2 continues along the existing Amtrak route to Detroit/Pontiac. The area is fully developed in urban and industrial uses from the Illinois border, east past Gary, Indiana to a point where it enters the Indiana Dunes National Lakeshore. From this point to the LaPorte County line it travels through or along the National Lakeshore property, which is interspersed with smaller communities. Through LaPorte County, Route 2 runs through a number of smaller communities and into Michigan. Although Route 2 is on existing tracks, there would be limited right of way acquisition in the National Lakeshore as needed to achieve a double track. This would result in a change from natural areas to a transportation use (railroad) (a potential Section 4(f) and Section 6(f) impact, see also Section 3.12 (Section 4(f) Resources)). However, the adjacent land uses and patterns of development are not likely to change because as a unit of the National Park System it is protected and managed by the National Park Service for this specific use. The potential new suburban station in northwest Indiana would likely be compatible with the uses already present within this urbanized area.

3.3.4.3 Route 4 Impacts

Illinois

In Illinois, Route 4 is the same as Route 2 and therefore the effects would be the same as Route 2 as discussed above.

Indiana

In Indiana, Route 4 is very similar to Route 2. The only difference is a slight variation in the section between Gary and Burns Harbor near the Indiana Dunes National Lakeshore. The land use changes discussed above under Route 2 would be similar and have an impact on Section 4(f) property.

3.3.4.4 Route 5, Option 1 and Option 2 Impacts

Illinois

In Illinois, Both Route 5 Option 1 and Option 2 are the same as Route 2 and therefore the land use changes discussed would be the same as that for Route 2.

Indiana

In Indiana, Route 5 Option 1 and Option 2 follow a different route than the current Amtrak route between Gary, Indiana and Porter, Indiana. Route 5 is roughly parallel and south of the existing route and travels through different areas of the cities of Gary, Chesterton, Lake Station and the towns of Burns Harbor and Porter. Route 5 would result in some new railroad facilities including additional track and flyovers at Willow Creek and Porter; however, land use would not change because it follows the existing railroad corridor. Adjacent land use is not likely to change. Route 5 continues along the same track as Route 2 to the Michigan border and as such land use impacts would be the same. The small variation in Build Alternatives Route 5 Option 1 and Option 2 would not impact existing land uses.

3.3.4.5 Route 9, Option 1 and Option 2 Impacts

Illinois

In Illinois, Route 9 Option 1 and Route 9 Option 2 are the same. This route varies considerably from the other alternatives. It travels east out of Union Station to Lake Shore Drive where it follows Lake Shore Drive to approximately 51st Street where it turns south and then west to the Indiana Border. It travels through sections of Chicago, Calumet City and the Village of Burnham. Although this route is different than the others through the Illinois portion, there would similarly be no changes to existing land use because it follows existing rail routes. No change in land use patterns in the region is anticipated.

Indiana

In Indiana, Route 9 is similar to Route 5 except between the Illinois state line to the middle of Gary near Ivanhoe Junction. The route travels through the southern portion of the city of Chesterton, and then meets Route 5 and continues along the same route. This alternative also follows existing rail corridors and is not likely to change adjacent land uses. The small variation in Route 9 Option 1 and Option 2 similarly would not directly change local land use or regional land use patterns.

3.3.5 Potential Mitigation Measures

Specific mitigation measures, to the extent required, would be identified and discussed during Tier 2 NEPA analysis after design details are known. The extent of land use, zoning, and property acquisition impacts would be analyzed and potential mitigation measures would be identified through coordination with impacted property owners, local communities and agencies. Mitigation would be recorded in Tier 2 NEPA analysis documents.

Future design plans would be reviewed to determine whether direct and indirect changes in land use are compatible with locally adopted comprehensive plans and zoning policies. These analyses would be reported and specific project-level mitigation measures developed in Tier 2 NEPA analysis documents.

Potential Programmatic-level mitigation measures include minimizing the footprint of the Preferred Alternative's improvements to existing right of way, maintenance facility, and station areas to the greatest extent possible. When the acquisition of adjacent land cannot be avoided and/or relocations prove to be unavoidable, the partnering states would follow the provisions of the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended to ensure fairness in the acquisition and relocation process.

3.4 Agriculture

The agricultural resources assessed in this Tier 1 EIS include land with soils designated by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) as prime farmland and farmland of statewide importance, as defined in the following section. This section reviews the Program's potential to impact agricultural production.

The *Farmland Protection Policy Act of 1981 (7CFR 658)* defines farmland and separates it into three categories, as follows:

- Prime Farmland – "Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary" of USDA (7 USC 4201(c)(1)(A)). These are soils that occur on slopes less than 6 percent.
- Unique Farmland – "Land other than prime farmland that is used for production of specific high-value food and fiber crops, as determined by the Secretary….Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables" (7 USC 4201(c)(1)(B)).
- Farmland of Statewide or Local Importance – "Farmland, other than prime or unique farmland, that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops, as determined by the appropriate State or unit of local government agency or agencies, and that the Secretary determines should be considered as farmland" (7 USC 4201(c)(1)(C)). These are soils that generally can also be highly productive for cropland, but occur on slopes greater than 6 percent or have limitations in drainage or flood control that are more difficult to overcome.

3.4.1 Methodology and Regulatory Requirements

The federal regulatory framework pertaining to farmland is the *Farmland Protection Policy Act of 1981*[70] (7 CFR 658). State-level regulations that pertain to farmland include the *Illinois Farmland Preservation Act* (IFPA)[71] and the *Michigan Farmland and Open Space Preservation Act.*[72] Indiana does not have farmland preservation legislation. Locally adopted planning and zoning policies also protect farmland in many of the communities within the Area of Analysis and would be addressed during Tier 2 NEPA analysis.

This analysis is qualitative in nature and is based upon readily available, mapped data within the Area of Analysis. General maps were collected from the NRCS website for prime farmland. Information regarding Unique Farmland and Farmland of statewide importance was collected from state websites. The agricultural resources assessed in this Tier 1 EIS include land with soils designated by the NRCS as prime farmland and farmland of statewide importance.

The municipal limits of cities, villages and towns within the Area of Analysis were generally excluded from the farmland assessment for a lack of farmland acreage in these locations. It should be noted however that some urban areas and the Area of Analysis have embraced urban farming and community gardening. Community gardens are often allowed within city limits. Community garden produce is sold at local farmers' markets or donated to food pantries. Such programs are often used to promote education, sustainability and community, while urban farms grow food that is intended to be sold commercially. Chicago and Detroit both have zoning ordinances that provides for community gardens and urban farms in certain zoning districts. These ordinances allow a number of different types of agricultural operations as a conditional use.

A more detailed investigation of farmlands within the Area of Analysis would be performed during Tier 2 NEPA analysis to identify specific traditional farmlands, urban farms, and community gardens and determine impacts to these operations.

3.4.2 Affected Environment

The following summarizes the types of farmland present in each state along the Corridor.

---

[70] *Farmland Protection Policy Act of 1981.* 7 USC Section 4201. Final rules and regulations were published in the Federal Register on June 17, 1994.
[71] Illinois Farmland Preservation Act (IFPA) (505 Illinois Compiled Statutes [ILCS] 75)
[72] *Michigan Farmland and Open Spaces Preservation Act* Part 361 of the Natural Resources and Environmental Protection Act, Act 451 of 1994

Illinois

In Illinois there are designated Prime Farmlands and Farmlands of Statewide Importance but no Unique Farmlands[73]. The Area of Analysis is located in urban, built-up areas in and surrounding metropolitan Chicago, and there are no farmlands of this type present. However, Chicago has embraced urban agriculture and community gardening through the Advocates for Urban Agriculture[74]. Specific locations of urban agricultural lands would be identified in Tier 2 NEPA analysis.

Indiana

Review of statewide and county websites did not indicate any Unique Farmland within the Area of Analysis. Per the NRCS mapping, there are areas of soils that are highly suitable for growing crops that are considered Prime Farmland. Porter County's County-Wide Goals include encouraging preservation of Prime Agricultural lands in the County.[75] The presence of potentially impacted agricultural lands would be verified during Tier 2 NEPA analysis.

Michigan

There is designated Prime and Unique Farmland in the rural Michigan portion of the Area of Analysis per the definition above. In addition, food is grown in urban community gardens and urban farms, which is most often sold or traded at community farmers' markets or donated to food pantries. Such lands may be present in the Area of Analysis, although none have currently been identified. Specific locations of such agricultural lands would be identified in coordination with stakeholders during Tier 2 NEPA analysis.

3.4.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program would not be implemented and any associated passenger rail improvements would not be built. Impacts on farmland resources are not anticipated beyond those that could occur due to other development projects in the Area of Analysis including highway expansion.

3.4.4 Impacts of the Build Alternatives

3.4.4.1 Impacts Common to All Route Alternatives

The impacts to agricultural operations in the Area of Analysis are essentially the same for all route alternatives. In general, construction of the Build Alternatives would directly impact farmland only in those areas where additional right of way would be acquired. The amount of land converted from

---

[73] Illinois Land Evaluation and Site Assessment (LESA), Illinois Department of Agriculture, August 2001. http://www.agr.state.il.us/Environment/LandWater/LESA.pdf. Accessed online January 2014.
[74] Advocates for Urban Agriculture. http://auachicago.org/. Accessed online January 2014.
[75] Porter County, Indiana. *Porter County Corridor Plan*. http://www.porterco.org/index.aspx?NID=409. Accessed online November 2013.

agricultural land to a transportation use would not be substantial because in those locations, only minor strips of land may be needed to construct new track and siding. Another potential impact would be how agricultural lands are accessed should existing rail crossings in rural areas of the Corridor need to be closed to facilitate higher speeds and more frequent intercity passenger rail service. Specific access changes and associated impacts would be identified and documented in Tier 2 NEPA analysis.

The potential new suburban station in northwest Indiana would not impact farmland because it would be in an existing urbanized area. Other planned stops are at stations that are also currently in urbanized areas and so it is not expected that farmland would be impacted due to any improvements to the existing stations. No severances of existing farmland would occur.

The following summarizes farmland impacts identified for the Build Alternatives.

Illinois

The Build Alternatives are all expected to stay within designated rail right of way and not expected to impact agriculture lands. Specific locations and potential impacts on urban agricultural lands would be verified in Tier 2 NEPA analysis.

Indiana

A review of the Build Alternatives indicates that there are farmlands within the Area of Analysis in Indiana. Although Build Alternatives run adjacent to existing farmland, they would either stay within existing right of way or are not expected to extend into existing farmed lands.

Michigan

A review of the Area of Analysis in Michigan indicates that there are Michigan Farmland and Open Space Public Act 361 of 1994 (commonly known as PA116) parcels in the rural areas. No right of way is anticipated to be acquired for the Build Alternatives in the rural areas of Michigan. If future design plans warrant acquisition of farmland within farm enrolled under PA116, a PA116 review of such acquisitions would be required.

Impacts to potential urban agricultural lands are also not anticipated. However, specific locations and potential impacts of urban agricultural lands would be verified in coordination with stakeholders in Tier 2 NEPA analysis.

3.4.5 Potential Mitigation Measures

It is not expected that any of the Build Alternatives would result in impacts on farmland. A detailed assessment would be conducted once the final infrastructure features are determined and impacts to farmland can be quantified during Tier 2 NEPA analyses.

Coordination would take place with NRCS as part of Tier 2 NEPA analysis. Attempts would be made to avoid or minimize adjacent farmland impacts.

During Tier 2 NEPA analyses, the presence or absence of urban agriculture and community garden lands would be verified in coordination with local stakeholders. If potential impacts are identified, measures to avoid, minimize or mitigate impacts would be implemented.

Should there be any impacts to farmlands, the requirements of the Illinois Farmland Preservation Act (IFPA) in Illinois, the requirements of the Indiana Coastal Zone Management Plan in Indiana, and the requirements of Public Act 116 in Michigan shall be adhered to.

3.5 Socioeconomic Resources

The evaluation of the social and economic environment considers population, employment, demographic shifts, community cohesion, effects on commerce, and general state, regional, and local economies. In addition to assessing potential adverse impacts to communities, the assessment considers likely benefits resulting in any potential increase in economic activity in and near the Area of Analysis shown in the maps in Appendix D.

3.5.1 Methodology and Regulatory Requirements

The applicable livability principles from the Partnership for Sustainable Communities – a joint initiative from the U.S. Department of Housing and Urban Development (HUD), the U.S. Department of Transportation (USDOT), and the U.S. Environmental Protection Agency (USEPA) – were considered. In addition, socioeconomic considerations were evaluated in accordance with FRA's Environmental Procedures section 14(n)(16).

The area evaluated for population and economic evaluation considers not only data within the 500 foot-wide Area of Analysis shown in the maps in Appendix D, but also examines these issues on a more region-wide scale. This section discusses data related to municipal, county, state and even nationwide scales because the socio-economic effects of a region-wide transportation system can be far-reaching.

Social and economic characteristics were gathered from the U.S. Census Bureau's 2010 Census and the American Community Survey (ACS). Data collected include population and employment statistics, demographic shifts, and community services, such as schools, places of worship, and emergency services. Major social communities and economic centers along the Area of Analysis were identified from GIS data. Demographic data were collected at the county level within rural areas and at the city level within urban areas (that is, communities with population greater than 50,000).

3.5.2 Affected Environment

This section describes the social and economic characteristics of the communities along the Corridor. It includes discussion of the built environment, public facilities, population characteristics and characteristics of industry and employment.

3.5.2.1 Community Character and Resources

The Corridor passes through all types of communities from major urban centers to small towns and rural areas, each having its own character and make-up. Community character is largely defined by the built environment and is affected by existing and future social and economic conditions (see also Section 3.3 (Land Use)). Each community can be expected to have differing needs and desires related to passenger rail service and other modes of transportation, economic development, and quality of life characteristics. Station areas will be especially important and will be closely analyzed in Tier 2 NEPA analysis.

The built environment near or within the Area of Analysis is shown in the maps in Appendix D. Buildings and land uses comprising the socioeconomic environment within the cities and small towns include businesses, schools, places of worship, parks, community centers, hospitals, emergency facilities, and other public buildings. Public outreach and more specific identification of these types of facilities will be identified and impacts assessed at the Tier 2 level of NEPA analysis when design plans are developed for specific Program improvements, such as station area improvements.

Public facilities such as schools, medical centers, places of worship, fire stations, police stations, and recreational areas serve the daily needs of the residents. Fire stations and police stations are located within all the Area of Analysis communities, and it is likely that their service would need to cross the Corridor. The operational boundaries for public services often extend beyond the limits of municipalities and covers vast agricultural areas. Typically, municipal governments would be responsible for those services within the communities while the county would manage services outside of communities. Access to and from the public facilities plays a critical role in providing these resources; and current railroad lines do not limit or restrict access. Furthermore, coordination will be conducted to make sure that public services are not affected by crossings and blocked crossings are minimized.

The population characteristics of the Area of Analysis were analyzed to establish the demographic character and to see the trends for future growth. The demographics here will help provide a better understanding of the communities that are being served. Different groups of people will have varying needs and desires. Demographic patterns reported here may assist with planning and implementation of the Program.

Appendix F contains summaries of population and economic data. A summary of population trends for all counties in the Area of Analysis is included in Table 3-6. As indicated in the tables, the nine counties identified in the Area of Analysis have a combined 2010 population of 10,166,316 (U.S. Census Bureau, 2010). The total population within these counties decreased by 3.4 percent between 2000 and 2010. This compares to a 52.2 percent increase in the overall U.S. population, a 3.3 percent increase for the state of Illinois, a 6.6 percent increase for the state of Indiana, and a 0.6 percent decrease for the state of Michigan over the same time period.

Table 3-6: County Population Counts and Projections

	2000[1]	2010[1]	2015	2020	% Change 2000 – 2010	% Change 2010 – 2020
Illinois[2]	**12,419,293**	**12,830,632**	**13,748,695**	**14,316,487**	**3.3%**	**11.6%**
Cook County	5,376,741	5,194,675	5,562,950	5,707,832	-3.4%	9.9%
Indiana[3]	**6,080,485**	**6,483,802**	**6,677,751**	**6,852,121**	**6.6%**	**5.7%**
Lake County	484,564	496,005	502,228	507,724	2.4%	2.4%
Porter County	146,798	164,343	172,563	179,751	12.0%	9.4%
LaPorte County	110,106	111,467	112,111	112,471	1.2%	0.9%
Michigan[4]	**9,938,444**	**9,883,640**	**10,285,000**	**10,454,700**	**-0.6%**	**5.8%**
Berrien County	162,453	156,813	159,700	158,900	-3.5%	1.3%
Calhoun County	137,985	136,146	146,400	147,200	-1.3%	8.1%
Cass County	51,104	52,293	50,400	50,200	2.3%	-4.0%
Jackson County	158,422	160,248	162,000	163,400	1.2%	2.0%
Kalamazoo County	238,603	250,331	244,500	247,500	4.9%	-1.1%
Oakland County	1,194,156	1,202,362	1,385,100	1,444,100	0.7%	20.1%
Van Buren County	76,263	76,258	91,500	95,800	-0.01%	25.6%
Washtenaw County	322,895	344,791	340,400	351,200	6.8%	1.9%
Wayne County	2,061,162	1,820,584	1,864,500	1,821,800	-11.7%	0.1%
Total of all Counties	**10,521,252**	**10,166,316**	**10,794,352**	**10,987,878**	**-3.4%**	**8.1%**
US Total[5]	**281,421,906**	**308,745,538**	**321,363,000**	**333,896,000**	**9.7%**	**8.4%**

Sources:
[1] 2010 U.S. Census
[2]Illinois Projection Data: data.illinois.gov/Economics/DCEO-County-Population-Projections, Accessed 3/25/2014
[3]Indiana Projection Data: www.stats.indiana.edu/pop_proj, Accessed 3/25/2014
[4]Michigan Projection Data: Michigan Counties Preliminary Projections to the year 2020, Michigan.michigan.gov/cgi, Accessed 3/25/2014
[5]US Census 2012 National Population Projections: Summary Tables.

Between 2000 and 2010, the population of the Area of Analysis counties in Indiana, (Lake, Porter and LaPorte) increased and the population of Cook County, Illinois declined by 3.4 percent. During the same time period there was an increase in the population of five counties in Michigan (Cass, Kalamazoo, Jackson, Washtenaw, and Oakland), while the population of three counties (Berrien, Calhoun and Wayne) declined. Van Buren County's population remained nearly steady.

The single largest gain in population by percent was Porter County, Indiana, which experienced a twelve percent increase between 2000 and 2010. The next largest population change by percentage was Washtenaw County, Michigan, with a 6.8 percent increase. The largest population decline by percentage in the counties in the Area of Analysis is Wayne County, Michigan at -11.7 percent.

There are 61 cities, villages and towns in the Area of Analysis. Twelve of the 61 cities (Ann Arbor, Battle Creek, Dearborn, Detroit, Kalamazoo, Pontiac, Royal Oak, Troy City and Westland City, Michigan; Gary and Hammond, Indiana; and Chicago) are classified as urban. The total population of these urban areas represents almost 90 percent of the total population of all cities and villages within Area of Analysis. Chicago alone comprises 57 percent, with a 2010 population of 2,695,598. The city of Detroit comprises the next highest with 15 percent, with a 2010 population of 713,777. These two cities themselves comprise 72% of the total population in the Area of Analysis. Outside of the Chicago and Detroit metropolitan areas, the largest urban areas are Hammond and Gary, Indiana, and Ann Arbor, Kalamazoo, and Battle Creek, Michigan.

Although Wayne County, which contains the city of Detroit, has experienced substantial population decline since 1970, its two adjacent counties (Washtenaw and Oakland) experienced substantial population growth, 47.3 percent and 34.2 percent respectively. The remaining cities, villages and towns with populations of less than 50,000 comprise approximately 9.5 percent of the total population of all areas within the Area of Analysis. These places have a median population of 9,093.

Population projections done by each state for their counties were reviewed. The figures reported in Table 3-6 show that future population growth is expected to vary throughout the Area of Analysis with Oakland and Van Buren counties in Michigan projected to see the greatest population growth. Other areas within Indiana and Michigan will see very little growth or even population decreases. Although the growth rate over the 2000 to 2010 period was negative in the Area of Analysis counties (-3.4%); there is a projected increase between 2010 and 2020 (8.1%).

Oakland, Michigan is expected to continue to grow while Wayne County is expected to continue to see very little growth (.1%). However, Wayne County's growth will improve from the past decade's decrease in population (-11.7%). Cook County, likewise saw a decrease in population between 2000 and 2010 (-3.4%), but is projected to see gains in the coming decade (9.9%).

3.5.2.2 Economy

There are a number of industry employment sectors within the Area of Analysis. The employment sectors are very diverse and relatively consistent between counties throughout the Area of Analysis. Overall, the industry sectors for all counties are education, health care, and social assistance; manufacturing; retail trade; arts, entertainment, recreation, accommodation and food services; and professional, scientific, management and administrative, and waste management. This is consistent with the statewide averages. The trend of employment demographics is similar across all counties within the Area of Analysis. However, in general there are higher percentages of agriculture, hunting, fishing and mining industries in the rural counties (LaPorte, Indiana, and Berrien, Cass, Calhoun, Jackson, Kalamazoo and Van Buren,

Michigan) and a higher percentage of the professional, scientific, management, administration and finance, and insurance and real estate in the urban counties (Cook, Illinois, and Oakland, Washtenaw and Wayne, Michigan) Table 3-7 provides a detailed summary of industrial employment sectors for each county in the Area of Analysis.

Table 3-7: Industry Types and Percentages by State and County

	Illinois	Indiana			Michigan								
Industry	Cook County	Lake County	LaPorte County	Porter County	Berrien County	Calhoun County	Cass County	Jackson County	Kalamazoo County	Oakland County	Van Buren County	Washtenaw County	Wayne County
Agriculture, fishing, hunting and mining	0.17	0.4	1.3	0.53	2.2	1.3	2.4	1.0	1.2	0.2	4.8	0.4	0.3
Construction	5.4	6.7	7.7	8.0	5.9	5.0	7.4	5.5	4.5	4.4	6.1	3.2	4.0
Manufacturing	11.3	15.6	24.6	17.6	19.6	22.9	26.8	18.8	17.2	17.7	19.9	11.4	16.7
Wholesale Trade	3.1	2.6	2.8	2.4	23.0	1.8	2.9	3.0	2.6	3.2	3.1	1.9	2.7
Retail Trade	9.8	11.6	12.3	12.2	10.6	11.6	10.7	11.8	11.9	10.5	11	9.1	11.1
Transportation and warehousing, & Utilities	6.3	7.2	5.6	5.4	6.0	4.7	5.5	5.1	3.0	2.8	5.7	2.8	5.8
Information	2.6	1.7	1.7	1.9	1.3	1.3	1.1	1.7	1.6	2.4	1.5	2.6	2.2
Finance, Insurance, Real Estate,	8.9	5.4	4.0	4.8	4.1	4.7	3.7	4.7	6.0	8.1	4.1	4.7	6.0
Professional, scientific, and management and administrative and waste management	13.2	7.8	6.4	8.0	7.4	7.1	6.0	7.4	7.8	13.7	7.2	11	9.8
Education, Healthcare, and social assistance	21.3	22.2	18.9	22.5	23.2	21.6	19.8	23.1	26.4	21.9	22	37.4	22.5
Arts, entertainment, recreation and accommodation and food services	9.22	10.0	9.7	8.9	9.2	7.8	7.8	7.5	10.2	8.7	5.8	9.2	10.3
Other Services except Public Administration	4.9	5.3	4.0	4.4	5.5	6.0	3.9	4.8	5.0	4.1	3.8	4.0	4.6
Public Administration	3.4	3.7	4.2	3.3	2.6	4.4	2.3	5.5	2.6	2.8	3.57	2.6	4.0

Source: Social Explorer – U.S. Census Bureau American Community Survey 2006 -- 2010 (5-Year Estimates)

The Census uses data from the ACS to estimate labor force statistics, including unemployment rates. Only one county, Washtenaw in Michigan has an ACS 5-year estimate (2006 – 2010) unemployment rate lower than the state average (8.0 percent compared to 8.5 percent). The rest of the counties have higher estimated unemployment rates than their respective state averages. The highest 5-year estimate unemployment rate (16.2 percent) is in Wayne County, Michigan, which contains the metropolitan area of Detroit. Data were also collected from the Bureau of Labor Statistics which provides the latest unemployment rates. Per this data, Cook County in Illinois, Lake and LaPorte Counties in Indiana and Oakland and Wayne counties in Michigan all have unemployment rates higher than their state averages. Table 3-8 provides a summary of employment statistics by county and state within the Area of Analysis.

Table 3-8: Employment Statistics

	Employed[1]	Unemployed[1]	Unemployment Rate[1]	Unemployment Rate August 2013[2]
Illinois	**6,062,848**	**316,527**	**6.6%**	**9.2%**
Cook County	2,438,989	267,681	9.9%	9.9%
Indiana	**2,999,570**	**152,143**	**6.3%**	**8.1%**
Lake County	217,015	23,926	9.9%	9.7%
Porter County	77,701	6,286	7.5%	7.8%
LaPorte County	48,968	5,191	9.6%	9.9%
Michigan	**4,369,785**	**323,025**	**8.5%**	**9%**
Berrien County	69,977	8,092	10.4%	8.8%
Calhoun County	58,865	7,670	11.5%	7.4%
Cass County	23,405	2,432	9.4%	7.2%
Jackson County	67,946	8,089	10.6%	8.6%
Kalamazoo County	117,835	14,149	10.9%	7.1%
Oakland County	583,107	58,655	9.1%	9.6%
Van Buren County	33,682	4,069	10.8%	8.8%
Washtenaw County	168,393	14,614	8.0%	6.0%
Wayne County	726,108	140,459	16.2%	12.3%
Total County	**4,631,991**	**561,313**	**10.3%**	**8.7%**
US Total	**n/a**	**n/a**	**7.6%**	**7.3%**

Sources: [1] American Community Survey 2006-2010 (5-Year Estimates) [2] Bureau of Labor Statistics

The *Public Works and Economic Development Act of 1965*, as amended (PWEDA) indicates that an area is considered economically distressed if it has an unemployment rate that is at least 1 percent greater than the national average unemployment rate (7.3 percent, August 2013). Utilizing the current Bureau of Labor Statistics data, currently eight out of the thirteen counties in the Area of Analysis meet this criterion (Cook County in Illinois; Lake and LaPorte counties in Indiana; and Berrien, Jackson, Oakland, Van Buren and Wayne counties in Michigan).

3.5.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and effects on socioeconomic conditions are not anticipated beyond those that could occur due to other projects in the Area of Analysis.

The No Build Alternative would not provide the socio-economic benefits described in the purpose and need statement for the Program. Not implementing the Program could hinder the expected benefits of employment opportunities (both temporary and permanent), travel options (passenger rail and auto), and new business opportunities and economic development. These benefits are fully discussed in Chapter 1, Purpose and Need.

3.5.4 Impacts of the Build Alternatives

The Build Alternatives would have an overall positive effect on the communities along the Corridor in terms of generating construction jobs, allowing for new employment opportunities, reducing congestion on highways, and improving train speeds. These proposed improvements would also complement the other proposed improvements (discussed in Chapter 2) in Illinois, Indiana and southern Michigan by reducing delays, and increasing train speeds. The following sections describe these anticipated socio-economic effects. Displacements of businesses and residences resulting from the Preferred Alternative would be identified in Tier 2 NEPA analysis.

3.5.4.1 Effects on Community Character and Resources

Implementation of higher-speed passenger rail service could promote existing and potential future development that may occur around stations served throughout the Corridor. If such development were to occur, it would change or enhance the existing land use around stations served.

There would be temporary vehicular and pedestrian access impacts during construction and long-term impacts for travel across at-grade crossings by the public and community service vehicles. Temporary access and safety impacts would include the potential for disruption of vehicular traffic to existing businesses and community facilities including schools, places of worship, parks, community centers, hospitals, emergency services, and other public buildings along the route alternative during construction, which may make it difficult to access these facilities. Appropriate safety measures would be taken and are described in Section 3.7 (Public Health and Safety). Overall, the Program would result in safety and

access improvements across the at-grade crossings, resulting in long-term net benefit to community services in the Area of Analysis.

3.5.4.2 Economic effects

The regional transportation investment that the Program would provide would impact the regional economy; in the short term construction phase and in the long term. Short-term economic benefits would be derived from the Build Alternatives through an increase in employment for construction-related jobs, and increased economic activity from those employees patronizing local businesses and service establishments along the Corridor and in areas of future rail stations.

Long-term economic impacts along the Corridor would be beneficial because the Chicago to Detroit/Pontiac service would provide easier and quicker connections to major markets in the Area of Analysis. This would improve mobility and expand employment opportunities over a large geographic area, which would benefit employers by expanding the labor market and offering employees more choices of where to live.

A measure of the level of benefit of the Program's passenger rail service depends on the frequency and speed of service. On a local level, station areas may see the greatest benefits, while areas between stations would see less economic benefit. Long-term economic benefits would include the potential for increased economic activity within cities along the Corridor near proposed existing stations.

The MWRRI conducted an economic cost benefit analysis that showed the economic value of the MWRRS. The data presented in that study indicates that within the Area of Analysis, the Program could be expected to create 35,710 jobs; joint development potential is expected to increase property values by over $3 million; and urban household income is estimated to increase by over $7 billion. Table 3-9 shows the study's economic rent analysis by state.

Economic benefit can also be derived from the proposed safety improvements at at-grade crossings by reducing the costs associated with fatalities, injuries and property damage resulting from crashes between trains and vehicles or pedestrians. The overall financial and social impact of a crash has not been quantified[76] and the magnitude of the economic effects of improving crossing has not been assessed for this Tier 1 EIS. However, there are several known costs that could be avoided to some extent including but not limited to damage to rail equipment and infrastructure, damage to motor vehicles, injuries to employees, passengers and vehicle operators and pedestrians, delays for both rail and highway traffic, clean-up costs from any hazardous spills and legal costs.

[76] Transportation Research Board, National Academy of Sciences. NCHRP Report 755. Comprehensive Costs of Highway-Rail Grade Crossing Crashes. 2013.

Table 3-9: Economic Rent Analysis by MWRRI State

State	Employment Value (# of Jobs)	Household Income (in Millions)	Joint Development Potential (Millions)
Illinois	24,200	$480	$2,227
Indiana	4,540	$86	$350
Michigan	6,970	$138	$680
Total in Area of Analysis	**35,710**	**$704**	**$3,257**
Total in MWRRS*	**57,450**	**$1,096**	**$4,911**

** Excludes benefits in Kentucky and Kansas.*

Source: Midwest Regional Rail Initiative Benefit Cost & Economic Analysis, TEMS, Inc. in association with HNTB. November 2006

While the Chicago to Detroit/Pontiac service would cause some temporary disruptions to existing businesses and neighborhoods during construction, appropriate measures would be taken to mitigate these temporary impacts. These measures are described in Section 3.26 (Construction Impacts) and Section 3.8 (Noise and Vibration).

The Build Alternatives are expected to be contained within existing right of way for most of the Corridor, and where right of way is acquired, there is not expected to be substantial relocation of residences or businesses. A minor loss of tax base may be seen from right of way acquisition. Upon refinement of specific features and locations, specific impacts to businesses and residences would be determined during Tier 2 NEPA analysis and potential displacements would be quantified and documented.

Detailed economic benefits and impacts of Program improvements and locations of stations would be identified during Tier 2 studies after coordination with local communities, agencies and property owners.

3.5.5 Potential Mitigation Measures

Specific infrastructure features and locations would be further defined and delineated in Tier 2 NEPA analyses, and potential impacts on socioeconomic conditions would be identified along with strategies to avoid, minimize or mitigate these impacts. In addition, public involvement and agency coordination activities may result in identification of potential mitigation needs at a local level. Specific mitigation measures, to the extent required, would be identified and discussed during Tier 2 NEPA analyses after design details are known and as specific impacts are identified, and implemented.

Where the acquisition of adjacent land cannot be avoided, the provisions of the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended, and the *Civil Rights Act of 1964* would be followed.

Grade-crossing upgrades would require working very closely with each community to ensure impacts are minimized when the work is being done. Access to properties would be maintained to the extent possible. Working with the local communities and stakeholders, the duration of grade-crossing upgrades could be minimized using accelerated work crews, and scheduled at non-peak time to minimize rail, motorized vehicle, pedestrian, and bicycle movement conflicts.

The following mitigation measures could be implemented to address temporary impacts:

- minimizing disruption of traffic in the construction area by coordinating with local agencies and the community
- placing signs in all of the construction areas notifying motorists and pedestrians
- require construction equipment to have mufflers in good working order and portable compressors that meet federal noise-level standards for equipment
- require that contractors will be responsible for applying dust-control measures during construction

See Section 3.26 (Construction Impacts) for more detailed discussion.

3.6 Title VI and Environmental Justice

Title VI of the Civil Rights Act of 1964, prohibits discrimination based upon race, color, and national origin. Specifically, 42 USC 2000d states that "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."

Executive Order 12898 requires Federal agencies to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations."

This section summarizes the findings of an evaluation of the Program's potential effects on disadvantaged populations, including low-income and minority populations. An assessment is conducted to determine whether minority or low-income communities are present within or adjacent to the Area of Analysis. Minority populations may include, Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander. Data and information about populations of Hispanic origin (of any race) was also gathered. The Department of Transportation defined low-income as a person whose median household income is at or below the U.S. Department of Health and Human Services poverty guidelines.[77] The assessment also addresses people with Limited English Proficiency (LEP). A more detailed assessment of these populations would be conducted during Tier 2 NEPA analysis when a higher level of design is available and more specific impacts can be assessed.

[77] U.S. Department of Transportation Order 5610.2(a) Final DOT Environmental Justice Order. May 2, 2012.

3.6.1 Methodology and Regulatory Requirements

The review and evaluation of minority and low-income populations is done in accordance with federal regulations and guidelines, including Title VI of the *Civil Rights Act of 1964*; FRA's Environmental Procedures; Environmental Justice Guidance (CEQ, December 10, 1997); Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; and USDOT Order 5610.2(a). LEP populations are evaluated in accordance with Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency.

Demographic data from the 2010 U.S. Census, including total population, minority and poverty status, is compiled at the tract and county levels within and adjacent to the Area of Analysis. Population and minority racial data are reported by the U.S. Census Bureau, and income and language (LEP) data are reported by the ACS. The LEP Data is obtained through the USEPA Environmental Justice website. State-level data are also gathered as a basis for comparison.

To help determine if a low income or minority population would incur disproportionately high and adverse impact by the Program, the Program Sponsors first determined where minority or low-income populations existed within the Area of Analysis. Within the Area of Analysis, both minority and low-income populations tend to be concentrated in the larger urban areas. Population data tables are contained in Appendix F. As defined in the CEQ guidelines, low-income or minority populations include populations where either the percentage of low-income or minority populations is greater than 50 percent of the affected area's total population, or where the percentage exceeds the statewide and/or citywide percentage by more than 50 percent.[78]

Using GIS data as well as spatial and demographic data from the 2010 U.S. Census, the counties and communities in the Area of Analysis were analyzed. Areas of substantial minority populations and/or low-income populations were identified. Counties, cities, and/or census designated places within the Area of Analysis were then designated as containing potential low-income and minority populations.

3.6.2 Affected Environment

Low-income, minority and Title VI populations are present in various locations along the Corridor. Census data were collected for the Area of Analysis to identify potential minority and low-income populations, see Appendix F. There are 13 counties transected by the Area of Analysis (1 in Illinois, 3 in Indiana, and 9 in Michigan). The Area of Analysis crosses through 61 cities and villages (3 in Illinois, 17 in Indiana, and 41 in Michigan).

A summary of the minority, poverty, and LEP population percentages are shown for the county level in Table 3-10. Detailed data for the cities within the Area of Analysis is included in Appendix F.

---

[78] Federal Transit Administration. Environmental Justice: Final Circular. Federal Register, Vol. 77, No. 137, July 17, 2012.

3.6.2.1 Minority Populations and Ethnic Groups

Three counties (Cook in Illinois; Lake, in Indiana; and Wayne in Michigan), 13 cities and villages (Chicago, Burnham Village, and Calumet City, in Illinois; East Chicago, Gary, Hammond, and Whiting in Indiana; and Albion, Detroit, Hamtramck, Highland Park, Inkster, and Pontiac in Michigan), have a minority population that is greater than 50 percent of their respective statewide total. Burnham Village, Calumet City, East Chicago, Gary, Detroit, Highland Park, Inkster and Pontiac all have a minority population in excess of 50 percent of their total state-wide population. Table 3-10 shows a summary of minority and LEP populations of the various states and counties through which the Build Alternatives pass. Appendix F shows more details including the 2010 population by race, ethnicity, and poverty for the municipalities through which the Build Alternatives pass.

There are substantial African American populations in and near Chicago and Detroit, including, as shown in Appendix F, Burnham Village and Calumet City in Illinois, Gary in Indiana, and Detroit, Highland Park, and Inkster in Michigan.

A review of ancestry data from the 2010 US Census shows that some ethnic populations are concentrated in various locations within the Area of Analysis, especially the more urban areas. For example, Dearborn has a large Arab population. The Build Alternatives pass through both Oakland and Wayne Counties where most of Michigan's Arab-American population resides. Based on US Census ancestry data, there are over 101,000 people who identify themselves as Arab in Oakland and Wayne County. This is a total of over two percent of the population in Oakland County and over four percent in Wayne County.[79]

Other ethnic groups are present along the corridor, including those who identify themselves as being of Hispanic and Latino ancestry, see Appendix F. Whiting, Indiana (40.7%) and East Chicago, Indiana (50.9%) have the highest percentage of Hispanic and Latino populations of the municipalities along the Corridor.

3.6.2.2 Low-Income Populations

There are no counties in the Area of Analysis that have a population of people below the poverty level that is 50 percent greater than their respective statewide poverty levels. However there are 21 cities that have poverty levels 50 percent greater than their respective statewide poverty level. A summary of these low-income populations for all municipalities within the Area of Analysis is provided in Appendix F. In Tier 2 NEPA analyses, the Department of Health and Human Services poverty level data will be examined at the tract level. This review will take place closer in time to actual construction. Currently the 2014 Poverty Guidelines show that the poverty level is $23,850 annual income for a household of four persons.

[79] US Census Bureau. American Community Survey 2008-2012 Five Year Estimates.

3.6.2.3 Limited English Proficiency (LEP) Populations

An analysis of LEP populations for counties is presented in Table 3-10. Cook County, Illinois has the highest population percentage of low English speaking proficiency at 5 to 10%. Lake County Indiana, and Wayne and Oakland Counties in Michigan have the next highest percentage at 2 to 5%. These same counties also have the highest minority populations in the Corridor counties. The cities with substantial minority populations are listed in Appendix F.

Table 3-10: Summary of Minority, Poverty, and LEP Populations at the County Level

County/State	2010 Total Population	Minority Population	Percentage of Minority Populations	Percentage Population Below Poverty Level	Percentage of Limited English Proficiency
Illinois	**12,830,632**	**3,652,755**	**28.5**	**12.6**	
Cook County	5,194,675	2,317,463	44.6	15.3	5-10%
Indiana	**6,483,802**	**1,015,896**	**15.7**	**13.5**	
Lake County	496,005	176,593	35.6	16.1	2-5%
Porter County	164,343	14,348	8.7	9.4	0-1%
LaPorte County	111,467	17,680	15.9	13.8	1-2%
Michigan	**9,883,640**	**2,080,520**	**21.1**	**14.8**	
Berrien County	156,813	34,009	21.7	16.4	1-2%
Calhoun County	136,146	24,231	17.8	16.7	1-2%
Cass County	52,293	5,797	11.1	13.9	0-1%
Jackson County	160,248	19,741	12.3	14.9	0-1%
Kalamazoo County	250,331	45,687	18.3	18.4	0-1%
Oakland County	1,202,362	273,450	22.7	8.7	2-5%
Van Buren County	76,258	10,129	13.3	15.8	1-2%
Washtenaw County	344,791	87,911	25.5	13.7	1-2%
Wayne County	1,820,584	868,648	47.7	21.4	2-5%
Total County Population	**10,166,316**	**3,895,687**			
US Total Population	**308,143,815**	**85,192,273**		**14.3**	

Source: U.S. Census Bureau. American Community Survey 2010 Five Year Estimates.
State data from U.S. Census 2010.

3.6.2.4 Community Character Analysis

The communities where there are higher levels of minority and low-income and Title VI populations can be affected by the provision of new transportation choices and the subsequent development it may stimulate in station areas. It is anticipated that at station areas, the communities will see increased access activities related to boarding's and alighting's and thus the potential for economic development that could be of benefit to these communities. Communities stand to benefit from the Program in ways such as

reducing congestion, improving livability through station-area economic activity and development, retaining and generating new job opportunities, and other benefits cited in the Program's Purpose and Need (see Chapter 1).

Community character can also be affected by physical improvements to be made. Construction of new structures such as flyovers or bridges, or grade crossing improvements could affect the character of the immediate surrounding by introducing new views, see Section 3.14 (Visual and Aesthetic Quality).

Noise and vibration can also affect quality of life in a community. Increases in noise and vibration events are expected to occur in various locations along the corridor as reported in Section 3.8 (Noise and Vibration).

In the Tier 2 NEPA analyses, both the beneficial and negative effects of the Program on individual community characteristics would be analyzed based on the Selected Program Alternative. Public Outreach efforts would solicit input from affected community members to review the Program's effects. Citizen input is expected to inform planners about ways to minimize adverse effects as well as inform communities so they can take advantage of the potential benefits expected from implementation of the Program.

3.6.2.5 Outreach Efforts and Expected Results

The Program's formal Public Involvement Plan[80] describes the approach for Title VI and Environmental Justice outreach. Outreach focused on two distinct steps including first identifying populations using Census data that provides an overview for the entire corridor. Next, the Census data were supplemented by reaching out to organizations that represent Title VI and minority and low-income populations. Local advocacy groups including but not limited to Detroiters Working for Environmental Justice, Urban League of Northwest Indiana, Chicago's Center for Urban Transformation, social service agencies, and transit organizations were contacted to:

- Identify more specific neighborhoods and business districts along the Corridor that could be affected.
- Help determine additional outreach efforts that most effectively engage traditionally underserved populations.
- Serve as third-party communicators to distribute information to their members.

The Program Sponsors sought to include organizations that represent traditionally underserved Title VI and minority and low-income populations to send these organizations all meeting notices and Program updates. In addition, the Program Sponsors are committed to engaging media that serves traditionally underserved populations. All public meeting locations have been and will continue to be ADA accessible (compliant with the Americans with Disabilities Act) and accessible by public transportation. Upon

[80] Michigan Department of Transportation. *Chicago-Detroit/Pontiac Passenger Rail Corridor Program Public Involvement Plan* September 2012

request, the Program Sponsors provide resources, such as bilingual interpreters and translated materials for meetings to ensure that the information and services are readily available in the languages clearly understood by persons with limited English proficiency. Interpretation services for hearing impaired and visually impaired individuals will also be provided upon request. No requests for interpretation services have been made at any previous meetings, however interpretation services will continue to be available at future meetings as requested.

As part of stakeholder outreach, meetings were conducted with advocacy groups to discuss the Program, identify potential impacts and benefits, and appropriate mitigation as needed.

Title VI and Environmental Justice outreach would continue throughout Program planning and construction.

3.6.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and impacts on minority and low-income populations would not be anticipated beyond those that could occur due to other projects. There would be no direct impacts from Program improvements to low-income or minority populations.

The long-term socioeconomic benefits for the Build Alternatives would not be realized under the No-Build Alternative. The opportunities and benefits of the Program, as discussed in the Purpose and Need Statement in Chapter 1 would not be realized.

3.6.4 Impacts of the Build Alternatives

The Build Alternatives may result in direct and indirect impacts on minority and low-income populations. The 2010 Census data were analyzed for the census tracts transected by and adjacent to the Area of Analysis. The demographic, race, and poverty level information for all of the affected census tracts for each route through Gary are provided in Appendix F. The impacts on populations throughout the Corridor are essentially the same for all Build Alternatives. The Outreach program described in Section 3.6.2.5 would help to identify and verify Program impacts and whether they may disproportionately affect environmental justice populations.

3.6.4.1 Impacts Common to all Route Alternatives

Direct impacts to Title VI, minority, and low-income populations include the potential displacement of residents and businesses in areas of right of way acquisition. Acquisitions are possible where improvements would be made outside of existing right of way, which are limited to areas where new track would be constructed, new alignment connections, station and maintenance facility locations, and potentially for safety improvements at crossings.

Adjacent Title VI, minority, and low-income populations may also be temporarily impacted by increased traffic congestion and delays at at-grade public roadway crossings during construction. Noise and vibration during construction would also be felt by adjacent property owners. Since improvements would

be within existing right of way or on property that is currently designated as rail or adjacent to the rail, the effects would be incremental.

Noise and vibrations would be caused by the operation of new higher speed rail service along all of the alternative routes between Chicago and Detroit/Pontiac. There would also be increased noise and vibrations due to the potential added frequencies of service that would occur along all routes from end to end. See Section 3.8 (Noise and Vibration) for detailed information about potential noise and vibration impacts.

A more detailed evaluation of moderate and severe noise and vibration impacts for specific areas within the Area of Analysis would be conducted during Tier 2 NEPA analysis when specific right of way requirements and improvements are known, see also Section 3.7 (Public Health and Safety).

A new suburban station would be located in northwest Indiana. Many of the communities in this area have high minority and low income populations. Therefore, construction of a new station in this area could potentially affect these populations. Specific impacts would be evaluated and addressed during Tier 2 NEPA analysis once the station location is selected.

Other direct and indirect impacts relate to safety at rail crossings and traffic delays due to increased train speeds and volumes through counties, cities, and villages with Title VI and minority and low-income populations.

A detailed assessment of anticipated indirect impacts is presented in Section 3.24 (Indirect and Cumulative Effects), and construction impacts are described in Section 3.26 (Construction Impacts).

The expected benefits of passenger rail are detailed in the Program's Purpose and Need Statement (see Chapter 1). These benefits include meeting existing and future travel demand in the corridor and reducing congestion across all travel modes, which in turn provides environmental benefits by shifting traffic from other, less environmentally-friendly, modes. The Program is expected to benefit travelers and increase the economic benefits of tourism by increasing travel efficiencies and by providing direct connections to other passenger rail corridors. Stimulation of localized station area economic development is also possible from the improvements to intercity passenger rail service and convenience. The Program improvements are expected to help retain employment and generate new job opportunities as a result of improved access and spin-off economic development opportunities. Finally, the Program will make rail infrastructure improvements that would benefit both freight and passenger rail operations. The likelihood of these benefits would be analyzed in greater detail in Tier 2 NEPA analyses.

3.6.4.2 Routes 2 and 4

Routes 2 and 4 are not anticipated to have route-specific impacts beyond those discussed above that are in common with all Build Alternatives.

3.6.4.3 Routes 5 and 9 (Options 1 and Options 2)

Route 5 (Options 1 and 2) in Indiana and Route 9 (Options 1 and 2) in both Illinois and Indiana do not follow the existing passenger rail route, rather they follow routes that already carry freight rail traffic. Due to the existing presence of heavy freight traffic, there is expected to be minimal change in noise and vibration effects to neighborhoods along the Corridor.

Minority populations within the Area of Analysis may include populations with LEP. During Tier 2 NEPA analysis, these affected populations would be identified in impacted areas and specific approaches to providing access to services and for additional public involvement would be documented as appropriate.

The higher speed passenger rail service under the Build Alternatives would provide economic and quality of life benefits to minority and low-income populations through improved mobility and access to an alternative transportation mode serving multiple destinations throughout the Corridor. However, these benefits would be limited to the area near the identified station stops. Some of these populations would also be impacted through potential displacements, noise, increased congestion, and other impacts. Specific impacts would be evaluated and addressed during Tier 2 NEPA analysis.

3.6.5 Potential Mitigation Measures

Specific mitigation measures would be identified and discussed during Tier 2 NEPA analyses after design details of the Selected Program Alternative are known and recorded in NEPA documents as specific impacts are identified, and implemented.

Further outreach to minority and low income populations would be completed during Tier 2 NEPA analyses to identify specific needs of affected populations and to work with neighborhoods and individuals to avoid or minimize impacts or relocations.

When the acquisition of adjacent land cannot be avoided, the provisions of the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended, and the *Civil Rights Act of 1964* would be followed.

3.7 Public Health and Safety

This section discusses considerations related to the health and safety of residents and communities and the level of protection that would be provided in relation to future construction activities as well as the long-term operations associated with the Program. This section identifies and discusses potential increased and reduced health and safety risks. An overview of existing public crossings in each alternative route is also presented here. General, brief recommendations are included for any specific safety issues that may require further Tier 2 NEPA analysis.

3.7.1 Methodology and Regulatory Requirements

The regulatory requirements associated with public health and safety includes the Americans with Disabilities Act (ADA), the Resource Conservation and Recovery Act of 1976 (RCRA) and its amendments, and the Occupational Health and Safety Act of 1970. Public health and safety considerations were evaluated in accordance with FRA's Environmental Procedures section 14(n)(17) and (18).

Publications and resource materials from FRA and other USDOT agencies were also reviewed for general safety requirements including, but not limited to, the Americans with Disabilities Act of 1990, High-Speed Passenger Rail Safety Strategy (FRA, 2009), the Rail Safety Improvement Act of 2008 (Public Law 110-432), and the Federal Railroad Safety Act (FRSA) (49 USC §20101 et seq.). During Tier 2 NEPA analysis, coordination would take place with the host railroads to obtain information regarding the level of protection afforded the public in regard to health and safety issues.

3.7.2 Affected Environment

The Area of Analysis currently contains common safety and security issues associated with conflicts that typically occur between pedestrians, vehicles, bicyclists, and trains at railroad crossings. Streets within the Area of Analysis are equipped with typical traffic safety controls, including traffic lights, signage and lane markings.

One safety issue inherent to passenger rail is that the passenger trains must cross paths with other vehicles or with pedestrians. Throughout the approximately 300-mile long Area of Analysis, the Build Alternatives cross numerous public and private roads, sidewalks, bike routes, and state, local and federal highways at at-grade and grade-separated crossings. The total number of existing crossings varies between each Build Alternative. A breakdown of crossings by route, state, and type is shown in Table 3-11. Depending on the route, the total number of at-grade and grade-separated crossings range from 592 to 625 roadway crossings for an average of approximately two crossings per mile. Between 58 and 64 percent of the roadway crossings are at-grade and currently have various forms of warning devices ranging from active gates and flashing signals, to passive protective lights and bells, to simple cross-buck warning signs at rural and private crossings. FRA has established train control requirements for train movements above 79 mph (49 CFR 236). For crossings with train speeds between 80 and 110 mph, which is the highest speed being considered for the Program, FRA recommends the installation of the most sophisticated warning or traffic control devices that fit the location. Examples include dispatcher-controlled electrically locked gates, bells, flashing lights, and constant warning time devices.

Table 3-11: Total Existing At-Grade and Grade Separated Roadway Crossings by State

Route	Illinois		Indiana		Michigan*		Area of Analysis	
	At-Grade	Grade Separated	At-Grade	Grade Separated	At-Grade	Grade Separated	Total Crossings	Percent At-Grade
Route 2	1	83	34	24	313	150	605	58%
Route 4	1	83	37	22	313	150	606	58%
Route 5 Option 1	1	83	52	26	313	150	625	59%
Route 5 Option 2	1	83	57	20	313	150	624	59%
Route 9 Option 1	5	49	50	25	313	150	592	62%
Route 9 Option 2	5	49	59	16	313	150	592	64%

Source: Data was obtained from existing track charts, where available, and supplemented with aerial imagery. Norfolk Southern Railway, Amtrak, Canadian National, CSX Transportation, Northern Indiana Commuter Transportation District, Indiana Harbor Belt Railroad
**The route in Michigan is the same for all alternatives.*

Within the Area of Analysis, freight and passenger operations would travel on, parallel to, or across the proposed Build Alternatives at various points along each route. Table 3-12 includes information on the number of existing diamonds (at-grade rail crossings) and flyovers (grade-separated rail crossings) along each route.

Table 3-12: Total Existing Railway Crossings by State

Route	Illinois		Indiana		Michigan		Area of Analysis	
	Diamonds	Flyovers	Diamonds	Flyovers	Diamonds	Flyovers	Total Diamonds	Total Flyovers
Route 2	1	5	2	2	5	3	8	10
Route 4	1	5	2	1	5	3	8	9
Route 5 Option 1	1	5	4	0	5	3	10	8
Route 5 Option 2	1	5	4	1	5	3	10	9
Route 9 Option 1	2	3	8	1	5	3	15	7
Route 9 Option 2	2	3	8	0	5	3	15	6

3.7.3 Impacts of No Build Alternative

Under the No Build Alternative, the Program would not be built, and impacts on public health and safety are not anticipated beyond those that would occur under existing conditions or could occur due to other projects. Consequently, the safety and operational benefits of improvements to public/private crossings, and improvements in air quality as described under the Build Alternatives would not be realized.

3.7.4 Impacts of Build Alternatives

3.7.4.1 Pedestrian, Vehicle, and Bicycle Safety

Conflicts between passenger train traffic and pedestrians, vehicles, and bicycles could potentially increase due to increased passenger train frequencies and proposed speeds, especially at grade crossings[81]. Trespassing incidents and incidents at railroad grade crossings accounted for approximately 95 percent of all fatalities on railroads nationally in 2013.[82] The FRA approximates that there are 270 deaths that occur at railroad grade crossings per year in the United States. Trespassing along railroad rights-of-way is the leading cause of rail-related deaths in America. Nationally, more than 431 trespass fatalities occur each year, and nearly as many injuries.[83] However, accidents involving passenger trains make up a small percent of all train accidents. Approximately three percent of all train accidents in 2013 involved passenger trains.[84] Safety improvements made at grade crossings as part of the Build Alternatives are expected to reduce these types of trespassing incidents and fatalities in the Area of Analysis.

3.7.4.2 Accessibility

All future Build Alternative passenger rail cars and stations would comply with the Americans with Disabilities Act (ADA) to accommodate the safety of disabled passengers. The passenger cars would provide allocated space and/or priority seating for individuals who use wheelchairs. Also, stations would be designed to minimize physical barriers that prohibit or restrict access.

3.7.4.3 Passenger Safety at Stations and On Board

Relative to traveling by automobile, passenger rail is a much safer way to travel. Passenger rail (commuter and long-haul) experiences 0.43 fatalities per billion passenger miles compared to automobiles that see 7.28 fatalities per billion passenger miles. Buses and airplanes have lower fatality rates with 0.11 and 0.07 deaths per billion passenger miles, respectively.[85]

Passenger safety considerations include passengers possibly injuring themselves getting on and off standing trains, crossing tracks, or stumbling aboard trains. Precautions that would protect the safety of passengers waiting for their train would be considered at stations and crossings. Standard safety precautions such as textured warning strips along platform edges, public address systems designed to

---

[81] A grade crossing is a location where a public highway, road, street, or private roadway, including associated sidewalks, and pathways, crosses railroad tracks at grade

[82] Federal Railroad Administration Office of Safety Analysis. National Accident/Incident Overview, 2013 www.safetydata.fra.dot.gov/OfficeofSafety. Accessed November 25, 2013.

[83] Federal Railroad Administration. Highway-Rail Grade Crossing and Trespass Prevention. http://www.fra.dot.gov/Page/P0040. Accessed November 25, 2013.

[84] Federal Railroad Administration Office of Safety Analysis. National Accident/Incident Overview, 2013 www.safetydata.fra.dot.gov/OfficeofSafety. Accessed November 25, 2013.

[85] Savage, Ian. July 2013 Comparing the fatality risks in United States transportation across modes and over time. *The Economics of Transportation Safety*, 43(1), 9-22.

articulate announcements in a noisy environment, properly designed lighting and adequate platform depth to allow passengers to stand away from active tracks will all be considered. Grade separated pedestrian crossings would be provided at all stations to allow passengers to safely cross live tracks while being able to access all station platforms. Other station improvements that promote safety may include designating pedestrian and vehicle space, and adding passenger pick-up and drop-off zones.

FRA's Passenger Rail Division provides technical expertise and direction in the development and implementation of rail safety programs applicable to Commuter and Passenger Railroads, as well as advice and oversight in system safety, emergency preparedness, and safety related to shared use with freight rail.[86]

3.7.4.4 Air Quality

According to the USEPA, current scientific evidence links certain air pollutant exposures to adverse respiratory system effects.[87] Exposure would be of particular concern for susceptible individuals, including asthmatics, children and the elderly. The Program's impacts on air quality are discussed in detail in Section 3.9.4, where it is shown that trip diversion from other transportation modes to trains is expected to result in reduced emissions in all types of the studied pollutants except NO_x, which increase is due to the use of diesel fuel by trains. Health benefits may therefore be an expected result from the reduced exposure by individuals in proximity to other travel modes (such as near highways). Additional study would be conducted as part of Tier 2 NEPA analysis to determine the significance of the impacts and benefits both regionally and locally.

3.7.4.5 Noise and Vibration

Noise and vibration would be caused by the operation of new higher speed rail service along all of the alternative routes between Chicago and Detroit/Pontiac. There would also be increased noise and vibration due to the potential added frequencies of service that will occur along all routes from end to end. See Section 3.8 (Noise and Vibration) for detailed information about potential noise and vibration impacts.

Noise pollution can have physiological and psychological health effects on people.[88] The noise and vibration effects analyzed in the Noise and Vibration Section are based on certain criteria that identify levels that would impact human health. The noise and vibration analyses conducted for the Program indicates that the Program will have noise and vibration impacts in certain sections of the Corridor.

---

[86] Federal Railroad Administration. Passenger Rail Division. http://www.fra.dot.gov/Page/P0046. Accessed November 25, 2013.
[87] United States Environmental Protection Agency. Six Common Air Pollutants webpage. http://www.epa.gov/airquality/urbanair/. Accessed January 6, 2014.
[88] Federal Railroad Administration. Cynthia S.Y. Lee and Gregg G. Fleming. General Health Effects of Transportation Noise Final Report. June 1, 2002.

3.7.5 Potential Mitigation Measures

Specific mitigation measures, to the extent required, would be identified and discussed during Tier 2 NEPA analysis after design details are known.

There are a number of safety measures and strategies that would be considered by each partnering state to protect the health and safety of passengers as well as motor vehicles and pedestrians at existing or new at-grade crossings. The following safety measures and strategies may be used:

- At public and private at-grade crossings, install the most sophisticated traffic control/warning device appropriate for that location. At a minimum, crossings would meet FRA safety standards set forth under the Code of Federal Regulations (49 CFR 236). These improvements may include flashing lights, median barriers, special signage, four-quadrant gates, etc. Construction of additional grade separations, road closures, and railroad crossing upgrades would further minimize the potential for collisions.
- Consolidate public and private grade crossings where practical. Redundant and/or unsafe crossings should be eliminated where alternate access can be reasonably provided.
- For private crossings that serve industrial developments and cannot be closed, consideration should be given to providing a locking device for when the crossing is not in use.
- Maintain existing Centralized Traffic Control (CTC) and install Incremental Train Control System (ITCS) infrastructure throughout the Corridor.
- Active warning systems for pedestrians should be installed where rail lines cross existing pedestrian-ways or bikeways.

Health effects related to Noise and Vibration would be mitigated as set forth in Section 3.8.5 (Noise Mitigation) and 3.8.10 (Vibration Mitigation).

Education and public outreach are important to prepare road users for the challenges that higher-speed rail will present. The public would need to be informed that the proposed service travels at higher speeds than existing trains in the area of the Program. Exclusively relying on visual and/or audible cues to judge the arrival of higher-speed trains can be extremely dangerous.

3.8 Noise and Vibration

3.8.1 Methodology and Regulatory Requirements Regarding Noise

The FRA's High-Speed Ground Transportation Noise and Vibration Impact Assessment manual[89] provides background information on high-speed ground transportation noise and vibration, establishes

[89] Federal Railroad Administration. High-Speed Ground Transportation Noise and Vibration Impact Assessment Final Report. September 2012

FRA's noise and vibration impact criteria, and presents methodologies for assessing noise and vibration impacts. The majority of the Area of Analysis presently is served by transit, freight, or Amtrak service or combinations of the three services. Given the diversity of the rail services along the study corridor, the Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment guidance manual and a "supplemental freight rail analysis spreadsheet tool….developed for the Chicago Rail Efficiency And Transportation Efficiency (CREATE) program using the FTA procedures" were used to develop the existing and future noise and vibration levels in the Area of Analysis. The following assessment focused on determining the distance from the right of way to the potential onset of moderate and severe noise impacts and potential vibration impacts using FRA criteria. Areas identified with moderate or severe noise impacts or vibration impacts would be further evaluated for noise and vibration analysis and if needed, assess potential mitigation measures during the Tier 2 NEPA analysis.

3.8.1.1 Noise Background

Noise is a form of vibration that causes pressure variations in elastic media such as air and water. The ear is sensitive to this pressure variation and perceives it as sound. The intensity of these pressure variations causes the ear to discern different levels of loudness. These pressure differences are most commonly measured in decibels.

The decibel (dB) is the unit of measurement for noise. The decibel scale audible to humans spans approximately 140 dB. A level of zero decibels corresponds to the lower limit of audibility, while 140 decibels produces a sensation more akin to pain than sound. The decibel scale is a logarithmic representation of the actual sound pressure variations. Therefore, a 26 percent change in the energy level only changes the sound level one dB. The human ear would not detect this change except in an acoustical laboratory. A doubling of the energy level would result in a three dB increase, which would be barely perceptible in the natural environment. A tripling in energy sound level would result in a clearly noticeable change of five dB in the sound level. A change of ten times the energy level would result in a ten dB change in the sound level. This would be perceived as a doubling (or halving) of the apparent loudness.

The human ear has a nonlinear sensitivity to noise. To account for this in noise measurements, electronic weighting scales are used to define the relative loudness of different frequencies. The "A" weighting scale is widely used in environmental work because it closely resembles the nonlinearity of human hearing. Therefore, the unit of A-weighted noise is dBA.

Time-varying characteristics of environmental noise are analyzed statistically to determine the duration and intensity of noise exposure. The single number descriptors, Leq(h) and Ldn, are used to assess train noise. The Leq(h) is the equivalent steady-state sound having the same A-weighted sound energy as that contained in the time-varying sound over a one-hour period. The Leq correlates reasonably well with the effects of noise on people. The Day-Night Sound Level, Ldn, is based on the A-weighted equivalent sound level for a 24-hour period, with an additional 10 decibels added to the actual or projected noise levels during the nighttime hours (10 pm to 7 am). All noise levels in this assessment will be A-weighted sound levels.

There are four basic sources of railroad wayside noise:

- Diesel-engine exhaust
- Cooling fans
- Wheel/rail noise (The noise that is radiated directly from the vibrating wheels and rails)
- Horns and crossing bells

There are two types of wheel/rail noise:

- Roar noise caused by small-scale roughness of wheel- and rail-running surfaces that produces fluctuations in the interaction forces between wheels and rail
- Impact noise created by discontinuities such as rail joints, wheel flats, or shelled or spalled areas on the wheel- and rail-running surfaces

The factors considered in developing the existing and future Ldn noise levels include:

- Distance between track and receptors
- Train type – transit, freight, Amtrak
- Operation speed
- Number of locomotives
- Number of transit cars
- Number of empty/full hopper cars
- Number of freight cars
- Number of Amtrak passenger cars
- Track condition
- Number of train operations during the day, 7:00 a.m. to 10:00 p.m.
- Number of train operations during the night, 10:00 p.m. to 7:00 a.m.

3.8.1.2 Noise Criteria

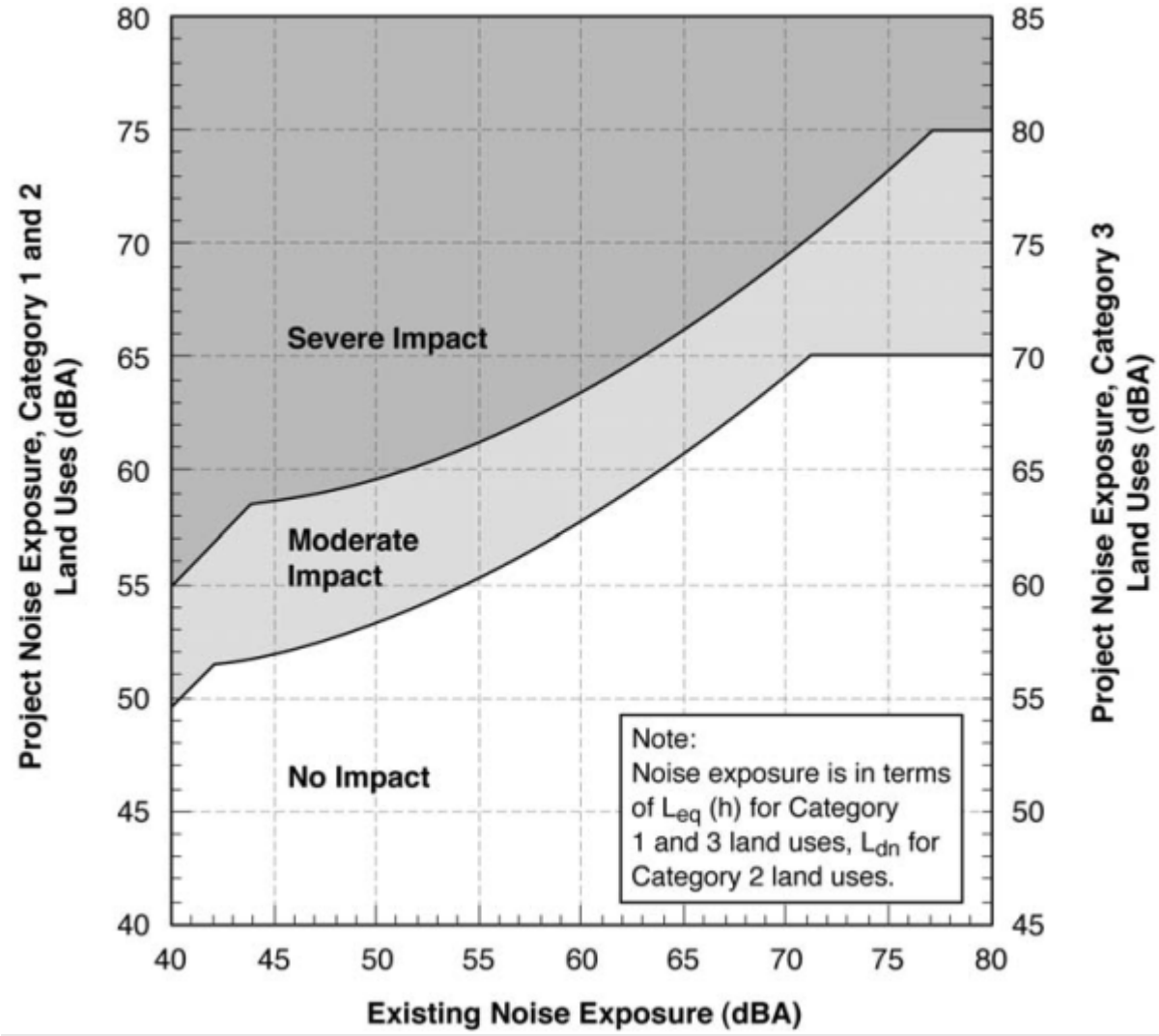
The FRA noise impact criteria are based on a comparison of existing and future outdoor noise levels. The criteria were developed to address potential annoyance in a residential environment using Ldn as the noise descriptor. The Ldn noise level descriptor is defined as the 24-hour Leq where the nighttime noise, 10:00 p.m. to 7:00 a.m., is increased by 10 decibels prior to including the noise levels in the 24-hour calculation. Noise mitigation is considered when measures are necessary to mitigate adverse impacts. The graphical representation of the FRA criteria, which is based on three land use categories identified as Category 1, 2, and 3, is presented in Figure 3-7. The categories are:

Category 1: "Tracts of land where quiet is an essential element in their intended purpose,

Category 2: Residences and buildings were people normally sleep, and

Category 3: Institutional land uses with primarily daytime and evening use." [90]

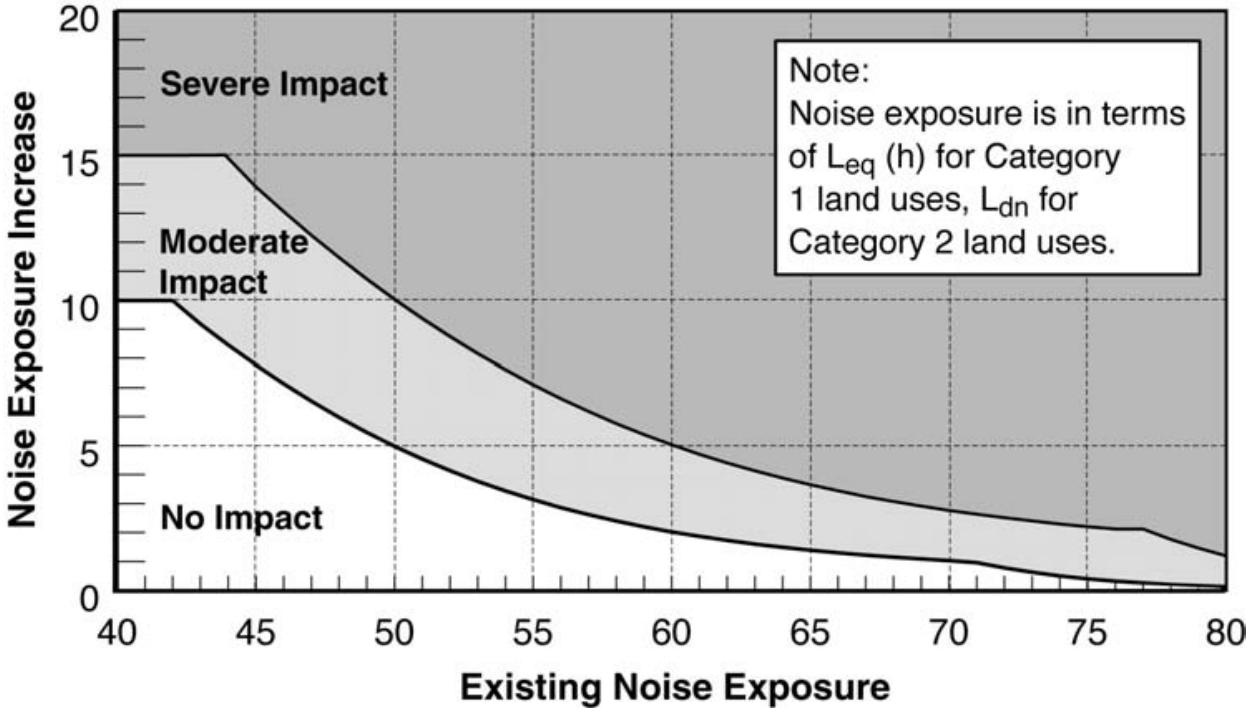
Figure 3-7: FRA Noise Impact Criteria for Higher-Speed Rail Projects[91]



[90] High-Speed Ground Transportation Noise and Vibration Impact Assessment, Table 3-2.
[91] High-Speed Ground Transportation Noise and Vibration Impact Assessment, Page 3-3.

Another way to look at the criteria is based on the allowable increase in cumulative noise exposure when the Program noise is added to existing noise levels as is shown in Figure 3-8 for Category 1 and 2 land uses.

Figure 3-8: Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Cat. 1 & 2) [92]



3.8.2 Noise Affected Environment

Using the methods discussed above, the existing Ldn noise levels in the Area of Analysis, at a 50 foot right of way offset from the rail centerline were determined to range from 64 to 81 dBA for the freight trains and 56 to 75 dBA for commuter and passenger trains. The total Ldn noises for all existing rail operations ranged from 64 to 81 dBA. The noise levels decreased 4 to 5 decibels each time the distance from the track was doubled.

3.8.3 Noise Impacts of the No Build Alternative

Under the No Build Alternative, the Build Alternative improvements would not be built, and the noise levels would remain in the same range as presently exists and as projected for the future without the Program. No additional maintenance activities or construction would occur, however greater degradation of the rail bed may increase the likelihood of increased rail joint noise.

[92] High-Speed Ground Transportation Noise and Vibration Impact Assessment, Figure 3-2.

3.8.4 Noise Impacts of the Build Alternative

Using the methods discussed above, the future right of way Ldn noise levels along the Corridor would range from 68 to 81 dBA. The noise levels would decrease 4 to 5 decibels each time the distance from the track was doubled. The cumulative total rail operations noise level increases would range from no change in some areas to a 4-decibel increase for the receptor being an average of 400 feet from the track, along one nine-mile section of track in Gary, Indiana, that presently only serves four freight trains per day.

There are between 348 and 377 at-grade crossings in the Area of Analysis, depending on the proposed routes. The FRA Horn Model was used to determine the existing and future width of the 67 dBA Ldn contour at the crossings. The existing contour distances range from 320 feet to 788 feet on each side of the track. The proposed future operations increase these distances to between 491 feet and 802 feet. Impact distances, which are based on the increase over existing would range 235 feet to 1,056 feet from the crossing on each side of the track.

The primary source of impacts along the study corridor would be the horn noise at the crossings. There are no existing "quiet zones" along the corridor.[93] In a quiet zone, railroads do not routinely sound their horns at highway-rail grade crossings. Train horns may still be used in emergency situations or to comply with other Federal regulations or railroad operating rules. To establish a quiet zone the locality must first mitigate the increased risk caused by the absence of a horn, by having other crossing safety measures.[94] Exploration of opportunities to review the applicability, design and funding of "quiet zones" as a mitigation measure would be done during Tier 2 NEPA analyses.

The entire Corridor was analyzed to determine the areas within the Area of Analysis that may experience cumulative increases in noise levels at moderate or severe impact levels, see Figure 3-8. The discussion of impacts by alternative in the following sections, lists the areas projected to experience a moderate or severe impact at the railroad right of way, 50 feet from the centerline of the track, based on the cumulative Category 2 land use FRA Criteria in Figure 3-8. With typical first row shielding of second row properties, the moderate and severe impact areas only extend to the first row properties. The remaining areas within the Corridor that are not indicated below are expected to have no impacts.

3.8.4.1 Impacts Common to All Alternatives

Construction of the Build Alternative would result in a temporary increase in the ambient noise level in the vicinity of the project.

---

[93] Federal Railroad Administration. Quiet Zone Locations by City and State, Report Date 1/16/14. http://www.fra.dot.gov/eLib/details/L04912. Accessed January 24, 2014.
[94] The Train Horn Rule and Quiet Zones. http://www.fra.dot.gov/Page/P0104. Accessed February 9, 2014.

Michigan

Impacts in common with all of the Build Alternatives are relevant to the portion of the Area of Analysis in Michigan. Within the Michigan portion, the proposed track improvements and increased passenger train frequency and speed along Route 2 would create a moderate impact along three relatively long sections of track: from the Indiana/Michigan border to Harrison St. in Kalamazoo; from 30 Mile Road, east of Albion to a point due north of the intersection of North Parker Road and Dexter Chelsea Road, west of Dexter; and from North Maple Road on the northwest side of Ann Arbor to Clay Street in Detroit.

3.8.4.2 Route 2 Impacts

Illinois

The analysis shows that the proposed Route 2 improvements through the Illinois portion of the Corridor would result in a moderate impact in the areas between Chicago Union Station to the 21st Street Bridge and from the South Branch of the Chicago River to 43rd Street.

Indiana

For Route 2 within Indiana, the analysis showed that the program would create moderate impacts for all the Category 2 land uses in the portion of the Corridor between Buffington Harbor Drive and the Indiana/Michigan border.

3.8.4.3 Route 4 Impacts

Illinois

In Illinois, Route 4 is the same as Route 2. Therefore, the locations where moderate impacts would be created are the same as those for Route 2.

Indiana

The analysis showed that there would be moderate impacts in a few locations within Route 4 in Indiana. Moderate impacts were projected for all the Category 2 land uses between Buffington Harbor Drive and Broadway Street and from the East Dunes Highway to the Indiana/Michigan border along the proposed Route 4 improvements, which impacts are the same as Route 2.

3.8.4.4 Route 5 Option 1 and Option 2 Impacts

Illinois

In the Illinois portion of the Corridor, Route 5 is the same as Routes 2 and 4. Therefore, the areas identified that would have moderate impacts would be the same as those for Routes 2 and 4.

Indiana

Within the Indiana portion of the Corridor, severe impacts were projected for all the Category 2 land uses between Buffington Harbor Drive and West 9th Avenue in Gary. Moderate impacts would be experienced by residences abutting the right of way between West 9th Avenue and the junction with Routes 2 and 4. The areas of moderate impacts reported under Routes 2 and 4 would also be created.

3.8.4.5 Route 9 Option 1 and Option 2 Impacts

Illinois

The proposed Route 9 improvements through Illinois would create a moderate impact between Chicago Union Station to the 21st Street Bridge and from Clark Street to East Cermak Road.

Indiana

Route 9 merges with Route 5 at the railroad junction southeast of the Gary/Chicago Airport. Route 9 is the same as Route 5 from the junction east to the Indiana/Michigan border. Therefore, the areas of moderate impacts would be the same as those for Route 5.

3.8.5 Noise Mitigation Measures

FRA criteria recommend the review of noise mitigation for areas exposed to a moderate or severe impact. Opportunities to review the applicability, design and funding of "quiet zones" as a mitigation measure would be explored. The Build Alternative would upgrade the existing rails from jointed to continuous welded rail which would eliminate the clacking noise typically associated with trains. In addition, the Build Alternative will benefit from the purchase of new lighter and quieter cars and engines that can aid in the reduction of noise impacts.

MDOT, IDOT, and INDOT would implement mitigation measures for temporary construction impacts, which may include construction contract specifications that require that the contractor adhere to all federal, state, and local noise abatement and control requirements. Construction activities may be limited to daytime hours so as to confine the timespan of temporary noise impacts. Noise may also be controlled by measures such as, but not limited to ensuring construction equipment is in good repair and fitted with manufacturer recommended mufflers.

Additional mitigation strategies would be reviewed once a preferred Route is selected and Tier 2 noise analyses are conducted. The avoidance or minimization of noise impacts would be accomplished in appropriate areas by the use of best management practices (BMPs).

3.8.6 Vibration Methodology and Regulatory Requirements

3.8.6.1 Vibration Background

Ground-borne vibration and noise are caused by vibrations originating at the wheel/rail interface and propagating from the rails through the intervening soil and rock to nearby buildings. The resulting vibration may be perceptible as mechanical motion (windows rattling, dishes on shelves rattling, etc.) and the acoustic radiation by the building components may cause an audible low-frequency rumble.

Airborne noise from trains on at-grade or aerial structures generally overpowers the ground-borne noise and vibration. However, there is potential for cumulative impacts of ground-borne vibration in conjunction with noise.

Ground-borne vibration and noise inside buildings are often near the threshold of human sensitivity. In this range, a small increase in vibration or noise levels can cause increases in human response. Unfortunately, variability in soil and rock conditions and building designs make prediction more difficult than for airborne noise levels.

Vibration can be described in terms of the displacement, velocity or acceleration of a vibrating surface. The peak velocity of a vibration is used to assess building damage. However, it is not appropriate for human response to vibration. One single number descriptor, VdB, is used to assess transit vibration. Vibration velocity in decibels is ratio of the root mean square velocity amplitude to the reference velocity amplitude. All the vibration levels in this assessment will be referenced to $1x10^{-6}$ in./sec.

Ground-borne noise is the rumbling sound created by the vibration of a room's surfaces. The descriptor used is the A-weighted sound level, dBA. Ground-borne noise from rail facilities has a considerably low frequency component. Therefore, the rumbling noise created ground-borne noise sounds louder than broadband noise with the same dBA level.

3.8.6.2 Vibration Criteria

Ground-borne vibration and noise are typically not every day experiences to most people. However, in the Area of Analysis freight, commuter and passenger trains are the source of most perceptible outdoor ground-borne vibration velocity levels. Typical background vibration velocity levels in residential neighborhoods not exposed to rail traffic are usually 50 VdB or lower. The human threshold is around 65 VdB.[95] The FRA criteria for ground-borne vibration and noise are presented in Table 3-13.[96]

The criteria presented in Table 3-13 are for new rail alignments or when existing freight lines in joint use corridors are moved closer to sensitive receptors to accommodate future higher speed passenger rail. More appropriate to this Tier 1 assessment are the FRA guidelines on how to account for improved

[95] High-Speed Ground Transportation Noise and Vibration Impact Assessment, Page 6-38.
[96] High-Speed Ground Transportation Noise and Vibration Impact Assessment, Table 7-1.

passenger rail operations in a rail corridor that has existing operations. When the proposed passenger rail vibration levels exceed the existing vibration levels by 5 VdB, the existing operations are not included in the impact assessment and the future operations are compared to the criteria in Table 3-13.

Following are some representative scenarios for addressing vibration impact in joint use corridors:

Infrequently used rail corridor (fewer than five trains per day)

- The general vibration criteria in Table 3-13 is used when the existing rail traffic consists of four or less trains per day.

Moderately used rail corridor (5 to 12 trains per day)

- There will be no impact from vibration levels if the existing train vibration levels using FRA procedures exceed the impact criteria in Table 3-13 and the future proposed operations are at least 5VdB less than the existing train vibration levels.
- Otherwise, the vibration criteria in Table 3-13 apply.

Heavily used rail corridor (more than 12 trains per day)

- If the existing train vibration exceeds the impact criteria given in Table 3-13, the Program will cause additional impact if the Program significantly increases the number of vibration events. A significant increase is when the existing number of trains plus the proposed trains approximately doubles the existing operations.
- If there is not a significant increase in vibration events, there will be additional impact only if the vibration, estimated using FRA procedures, will be 3 VdB or more than the existing vibration. When the Program will cause vibration more than 5 VdB greater than the existing source, the existing source can be ignored, and the vibration criteria in Table 3-13 can be applied.[97]

[97] High-Speed Ground Transportation Noise and Vibration Impact Assessment, Pages 7-4 to 7-5.

Table 3-13: Ground-Borne Vibration and Noise Impact Criteria for General Assessment

	Ground-Borne Vibration Impact Levels, VdB			Ground-Borne Noise Impact Levels, dBA		
Land Use Category	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]	N/A[5]	N/A[5]	N/A[5]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Notes:

[1] *"Frequent Events" is defined as more than 70 vibration events per day.*

[2] *"Occasional Events" is defined as between 30 and 70 vibration events per day.*

[3] *"Infrequent Events" is defined at fewer than 30 vibration events per day.*

[4] *This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.*

[5] *Vibration-sensitive equipment is not sensitive to ground-borne noise.*

3.8.7 Vibration Affected Environment

Using FRA's general vibration assessment procedures, the existing freight, commuter and passenger rail vibration levels in the Area of Analysis, at a 50 foot right of way offset from the rail centerline were determined to range from 70 to 91 VdB. These levels dropped 6 VdB at 100 from the rail center line.

Ground-borne noise levels at the right of way line range from 20 to 41 dBA throughout much of the Corridor. In areas where soil conditions are a little more clayey: New Buffalo, Three Oaks, Buchanan, southeast of Sunrise Heights, Marshall, Albion, and Sylvan Center, Michigan, ground-borne noise levels would range from 35 to 56 dBA. As with the vibration levels, the ground-borne noise levels would also decrease by 6 decibels 100 feet from the track centerline. Except for very slow moving trains, the majority of existing trains exceed the criteria in Table 3-13.

3.8.8 Vibration Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and the vibration levels would remain in the same range as presently exists.

3.8.9 Vibration Impacts of the Build Alternative

Using FRA's general assessment procedures, the future right of way vibration levels along the Area of Analysis would range from 70 to 91 VdB. The vibration levels would decrease into the 64 to 85 VdB

range at 100 feet. The proposed passenger rail speeds would create a 1 to 2 VdB increase over the majority of the existing freight lines.

Ground-borne noise levels throughout the Area of Analysis will be in the same ranges for the same locations as identified for the existing conditions, see Section 3.8.7.

The following description of impacts by alternative addresses only those areas where operations could potentially double or more, creating a significant increase in events.

3.8.9.1 Impacts Common to All Alternatives

Construction of the Build Alternative may result in a temporary increase in vibration levels in the vicinity of the project.

Michigan

Common impacts for this topic are relevant only to the portion of the Area of Analysis in Michigan. The proposed track improvements and increased passenger train frequency and speed along the route in Michigan would create a significant increase in events (double or more) from the Indiana/Michigan border to North 48th Street, west of Springfield and from Main Street in Battle Creek to Central Street in Detroit.

3.8.9.2 Route 2 Impacts

Illinois

The proposed Route 2 improvements through Illinois would not create a significant increase in events.

Indiana

Significant increases in events would occur from Buffington Harbor Drive to Broadway in Gary and from Porter to the Indiana/Michigan border along the Route 2 proposed improvements.

3.8.9.3 Route 4 Impacts

Illinois

In Illinois, Route 4 is the same as Route 2. Therefore, there would not be a significant increase in events.

Indiana

Significant increases in events would occur from Buffington Harbor Drive to Broadway Street and from the East Dunes Highway to the Indiana/Michigan border along the proposed Route 4 improvements which are the same as Route 2.

3.8.9.4 Route 5 Option 1 and Option 2 Impacts

Illinois

In Illinois, Route 5 is the same as Routes 2 and 4. Therefore, there would not be a significant increase in events.

Indiana

Significant increases in events would occur from Buffington Harbor Drive to the Indiana/Michigan border.

3.8.9.5 Route 9 Option 1 and Option 2 Impacts

Illinois

The proposed Route 9 improvements through Illinois would create a significant increase in events from West 116th Street to the Illinois/Indiana border.

Indiana

Significant increases in events would occur from Illinois/Indiana border to the railroad junction southeast of the Gary/Chicago Airport where Route 9 merges with Route 5. Route 9 is the same as Route 5 from the junction east to the Indiana/Michigan border.

3.8.10 Vibration Mitigation Measures

Each state would review vibration mitigation to minimize the adverse effects that the ground-borne vibration would have on sensitive land uses. Because ground-borne vibration is not as common a problem as environmental noise, the mitigation approaches have not been as well defined. The Build Alternative will benefit from the purchase of new lighter and quieter cars and engines that can aid in the reduction of vibration impacts.

MDOT, IDOT, and INDOT would implement mitigation measures for temporary construction impacts. Construction activities may be limited to daytime hours so as to confine the timespan of temporary vibration impacts.

Additionally, the vibration assessment would be reviewed on the Selected Program Alternative during Tier 2 NEPA analysis. During the Tier 2 NEPA analysis it would also be possible, as recommended in the FRA manual, to measure existing rail operations throughout the Selected Program Alternative route refining existing vibration levels, which might also lead to a refinement in the projections and impact determination. Additional mitigation strategies would be reviewed at that time, and avoidance or minimization of vibration impacts would be accomplished in appropriate areas by the use of best management practices (BMPs).

3.9 Air Quality

3.9.1 Methodology and Regulatory Requirements

Air Quality is evaluated in accordance with FRA's Environmental Procedures Section 14(n)(1). The analytical steps used to identify and evaluate potential effects on air quality from the No Build and Build Alternatives are described in the following sections. The air quality analysis for this Tier 1 EIS is focused on regional air quality impacts associated with the Build Alternatives. Local impacts including analysis of air quality impacts at stations, intersections, and/or grade crossings (hot-spot analysis) will be included in Tier 2 NEPA analyses if required.

3.9.1.1 Criteria Pollutants

The regulatory framework pertaining to air quality is the Clean Air Act of 1970 (as amended) (CAA). Primary and secondary National Ambient Air Quality Standards (NAAQS) established by the CAA are used as a basis for the review of potential air quality impacts. Each of the states have adopted the NAAQS and standards have been established for the following pollutants: carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), lead (Pb), sulfur dioxide (SO2), particulate matter smaller than 10 microns in diameter (PM10), and particulate matter smaller than 2.5 microns in diameter (PM2.5). Areas of the country where air pollution levels persistently exceed the NAAQS are designated as "nonattainment" areas. Areas of the country that meet the NAAQS are designated as "attainment" areas, and areas of the country that were formerly nonattainment, but now meet the standards are designated as "maintenance" areas.

Based on the monitored levels of air pollutants, USEPA has designated each county as attainment, nonattainment, or maintenance with respect to the NAAQS. The current attainment status of each county within the Area of Analysis is shown in Table 3-14.

3.9.1.2 General Conformity

In those counties designated nonattainment or maintenance, FRA, in coordination with USEPA, must make a determination that a federal action conforms to one or more applicable state implementation plans (SIPs) to achieve attainment of the NAAQS. The General Conformity Rule (40 CFR 93 Subpart B) is designed to ensure that projects using Federal funds or requiring Federal approval not:

- Cause or contribute to any new violation of a NAAQS,
- Increase the frequency or severity of any existing violation, or
- Delay the timely attainment of any standard, interim emission reduction, or other milestone.

A conformity applicability analysis is the first step of a conformity evaluation and this process assesses if a Federal action must be supported by a conformity determination. This is typically done by quantifying the direct and indirect emissions from the Federal action. If the results of the applicability analysis indicate that the total emissions would not exceed *de minimis* emission thresholds of the Program

improvements, then the conformity evaluation process is completed. If emissions of one or more of these compounds exceed the *de minimis* threshold, the agency must demonstrate conformity under one of the methods outlined in the General Conformity Rule.

The applicable General Conformity *de minimis* thresholds are:

- CO, 100 tons per year
- O_3, 100 tons per year of either NO_X or VOC
- Pb, 25 tons per year
- $PM_{2.5}$, 100 tons per year
- PM_{10}, 100 tons per year

3.9.1.3 Hazardous Air Pollutants and Mobile Source Air Toxics

USEPA also regulates hazardous air pollutants (also referred to as air toxics). Air toxics originate from a wide variety of sources including mobile sources (such as cars, airplanes, and locomotives) and stationary sources (such as factories or refineries). Air toxics are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. Research into the health impacts of air toxics is ongoing and USEPA is in the process of assessing the risks of exposure to these pollutants.

Diesel particulate matter is another class of pollutants that has also been recently studied for its contribution to human health effects. Diesel particulate matter is part of a complex mixture that makes up diesel exhaust, which is composed of both a gas phase and a particle phase, both of which contribute to the health risk. Diesel exhaust is emitted from a broad range of diesel engines including on-road diesel engines of trucks, buses and cars and off-road diesel engines that include locomotives, marine vessels and heavy duty equipment.

USEPA has direct regulatory authority over emissions from mobile sources, and has established both criteria and Mobile Source Air Toxics (MSAT) emission standards for newly manufactured and remanufactured diesel locomotive engines. These emission standards were finalized in March 2008 and are projected to reduce particulate emissions from locomotives by 90 percent and NO_X emissions by as much as 80 percent when fully implemented. The standards are based on the application of high-efficiency catalytic after-treatment technology for engines built in 2015 and later. USEPA standards also apply to existing locomotives when they are remanufactured.[98] Based on these recently passed standards, USEPA is projecting that emissions from the national passenger locomotive fleet will continue to decrease over time as older locomotives are replaced with newly manufactured engines.

[98] USEPA, 2013b, Locomotives website, Available online at: http://www.epa.gov/otaq/locomotives.htm. Accessed September 16, 2013

3.9.1.4 Data Collection and Government Agency Coordination

Air quality data and the current attainment status of the counties through which the four remaining Build Alternative routes would pass was obtained from the USEPA's Green Book, the Illinois Environmental Protection Agency (Illinois EPA), the Indiana Department of Environmental Management (Indiana DEM), and the Michigan Department of Environmental Quality (DEQ).

3.9.2 Affected Environment

Of the 14 counties through which the Build Alternative routes would pass, only Jackson County, Michigan has been in full attainment of the NAAQS (never designated non-attainment). The only current nonattainment areas within the Area of Analysis are Cook County, Illinois ($PM_{2.5}$, Pb, and 8-hour O), and Lake and Porter counties, Indiana (8-hour O). All of the other counties are designated maintenance for one or more of the criteria pollutants.

The attainment statuses of the 13 counties designated either nonattainment or maintenance for one or more of the criteria pollutants are presented in Table 3-14.

Table 3-14: Nonattainment and Maintenance Areas within the Area of Analysis

Criteria Pollutants	County	State	Status
Particulate matter less than 10 microns in diameter (PM_{10})	Cook County – Lyons Township and Southeast Chicago	IL	Maintenance
	Lake County	IN	Maintenance
	Wayne County	MI	Maintenance
Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)	Cook County	IL	Nonattainment
	Lake County	IN	Maintenance
	Porter County	IN	Maintenance
	Macomb County	MI	Maintenance[2]
	Oakland County	MI	Maintenance[2]
	Washtenaw County	MI	Maintenance[2]
	Wayne County	MI	Maintenance[2]
8-hour ozone (O_3) (2008 Standard)[1]	Cook County	IL	Nonattainment (Marginal)
	Lake County	IN	Nonattainment (Marginal)
	Porter County	IN	Nonattainment (Marginal)
Carbon Monoxide (CO)	Lake County	IN	Maintenance
	Macomb County	MI	Maintenance
	Oakland County	MI	Maintenance
	Wayne County	MI	Maintenance
Sulfur Dioxide (SO_2)	Lake County	IN	Maintenance
	LaPorte County	IN	Maintenance
Lead (Pb)	Cook County	IL	Nonattainment

Source: USEPA, 2013a

Table Notes:

[1] *In addition, Cook County (Illinois), Lake, Porter, and LaPorte counties (Indiana), and Berrien, Calhoun, Cass, Kalamazoo, Oakland, Van Buren, Washtenaw, and Wayne counties (Michigan) are designated "maintenance" for the 1997 8-hour ozone standard.*

[2] *Redesignated "maintenance" on 8/29/2013.*

Lead and SO_2 are not discussed further in the conformity analyses found later in this section because none of the transportation modes considered emit lead or SO_2 in substantial quantities from operation.

3.9.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and impacts on air quality are not anticipated beyond those that could occur due to other projects. Over time, emissions from vehicles will decrease due to technological improvements, but air quality will not be as good as it could be due to vehicle congestion increases on the roads and highways between Chicago and Detroit. There could also be more delays at at-grade railroad crossings as vehicular traffic congestion increases, which

would worsen local air quality. Intercity bus service between Chicago and Detroit/Pontiac may have greater ridership under the No Build Alternative, and this could result in greater emissions from buses. Overall, the No Build Alternative would have a minor to moderate negative impact on local and regional air quality.

3.9.4 Impacts of the Build Alternatives

Regional air quality impacts under each of the Build Alternatives would be essentially identical as there is only a two percent difference in length between the shortest route (Route 2 at 304.7 miles) and the longest route (Route 9 at 310.2 miles). Therefore, regional air quality impacts are presented for a single Build Alternative, as described below.

Table 3-15, Table 3-16 and Table 3-17 show the pollutants evaluated under the general conformity analysis for the Build Alternatives. Emissions are estimated for full implementation by the year 2035 based on ridership forecasts for the Build Alternatives. Given that 13 of 14 counties through which the alternative routes would pass are designated either maintenance or non-attainment, the conformity determination was conducted on a state-by-state basis, rather than on a county-by-county basis.

Along the Corridor, there would be a reduction in all types of emissions with the exception of NO_X emissions, which would increase slightly due to the additional diesel fuel burned as a result of the increase in passenger train traffic by switching passengers from other modes of travel to rail. Total emissions diverted for each state presented in Table 3-15, Table 3-16 and Table 3-17, includes the calculated reduction in passenger vehicles, bus, and plane emissions from trips diverted to trains. Trip diversion and ridership information can be found in Appendix E and detailed emission calculations are presented in Appendix G. Although NO_X emissions would increase within each state as shown in the Tables, the emission increases within each nonattainment or maintenance county would be below the General Conformity *de minimis* threshold. In order to assess the potential regional impact of this increase in NO_X emissions, additional regional analysis may need to be conducted as part of Tier 2 NEPA analysis or as part of the Regional Transportation Planning process. Construction-related emissions would need to be addressed during Tier 2 NEPA analysis. Construction related impacts are described in Section 3.26.

Table 3-15: Summary of General Conformity Determination for the Build Alternatives in 2035 - Illinois

Pollutant	Route in miles in State	De Minimis Threshold (tons/year)	Train Emissions Increase (tons/year) Illinois (Cook County)	Total Emissions Diverted (tons/year) Illinois	Statewide Net Emissions Change (tons/year)	Number of Counties Crossed	*Average Net Emissions Change (tons/year) per County
HC	14	100	3.82	6.86	-3.04	1	-3.04
CO	14	100	25.10	53.54	-28.44	1	-28.44
NO_X	14	100	86.32	57.97	28.34	1	28.34
PM-10	14	100	2.24	2.65	-0.41	1	-0.41
PM-2.5	14	100	2.17	2.20	-0.03	1	-0.03

Notes: All emission numbers are in tons per year. Totals may not add due to rounding.

** A negative net change indicates that the implementation of the Build Alternative will result in an overall decrease in emissions as the additional rail service is replacing passenger vehicle, bus, and plane trips along a similar route, and produce fewer emissions per passenger then other modes of transportation.*

Table 3-16: Summary of General Conformity Determination for the Build Alternatives in 2035 – Indiana

Pollutant	Route in Miles in State	De Minimis Threshold (tons/year)	Train Emissions Increase (tons/year) Indiana	Total Emissions Diverted (tons/year) Indiana	Statewide Net Emissions Change (tons/year)	Number of Counties Crossed	*Average Net Emissions Change (tons/year) per County
HC	44	100	11.68	2.97	-9.30	3	-3.1
CO	44	100	76.71	163.59	-86.89	3	-28.96
NO_X	44	100	263.74	177.13	86.61	3	28.87
PM-10	44	100	6.85	8.10	-1.25	3	-0.42
PM-2.5	44	100	6.64	6.74	-0.10	3	-0.03

Notes: All emission numbers are in tons per year. Totals may not add due to rounding.

** A negative net change indicates that the implementation of the Build Alternative will result in an overall decrease in emissions as the additional rail service is replacing passenger vehicle, bus, and plane trips along a similar route, and produce fewer emissions per passenger then other modes of transportation.*

Table 3-17: Summary of General Conformity Determination for the Build Alternatives in 2035 - Michigan

Pollutant	Route in Miles in State	De Minimis Threshold (tons/year)	Train Emissions Increase (tons/year) Michigan	Total Emissions Diverted (tons/year) Michigan	Statewide Net Emissions Change (tons/year)	Number of Counties Crossed	*Average Net Emissions Change (tons/year) per County
HC	246	100	65.39	117.45	-52.06	8	-6.51
CO	246	100	429.56	916.12	-486.56	8	-60.82
NO_X	246	100	1,476.97	991.96	485.01	8	60.63
PM-10	246	100	38.33	45.34	-7.01	8	-0.88
PM-2.5	246	100	37.18	37.73	-0.54	8	-0.07

Notes: All emission numbers are in tons per year. Totals may not add due to rounding.

** A negative net change indicates that the implementation of the Build Alternative will result in an overall decrease in emissions as the additional rail service is replacing passenger vehicle, bus, and plane trips along a similar route, and produce fewer emissions per passenger then other modes of transportation.*

As shown in Table 3-15, Table 3-16, and Table 3-17, with the exception of NO_X, emissions of all criteria pollutants would decrease under the Program. The NO_X emission increase would be the greatest for counties in Michigan; however, the average increase per county would be approximately 61 tons/year which is less than the General Conformity *de minimis* threshold.

Because the alternatives include new train service, impacts from the Build Alternatives on air quality are unavoidable due to the use of diesel fuel. However, with the exception of NO_X, overall emissions would be less than the No Build Alternative because the additional rail service is replacing passenger vehicles, bus, and plane trips along a similar route, and trains require fewer BTUs per passenger mile than other modes of transportation.

As shown in Table 3-18, operation of the Build Alternatives between Chicago and Detroit would increase NO_X emissions along the entire corridor by 600 tons/year. However, within the Corridor, there would be a reduction of 64 tons/year of HC emissions, a reduction of 602 tons/year of CO emissions, a reduction of 8.7 tons/year of PM_{10} emissions, a reduction of 0.7 tons/year of $PM_{2.5}$ emissions, a reduction of 3.5 tons/year of SO_2 emissions and a reduction of 10,284 tons/year of CO_2 emissions. Detailed emission calculations are shown in Appendix G, and trip diversion and ridership information can be found in Appendix E.

Table 3-18: Build Alternatives – 2035 Estimated Changes in Corridor Air Pollutants from Diversion of Passenger Vehicle, Bus, and Plane Trips (Tons per Year)

Pollutant	Additional Train Emissions (tons/year)	Reduction in Emissions (tons/year)				*Net Change (tons/year)
		Vehicles	Buses	Planes	Total Emission Reduction	
HC	80.89	131.86	9.01	4.43	145.29	-64.40
CO	531.37	1,033.01	72.45	27.82	1,133.25	-601.88
NO_X	1,827.03	1,063.93	73.97	89.15	1,227.06	599.97
PM-10	47.42	52.42	3.67	0	56.08	-8.67
PM-2.5	46.00	43.56	3.11	0	46.67	-0.67
SO_2	1.34	2.20	0.14	2.75	4.86	-3.52
CO_2	141,687.56	113,850.34	17,929.77	21,965.59	151,971.06	-10,283.51

Note: Totals may not add due to rounding.

** A negative net change indicates that the implementation of the Build Alternative will result in an overall decrease in emissions as the additional rail service is replacing passenger vehicle, bus, and plane trips along a similar route, and produce fewer emissions per passenger then other modes of transportation.*

3.9.5 Potential Mitigation Measures

Although average NO_X emissions per county are below the *de minimis* thresholds, as demonstrated in Table 3-15, Table 3-16, and Table 3-17, general air quality conformity analysis modeling may be required during Tier 2 NEPA analysis to verify these findings and demonstrate that the Program would not have an adverse impact on air quality across the 3-state area. During Tier 2 NEPA analysis, mitigation to reduce NO_X emissions may be considered and investigated. Potential NO_X reduction measures could include converting fleet vehicles from diesel to alternative fuels, implementing idling restrictions for locomotives and buses at station stops, and other appropriate measures.

3.10 Hazardous Waste and Waste Disposal

This section discusses hazardous materials and waste sites, either from the presence of stored materials or due to past spills or leaks. A hazardous material or waste is any chemical, biological, or physical substance (liquid, solid, gas, or sludge) that can be potentially harmful to public health or the environment. Hazardous materials or wastes can be substances such as solvents, pesticides, or discarded commercial, industrial, or medical waste.

3.10.1 Methodology and Regulatory Requirements

The regulatory framework governing activities potentially affecting hazardous materials and waste sites include the Toxic Substances Control Act (TSCA), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended, the Resource Conservation and Recovery Act (RCRA), the Superfund Amendments and Reauthorization Act (SARA), and the Emergency Planning and Community Right-to-Know Act (EPCRA).

USEPA is the federal agency overseeing hazardous waste management. State agencies' regulatory frameworks include the Illinois EPA's Hazardous Waste Program (35 Illinois Administrative Code 700-739), Indiana's Department of Environmental Management's hazardous waste management rules (329 IAC 3.1), and Michigan DEQ's Hazardous Waste Management Program (Part 111, Hazardous Waste Management, Natural Resource and Environmental Protection Act, 1994 PA 451). Solid waste disposal is evaluated in accordance with FRA's Environmental Procedures Section 14(n)(4).

The Area of Analysis was reviewed using recent aerial and satellite high-resolution photographic imagery; maps of hydrography, and other features; and the most recent GIS data for a variety of environmental resources. For this Tier 1 EIS, field visits for resource review were not conducted. This would be done during Tier 2 NEPA analysis. As data gathered from various GIS databases have overlapping coverage and many sites have multiple record associations; the effort focused on records associated with the types of sites most likely to require additional screening due to the presence of special waste. These are listed in Table 3-19.

Table 3-19: Environmental Databases by Site Type

Site Type	Illinois*	Indiana	Michigan*	Comments
Superfund Sites	IEPA	IDEM		
Brownfield Sites	USEPA	IDEM		
LUST	IEPA	IDEM		
Sites with Institutional Controls		IDEM		Contaminated site with controls to restrict use, activity or access
Hazardous Waste Sites		IDEM	MDEQ	Called Treatment Storage Disposal for IDEM (treat, store or generate)
Solid Waste (Illegal Dump Sites, Tires Dumps, Solid Waste Landfills)		IDEM	MDEQ	
Industrial Waste		IDEM		(hazardous, non-hazardous, solid waste)
Clean-up Sites		IDEM		State sites pose threat to human health.

Site Type	Illinois*	Indiana	Michigan*	Comments
RCRA Corrective Action Sites	USEPA	IDEM		
Former Manufactured Gas Plants		IDEM		Toxic by product wastes at former gas plants
Voluntary Remediation Program Sites	IEPA	IDEM		Voluntary remediation site locations (VRP)

**Blank spaces indicates that there was not readily available GIS Data for the category*

Data were gathered from USEPA's Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) list of final National Priorities List (NPL) hazardous material sites. According to the USEPA, the NPL is "…a list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States…"[99] The NPL list includes Superfund sites, which can pose a severe contamination risk or threat to public health and/or the environment. Other less severe sites (not on the NPL list) that store or generate hazardous materials are described as "brownfield" sites, which are lands that are contaminated because they were previously used for industrial or certain commercial uses, but have the potential to be reused or redeveloped once they are appropriately cleaned up. Data were compiled for leaking underground storage tank (LUST) locations, and other solid wastes sites using the Michigan DEQ, Indiana DEM, and Illinois EPA websites.

3.10.2 Affected Environment

The data gathered for hazardous material and waste sites within the Area of Analysis were reviewed, and a general description of those areas was prepared. It was determined that there are no NPL (Superfund) sites located within or adjacent to the Area of Analysis.

Other less severe (non-NPL) hazardous material sites within the Area of Analysis include brownfield sites, industrial waste sites, old landfills and other solid waste sites, hazardous waste sites, LUST sites, RCRA corrective action sites, sites with institutional controls (contaminated site with controls to restrict use, activity or access) and former manufactured gas plant sites. RCRA hazardous material sites include industrial facilities dealing with plastics, metals, agricultural products, and building materials; and commercial sites such as automotive repair/maintenance facilities, dry cleaners, and petroleum companies. There are several non-NPL hazardous material sites within the Area of Analysis for each route. The state listings of LUST sites within the Area of Analysis include up to 202 in Michigan, 10 in Indiana, and 19 in Illinois. There likely are more sites in Indiana and Illinois but the available databases maintained by these two states are relatively smaller than Michigan.

[99] USEPA. USEPA NPL website: http://www.epa.gov/superfund/sites/npl/index.htm. Retrieved on February 15, 2013.

3.10.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built. Continual maintenance activities are contained within existing right of way and hazardous materials are not expected to be encountered. Hazardous waste impacts from the programmed projects are/or will be addressed separately and will follow environmental requirements in accordance with federal and respective state laws.

3.10.4 Impacts of the Build Alternatives

3.10.4.1 Impacts Common to all Route Alternatives

Table 3-20 presents the number of hazardous material and waste sites within the Area of Analysis, listed by state and Build Alternative.

Specific site limits, contamination boundaries, and impacts would be performed as part of the Tier 2 NEPA analysis. Within the estimated areas of additional right of way acquisition, there may be instances where demolition of existing structures or buildings would be required. Some of these materials may be recycled. However, some of these buildings or structures may include small amounts of hazardous waste; especially in older industrial areas that are prevalent in the developed portions of the Area of Analysis fronting existing rail lines, and in some cases, testing of hazardous waste may be required.

There was substantially more readily available data from Indiana than from Illinois and Michigan so Illinois and Michigan may be underrepresented and the data may not present all of the potential hazardous or waste sites within the Area of Analysis.

Table 3-20: Number of Hazardous Material and Waste Sites within Area of Analysis

Site Type	Route Alternatives					
	2	4	5 Option 1	5 Option 2	9 Option 1	9 Option 2
Illinois						
Brownfields						
Hazardous						
Solid Waste						
LUST	10	10	10	10	19	19
Manufactured Gas Plants						
Clean-up						
Voluntary Remediation Program (VRP)						
Institutional Controls						
RCRA	21	21	21	21	43	43
Industrial						
Indiana						
Brownfields	1	2				
Hazardous	1	1	1	1		
Solid Waste	4	4	4	4	2	2
LUST	6	8	9	8	10	9
Manufactured Gas Plants	1	1	1	1	1	1
Clean-up	1	1	1	1	1	1
Voluntary Remediation Program (VRP)	3	3	2	2	2	2
Institutional Controls	1	1	1	1		
RCRA	2	2	1	1		
Industrial	7	11	7	7	7	7
Michigan						
Brownfields						
Hazardous	6	6	6	6	6	6
Solid Waste	4	4	4	4	4	4
LUST	202	202	202	202	202	202
Manufactured Gas Plants						
Clean-up						
Voluntary Remediation Program (VRP)						
Institutional Controls						
RCRA						
Industrial						

As a result of increased train traffic from operation of the Build Alternatives, and in addition to operations at maintenance facilities, there could be an increase in the chances of a hazardous material incident during refueling, maintenance operations, or from a spill during operation of the trains. Such incidents can affect water quality if railway contaminants or accidental chemical/fuel spills from operations and maintenance activities reach water resources adjacent to or downstream. However, with appropriate permanent best management practices (BMPs) in place, water quality impacts from hazardous materials would be avoided or minimized.

The construction of the Build Alternatives has the potential to generate waste material from clearing plant material, excavation of soil, and removal of existing track and railroad ties where replacement is warranted. Other examples of site waste may include construction material packaging, broken equipment/parts, and other excess material. Some of these materials may be suitable for recycling. Also, if removal of structures is required, such structures may contain asbestos.

During typical construction activities, small amounts of soil may be contaminated through on-site motor or hydraulic oil spills.

Within the limited areas of additional right of way acquisition, there may be instances where demolition of existing structures or buildings would be required that may include hazardous waste, especially in older industrial areas. Testing for hazardous waste may be required.

Michigan

The route through Michigan is the same for all Build Alternatives. There are 6 listed hazardous sites, 4 solid waste sites and 202 LUST sites within the Area of Analysis. The majority of the sites are located within the Detroit metropolitan area. However, the proposed improvements are anticipated to be within the existing right of way through the Michigan corridor. The exception may be at grade crossings, potential flyovers, the proposed Pontiac Maintenance Facility and station area improvements. Once the specific improvements have been identified and in conjunction with the Tier 2 NEPA analyses, the specific hazardous and solid waste sites would be reviewed to determine potential impacts and where it is possible and practical to avoid these areas.

Specific impacts for each route are discussed below.

3.10.4.2 Route 2 Impacts

Illinois

In Illinois, Route 2 would not potentially affect, and/or be affected by NPL (Superfund) sites or CERCLIS sites because no such sites are located within or adjacent to the Area of Analysis in Illinois. However, there are 21 RCRA sites and 10 LUST sites that could potentially affect or be affected by this route.

Indiana

There are no NPL (Superfund) sites along Route 2 in Indiana. However there are 17 potential various types of hazardous sites, 4 solid waste sites and 6 LUST sites located within or adjacent to the Area of Analysis in Indiana that could potentially affect or be affected by this alignment.

3.10.4.3 Route 4 Impacts

Illinois

In Illinois, Route 4 is the same as Route 2. Therefore, impacts to various non NPL, solid waste and LUST sites would be similar to those for Route 2.

Indiana

In Indiana, Route 4 is very similar to Route 2. However, the total number of sites located within or adjacent to the Area of Analysis that could potentially affect or be affected by this alternative is higher (31). There are 22 potential various types of hazardous sites, 4 solid waste sites and 8 LUST sites.

3.10.4.4 Route 5 Option 1 and Option 2 Impacts

Illinois

In Illinois, Route 5, Options 1 and 2 are the same as Route 2. Therefore, impacts to various non-NPL, solid waste, and LUST sites would be similar to those for Route 2.

Indiana

In Indiana, Route 5 Options 1 and 2 are very similar to Route 2. There is a small area that deviates from the Route 2 alignment; however, the number of impacted sites is very similar, just the breakdown of types of sites is different. For Route 5 Option 1 there are 14 potential various types of hazardous sites, 4 solid waste sites and 9 LUST sites. The only difference in Route 5 Option 2 is that it has one more LUST site than Route 5 Option 1.

3.10.4.5 Route 9 Option 1 and Option 2 Impacts

Illinois

In Illinois, Route 9 Options 1 and 2 would not potentially affect and/or be affected by NPL (Superfund) sites or CERCLIS sites as none are located within or adjacent to the Area of Analysis in Illinois. However, there are 43 RCRA sites and 19 LUST sites that could potentially affect or be affected by this route.

Indiana

In Indiana, Route 9 Options 1 and 2 are very similar to Route 5. However, the route does deviate from Route 5 in the west end of the state. For Route 9 Options 1 and 2 there are 11 potential various types of hazardous sites, 2 solid waste sites, and 10 LUST sites. The only difference between Route 9 Options 1 and 2 is that Option 1 has one more LUST site.

3.10.5 Potential Mitigation Measures

In areas of additional right of way acquisition or excavation, there is a potential for exposure to hazardous materials from adjacent sites during construction. However, the level of risk and potential mitigation measures cannot be determined in this Tier 1 NEPA analysis given the current level of design detail. A more detailed investigation of specific site limits, contamination boundaries, and impacts would be performed on the Selected Program Alternative as part of the Tier 2 NEPA analysis, and specific mitigation measures, to the extent required, would be identified and discussed after design details are known.

Requirements for safety procedures and protection of human health and the environment would be established to help ensure that there would be no further contamination of adjacent sites and to provide a safe working environment during construction. See also Section 3.7 (Public Health and Safety).

All solid waste materials generated during construction should be recycled or properly disposed of in accordance with the provisions of each state's solid waste management statutes and regulations, and local regulations. Handling, collection, and disposal of hazardous waste materials would be performed according to federal, state, and local regulations.

It is possible that some of the soil material could be reused for fill material in other construction areas or other nearby construction projects. Recyclable construction materials should be taken to recycling facilities that are in compliance with federal, state, and local regulations. Construction debris that cannot be recycled should be disposed of in permitted landfills following proper disposal procedures and in compliance with federal, state, and local regulations. State and local regulations may include prohibitions or limitations on burning of construction debris, and control measures to limit pollution if tree trunks and limbs are permitted to be burned on site.

Appropriate permanent best management practices (BMPs) put in place would avoid or minimize impacts to water quality for potential hazardous material incident during refueling, maintenance operations, or from a spill during operation of the trains. Accidental spills of hazardous materials and wastes during construction or operation of the transportation system require special response measures. Occurrences will be handled in accordance with local government response procedures. Refueling, storage of fuels, or maintenance of construction equipment will not be allowed within 100 feet of wetlands or water bodies to avoid accidental spills impacting these resources.

3.11 Cultural Resources and Section 106 Coordination

This section discusses the Program's potential impacts to cultural resources including archaeological resources, architectural resources, and traditional cultural properties.

3.11.1 Methodology and Regulatory Requirements

Sites of historical, archeological, architectural, or cultural significance are evaluated in accordance with FRA's Environmental Procedures Section 14(n)(21). Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to determine whether their undertakings have adverse impacts on historic properties (any site, structure, or other property listed in or eligible for listing on the National Register of Historic Places (NRHP)) and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment in the event that there is disagreement on adverse effect determination made by the Federal agency and reviewed by a State Historic Preservation Office (SHPO). Regulations promulgated from the NHPA are codified under 36 Code of Federal Regulations (CFR) 800.

Cultural resources include a variety of heritage- or culture-related resources that are the subject of certain Federal and state laws, regulations, executive orders, and other requirements. Archaeological sites are places on the landscape where prehistoric or historic human activity has left physical evidence of those activities. In general, these traces of human activity must be at least 50 years old to qualify as archaeological sites that are potentially eligible for nomination to the NRHP. Architectural resources include standing buildings, bridges, and other structures. In general, architectural resources must be at least 50 years old to qualify for nomination to the NRHP. Newer structures might warrant protection if they have the potential to gain significance in the future or if they meet exceptional significance criteria. A historic district consists of a definable geographic area that possesses a substantial concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development. Also potentially eligible for listing in the NRHP are historic landscapes. A designed historic landscape is a geographically bound area that was developed according to academic or professional design standards, theories, or philosophies of landscape architecture; that is associated with a historically significant person, trend, or event; or that is recognized for its design or artistic merit. A rural historic landscape is a geographical area that has been used by or modified by people historically and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features.

Traditional cultural properties are a special category of cultural resources that hold traditional cultural significance to a group such as a Native American Tribe. This category of resources can encompass archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that people consider essential for the preservation of a traditional culture.

Cultural resources are evaluated for eligibility for listing in the NRHP based on four criteria. Eligible resources may be associated with events that have made a significant contribution to the broad patterns of our history (criterion a); they may be associated with the lives of historically significant people (criterion

b); they may embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values (criterion c); or they may have yielded, or may be likely to yield, important information on prehistory or history (criterion d). In addition, eligible resources must possess integrity of location, design, setting, materials, workmanship, feeling, and association.

Potential impacts on cultural resources were evaluated in accordance with 40 CFR 1500 et seq., and FRA's *Procedures for Considering Environmental Impacts* (64 FR 28545). No field studies were conducted for this Tier 1 NEPA analysis; field efforts would occur as needed during the Tier 2 NEPA analysis. The analytical methods are briefly summarized below:

- Prior to development of the Tier 1 EIS, the Illinois, Indiana, and Michigan SHPOs were consulted concerning the definition of the Area of Potential Effects (APE). The APE is defined below under the description of the affected environment.
- Illinois, Indiana, and Michigan SHPOs were consulted concerning the Program, seeking their advice regarding the identification of consulting parties with an interest in the Program.
- SHPOs, Tribal Historic Preservation Offices (THPOs) and other appropriate entities were consulted to determine if the proposed preliminary APE for the Tier 1 NEPA analysis is reasonable.
- Using a variety of sources, the known cultural resources within the preliminary APE was identified. The Tier 1 level of effort focused on the known record of properties listed in state and national registers as well as known National Register-eligible properties identified through the data sources listed below.
- The preliminary location for stations, facilities, and potential capacity improvements were identified.
- Physical changes to the rail line and rail traffic resulting from the alternatives were identified and evaluated for the potential to impact known historic properties.
- A discussion on the level of conceptual design information was prepared, which helped clarify the preliminary nature of the information and the opportunity for more detailed evaluations in Tier 2.
- The analysis will be provided to SHPOs and THPOs for review and comment.

Data was gathered from several sources during Tier 1 identification of resources near the Area of Analysis and within the identified APEs. Potential impacts on historic properties were identified. Data sources included the following:

- The National Register of Historic Places maintained by the National Park Service
- Illinois, Indiana, and Michigan State Historic Preservation Office files and databases (geographic information system (GIS), PDF, Excel, paper, and other formats), including:
    - The Illinois Inventory of Archaeological Sites online GIS database maintained by the Illinois State Museum
    - A list of potentially affected historic resources provided to FRA by the Illinois DOT Cultural Resources Unit

  - The Historic and Architectural Resources Geographic Information System (HARGIS) maintained by the Illinois SHPO
  - the Indiana State Historic Architectural and Archaeological Research Database (SHAARD)
  - Paper records maintained by the Michigan SHPO
  - Previous NEPA evaluations of projects in the same corridor as the Program:
  - The 2011 EA for the acquisition of the Dearborn-Kalamazoo portion of the Area of Analysis by MDOT
  - The 2009 EIS for the Detroit Intermodal Freight Terminal
  - The 2008 EA for the CN—Control—EJ&E project in Illinois
- Lists of potentially affected resources provided by the Illinois, Indiana, and Michigan DOTs
- Information obtained from public scoping and the consulting parties
- Historic maps provided by local governments and others
- Literature on the history of the existing rail systems
- Other consulting parties' information, including lists of those properties that may be of religious and cultural significance to Indian tribes (known as traditional cultural properties or TCPs)

As the lead federal agency, FRA initiated coordination with Native American tribes with ties to Illinois, Indiana, and Michigan during the Tier I EIS process. After the Tier 1 EIS Record of Decision has been obtained, formal Section 106 consultation and compliance with the appropriate federal and state agencies and Native American tribes will occur during Tier 2 analyses.

3.11.2 Affected Environment

In the absence of details about the locations and site improvements that would be used for any new stations, maintenance facilities and layover facilities, the data gathering area (preliminary Area of Potential Effect) for the Tier 1 EIS includes a corridor of 500 feet on either side of the rail centerline of all Build Alternatives. Data was gathered from sources identified in Section 3.11.1 above and compiled in suitable GIS and database formats.

It is assumed that as part of formal consultation during Tier 2 NEPA analysis, the state DOTs and FRA in consultation with the appropriate SHPOs, THPOs, and tribes, and other consulting parties, may further define the APE to include only those areas that could reasonably be affected by the Program, which may include but not be limited to:

- Sites for construction of new rail lines
- Sites for new stations or improvements to existing station
- Sites for new rail facilities, such as a layover facility or a maintenance facility
- Locations for rail line capacity improvements which would encroach outside the existing ballast surfaces

3.11.2.1 Cultural Resource inventory

The preliminary APE includes 126 historic resources listed on the NRHP or eligible for listing on the NRHP, including buildings (residential, commercial, and industrial), historic districts, and bridges and other structures. Several of these properties are related to the operation of the railroad such as depots and stations. The density of cultural resources is highest in urban areas. The 126 properties are listed in Table 3-22. The APE also includes 21 known archaeological sites. Information concerning the nature and locations of any archaeological resources are confidential to protect artifacts and sites from theft and vandalism.

Table 3-21: Count of National Register Listed and Eligible Historic Resources within the APE by Alternative

	Alternatives					
	2	4	5 Option 1	5 Option 2	9 Option 1	9 Option 2
Illinois	23	23	23	23	35	35
Indiana	5	5	5	5	7	7
Michigan	68	68	68	68	68	68
TOTAL	98	98	98	98	110	110

Source: See Table 3-22.

Table 3-22: National Register Listed and Eligible Historic Resources within the APE

NRHP Site Number*	County and State	Site Name	Routes	Site Type
Illinois				
None	Cook County, Illinois	Union Station	2, 4, 5, 9	Building
None	Cook County, Illinois	Structure #016-6026, Jackson Ave. over S. Branch Chicago River	2, 4, 5, 9	Structure
1000868	Cook County, Illinois	United States Post Office	2, 4, 5, 9	Building
None	Cook County, Illinois	Chicago Park Boulevard System Historic District	2, 4, 5, 9	District
2001347	Cook County, Illinois	Fuller Park District	2, 4, 5	District
78001130	Cook County, Illinois	South Loop Printing House Row Historic District	2, 4, 5, 9	District
80001350	Cook County, Illinois	Sheridan Plaza Hotel	2, 4, 5	Building
82000392	Cook County, Illinois	St. Luke's Hospital Complex	9	Building
84001052	Cook County, Illinois	Soldier Field	9	Building

NRHP Site Number*	County and State	Site Name	Routes	Site Type
78001128	Cook County, Illinois	Schoenhofen Brewery Historic District	2, 4, 5	District
72000452	Cook County, Illinois	Prairie Avenue Historic District	9	District
71000291	Cook County, Illinois	William W. Kimball House	9	Building
12000243	Cook County, Illinois	Cermak Road Bridge Historic District	2, 4, 5	District
99001072	Cook County, Illinois	Raymond M. Hilliard Center Historic District	9	District
99000975	Cook County, Illinois	Wheeler-Kohn House	9	Building
03000783	Cook County, Illinois	Reid House	9	Building
None	Cook County, Illinois	American Book Company Building	9	Building
83000308	Cook County, Illinois	R.R. Donnelly & Sons Company	2, 4, 5	Building
None	Cook County, Illinois	A. Brandwein & Co. Warehouse	2, 4, 5, 9	Building
None	Cook County, Illinois	James Ward Elementary School	2, 4, 5	Building
None	Cook County, Illinois	Prairie Shore Apartments	9	Building
None	Cook County, Illinois	Structure #016-6173, 31st St. over ICG RR	2, 4, 5	Structure
03000789	Cook County, Illinois	Armour Square	2, 4, 5	District
05000871	Cook County, Illinois	Illinois Institute of Technology Academic Campus	2, 4, 5	District
01001049	Cook County, Illinois	S.R. Crown Hall	2, 4, 5	Building
None	Cook County, Illinois	Lake Meadows Apartments	9	Building
None	Cook County, Illinois	Soldier's Home	9	Building
76000689	Cook County, Illinois	Douglas Tomb State Memorial	9	Structure
None	Cook County, Illinois	Structure #016-6174, Oakwood Blvd. over ICG RR	9	Structure
86001091	Cook County, Illinois	Overton Hygienic Building	2, 4, 5	Building
86001090	Cook County, Illinois	Chicago Bee Building	2, 4, 5	Building
2001347	Cook County, Illinois	Fuller Park	2, 4, 5	Structure
79000824	Cook County, Illinois	Hyde Park-Kenwood Historic District	9	District
05000107	Cook County, Illinois	The Narragansett	9	Building

NRHP Site Number*	County and State	Site Name	Routes	Site Type
86001193	Cook County, Illinois	Chicago Beach Hotel	9	Building
69000054	Cook County, Illinois	Pullman Historic District	9	District
86001197	Cook County, Illinois	East Park Towers	9	Building
70000233	Cook County, Illinois	John J. Glessner House	9	Building
86001195	Cook County, Illinois	Hotel Del Prado	9	Building
86001198	Cook County, Illinois	Mayfair Apartments	9	Building
86001199	Cook County, Illinois	Poinsetta Apartments	9	Building
82000391	Cook County, Illinois	Hotel Windermere East	9	Building
72001565	Cook County, Illinois	Jackson Park Historic Landscape District and Midway Plaisance	9	District
11000848	Cook County, Illinois	Parkway Garden Homes	2, 4, 5	District
None	Cook County, Illinois	Oak Woods Cemetery	2, 4, 5, 9	District
95000487	Cook County, Illinois	Hamilton Park	2, 4, 5	District
06000678	Cook County, Illinois	Grand Crossings Park	2, 4, 5, 9	District
03000788	Cook County, Illinois	Calumet Park	2, 4, 5	District
None	Cook County, Illinois	Trumball Park Homes	2, 4, 5, 9	District
07000855	Cook County, Illinois	Palmer Park	9	District
None	Cook County, Illinois	Altgeld Gardens	9	District
Indiana				
11000118	Lake County, Indiana	Hohman Avenue Commercial Historic District	9	District
6001290	Lake County, Indiana	State Street Commercial Historic District	9	District
91000793	LaPorte County, Indiana	Washington Park	2, 4, 5, 9	Structure
8000565	LaPorte County, Indiana	Washington Park Historic District	2, 4, 5, 9	District
678	Porter County, Indiana	Porter Town Hall	2, 4, 5, 9	Building
4000208	Porter County, Indiana	Bartlett Real Estate Office	2, 4, 5, 9	Building
89000411	Porter County, Indiana	Beverly Shores South Shore Railroad Station	2, 4, 5, 9	Building
Michigan				
72000596	Berrien County, Michigan	Union Meat Market	2, 4, 5, 9	Building
85002152	Berrien County, Michigan	Old US Post Office	2, 4, 5, 9	Building

NRHP Site Number*	County and State	Site Name	Routes	Site Type
None	Berrien County, Michigan	Niles Railroad Depot	2, 4, 5, 9	Building
99001612	Cass County, Michigan	Thompson Road--Air Line Railroad Bridge	2, 4, 5, 9	Structure
93001349	Cass County, Michigan	Michigan Central Railroad Dowagiac Depot	2, 4, 5, 9	Building
222	Van Buren, Michigan	Houppert Winery Complex (Lawton Heritage Community Center)	2, 4, 5, 9	Building
90001230	Kalamazoo, Michigan	Western State Normal School Historic District	2, 4, 5, 9	District
95000447	Kalamazoo, Michigan	South Street Historic District	2, 4, 5, 9	District
83000874	Kalamazoo, Michigan	Stuart Area Historic District	2, 4, 5, 9	District
75000949	Kalamazoo, Michigan	Michigan Central Depot	2, 4, 5, 9	Building
75000949	Kalamazoo, Michigan	Depot, Kalamazoo	2, 4, 5, 9	Building
83000874, 95000448	Kalamazoo, Michigan	Stuart Neighborhood District (and increase), Kalamazoo	2, 4, 5, 9	District
None	Kalamazoo, Michigan	RR Bridge over M-43/East Michigan Avenue (X01-39082), Kalamazoo	2, 4, 5, 9	Structure
None	Kalamazoo, Michigan	Switch Tower, east of Porter Street, Kalamazoo	2, 4, 5, 9	Structure
None	Kalamazoo, Michigan	Coal Dock in the Augusta area	2, 4, 5, 9	Structure
None	Kalamazoo, Michigan	Grand Trunk Depot, Battle Creek	2, 4, 5, 9	Building
83000867	Kalamazoo, Michigan	Old Fire House No. 4, Battle Creek	2, 4, 5, 9	Building
96000367	Calhoun County, Michigan	Van Buren Street Historic District	2, 4, 5, 9	District
71000384	Calhoun County, Michigan	Penn Central Railway Station	2, 4, 5, 9	Building
97000626	Calhoun County, Michigan	Superior Street Commercial Historic District	2, 4, 5, 9	District
None	Calhoun, Michigan	Depot east of North Eaton Street, Albion	2, 4, 5, 9	Building

NRHP Site Number*	County and State	Site Name	Routes	Site Type
2001504	Jackson County, Michigan	Michigan Central Railroad Jackson Depot	2, 4, 5, 9	Building
None	Jackson, Michigan	Parma Mill-Hardware, Parma	2, 4, 5, 9	Building
None	Jackson, Michigan	F. P. Miller factory, Jackson	2, 4, 5, 9	Building
None	Jackson, Michigan	Power house, Airmaster Fan complex, Jackson	2, 4, 5, 9	Building
None	Jackson, Michigan	Factory complex, south side of tracks, east of South Elm Street, Jackson	2, 4, 5, 9	District
None	Jackson, Michigan	Historic properties abut the railroad right of way on the north side from a line parallel with Ingham Street to Steward Street, and flank the railroad from Steward Street to West Street, Jackson	2, 4, 5, 9	Structures
9000474	Jackson, Michigan	Temple Beth El Cemetery, Jackson	2, 4, 5, 9	Site
None	Jackson, Michigan	Depot at 210 East Michigan Avenue, Grass Lake	2, 4, 5, 9	Building
None	Jackson, Michigan	Commercial and residential historic districts between Grass Lake Village east limits and North Lake Street	2, 4, 5, 9	Districts
11000046	Washtenaw County, Michigan	Chelsea Commercial Historic District	2, 4, 5, 9	District
87000915	Washtenaw County, Michigan	Michigan Central Railroad Chelsea Depot	2, 4, 5, 9	Building
75000963	Washtenaw County, Michigan	Michigan Central Ann Arbor Depot/Gandy Dancer	2, 4, 5, 9	Building
78001515	Washtenaw County, Michigan	Ypsilanti Historic District	2, 4, 5, 9	District
None	Washtenaw, Michigan	Jiffy Mix complex, Chelsea	2, 4, 5, 9	District
None	Washtenaw, Michigan	Island Lake Road Bridge, Dexter	2, 4, 5, 9	Structure

NRHP Site Number*	County and State	Site Name	Routes	Site Type
None	Washtenaw, Michigan	Rail Bridge over Dexter-Pinckney Road, Dexter	2, 4, 5, 9	Structure
None	Washtenaw, Michigan	House in the southwest quad of the railroad crossing at East Delhi Road, Scio Township	2, 4, 5, 9	Building
None	Washtenaw, Michigan	Depot north of Cross Street, Ypsilanti	2, 4, 5, 9	Building
None	Washtenaw, Michigan	Freighthouse north of Cross Street, Ypsilanti	2, 4, 5, 9	Building
69000071	Wayne County, Michigan	Greenfield Village and Henry Ford Museum	2, 4, 5, 9	Building
80001931	Wayne County, Michigan	Woodbridge Neighborhood Historic District	2, 4, 5, 9	District
1000570	Wayne County, Michigan	New Amsterdam Historic District	2, 4, 5, 9	District
4000601	Wayne County, Michigan	Piquette Avenue Industrial Historic District	2, 4, 5, 9	District
None	Wayne, Michigan	Rail bridge over Inkster Road, Inkster	2, 4, 5, 9	Structure
None	Wayne, Michigan	Rail bridge over Middlebelt Road, Inkster	2, 4, 5, 9	Structure
None	Wayne, Michigan	Numerous structures along tracks, Dearborn	2, 4, 5, 9	Structures
None	Wayne, Michigan	Southern Avenue Twin Warren Truss Bridges, Detroit	2, 4, 5, 9	Structures
None	Wayne, Michigan	Conrail and Norfolk Southern crossings, Livernois Ave., Detroit	2, 4, 5, 9	Structures
80001925	Wayne, Michigan	Exhibition Building Historic District, Michigan State Fairgrounds, Detroit	2, 4, 5, 9	District
None	Wayne, Michigan	Band Shell, Michigan State Fairgrounds, Detroit	2, 4, 5, 9	Structure
None	Wayne, Michigan	Grant House, Michigan State Fairgrounds, Detroit	2, 4, 5, 9	Building

NRHP Site Number*	County and State	Site Name	Routes	Site Type
None	Wayne, Michigan	Garland Stove, Michigan State Fairgrounds, Detroit	2, 4, 5, 9	Building
None	Wayne, Michigan	Michigan Box Company/Spranger Wire Wheel Company, Detroit	2, 4, 5, 9	Building
None	Wayne, Michigan	Rickenbacker Motor Company/Springfield Body Corporation	2, 4, 5, 9	Building
None	Wayne, Michigan	Conrail and Grand Trunk Western Railroad Bridges, Woodward Avenue, Detroit	2, 4, 5, 9	Structures
None	Wayne, Michigan	Frederick Wolf and Sons historic homes, Central at St. John Street, Detroit	2, 4, 5, 9	Buildings
None	Wayne, Michigan	House, 6332 John Kronk Street, Detroit	2, 4, 5, 9	Building
None	Wayne, Michigan	Tomms House, 3434 Martin Street, Detroit	2, 4, 5, 9	Building
None	Wayne, Michigan	Markey House, 3504 Martin Street, Detroit	2, 4, 5, 9	Building
None	Wayne, Michigan	Federal Screw Works Factory, Detroit	2, 4, 5, 9	Building
None	Wayne, Michigan	Livernois Avenue Art Deco Bridge, Detroit	2, 4, 5, 9	Structure
None	Wayne, Michigan	Southern Avenue Twin Warren Truss Bridge	2, 4, 5, 9	Structure
None	Wayne, Michigan	Clippert Brick Company office, 10500 Southern Avenue, Detroit	2, 4, 5, 9	Building
None	Wayne, Michigan	Central Avenue Fire Station/Engine Company No. 37, 2820 Central Ave., Detroit	2, 4, 5, 9	Building
6000149	Oakland County, Michigan	B and C Grocery Building	2, 4, 5, 9	Building
85002148	Oakland County, Michigan	Grand Trunk Western Railroad Birmingham Depot	2, 4, 5, 9	Building
99001730	Oakland County, Michigan	Derby Street--Grand Trunk Western Railroad Bridge	2, 4, 5, 9	Building

Sources:

Illinois DOT Cultural Resources Unit, March 4, 2013, National Park Service National Register of Historic Places Spatial Database, Retrieved August 29, 2013, http://nrhp.focus.nps.gov/natreg/docs/Download.html.

The Illinois Inventory of Archaeological Sites online GIS maintained by the Illinois State Museum

A list of potentially effected historic resources provided to FRA by the Illinois DOT Cultural Resources Unit

The Indiana State Historic Architectural and Archaeological Research Database (SHAARD)

Paper records maintained by the Michigan SHPO

Previous NEPA evaluations of projects in the same corridor as the Program:

2011 EA for the acquisition of the Dearborn-Kalamazoo portion of the current project area by MDOT

2009 EIS for the Detroit Intermodal Freight Terminal

2008 EA for the CN—Control—EJ&E project in Illinois

**Site number is the NRHP listing number for the resource. Resources eligible for listing are not on the NRHP, and thus have no NRHP listing number.*

3.11.3 Impacts of the No Build Alternative

The No Build alternative would have no adverse or beneficial effects to any type of cultural resources.

3.11.4 Impacts of the Build Alternatives

3.11.4.1 Impacts Common to All Route Alternatives

Illinois

The portions of the route shared by all Build Alternatives, primarily in downtown Chicago, could potentially have adverse effects to nine known historic structures and districts in Illinois. The Build Alternatives would have no adverse effects to known archaeological sites that are listed on, eligible for listing on, or not yet evaluated for listing on the NRHP. Effects to previously unidentified archaeological sites and architectural resources will be addressed by the inadvertent discoveries plan discussed under Section 3.11.5 (Potential Mitigation Measures).

Indiana

The portions of the route shared by all Build Alternatives, primarily in LaPorte and Porter Counties, could potentially have adverse effects to five known historic structures and districts in Indiana. The Build Alternatives would have no adverse effects to known archaeological sites. Note that most archaeological sites in the Indiana SHAARD system lack precise information on their location, making it difficult to reliably determine if any sites are in the APE. Additional study would be conducted on the Selected Program Alternative during Tier 2 NEPA analysis.

Michigan

The portions of the route shared by all Build Alternatives could potentially have adverse effects to 68 known historic structures and districts in Michigan. Of those 68 structures and districts, potential effects to 40 were previously evaluated in 2011 for the EA for Michigan DOT's acquisition of rail lines from Kalamazoo to Dearborn.[100] That EA also concluded that the project would have no adverse effects to 17 archaeological sites in or immediately adjacent to the APE between Kalamazoo and Dearborn, which followed the same route as the Kalamazoo to Dearborn portion of all Build Alternatives addressed here.

Because no field work was performed as part of the Tier 1 EIS, there may be additional impacts to cultural resources that have not yet been identified. Tier 2 NEPA analyses would require archaeological survey as necessary to determine specific impacts of construction of Program improvements.

3.11.4.2 Routes 2, 4, 5 Option 1 and 5 Option 2

Illinois

The portions of the route shared by Routes 2, 4, 5 Option 1 and Option 2 could potentially have adverse effects to 16 known historic structures and districts in Illinois. These Build Alternatives would have no adverse effects to known archaeological sites that are listed on, eligible for listing on, or not yet evaluated for listing on the NRHP.

Indiana and Michigan

The portions of the route shared by Routes 2, 4, 5 Option 1 and Option 2 would have no adverse effects to known historic structures and districts in Indiana and Michigan. These Build Alternatives would have no adverse effects to known archaeological sites that are listed on, eligible for listing on, or not yet evaluated for listing on the NRHP. Note that most archaeological sites in the Indiana SHAARD system lack precise information on their location, making it difficult to reliably determine if any sites are in the preliminary APE.

3.11.4.3 Route 9 Option 1 and Option 2

Illinois

The portions of the route shared by Routes 9 Option 1 and Option 2 could potentially have adverse effects to 26 historic structures and districts in Illinois. These portions of the route would also pass within 250 feet of four archaeological sites. However, the Illinois DOT Cultural Resources Unit analysis of the Build Alternatives states that "No recorded archaeological sites that warrant National Register consideration fall

[100] Michigan Department of Transportation. Environmental Assessment, Norfolk Southern Railway Section, Improvements from Dearborn to Kalamazoo, Michigan. August 31, 2011.

within the project limits"[101] and the four archaeological sites are not in the area that will be directly affected by any activity associated with improvements or ongoing operation of the rail lines in Route 9, Options 1 and 2.

Indiana

The portions of the route shared by Routes 9 Option 1 and Option 2 could potentially have adverse effects to two historic districts in Indiana. The Build Alternatives would have no adverse effects to archaeological sites that are listed on, eligible for listing on, or not yet evaluated for listing on the NRHP. Note that most archaeological sites in the Indiana SHAARD system lack precise information on their location, making it difficult to reliably determine if any sites are in the preliminary APE.

Michigan

The portions of the route shared by Route 9 Option 1 and Option 2 would have no adverse effects to known historic structures and districts in Michigan. These Build Alternatives would have no adverse effects to known archaeological sites that are listed on, eligible for listing on, or not yet evaluated for listing on the NRHP.

3.11.5 Potential Mitigation Measures

During Tier 2 NEPA analysis, FRA would consult with the SHPOs, THPOs and local agencies to identify any additional parties who meet the regulatory criteria of being consulting parties pursuant 36 CFR 800.2. Mitigation measures may be developed in accordance with the terms of a programmatic agreement (PA) between FRA and consulting parties including the SHPOs and/or THPO and ACHP. The timing of the PA would be determined based on input from the consulting parties. The PA would focus on commitments for the Selected Program Alternative, documentation of the qualities that contribute to the historic significance of resources, review procedures, and products to be produced for mitigating adverse effects during the preparation of Tier 2 NEPA analyses prepared for the Selected Program Alternative. In addition, all ground-disturbing construction activity would follow an inadvertent discoveries plan developed in consultation with the Illinois, Indiana, and Michigan SHPOs and the Tribes to ensure proper treatment of archaeological materials encountered during construction.

3.12 Section 4(f) Resources

This section identifies and discusses potential impacts to Section 4(f) properties and ways to avoid and/or minimize potential Program impacts to them.

[101] Illinois Department of Transportation memorandum from John D. Baranzelli. Passenger Rail Improvement Project – Property Avoidance. March 4, 2013.

3.12.1 Methodology and Regulatory Requirements

Section 4(f) of the USDOT Act (49 USC 303(c)) governs the protection of publicly owned parks, recreation areas, and wildlife and waterfowl refuges of national, state or local significance. It also protects lands of a publicly or privately held historic site of national, state or local significance. All of these types of properties are referred to as Section 4(f) properties. Significance of the property is determined by the federal, state or local officials that have jurisdiction over the property.

Section 4(f) dictates that FRA cannot implement any program or project that uses[102] a Section 4(f) property unless there is no feasible and prudent alternative to the use of the land. The program or project must also include all possible planning to minimize harm to the Section 4(f) property.

Sources of data and information for determining the potential use of Section 4(f) properties included state, local and national websites, published GIS data layers containing information about public parks and potential wildlife refuges as well as a review of recent aerial photographic imagery and noted park and recreation sites on Google Maps. Wildlife and waterfowl refuges that were identified on websites or maps were listed as potential Section 4(f) properties. Historic properties were identified as described in 3.11.2.1of this document and include properties on or eligible for the National Register of Historic Places.

A distinction was made between resources that are directly adjacent to the rail corridor, and therefore having a greater possibility of being impacted; or resources within the 500-foot Corridor, but not abutting the track. Resources further removed from the track would not be directly impacted, however they could be determined to incur a "constructive use" during Tier 2 NEPA analysis (see footnote).

3.12.2 Affected Environment

Table 3-23 presents of a summary of potential Section 4(f) properties that are within the Area of Analysis of the various alternatives. The listed parks and recreation resources (Table 3-24) include community, neighborhood, county, and state parks as well as recreational trails and public school playfields. (Note that the requirements of Section 4(f) would apply to public school property only if the recreational area of the property permits visitation of the general public at any time during the normal operating hours.)[103] Wildlife and waterfowl refuges listed in Table 3-25 include properties designated by the officials with jurisdiction over them as nature preserves or publicly owned wildlife management areas. Historic or archaeological properties are listed in Section 3.11 (Cultural Resources) in Table 3-22 and include

---

[102] "Use" in the context of Section 4(f) is defined in 23 CFR 774.17 (FHWA/FTA regulations, which are often followed by FRA) and the term has very specific meanings. It can mean that land is permanently incorporated into the transportation facility, such as when land is purchased for right of way, or it can mean a temporary occupancy during project construction. It can also be designated a "constructive use" where there is no actual physical use, but due to the proximity of the project, it results in substantial impairment to features that qualify it as a Section 4(f) property. Constructive uses are very rare.

[103] US Department of Transportation. *Federal Highway Administration Section 4(f) Policy Paper (Question 14)*. July 20, 2012.

properties that are on the National Register of Historic Places (NRHP) or that are eligible for listing on the NRHP.

Table 3-23: Summary of Numbers of Potential Section 4(f) Properties within the Area of Analysis

	Alternatives					
	2	4	5 Option 1	5 Option 2	9 Option 1	9 Option 2
Illinois						
Parks/Rec	9	9	9	9	17	17
Wildlife Refuges	0	0	0	0	2	2
National Register Listed or Eligible Historic Resources	24	24	24	24	33	33
Indiana						
Parks/Rec	12	13	17	17	11	11
Wildlife Refuges	5	5	7	7	6	6
National Register Listed or Eligible Historic Resources	5	5	5	5	7	7
Michigan						
Parks/Rec	61	61	61	61	61	61
Wildlife Refuges	9	9	9	9	9	9
National Register Listed or Eligible Historic Resources	68	68	68	68	68	68
TOTAL	192	193	200	200	216	216

Table 3-24: Public Parks and Recreation Areas within the Area of Analysis

State and County	Site name	Location	Route Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Illinois				
Cook	Ping Tom Memorial Park	300 W. 18th St., Chicago	2, 4, 5	9
Cook	Fuller Park	331 W. 45th Street, Chicago		2, 4, 5
Cook	Armour Square Park	3309 S. Shields Avenue	2, 4, 5	
Cook	Malus Playlot Park (Malus Neighborhood Park	5426 S. Shields Avenue		2, 4, 5
Cook	Sherwood Park	5701 S. Shields Avenue	2, 4, 5	

State and County	Site name	Location	Route Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Cook	Englewood High School Athletic Fields	6201 South Stewart Avenue	2, 4, 5	
Cook	Unimproved Park No. 527	6200 S LaSalle Street, Chicago	2, 4, 5	
Cook	Calumet Citywide Park	9801 S. Avenue G, Chicago		2, 4, 5
Cook	Battle of Fort Dearborn Passive Park	1801 S. Calumet Ave., Chicago	9	
Cook	Lake Meadows Community Park	3113 S. Rhodes Ave., Chicago	9	
Cook	Burnham Park	5491 South Shore Drive	9	
Cook	Groveland Local Park	Cottage Grove Avenue, Chicago	9	
Cook	Woodland Local Park	Cottage Grove Avenue, Chicago	9	
Cook	Oakland Local Park	Lake Park Ave., Chicago	9	
Cook	Williams-Davis Park	4101 S. Lake Park Ave., Chicago	9	
Cook	Kenwood Academy High School Athletic Fields	5015 S. Blackstone Ave., Chicago		9
Cook	Jackson Park	6401 S. Stony Island Ave., Chicago		9
Cook	Midway Plaisance Citywide Park	5950 S. Woodlawn Ave., Chicago	9	
Cook	Debow Playlot Park	S. University and E. 8th St., Chicago	9	
Cook	Lorraine Dixon Park	S. Dauphin Ave. and 89th Street, Chicago	9	
Cook	Dauphin Park	S. Dauphin Ave. and 87th Street, Chicago	9	
Cook	Gately Park	744 E. 103rd Street, Chicago	9	
Cook	Pullman Playlot Park	E. 111th Pl., Chicago	9	
Cook	Burnham Prairie Nature Preserve	E. State St. and S. Torrence Ave., Chicago	9	
Indiana				
Lake	Brunswick Local Park	between Burr St and Clark Road	9	
Lake	Hammond Marina Lake Front Park and Sanctuary	Hammond		2, 4, 5
Lake	Wolf Lake/Forsyth Park Trail	overpass near Lakefront Park, Whiting	2, 4, 5	
Lake	Whihala Beach County Park	on Lake Michigan in Whiting		2, 4, 5

State and County	Site name	Location	Route Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Lake	Whiting Trail/ Whihala Beach Bike Trail	on Lake Michigan in Whiting	2, 4, 5	
Lake	Atchison Avenue Tot Lot & Whiting Horseshoe Club	1500 Atchison Ave. Whiting	2, 4, 5	
Lake	Whiting Park	Front Street, Whiting	2, 4, 5	
Lake	Phase 2 - Bridge St. to Clark Street	Longitudinal with a crossing at W. 2nd Street, Gary	5	
Lake	Phase 1 - Union Station to Bridge Street Trail	Tyler Street to Indiana Harbor Belt RR (crossing into Indiana Dunes), Gary	2, 4	
Lake	Van Buren Street Tot Lot	16th Ave. and Van Buren, Gary		5, 9
Lake	Clark and Pine Nature Preserve	West of Clark Road , Gary		4
Lake	Carolina Local Park	14th Avenue & Carolina St., Gary		4, 5, 9
Lake	Gibson Fields/Earl Buck Weaver Memorial Field	400 S. Gibson, Gary	2	
Lake	Four Winds Local Park/Lake Station Senior League Field	Marquette Road, Lake Station	5, 9	
Lake and Porter	Indiana Dunes National Lakeshore, various associated wildlife refuge and park facilities	Lake Michigan shoreline	2, 4	5, 9
Porter	Park (name not determined)	Off Blake Road just east of Lake/Porter County Line		5, 9
Porter	Woodland Park	Willow Creek Road, Porter County	5, 9	
Porter	State Park Little League Park	Woodlawn Ave. and Waverly Rd., Porter	2, 4, 5, 9	
Porter	Iron Horse Heritage Trail (Portage Park and Rec)	Crossing from Woodland Park to Willow Creek Road	5, 9	
LaPorte	Washington Park	Center Street, Michigan City	2, 4, 5, 9	
LaPorte	Pottawattamie Park	East of Michigan City	2, 4, 5, 9	
Michigan				
Berrien	Grand Beach Municipal Golf Course	Grand Beach	2, 4, 5, 9	

State and County	Site name	Location	Route Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Berrien	Galien River County Park Preserve Acquisition & Development	New Buffalo Township	2, 4, 5, 9	
Berrien	Red Arrow Corridor Bike Route crossing	New Buffalo Township	2, 4, 5, 9	
Berrien	Buffalo Township Memorial Park	US 12, New Buffalo Township	2, 4, 5, 9	
Berrien	McCoy Creek Recreation Area	Buchanan		2, 4, 5, 9
Kalamazoo	Knollwood City Park	1500 Greenwood Ave. Kalamazoo	2, 4, 5, 9	
Kalamazoo	Lovell Park Greenspace	1101 W. Lovell Street, Kalamazoo	2, 4, 5, 9	
Kalamazoo	College Park Greenspace	840 W. Michigan Ave, Kalamazoo	2, 4, 5, 9	
Kalamazoo	W. Main Park Greenspace	800 W. Main Street, Kalamazoo	2, 4, 5, 9	
Kalamazoo	Peer Park	Comstock Twp.		
Kalamazoo	Martin Luther King Jr. Memorial Park	507 N. Rose Street, Kalamazoo	2, 4, 5, 9	
Kalamazoo	River Oaks County Park	Galesburg	2, 4, 5, 9	
Kalamazoo	Fort Custer Recreation Area	5163 Fort Custer Drive, Augusta		2, 4, 5, 9
Calhoun	Kimball Pines County Park	E. Michigan Ave., Battle Creek (Emmett Township)	2, 4, 5, 9	
Jackson	Jackson High School athletic fields and property	544 Wildwood Ave., Jackson	2, 4, 5, 9	
Jackson	Beech Tree City Park	406 N Blackstone St., Jackson	2, 4, 5, 9	
Washtenaw	Beech Middle School	Chelsea	2, 4, 5, 9	
Washtenaw	Mill Creek Park (formerly Warrior Park)	Alpine Street, Dexter	2, 4, 5, 9	
Washtenaw	Dexter Huron Metropark	Dexter	2, 4, 5, 9	
Washtenaw	Quackenbush Dr. Green Space (Dexter)	Dexter	2, 4, 5, 9	
Washtenaw	Delhi Metropolitan Park	Ann Arbor	2, 4, 5, 9	
Washtenaw	Bird Hills Nature Area	Ann Arbor	2, 4, 5, 9	

State and County	Site name	Location	Route Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Washtenaw	Barton Hills Village Park/Barton Nature Area	Ann Arbor	2, 4, 5, 9	
Washtenaw	Huron Bridge Park	Ann Arbor	2, 4, 5, 9	
Washtenaw	Bandemer Park	1331 Lake Shore Dr., Ann Arbor	2, 4, 5, 9	
Washtenaw	Bluffs Nature Area	1099 Main Street, Ann Arbor		2, 4, 5, 9
Washtenaw	Wheeler Park	Depot Street, Ann Arbor		2, 4, 5, 9
Washtenaw	Broadway Park	Broadway Street, Ann Arbor	2, 4, 5, 9	
Washtenaw	Riverside Park	Canal St. and Island Dr., Ann Arbor	2, 4, 5, 9	
Washtenaw	Fuller Park	Fuller Street, Ann Arbor	2, 4, 5, 9	
Washtenaw	Furstenburg Park/Nature Area	Fuller Road, Ann Arbor	2, 4, 5, 9	
Washtenaw	Mitchell Field	2100 Fuller Road, Ann Arbor	2, 4, 5, 9	
Washtenaw	Gallup Park	Ann Arbor	2, 4, 5, 9	
Washtenaw	Devonshire	Devonshire Road, Ann Arbor		2, 4, 5, 9
Washtenaw	Huron Hills Golf Course	3465 Huron River Dr., Ann Arbor	2, 4, 5, 9	
Washtenaw	South Pond Nature Area	E. Huron River Service Drive, Ann Arbor	2, 4, 5, 9	
Washtenaw	Forest Nature Area	Stark Strasse St., Ann Arbor	2, 4, 5, 9	
Washtenaw	Parker Mill County Park	4650 Geddes Road, Ann Arbor	2, 4, 5, 9	
Washtenaw	Border to Border Trail/ Gallup Park Pathway	Along Huron River from Bird Road to Mitchell Field to Gallup Park to Parker Mill County Park, Ann Arbor. Along EMU Campus, Ypsilanti	2, 4, 5, 9	
Washtenaw	Frog Island Park	Ypsilanti	2, 4, 5, 9	
Washtenaw	Harris Park	Ypsilanti	2, 4, 5, 9	
Wayne	Treadwell Street Recreation Area		2, 4, 5, 9	
Wayne	H. Craig Walz Quadraplex	32500 Forest St., Wayne		2, 4, 5, 9
Wayne	Crowley Park	2600 Westwood St., Dearborn	2, 4, 5, 9	
Wayne	King Boring Park	3901 Greenfield Rd., Dearborn	2, 4, 5, 9	
Wayne	Geer Park Elementary School	14767 Prospect Rd., Dearborn	2, 4, 5, 9	
Wayne	Harry Ranch City Park/Playground	Earl Street, Wayne		2, 4, 5, 9

State and County	Site name	Location	Route Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Wayne	St. Hedwig Playfield (Memorial Park)	Junction Street, Detroit	2, 4, 5, 9	
Wayne	Coventry Park	Coventry Street, Highland Park	2, 4, 5, 9	
Wayne	Michigan State Fairgrounds	Woodward Avenue, Detroit	2, 4, 5, 9	
Wayne	Hunt Playground	Fayette Street, Detroit	2, 4, 5, 9	
Oakland	Gainsboro Park	Gainsboro Avenue, Pleasant Ridge	2, 4, 5, 9	
Oakland	Meininger Park	Maxwell & Farnum Ave., Royal Oak	2, 4, 5, 9	
Oakland	Royal Oak Middle School athletic fields	Upton Street, Royal Oak	2, 4, 5, 9	
Oakland	Lions Club Park (Woodsboro Park)	1501 Hilldale Drive, Royal Oak	2, 4, 5, 9	
Oakland	Clawson Park	Ferncliff Ave., Royal Oak	2, 4, 5, 9	
Oakland	Royal Oak Golf Club	Don Soper Drive, Royal Oak	2, 4, 5, 9	
Oakland	Normandy Oaks Golf Club	Delemere Blvd, Royal Oak	2, 4, 5, 9	
Oakland	Manor Park	Big Beaver Road, Bloomfield Township	2, 4, 5, 9	
Oakland	Springdale Park Golf Course	Strathmore Road, Birmingham	2, 4, 5, 9	
Oakland	Stonycroft Hills Golf Club	Opdyke Road, Bloomfield Hills	2, 4, 5, 9	

**The last column lists routes affecting parks that are not adjacent to the track, but still within the Area of Analysis.*

Table 3-25: Wildlife Refuges and Nature Preserves within the Area of Analysis

County and State	Site name	Location	Routes Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Illinois				
Cook	Beaubien Woods Forest Preserve	1 W. Doty Ave. S., Chicago	9	
Cook	Burnham Prairie Nature Preserve	2866 E 142nd St, Burnham	9	

County and State	Site name	Location	Routes Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Indiana				
Lake	Burnham Nature Sanctuary, 47th Street Habitat Garden	4700 S Lake Shore Dr., Chicago	9	
Lake	Clark and Pine Nature Preserve	Gary	5	
Lake	Pine Station Nature Preserve (DNR)	Gary	5	
Lake	Ivanhoe South (Dune and Swale) (Shirley Heinze Environmental Fund)	Gary	9	
Lake	Grand Lake Recreation Area (East Gary Park Board)	East Gary	5	
Lake	Portage (Woodland) Park (Portage Parks and Recreation)	Portage	5, 9	
Lake	Clarke Junction West Site	Gary	2, 4, 5	
Lake	Tolleston Nature Preserve	Gary	9	
Lake	Clarke and Pine Gen. Refractories Addition Site	Gary	5	
Lake	Brunswick Center Savanna Site	Gary	9	
Lake/Porter	Indiana Dunes National Lakeshore	Lake Michigan Shoreline	2, 4	5, 9
LaPorte	Washington Park	Michigan City	2, 4, 5, 9	
Michigan				
Berrien	Grand Beach Preserve (Nature Conservancy)	Grand Beach	2, 4, 5, 9	
Berrien	Bakertown Fen Preserve (Nature Conservancy)	Buchanan	2, 4, 5, 9	
Kalamazoo	Fort Custer State Recreation Area	5163 Fort Custer Drive, Augusta	2, 4, 5, 9	
Jackson	Grass Lake State Game Area/Schlee Waterfowl Production Area	Grass Lake	2, 4, 5, 9	

County and State	Site name	Location	Routes Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Washtenaw	Chelsea State Game Area (DNR)	Chelsea	2, 4, 5, 9	
Washtenaw	Albert J. Miller and Robert & Nancy Smith Preserve and Trail	Dexter	2, 4, 5, 9	
Washtenaw	Burns-Stokes Preserve and Trail	Dexter	2, 4, 5, 9	
Washtenaw	Osborne Mill Preserve and Trail	Dexter	2, 4, 5, 9	
Washtenaw	Barton Nature Area	Ann Arbor	2, 4, 5, 9	

**The last column lists routes affecting parks that are not adjacent to the track, but still within the 500-foot Area of Analysis.*

3.12.3 Impacts of the No Build Alternative

Under the No Build alternative, the Program would not be implemented and so the potential Program-related uses of Section 4(f) resources described in Section 3.12.3 would not occur.

3.12.4 Impacts of Build Alternatives

The greatest potential use of Section 4(f) properties lies within the Indiana and Illinois sections between Chicago Union Station and Porter, Indiana. In these locations, there may be a need to acquire right of way in areas where additional tracks are needed and for constructing new connections between railroads. Bridges may also be necessary in some locations. These improvements are described in Chapter 2 (Alternatives Considered). As engineering and design is refined, these impacts can be assessed more fully, which would occur during the Tier 2 NEPA analyses.

Table 3-24 summarizes which alternatives may affect each potential Section 4(f) park property and Table 3-25 lists potential wildlife refuges. See Section 3.11 (Cultural Resources), Table 3-22 for an analysis of each of the alternatives' potential effects on historical and archaeological properties. See Section 3.19 (Natural Habitats and Wildlife) for a discussion of potential impacts to wildlife refuges. Most of the resources listed in Table 3-24 and Table 3-25 are adjacent to the tracks and could be impacted in places where additional right of way will be acquired for the Program. The property list also included properties located within 250 feet, but not abutting the track, as indicated. These properties are not expected to be acquired by the Program, however due to their proximity, should be analyzed for potential "constructive use" during the Tier 2 NEPA analyses, see Footnote 102 on Page 172 for the definition of "Section 4(f) use".

All of the Build Alternatives in each of the states have Section 4(f) properties either directly adjacent to or within 250 feet of the existing rail centerline (the Area of Analysis). Potential impacts on Section 4(f) properties would be evaluated in accordance with the requirements set forth in 49 USC 303 and FRA will coordinate with the officials with jurisdiction over the properties to determine each affected property's significance and potential use during Tier 2 NEPA analysis. Note that throughout the Corridor no field work was performed as part of the Tier 1 EIS. Tier 2 NEPA analyses would require archaeological surveys as necessary to determine specific impacts where construction of Program improvements may involve ground disturbing activities.

The following discussion describes the various types of Section 4(f) properties within the Area of Analysis for each alternative.

3.12.4.1 Impacts Common to All Alternatives

Michigan

Within the Area of Analysis in Michigan, which is common among all Build Alternatives, there are 61 park and recreation areas, 9 wildlife and waterfowl refuges and 68 historic properties that may potentially be affected.

3.12.4.2 Route 2 Impacts

Indiana Dunes, community parks, public school athletic fields, playgrounds, recreational trails, nature preserves and a number of historic and archaeological resources are located within the Route 2 Area of Analysis. Most of the resources in Route 2 are adjacent to the tracks and could be impacted in places where additional right of way will be acquired for Route 2.

Within the Area of Analysis of Route 2 there are 81 park and recreation areas, 14 wildlife refuges and 54 historic sites that may potentially incur a Section 4(f) use.

Illinois

Within the Route 2 Area of Analysis in Illinois there are 9 park and recreation areas, no wildlife and waterfowl refuges, 24 historic sites that may incur a Section 4(f) use.

Indiana

Within the Route 2 Area of Analysis in Indiana there are 12 park and recreation areas, 5 wildlife and waterfowl refuges and 5 historic sites that may potentially incur a Section 4(f) use.

3.12.4.3 Route 4 Impacts

Indiana Dunes, community parks, public school athletic fields, playgrounds, recreational trails, nature preserves and a number of historic and archaeological resources are located within the Route 4 corridor.

Within the Area of Analysis of Route 4 there are 82 park and recreation areas, 14 wildlife refuges and 54 historic sites that may potentially incur a Section 4(f) use.

Illinois

Within the Route 4 Area of Analysis in Illinois there are 9 park and recreation areas, no wildlife refuges, and 24 historic sites that may potentially incur a Section 4(f) use.

Indiana

Within the Route 4 Area of Analysis in Indiana there are 13 park and recreation areas, 5 wildlife refuges and 5 historic sites that may potentially incur a Section 4(f) use.

Route 4 would impact the Indiana Dunes National Lakeshore more than other alternatives because it would require the acquisition of additional right of way for additional track on the NICTD line between Miller and Burns Harbor, Indiana Acquisition of property within this section would be a use of Section 4(f) property and would require further Section 4(f) analysis avoidance.

3.12.4.4 Route 5 Option 1 and 2 Impacts

Indiana Dunes, community parks, public school athletic fields, playgrounds, recreational trails, nature preserves and a number of historic and archaeological resources are located within the Route 5 Corridors. Most of the resources are adjacent to the tracks and could be impacted where additional right of way will be acquired. Others are located within 250 feet and are not expected to be impacted.

Within the Area of Analysis of Route 5 Option 1 and 2 there are 87 park and recreation areas, 16 wildlife refuges and 54 historic sites that may potentially incur a Section 4(f) use.

Illinois

Within the Route 5 Area of Analysis in Illinois there are 9 park and recreation areas, no wildlife refuges, and 24 historic sites that may potentially incur a Section 4(f) use.

Indiana

Within the Route 5 Area of Analysis in Indiana there are 17 park and recreation areas, 7 wildlife refuges and 5 historic sites that may potentially incur a Section 4(f) use.

Route 5 avoids potential land acquisition from the Indiana Dunes National Lakeshore. The route skirts alongside the park for approximately three miles between Chesterton, Indiana and Beverly Shores, Indiana where the National Lakeshore property is buffered from the railroad by US Highway 20.

3.12.4.5 Route 9 Option 1 and Option 2 Impacts

Community parks, public school athletic fields, playgrounds, recreational trails, nature preserves and a number of historic and archaeological resources are located within the Route 9 corridors. Most of the resources are adjacent to the tracks and could be impacted where additional right of way would be acquired. Others are located within 250 feet and are not expected to be impacted.

Within the Area of Analysis of Route 9 Option 1 and 2 there are 89 park and recreation areas, 17 wildlife refuges and 65 historic sites that may potentially incur a Section 4(f) use.

Illinois

Within the Route 9 Area of Analysis in Illinois, there are 17 park and recreation areas, 2 wildlife refuges and 33 historic sites that may potentially incur a Section 4(f) use.

Indiana

Within the Route 9 Area of Analysis in Indiana, there are 11 park and recreation areas, 6 wildlife refuges and 7 historic sites that may potentially incur a Section 4(f) use.

Route 9, like Route 5 avoids potential land acquisition from the Indiana Dunes National Lakeshore. The route skirts alongside the park for approximately three miles between Chesterton, Indiana and Beverly Shores, Indiana where the National Lakeshore property is buffered from the railroad by US Highway 20.

3.12.5 Potential Mitigation Measures

The next steps in the assessment of affected Section 4(f) properties will include whether there are impacts that constitutes a “use” of a Section 4(f) resource and then the evaluation of feasible and prudent avoidance alternatives and evaluation of all possible planning to minimize harm to the affected properties. Identification of potential impacts to Section 4(f) resources will be identified as preliminary engineering for each route is completed and will be used to help identify the Preferred Alternative.

Where the use of Section 4(f) property cannot be avoided, all possible planning must be done to minimize harm. Ways to minimize use of Section 4(f) properties include designing improvements in a way to avoid the acquisition of right of way from Section 4(f) properties. Minimization of harm could also include design that lessens the impact or agreeing on ways to compensate for impacts.

Specific mitigation measures, where required, would be developed in future Tier 2 NEPA analysis when design details are known and specific impacts to Section 4(f) properties are identified. Measures would be identified in consultation with the officials with jurisdiction over the resources. These mitigation measures would be implemented prior to construction when practical and possible.

Additional potential mitigation measures for historic properties are detailed in the discussion of potential mitigation measures for Cultural Resource impacts. This would include any measures stipulated in a Section 106 programmatic agreement, see Section 3.11.5 above.

There is also the potential for "*de minimis"* impacts. SAFETEA-LU Section 6009 part (a)[104] provides a simplified approval process of projects that are found to have *de minimis* impacts on Section 4(f) property. This means, in general, that the Section 4(f) use will not adversely affect the activities, features, and attributes of the Section 4(f) property. When a *de minimis* impact determination is made, an analysis of avoidance alternatives is not required. A *de minimis* impact determination requires agency coordination with the officials have jurisdiction over the property and opportunity for public involvement.

A *de minimis* impact, after considering measures to minimize harm, can result where a Section 106 determination of "no adverse effect" or "no historic properties affected" has been made. For other types of Section 4(f) properties (parks, recreation areas and refuges), a *de minimis* finding may be made when all three of the following criteria are satisfied:

- The transportation use of the Section 4(f) resource, together with any impact avoidance, minimization, and mitigation or enhancement measures incorporated into the project, does not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f)
- The public has been afforded an opportunity to review and comment on the effects of the project on the protected activities, features, and attributes of the Section 4(f) resource
- The officials with jurisdiction over the property are informed of the FRA's intent to make the *de minimis* impact determination based on their written concurrence that the project will not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f). Findings of *de minimis* impacts would take place as part of future Tier 2 NEPA analysis if a Build Alternative is identified as the Selected Program Alternative.

3.13 Section 6(f) Properties

This section identifies parks and recreation areas that are subject to the protections afforded under Section 6(f) and discusses potential impacts to any identified properties.

3.13.1 Methodology and Regulatory Requirements

The federal Land and Water Conservation Fund Act (LWCF or LAWCON) provides grants to assist in the planning, acquisition, development or rehabilitation of park facilities.[105] Section 6(f)(3) of the LWCF Act provides legal protection for grant-assisted recreation sites by disallowing conversion of any part of

[104] 109th Congress. Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy For Users (SAFETEA-LU). Public Law 109-59. August 10, 2005.
[105] 36 CFR 59, Land and Water Conservation Fund Program

these properties to other than public outdoor recreation uses. The intent of the law is to ensure that investments in park resources are not casually discarded.

Any proposed conversions of Section 6(f) lands for transportation uses must first be approved by the Secretary of Interior or the state responsible for compliance and enforcement of the provisions of the LWCF Act. If a conversion is approved, conditions may be applied, such as replacing the lands with other comparable recreation lands.

Section 6(f) properties were identified by comparing the list of Section 4(f) park and wildlife refuge properties (Table 3-24 and Table 3-25) to a list of LWCF funded properties. This list of LWCF properties is available on the National Park Service's website.[106] In future Tier 2 NEPA analysis, the list of identified properties along the Selected Program Alternative will be reviewed and updated and local jurisdictions will be contacted to determine the effects of each Program improvement project on qualifying parks.

3.13.2 Affected Environment

See Table 3-26 for a summary of properties that were identified as having received Section 6(f) funding for park improvements or acquisition. Future Tier 2 NEPA analysis will update this information and include coordination with park officials to determine with certainty whether they received funding for any affected parks.

Table 3-26: Section 6(f) Properties within the Area of Analysis

State and County	Site name	Location	Route Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Illinois				
	No Section 6(f) properties identified in Illinois			
Indiana				
Porter	Woodland Park	Willow Creek Road	5, 9	
Lake	Four Winds Park	Marquette Road, Lake Station	5, 9	
Porter and Lake	Indiana Dunes National Lakeshore	Lake Michigan shoreline	2, 4	5, 9
Michigan				

[106] National Park Service Land and Water Conservation Fund website. http://waso-lwcf.ncrc.nps.gov/public/index.cfm.

State and County	Site name	Location	Route Corridors with site directly adjacent to track	Route Corridors with site not adjacent to tracks*
Kalamazoo	River Oaks County Park	Galesburg	2, 4, 5, 9	
Kalamazoo	Fort Custer Recreation Area	5163 Fort Custer Drive, Augusta		2, 4, 5, 9
Washtenaw	Parker Mill County Park	4650 Geddes Road, Ann Arbor	2, 4, 5, 9	
Washtenaw	Border to Border Trail/Gallup Park Pathway	Along Eastern Michigan University Campus, Ypsilanti	2, 4, 5, 9	
Washtenaw	Frog Island Park	Ypsilanti	2, 4, 5, 9	

**The last column lists routes affecting parks that are not adjacent to the track, but still within the Area of Analysis.*

3.13.3 Impacts of the No Build Alternative

Under the No Build alternative, the Program would not be implemented and so the potential Program-related uses of Section 6(f) resources would not occur.

3.13.4 Impacts of Build Alternatives

The following sections describe the Section 6(f) properties within the Area of Analysis of each of the Alternatives.

3.13.4.1 Impacts Common to All Alternatives

Michigan

Common impacts for this topic are relevant only to the portion of the Area of Analysis in Michigan. Within Michigan there are a number of parks including River Oaks County Park and Fort Custer Recreation Area in Kalamazoo County, which were funded using the LWCF Act. In Washtenaw County, LWCF funded parks include Parker Mill County Park, Frog Island Park in Ypsilanti and the Border to Border Trail/Gallup Park Pathway. The Border to Border Trail/Gallup Park Pathway connects several parks including Gallup Park, Parker Mill County Park, and Mitchell Field. It is anticipated that the Build Alternatives would not require acquisition of right of way in these locations, however if right of way would be required, additional coordination would be necessary to determine the impacts and mitigation measures.

Illinois

There are no Section 6(f) properties identified in Illinois within the Area of Analysis.

3.13.4.2 Route 2 Impacts

Indiana

Route 2's alignment is located on existing rail alignment that travels through over five miles of Indiana Dunes National Lakeshore property. Additionally, it directly abuts about 3.5 miles of National Lakeshore lands. Areas within the 500-foot corridor for Route 2 are comprised primarily of wooded and wetland preservation areas. No facilities such as buildings or trails are expected to be affected by railroad improvements because they are too far from the rail line. Facilities located within the 500-foot corridor include the Paul H. Douglas Center for Environmental Education and Miller Woods property where there are wetlands, open water and trails, parking areas and buildings devoted to environmental education. Also, the Tolleston Dunes Overlook structure is located on the south side of the US 12. Picnic areas are also present within the 500 foot corridor. Any right of way acquisition from the National Lakeshore would constitute a Section 6(f) impact and require additional evaluation during Tier 2 NEPA analysis.

3.13.4.3 Route 4 Impacts

Indiana

Route 4's alignment is located on existing rail line that travels through about 3.75 miles of Indiana Dunes National Lakeshore property. Additionally, it abuts approximately 3.75 miles of the property. Areas within the 500-foot corridor for Route 4 are similar in character as described above for Route 2 for the Indiana Dunes National Lakeshore.

3.13.4.4 Route 5 – Options 1 and 2 and Route 9 – Options 1 and 2 Impacts

Indiana

The Indiana Dunes National Lakeshore lies just north of the Route 5 and 9 routes for about two miles. The National Lakeshore property is within the 500-foot corridor, but not directly adjacent to the tracks. In addition, a buffer is created by US 20, a two lane US Highway that runs parallel to and between the tracks and the Indiana Dunes' property line. It is expected that no right of way acquisition from the National Lakeshore would be required.

The wooded southeast corner of Woodland Park in Porter County, Indiana lies adjacent to the route at the Willow Creek Road crossing. Any necessary crossing improvements at this location could possibly require acquisition of right of way. This would need to be further analyzed in final design.

Four Winds Park lies within the 500-foot corridor, but is not directly adjacent to the tracks. A buffer is created by Marquette Road, a two lane rural highway that runs parallel to and between the tracks and the park property. It is anticipated that any acquisition of this property can readily be avoided.

3.13.5 Potential Mitigation Measures

Coordination would be done with the Department of Interior and Section 6(f) property agencies along the Selected Program Alternative to verify if potentially impacted lands were improved using LWCF funding. Impacts to LWCF funded lands would be addressed during Tier 2 NEPA analysis, when greater design detail is available to assess the effects.

In general, Section 6(f) lands will be avoided to the extent practicable. As required under 36 CFR Part 59 (Land and Water conservation Fund Program) all practical alternatives to the proposed conversion of LWCF lands will be evaluated. For LWCF lands that cannot be avoided, replacement property would be provided that is of at least equal fair market value and of reasonably equivalent usefulness for recreation purposes as the land proposed to be taken. Specific conversion requirements detailed in Section 36 CFR 59.3 will be followed to ensure that the Federal investments in LWCF assistance are maintained in public outdoor recreation use.

3.14 Visual and Aesthetic Quality

This resource includes both natural and built visual scenic resources along the Area of Analysis and the general aesthetic quality of the visual environment, including the track facility, trains, stations, and maintenance facility.

3.14.1 Methodology and Regulatory Requirements

The regulatory framework pertaining to visual resources and aesthetic quality is FRA's Environmental Procedures Section 14(n)(12). To determine which visual resources are unique and have potential scenic qualities, a review of GIS data to find public parks, recreation areas, national register-listed historic sites, and designated natural areas (including conservation areas, forest and nature preserves, wildlife refuges, and wildlife management areas) as these sites often possess aesthetic and visual qualities.

There are two distinct categories of views to be considered in discussing the visual environment: 1) views from the train, which are views of visual/scenic resources; and 2) views of the railroad facilities (sidings and track, trains, maintenance facilities and stations) from an adjacent vantage point, by people in adjacent areas who are sensitive to those views.

Potential visual/scenic resources within or adjacent to the Area of Analysis were divided into five categories

- Public parks and recreational areas
- Natural areas
- Major perennial river corridors with riparian woodlands
- Historic sites
- City/small town areas

3.14.2 Affected Environment

Visual/scenic resources including historic properties, public parks, recreational areas, and natural areas within the Area of Analysis are shown on the maps in Appendix B. The maps also readily portray a view of rural and urban areas.

3.14.2.1 Views from the Train

Potential visual/scenic resources within or adjacent to the Area of Analysis include 86 parks and recreation areas, 20 natural areas, 14 major perennial rivers with riparian woodlands, 81 historic resources listed on or eligible for listing on the NRHP, and 56 built-up environments of the cities (including suburbs) and small communities.

Illinois

The Illinois portion of the Area of Analysis travels through the urban built-up environment of the major metropolitan area of Chicago. The landscape includes the high-rises of downtown Chicago, transportation corridors including highways, city streets, freight and passenger rail facilities and trains, heavy industrial areas as well as commercial districts that the route passes through. There are also some natural, open space areas including Burnham Prairie Nature Preserve and Beaubien Woods Forest Preserve.

Indiana

Through Indiana the visual environment is characterized by both urban built-up environment through East Whiting, Gary, Michigan City, and the environs of the smaller communities located between these larger cities. The Corridor passes through heavy industrial zones of these communities. The landscape includes wetlands and woodlands as it transitions to the less developed areas surrounding the Indiana Dunes National Lakeshore. The East Fork of the Little Calumet River, Indiana Dunes National Lakeshore contains wooded areas, manicured open fields, and/or water bodies, which can provide visual interest.

Michigan

Through Michigan the Area of Analysis changes over to more rural landscapes interspersed with urban built-up environments of the larger cities of Kalamazoo, Jackson, Ann Arbor, Detroit and Pontiac as well as a number of smaller communities located along the Corridor. The majority of the visual environment through which the route alternatives travel in Michigan is characterized by flat to gently sloping plains of open agricultural cropland, interspersed with areas of gently rolling hills.

Although the agricultural cropland and pastureland in the Area of Analysis can exhibit visual qualities of their own, the river corridors contain woodlands and surface water that provide visual contrasts to the open areas of the countryside, and contrasts with the built environments within the cities. The numerous river corridors and their tributaries including St. Joe River, River Rouge, the Huron River, Galien River, and the Kalamazoo River provide scenic views as the passenger trains travel on bridges over these water resources.

Many of the parks/recreation areas and natural areas including the Chelsea State Game Area, Fort Custer Recreation Area in Michigan, contain wooded areas, manicured open fields, and/or water bodies, which can provide visual interest.

In addition, historic buildings and structures scattered within the cities and towns, possess unique architectural elements that can provide scenic qualities for on-looking passengers. In some instances, the remainder of the buildings in the urban areas and small towns can possess aesthetic qualities and provide views of urban and small town character.

3.14.2.2 Views of the Railroad Facilities

Individuals located in the adjacent residential areas of municipalities (cities, suburbs, and towns) who would have the potential for undesirable views of the railroad facilities are considered to be sensitive visual receptors. There are 56 municipal areas along the rail line that have potential sensitive visual receptors. Existing views of the railroad sidings and track will not change substantially throughout the Area of Analysis. Although the sidings and track are low-profile visual elements in the landscape, the current trains are vertical elements that are periodically seen by sensitive viewers. Currently, views of passenger and freight trains occur frequently throughout the urbanized areas of the Corridor. The residential areas within the cities and villages along the Corridor currently experience periodic views of passenger and freight trains. Existing train stations and depots are also visible to residents in adjacent neighborhoods. However, the architecture of some of the depot buildings is typically considered aesthetically pleasing.

3.14.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be constructed. The routes between Chicago and Detroit/Pontiac would continue to be used for freight and/or passenger trains. No new Program-related trains and facilities would be added to the landscape. Views to and from the Corridor would not be altered beyond what would occur with implementation of other projects.

3.14.4 Impacts of the Build Alternatives

The proposed Build Alternatives, include tree and brush clearing, placement of fill material for additional track and siding, new track and siding, new flyovers, culvert, replacement or extensions, bridge replacement or additions, a new suburban station in northwest Indiana and new maintenance facility in Pontiac, Michigan, as well as the added train frequencies could have the potential to impact visual/scenic resources and affect sensitive visual receptors present in the Area of Analysis. A summary of the type and number of visual receptors that may be affected along each Build Alternative route is shown in Table 3-27 below. Proposed major infrastructure improvements are shown in Table 2-11 in Chapter 2 (Alternatives Considered).

Table 3-27: Summary of Sensitive Visual Receptor Sites

	Alternative					
	2	4	5 Option 1	5 Option 2	9 Option 1	9 Option 2
Illinois						
Parks/Rec	9	9	9	9	17	17
Natural Areas	0	0	0	0	2	2
Major River Corridors	2	2	2	2	2	2
City/Small Towns	1	1	1	1	3	3
Historic	23	23	23	23	35	35
TOTAL ILLINOIS	**35**	**35**	**35**	**35**	**59**	**59**
Indiana						
Parks/Rec	12	13	17	17	11	11
Natural Areas	5	5	7	7	6	6
Major River Corridors	5	5	5	5	4	4
City/Small Towns	12	12	12	12	11	11
Historic	5	5	5	5	7	7
TOTAL INDIANA	**39**	**40**	**46**	**46**	**39**	**39**
Michigan						
Parks/Rec	61	61	61	61	61	61
Natural Areas	9	9	9	9	9	9
Major River Corridors	7	7	7	7	7	7
City/Small Towns	39	39	39	39	39	39
Historic	68	68	68	68	68	68
TOTAL MICHIGAN	**184**	**184**	**184**	**184**	**184**	**184**
TOTAL AREA OF ANALYSIS	**258**	**259**	**265**	**265**	**282**	**282**

Specific impact areas will be identified for the Selected Program Alternative during Tier 2 NEPA analysis when more specific project facility limits and designs are identified.

3.14.4.1 Impacts Common to All Route Alternatives

Michigan

Through Michigan the route is exactly the same for all alternatives. The majority of the work that could include visual changes is anticipated to be in the Dearborn to Pontiac section of the Corridor and possibly minor changes at the proposed station locations. It is expected that most of this work would be within the existing right of way and along current train routes, thus little to no visual changes would be seen along

this section. The view from the train along the Corridor in Michigan would follow the existing route and therefore views from the train would be largely the same as they are currently.

Views of the railroad facilities along the Michigan segment is exactly the same for all alternatives. The views of the railroad facilities would be similar to existing because most work is anticipated to be within the existing right of way. There may be additional track siding, station improvements, crossing improvements as well as the new maintenance facility in Pontiac. Also, in order to reach a total of twenty daily trains, an additional fourteen daily trains would be added.

3.14.4.2 Route 2

Illinois

Through Illinois, Route 2 travels along the existing Amtrak route on the way to Detroit/Pontiac. Construction of new facilities is minimal and would be within or immediately adjacent to existing right of way. The exception is the portion between Englewood and Buffington Harbor, which would install two new tracks in the Com Ed right of way next the NS tracks. However, since this follows the same general route, the views from the train are expected to be the same. Views of the facility would include new track in existing utility right of way. The existing right of way currently contains high tension power lines along wide, undeveloped, vacant lots, covered in pavement, gravel, scrub brush and weeds. This area is bound by the Chicago Skyway (Interstate 90 Toll road) on the southwest and S. South Chicago Avenue on the northeast. New tracks and train traffic along this corridor would not be a noticeable visual change.

The proposed reconstruction of the existing Amtrak-owned bridge at the Calumet River may create visual changes depending on the design. Such a change would be analyzed in Tier 2 NEPA analysis.

Indiana

In Indiana, Route 2 travels along the existing Amtrak route on the way to Detroit/Pontiac. Between the Illinois border and Gary, the landscape includes urban residential neighborhoods, views of Lake Michigan and lakeside parks, heavy industry, train yards, and multi-lane highways. Just east of Gary, the route enters the Indiana Dunes National Lakeshore. From this point to LaPorte County line it travels through or along the National Lakeshore's woodlands and wetlands, interspersed with small residential communities. Through LaPorte County it runs through, Michigan City. Between Michigan City and the Michigan state line, the route travels adjacent to a golf course community, wooded areas and suburban/rural residential type developments. Although the route follows the existing passenger train route, there would be some right of way acquisition in the National Lakeshore to achieve double track. Views to and from the train in this area will not change, except with a minor increase in frequency of passenger train traffic.

In northwest Indiana, there would be a new suburban station. Views of the station should be consistent with the existing urban landscape. Design of the facility would be reviewed during Tier 2 NEPA analysis.

In addition the proposed Indiana Harbor Belt flyover in East Chicago and the abandoned drawbridge at the Indiana Harbor Canal would also create visual changes to be analyzed for the Selected Program Alternative in Tier 2 NEPA analyses.

3.14.4.3 Route 4

Illinois

In Illinois, Route 4 is the same as Route 2 and therefore the views would be the same as described for Route 2, above.

Indiana

In Indiana, the only difference from Route 2 is a slight variation near the Indiana Dunes National Lakeshore. Route 4 skirts a portion of the park to the south for a short length, rather than running through it. It then continues to follow the same path as Route 2. Views to and from the trains would be very similar to Route 2 and very similar to existing conditions as well.

In Burns Harbor, Route 4 would require a new flyover to pass over US Highway 12 as well as the Indiana Harbor Belt flyover in East Chicago. The addition of structures in these areas would change views.

In northwest Indiana, there would be a new suburban station. Views of the station should be consistent with the urban landscape. Design of the facility would be reviewed during Tier 2 NEPA analysis.

3.14.4.4 Route 5, Option 1 and Option 2

Illinois

In Illinois, Route 5 is the same as Route 2 and therefore the views would be the same as reported above for Route 2.

Indiana

In Indiana, Route 5 follows a different route than the existing Amtrak route between Gary and Porter. The new route is parallel and approximately two miles south of the existing route between Buffington Harbor and Michigan City. It travels through different areas of Gary, Chesterton, Burns Harbor and Porter and through Lake Station. It does not go through the Indiana Dunes National Lakeshore in this segment but does travel past other natural areas including Clark and Pine Nature Preserve, Pine Station Nature Preserve, Grand lake Recreation. Route 5 also crosses Willow Creek and Salt Creek. The landscape along Route 5 is more residential than Route 2. East of Porter, Route 5 follows the same route as Route 2 to the Michigan border and as such views would be the same as described above for that portion.

This route would result in new railroad facilities including new structures at Buffington Harbor, Willow Creek and Porter as well as the addition of up to 24 additional passenger train trips through this section

that currently has none. There is currently limited freight traffic along this route so these changes could change the views and character of the area.

In northwest Indiana, there would be a new suburban station. Views of the station should be consistent with the urban landscape. Design of the facility would be reviewed during Tier 2 NEPA analysis.

3.14.4.5 Route 9, Option 1 and Option 2

Illinois

In Illinois, Route 9 Option 1 and Option 2 are the same. This route varies substantially from the other alternatives. It heads east out of Chicago Union Station to Lake Shore Drive where it follows Lake Shore Drive to approximately 51st Street where it turns south and then west to the Indiana border. Route 9 travels through sections of Chicago, Calumet City, and the village of Burnham. Although this route is different than the others through the Illinois portion, the landscape and views are similarly urban built-up environments. It does however pass through more natural areas, parks, rivers, and historic properties than it would for the other Build Alternatives.

From Chicago Union Station to Kensington Junction, currently has substantial freight and passenger train traffic. Therefore views of train traffic would not be different from the existing views. From Kensington Junction to the Calumet Park, this route is currently inactive with no traffic. From Calumet Park to the Indiana border does currently carry freight traffic. As such, there would be some passenger train traffic where currently there is none.

There would be a new structure at Kensington Junction that would alter views. This structure would be analyzed further in Tier 2 NEPA analysis.

Indiana

In Indiana, Route 9 is similar to Route 5 except from the Illinois border to Tolleston. The route travels through the southern portion of the city of Chesterton, through the Tolleston Nature Preserve, Ivanhoe South natural area, and adjacent to the Gibson Woods Nature Preserve. Route 9 then joins Route 5 and continues along the same route to Michigan. Although the views will be different than Route 5 they are of similar type. Route 9 Option 1 and Option 2 are similar to one another in terms of the view from the train.

There would need to be new tracks constructed adjacent to existing tracks. The view of these facilities would be similar to existing. Currently there is freight traffic along this section of the route. However there would be an increase in train traffic due to the addition of the passenger trains.

The addition of bridge structures at Hammond Junction, Gibson Yard and Willow Creek would create new views in these areas that would need to be further analyzed during Tier 2 studies.

3.14.5 Potential Mitigation Measures

Through continued public involvement, residents' concerns about the potential views of the railroad facilities would be identified. Mitigation and impact minimization efforts would be addressed in more detail for the Selected Program Alternative in the Tier 2 NEPA documents and could include consideration of potential measures such as appropriate re-vegetation of disturbed areas of the scenic resources, visual screening of railroad facilities from adjacent residential areas, and appropriate design of structures with aesthetic features and landscaping that would complement and blend with the context of the surrounding visual environment. Specific mitigation measures, to the extent required, would be identified and discussed during Tier 2 NEPA analysis after design details of the Selected Program Alternative are known, recorded in NEPA documents as specific impacts are identified, and implemented prior to construction when practical and possible.

3.15 Water Body Crossings and Floodplains

This section discusses water body crossings including perennial and intermittent streams, lakes and ponds as designated on USGS maps and USFWS National Wetlands Inventory (NWI) maps for deep water lakes and open water ponds.

3.15.1 Methodology and Regulatory Requirements

Regulatory Framework

The regulatory framework pertaining to water resources includes the following laws and regulations:

- Section 401 (Water Quality Certification) and Section 404 (regarding discharge of fill into navigable waters) of the *Clean Water Act of 1972* (as amended)
- Section 10 of the *Rivers and Harbors Act of 1899* (33 USC 403, as amended and supplemented)
- FHWA regulations on Bridges and Structures (23 CFR 650, subparts D and H)
- Federal Navigation Regulations (33 CFR 114-115)
- U.S. Coast Guard's Section 9 General Bridge Act of 1946
- Applicable state regulations for construction in floodways and floodplains
- FRA's Environmental Procedures Section 14(n)(8)

Data Collection

The USGS National Hydrography Dataset (NHD) for Illinois and Indiana was used to compile GIS data for locations of water bodies, in the form of lakes, rivers and perennial and intermittent streams. The City of Chicago Geographic Information Systems (GIS) database was also used to compile GIS data for locations of waterways in the form of rivers and streams in Illinois. Waterway information was supplemented by the Lake Michigan Basin parkways and scenic rivers database, Illinois Natural

Resources Geospatial Data Clearinghouse, Illinois State Geological Survey streams data, and the Indiana NRC for "Outstanding Rivers" data, and wetlands data were obtained from the USFWS NWI maps. GIS hydrology and hydrography data from the Michigan Department of Technology, Management and Budget was used to compile waterway, stream, and lake information in Michigan.

The National Park Service's Nationwide Rivers Inventory (NRI) list was reviewed and properties within the Area of Analysis were identified. This is a list that contains free-flowing river segments "…that are believed to possess one or more 'outstandingly remarkable' natural or cultural values judged to be of more than local or regional significance" (NPS, August 19, 2011).

Areas of 100-year floodplain (areas with a one percent annual chance of flooding) as defined by the Federal Emergency Management Agency (FEMA) in accordance with 44 CFR 59.1. The regulatory framework pertaining to floodplains is Executive Order 11988, Floodplain Management (42 FR 26951), which requires consideration of avoidance and minimization to floodplains. As stated in this policy, federal agencies are required "… to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative". In addition, the State Emergency Management Agencies (SEMAs) have floodplain management programs in each of the affected states. Floodplain mapping was obtained from FEMA GIS National Flood Hazard Layer Web Map Service.

Analysis Methodology

The potential impacts on streams, lakes, and ponds were evaluated using GIS tools by quantifying the length and number of stream crossings and/or longitudinal encroachments, and the area and number of lakes and ponds within the Area of Analysis, see Table 3-28. In addition, potential effects on floodplains were evaluated by quantifying the acres of perpendicular and/or longitudinal encroachments, based on the intersection of floodplain areas within the Area of Analysis. Data for wetlands as designated on NWI maps were reviewed and a general description of those areas was prepared. Additional information on wetlands is discussed further in Section 3.17 (Wetlands).

A more detailed impact analysis of waterways and water bodies would be conducted in conjunction with the Tier 2 NEPA analysis, including field surveys, at which time there is the potential for additional waterways and water bodies to be identified. Smaller streams with an Ordinary High Water Mark (OHWM) and connections to jurisdictional streams (see Section 3.25.4.1) that were not included in the databases studied may also be identified. Coordination would take place with the USACE and state resource agencies will identify what water resources are under the purview of the Section 404 permitting and Section 401 water quality certification processes.

3.15.2 Affected Environment

Railroad lines are often located along the valleys of rivers and creeks to take advantage of the level and nearly level terrain, thereby minimizing cut and fill construction operations. Consequently, the Area of Analysis is located parallel to and perpendicular to waterways throughout the Area of Analysis. The

waterways and water bodies near or within the Area of Analysis are shown on the maps in Appendix B. The 62 major named streams in the Area of Analysis are listed in Appendix I by state and county. There are also a number of other perennial and intermittent streams as well as unnamed smaller streams throughout the Area of Analysis. Some segments of a particular stream run perpendicular, parallel, or skewed to the Area of Analysis, and often cross it in more than one location.

All of the major rivers and their tributaries that cross this rail section have 100-year floodplain areas associated with them. The Federal Emergency Management Agency (FEMA) has established Flood Insurance Rate Maps along many of the rivers. The floodplains within the Area of Analysis are shown in the maps in Appendix D.

Illinois

The South Branch of the Chicago River and Calumet River in Illinois are considered navigable waterways. These rivers would be crossed on existing bridges. There are no segments of NRI-listed streams within the Area of Analysis in Illinois.

Indiana

The Indiana Harbor Canal, Grand Calumet River, Burns Waterway and Trail Creek in Indiana are considered navigable waterways. In addition, the Natural Resource Commission of Indiana has rated the East Fork of the Little Calumet River in Porter County, Indiana as an Outstanding River. It is considered to be a Blue Ribbon Trout Stream with outstanding fishing value, a state-designated canoe/boating route, and it is designated as a Salmonoid Stream. All these rivers would be crossed on existing bridges. There are no segments of NRI-listed streams within the Area of Analysis in Indiana.

Michigan

Michigan's NRI-listed rivers include the Grand River in Jackson, Huron River in Ann Arbor, Kalamazoo River and Portage Creek in Kalamazoo, and the St. Joe River in Niles. In addition Rice Creek, East Branch Paw Paw River, Pokagon Creek, McKinzie Creek, Galien River, and Canal Race are designated trout streams by Michigan DNR.

There are 144 acres of water designated as deep water lakes (lacustrine) on the NWI maps in the Area of Analysis as well as an additional 37 – 47 acres of open water ponds (palustrine unconsolidated bottom) within the Area of Analysis. (See maps in Appendix D).

3.15.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and no impacts on waterways, water bodies, and floodplains are anticipated beyond those that could occur due to other projects in the Corridor.

3.15.4 Impacts of the Build Alternatives

Impacts from Build Alternatives on waterways are unavoidable since some stretches of the existing railroad were originally built along waterways and floodplains. These waterways would be impacted by construction activities including placement of fill material for additional track and siding, culvert replacement or extensions, and bridge replacement or additions. Table 3-28 provides a summary of the total stream length, total lake area and floodplain crossing area within the Area of Analysis for each state and Build Alternative. Wetland areas and impacts are discussed in Section 3.17 (Wetlands).

Table 3-28: Summary of Waterbodies and Floodplains in the Area of Analysis

Route	Stream Length (feet)				Lake/Pond Area (Acres)**				Floodplain Area (Acres)			
	IL	IN	MI*	Total	IL	IN	MI	Total	IL	IN	MI	Total
2	683	7660	258,000	**266,343**	0	15	172	**187**	8	100	822	**930**
4	683	8128	258,000	**266,811**	0	10	172	**182**	8	100	822	**930**
5 Option 1	683	8731	258,000	**267,414**	0	19	172	**191**	8	168	822	**998**
5 Option 2	683	8731	258,000	**267,414**	0	19	172	**191**	8	168	822	**998**
9 Option 1	1038	6819	258,000	**265,857**	3	8	172	**183**	10	146	822	**978**
9 Option 2	1038	6819	258,000	**265,857**	3	9	172	**184**	10	146	822	**978**

Notes:
** GIS Calculated length may include both sides of stream thereby inflating the actual stream intersect length.*
*** Calculated from NWI wetland data for Lacustrian, Limnotic, and Palustrian Unconsolidated Bottom categories.*

Temporary construction impacts on waterways and water bodies would occur as a result of soil erosion and potential construction pollutant loading of stormwater runoff, fill material placed in water resources, and construction of bridges and culverts or culvert extensions. These effects would cease after construction is completed. The avoidance or minimization of sediment pollution would be accomplished in appropriate areas by the use of BMPs as discussed below for potential mitigation measures.

Specific Impacts for each route are discussed below.

3.15.4.1 Impacts Common to All Route Alternatives

Michigan

The route through Michigan is the same for all alternatives. In Michigan, the Build Alternatives cross multiple rivers, streams and floodplains; however, proposed improvements are not anticipated to impact streams, rivers, or wetlands beyond the temporary impacts during construction. The proposed work is not anticipated to result in an impact to natural and beneficial floodplain values, specifically, flood

attenuation and storage, water quality, groundwater recharge, biological productivity of fish and wildlife, and agricultural and forestry resources.

The existing railroad embankment is above the 100-year floodplain and the proposed improvements are not expected to occur within the limits of the 100-year floodplain, change the opening beneath any structures or culverts, nor would they result in flooding of a community's sole evacuation route. Therefore, the Build Alternative would not increase the risk of flooding and would not result in impacts to human safety, health, and welfare in Michigan.

Once the specific improvements have been identified and in conjunction with the Tier 2 NEPA analysis, the waterways would be reviewed to determine potential impacts and where it is possible and practical to avoid or minimize impacts. If a project would impact water bodies, stream crossings, floodplains and wetlands, then mitigation measures would be required. If temporary impacts are identified, but they cannot reasonably be avoided, these impacts would be identified and appropriate mitigation steps taken to reduce any increase in the risk of flooding during construction. Specific mitigation measures would be identified in the Tier 2 NEPA analysis.

3.15.4.2 Route 2 Impacts

Illinois

In Illinois, impacts from the construction of Route 2 would directly impact the South Branch of the Chicago River and the Calumet River segments, totaling approximately 680 linear feet, as well as encroaching upon approximately eight acres of the 100-year floodplains associated with these rivers. These waterway segments would be impacted by construction activities including placement of fill material for additional track and siding, culvert replacement or extensions, and bridge replacement or additions at these locations. Additional review of these effects would be done during Tier 2 NEPA analysis, based on additional design details.

Indiana

The major river crossings in Indiana for Route 2 include Grand Calumet River, Indiana Harbor Canal, Portage Burns Waterway, East Fork of the Little Calumet River, and Trail Creek. Total stream length within the Area of Analysis is 7,660 feet. There are approximately 15 acres of lakes and ponds within the Area of Analysis. This includes the Kinzele Ditch and Tributaries, Trail Creek and associated floodplains. The Area of Analysis encroaches on 100 acres of 100-year floodplains associated with the streams/rivers. See the maps in Appendix D. It is not expected that any streams/rivers, lakes/ponds or floodplains would be impacted in Indiana because there are only minor limited infrastructure improvements planned for this segment. There are floodplains present in northwest Indiana where a station may be located. The exact location of the new suburban station in northwest Indiana, and potential impacts to the floodplain would need to be determined during Tier 2 NEPA analysis and station planning.

3.15.4.3 Route 4 Impacts

Illinois

In Illinois, Route 4 is the same and would cross the same rivers and floodplains as Route 2. Therefore, impacts to waterways, water bodies, and floodplains would be similar to those for Route 2.

Indiana

In Indiana Route 4 is very similar to Route 2 and therefore impacts to waterways, water bodies, and floodplains would be similar. There would be the same stream/major river crossings as well as the same floodplains affected. However, the level of impacts would vary due to the slight variation in the route from Route 2. Within the Area of Analysis the total stream length is 8,130 feet, total lakes/ponds area is approximately ten acres and floodplain is approximately 100 acres.

3.15.4.4 Route 5 Option 1 Impacts

Illinois

In Illinois, Route 5, Option 1 is the same and would cross the same rivers and floodplains as Route 2. Therefore, impacts to waterways, water bodies, and floodplains would be similar to those for Route 2.

Indiana

In Indiana Route 5, Option 1's major river crossings include Grand Calumet River, Indiana Harbor Canal, Portage-Burns Waterway, Salt Creek and Willow Creek, East Fork of the Little Calumet River, and Trail Creek. Total stream length within the Area of Analysis is approximately 8,730 feet. There are approximately of 19 acres of lakes and ponds within the Area of Analysis. The Area of Analysis encroaches on approximately 170 acres of 100-year floodplains, associated with the streams/rivers. From Porter, Indiana to the Michigan border Route 5 Option 1 is the same as Route 2.

3.15.4.5 Route 5 Option 2 Impacts

Illinois

In Illinois, Route 5, Option 2 is the same and would cross the same rivers and floodplains as Route 2. Therefore, impacts to waterways, water bodies, and floodplains would be similar to those for Route 2.

Indiana

In Indiana, Route 5, Option 2's alignment is nearly identical to Route 5, Option 1 and would cross the same rivers and floodplains. Therefore, impacts to waterways, water bodies, and floodplains would be similar to those for Route 5, Option 1.

3.15.4.6 Route 9 Option 1 Impacts

Illinois

In Illinois, impacts from Route 9 Option 1 on waterways are unavoidable since some stretches of the existing railroad were originally built along waterways and floodplains, including the South Branch of the Chicago River and the Little Calumet River and the floodplains associated with them. Construction of Route 9, Option 1 would directly impact the South Branch of the Chicago River and the Little Calumet River segments, totaling approximately 1,040 linear feet. Route 9 Option 1's Area of Analysis crosses and encroaches on these two rivers' 100-year floodplain for approximately ten acres. There are also approximately three acres of lakes/ponds within the Area of Analysis.

Indiana

In Indiana Route 9, Option 1's major river crossings include Portage Burns Waterway, Salt Creek, Willow Creek, East Fork of the Little Calumet River, and Trail Creek. Total stream length within the Area of Analysis is approximately 6,800 feet. There are approximately eight acres of lakes and ponds within the Area of Analysis. The Area of Analysis encroaches on approximately 145 acres of 100-year floodplains associated with the streams/rivers. From Porter, Indiana to the Michigan border is the same as Route 2.

3.15.4.7 Route 9, Option 2

Illinois

In Illinois, Route 9 Option 2 is the same as Route 9 Option 1 and would cross the same rivers and floodplains as Route 9 Option 1. Therefore, impacts to waterways, water bodies, and floodplains would be similar to those for Route 9 Option 1.

Indiana

In Indiana, Route 9, Option 2 is nearly identical and would cross the same rivers and floodplains as Route 9, Option 1. The only difference is the approximate area of lakes/ponds, which is nine acres, one acre more than Route 9, Option 1. This is due to the slight variation in route from Route 9, Option 1.

3.15.5 Potential Mitigation Measures

Mitigation requirements would be identified in coordination with the permitting agencies. Permitting requirements are further discussed in Section 3.25 (Permits).

In conjunction with the Tier 2 NEPA analyses, the potentially affected waterways would be reviewed closely to determine where it is possible and practical to avoid or minimize impacts. Specific mitigation measures, to the extent required, would be identified and discussed after design details of the Selected Program Alternative are known. During the Tier 2 NEPA analysis, coordination would take place with the

USACE and the appropriate state resource agencies to develop avoidance and mitigation strategies. These mitigation measures would be recorded in the Tier 2 NEPA analysis and implemented prior to construction when practical and possible. Mitigation measures could include actions such as mitigation banking, in-lieu fees, and on-site or off-site Section 404 permittee responsible mitigation, see Section 3.25.4.1 (Section 404 Permits).

Impacts on the 100-year floodplains and regulatory floodways would also be assessed during Tier 2 NEPA analysis after design details of the Selected Program Alternative are known. Tier 2 NEPA analysis would include discussion of the regulatory requirements in floodplains. These discussions would also include avoidance and minimization measures, potential impacts on the natural and beneficial floodplain values, substantial changes in flooding risks or damage, and the potential for incompatible floodplain development.

Coordination with the state emergency management agencies, the departments of natural resources of each state, and local floodplain administrators would be initiated to discuss floodplain development permitting and potential mitigation measures if floodplains cannot be avoided. Mitigation could include restoring natural and beneficial floodplain values by seeding with native vegetation, and proper design of bridges and culverts so as to not restrict flood flows. Specific floodplain mitigation measures, to the extent required, would be identified and discussed during Tier 2 NEPA analysis after design details of the Selected Program Alternative are known, recorded in NEPA documents as specific impacts are identified, and implemented prior to construction when practical and possible.

3.16 Water Quality Resources

This section reviews the Program's effects on water quality resources. Water quality refers to the extent of the effects of sediment erosion and chemical pollution on surface water resources (streams, lakes, ponds, wetlands) and on groundwater in relation to karst areas (karst is defined in Section 3.16.2.2).

3.16.1 Methodology and Regulatory Requirements

Water quality was evaluated in accordance with FRA's Environmental Procedures Section 14(n)(2). The Federal Water Pollution Control Act (later amended to become the Clean Water Act), Section 303(d), requires that each state identify and list those waters that are impaired by pollutants and, as a result, are not meeting the state's water quality standards. This list of impaired surface waters is referred to as the 303(d) List. Other regulations pertaining to water quality include Sections 401 and 402 of the Clean Water Act of 1972 (as amended) and Executive Order 12088, Federal Compliance with Pollution Control Standards (43 FR 47707), and Michigan's Natural Resources and Environmental Protection Act.

In addition to the above regulations, the Clean Water Act requires that discharge of stormwater from state transportation facilities must comply with the respective state's National Pollutant Discharge Elimination System (NPDES) permit issued to the state. A state's NPDES permit includes post-construction requirements of new development, as well as stormwater controls to be used during construction for projects that disturb greater than one acre. Each state is required to develop, implement, and enforce

stormwater management programs designed to reduce the discharge of pollutants from the drainage system to the maximum extent practicable (MEP).

The same surface water data that were compiled for the Water Body Crossings and Floodplains in Section 3.15 and the Wetlands in Section 3.17 were reviewed for this water quality discussion. To determine potential karst regions in the Area of Analysis, information was obtained from Internet data and mapping by the USGS and Michigan DEQ, Indiana Geological Survey, Illinois State Geological Survey and Illinois Department of Natural Resources (Illinois DNR). The most recent Section 303(d) lists of impaired waters were gathered from the websites of the USEPA, the Illinois EPA and Indiana DEM. Mapped well locations were compiled from the Illinois Natural Resources Geospatial Data Clearinghouse, Indiana DNR geospatial data website and the Michigan DEQ's center for Shared Solutions and Technology Partnerships.

3.16.2 Affected Environment

3.16.2.1 Streams, Rivers and Lakes

As discussed in the Section 3.15 (Water Body Crossings and Floodplains), the Area of Analysis contains several waterways, and other surface water resources, all of which can be affected by runoff of pollutants from the Program. The maps in Appendix D show the water resources near or within the Area of Analysis.

As discussed in Section 3.15 (Water Body Crossings and Floodplains), there are a number of NRI-listed stream segments located within the Area of Analysis in Michigan and one Natural Resource Commission of Indiana-designated high quality stream in Indiana.

Within the Area of Analysis through all states, many of the existing stream crossings are listed as impaired under the USEPA's Section 303(d) impaired waters list. In Michigan there are over 100 such impaired stream crossings. This includes all of the major rivers except the Galien River in Berrien County, which has the fewest impaired streams within the Area of Analysis. The major rivers that are impaired are listed in Table 3-29 and the number of impaired streams by County is shown in Table 3-30. The East Branch Paw Paw River, Rice Creek, Pokagon Creek, McKinzie Creek, and Canal Race are all designated impaired, and are classified by Michigan Department of Natural Resources as Trout Streams.

Table 3-29: Major Streams Listed as Impaired within the Area of Analysis

Impaired Stream Crossings	Alternative					
	2	4	5 Option 1	5 Option 2	9 Option 1	9 Option 2
Illinois						
South Branch Chicago River	X	X	X	X	X	X
Calumet River	X	X	X	X		
Little Calumet River					X	X
Indiana						
Indiana Harbor Canal	X	X	X	X		
Grand Calumet River	X	X	X	X		
Portage Burns Waterway	X	X				
Burns Ditch			X	X	X	X
East Fork Little Calumet River (also designated an Outstanding River)	X	X	X	X	X	X
Willow Creek			X	X	X	X
Salt Creek			X	X	X	X
Kinzele Ditch and Tributaries	X	X	X	X	X	X
Trail Creek	X	X	X	X	X	X
Michigan						
East Branch Paw Paw River (Trout Stream)	X	X	X	X	X	X
Grand River	X	X	X	X	X	X
Kalamazoo River	X	X	X	X	X	X
Huron River & Barton Pond	X	X	X	X	X	X
Rouge River	X	X	X	X	X	X
St. Joe River	X	X	X	X	X	X
Rice Creek (Trout Stream)	X	X	X	X	X	X
McKinzie Creek (Trout Stream)	X	X	X	X	X	X
Canal Race (Trout Stream)	X	X	X	X	X	X

Table 3-30: Summary of Impaired Stream Crossings by County and Alternative

State and County	Alternative					
	2	4	5 Option 1	5 Option 2	9 Option 1	9 Option 2
Illinois						
Cook County	2	2	2	2	2	2
Indiana						
Lake County	3	3	5	5	2	2
Porter County	7	7	7	7	7	7
LaPorte County	3	3	3	3	3	3
Michigan						
Berrien County	10	10	10	10	10	10
Cass County	10	10	10	10	10	10
Van Buren County	10	10	10	10	10	10
Kalamazoo County	12	12	12	12	12	12
Calhoun County	13	13	13	13	13	13
Jackson County	11	11	11	11	11	11
Washtenaw County	28	28	28	28	28	28
Wayne County	11	11	11	11	11	11
Oakland County	4	4	4	4	4	4
TOTAL	**124**	**124**	**126**	**126**	**123**	**123**

3.16.2.2 Groundwater

In addition to runoff of pollutants potentially affecting surface water resources, groundwater can be affected by runoff as surface flow can be quickly lost through caves, sinkholes, and open fractures where there is minimal, if any, soil cover to act as a filter. Bedrock near the ground surface, composed of easily dissolved limestone and dolomite, is referred to as karst terrain and is characterized by fractures, caves, sinkholes, springs, and losing (influent) streams.[107] Groundwater in karst areas is highly susceptible to contamination from any pollutants that could travel with stormwater surface flow and into karst features.

[107] A losing stream is a stream where flow is reduced as it moves downstream because it infiltrates into the ground, recharging groundwater.

Illinois and Indiana

According to mapping and data available through the Indiana Geological Survey, the Illinois DNR and Illinois State Geological Survey websites, the Area of Analysis does not pass through any major karst areas in Indiana and Illinois.

Michigan

Per the USGS[108], there are potential karst areas in the Area of Analysis throughout Wayne County and a small portion of southeast Washtenaw and southeast Oakland Counties in Michigan. However, no known karst features have been identified here or in other parts of Michigan or in the remainder of the Corridor.

According to the available GIS data, there are approximately 200 water wells within the Area of Analysis in Michigan. Many of these are private wells, and from the GIS data, locations are very approximate. These locations and impacts would be further investigated in the Tier 2 studies.

3.16.2.3 Coastal Waters and Shoreland

As discussed in Section 3.18 (Coastal Zone Management Area), each state along the Corridor has a Coastal Zone Management Area.

Illinois and Indiana

Much of the Area of Analysis within Illinois and Indiana is within Coastal Zone Management Areas. All of the stream crossings in Illinois and Indiana and Lake Michigan along the Indiana shoreline in Lake and most of Porter County are on the USEPA 303(d) list of impaired waters.

Michigan

Michigan's Coastal Zone Management Area includes a small section of the Area of Analysis from the Indiana border to New Buffalo, Michigan Sections of the Galien River are within this area and a portion is on the 303(d) list, but not in the Area of Analysis.

3.16.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and permanent Program-related impacts on water quality would not occur beyond those that currently occur or could occur due to other projects.

---

[108] USGS. Michigan's Silurian-Devonian aquifer, USGS Online Publications Warehouse. Pubs.usgs.gov/ha/ha730/ch_j/jped/J079.jpeg. Accessed online January 30, 2014.

3.16.4 Impacts of Build Alternatives

The Build Alternatives would potentially affect the water quality of several water resources as a result of soil erosion from stormwater runoff; fill material placed in water resources; pollutant runoff and spills from operation and maintenance activities; and construction of bridges and culverts or culvert extensions. Construction activities of the Build Alternatives have the potential to temporarily affect water quality as a result of soil erosion and potential construction pollutant loading of stormwater runoff. The avoidance or minimization of sediment pollution would be accomplished in appropriate areas by the use of best management practices (BMPs) as discussed below under mitigation measures. Table 3-30 provides a summary of the number of impaired (Section 303(d)) stream crossings/intersects within the Area of Analysis by state, county and Build Alternative.

The construction of the Build Alternatives has the potential to affect groundwater in areas with groundwater wells. Although the exact locations of groundwater wells have not been determined as part of the Tier 1 NEPA analysis, wells would be investigated in the Tier 2 NEPA analysis, and/or during preliminary design, when more specific locations and impacts will be determined for the Selected Program Alternative.

Specific route alternatives are discussed below.

3.16.4.1 Impacts Common to All Route Alternatives

Michigan

The route through Michigan is the same for all alternatives. The proposed route crosses multiple rivers, streams and waterbodies. Proposed improvements are anticipated to impact any streams, rivers, or wetlands that may be altered during construction. These effects are expected to be minimal and BMPs would be employed to minimize effects.

Although there are karst regions in the Area of Analysis through Wayne County and small segments in Washtenaw and Oakland Counties, there are not anticipated to be any impacts to the groundwater. During Tier 2 NEPA analysis, if any specific karst features are identified, the potential direct impacts would be determined. Furthermore, BMPs would be used to divert any stormwater or pollution runoff from entering karst features.

Locations of groundwater wells have not been determined as part of the Tier 1 NEPA analysis and would be investigated during Tier 2 NEPA analyses, and/or during preliminary design, when more specific locations and impacts can be determined.

3.16.4.2 Route 2 Impacts

Illinois

In Illinois, Route 2 would cross the South Branch of the Chicago River and the Calumet River, both included on the 303(d) List of Impaired Waters and the water quality of these streams could be affected during construction.

The potential for Route 2 to adversely affect groundwater in Illinois and Indiana is minimal, since there are no major karst areas within the Area of Analysis.

Indiana

In Indiana, Route 2 crosses Grand Calumet River, Indiana Harbor Canal, Portage Burns Waterway, East Fork of the Little Calumet River, and Trail Creek, all of which are included on the 303(d) List of Impaired Waters (water quality limited waters). This alternative would potentially affect the water quality of these streams as well as potentially affect the water quality of other water resources.

3.16.4.3 Route 4 Impacts

Illinois

In Illinois, Route 4 is the same as Route 2. Impacts to water quality are the same as those for Route 2.

Indiana

In Indiana, Route 4 is very similar to and would cross the same streams as Route 2. However the actual length and total area of water bodies within the Area of Analysis varies slightly. Impacts to water quality are expected to be the same as those for Route 2.

3.16.4.4 Route 5 Option 1 and Option 2 Impacts

Illinois

In Illinois, both Route 5 Option 1and Option 2 are the same as and would cross the same impaired streams as Route 2. Therefore, impacts to water quality are the same as those for Route 2.

Indiana

In Indiana, Route 5 Option 1 and Option 2 cross the same streams as Route 2. In addition these Options cross Salt Creek and Willow Creek. All of the streams crossed are included on the 303(d) List of Impaired Waters. This alternative would potentially affect the water quality of these streams as well as the water quality of other water resources.

The potential for Route 5 Option 1 or Option 2 to adversely affect groundwater in Illinois and Indiana is minimal, since there are no major karst areas within the Area of Analysis.

3.16.4.5 Route 9 Option 1 and Option 2

Illinois

In Illinois, both Route 9 Option 1 and Option 2 would cross the South Branch of the Chicago River and the Little Calumet River; both of which are included on the 303(d) List of Impaired Waters. The impacts to water quality associated with Route 9 Option 1 would be similar as those described under Route 2, above.

Indiana

In Indiana, Route 9 Option 1 and Option 2 cross Portage Burns Waterway, Salt Creek, Willow Creek, East Fork of the Little Calumet River, and Trail Creek, all of which are included on the 303(d) List of Impaired Waters. The construction of this alternative would potentially affect the water quality of these streams as well as potentially affect the water quality of other water resources within the Area of Analysis. From Porter, Indiana to the Michigan border Route 5 Option 1 is the same as Route 2.

The potential for Route 9 Option 1 or Option 2 to adversely affect groundwater in Illinois and Indiana is minimal, since there are no major karst areas within the Area of Analysis.

3.16.5 Potential Mitigation Measures

There are a number of ways to address potential water quality impacts during construction activities. Typical measures include the development and implementation of Stormwater Pollution Prevention Plans (SWPPPs) and the use of temporary and permanent stormwater BMPs to avoid or minimize sediment pollution and water quality impacts through reductions in stormwater runoff from the site.

Best Management Practices (BMPs) will be implemented to minimize the volume of stormwater runoff discharge. This will result in physical, chemical, or biological pollutant load reduction, increased infiltration, and evapotranspiration. Proper soil erosion and sediment control measures will be used to minimize erosion and sedimentation from the project. These measures are a condition of Section 404 Clean Water Act permits, prescribed in design and construction guidance by each state, and will be coordinated with the local Soil & Water Conservation Districts (SWCD). Erosion control measures will consist of applying mulch, straw, soil tackifier, polymers, erosion control blankets, and vegetative soil stabilization.

Generally, vegetative soil stabilization includes temporary and permanent seeding, sodding, ground cover, and dormant seeding. Disturbance of streamside and riparian vegetation will be kept to a minimum. In stream construction and soil disturbing activities near streams will be conducted during low or normal flow periods in accordance with construction permits obtained prior to construction. Discharge points will be protected with rock (or an alternative measure) to minimize scour and erosion.

Perimeter sediment control devices will be installed before commencing soil disturbing activities. Perimeter silt fence, stabilized construction entrances, drainage inlet protection, ditch checks, diversions, sediment traps, and other appropriate BMPs will be used to control sediment and runoff and to protect receiving waters during construction.

Stream crossings and structure sizing will be performed in accordance with state and federal guidelines regarding floodplain encroachment and hydraulic capacity. All new structures will comply with these guidelines. Stormwater facilities and discharges will be monitored and managed during and following construction in accordance with area requirements per the National Pollutant Discharge Elimination System (NPDES).

Other stormwater control practices may be needed to mitigate water quality impacts. In addition to detention facilities, other practices such as vegetated basins/buffers, infiltration basins, and bioswales will be evaluated to minimize transport of sediment, heavy metals, and other pollutants.

Specific mitigation measures, to the extent required, would be identified during Tier 2 NEPA analysis after design details of the Selected Program Alternative are known. The Tier 2 NEPA analyses would further determine mitigation measures and control of pollutants and sediments in regard to the National Pollutant Discharge Elimination System (NPDES) permitting, SWPPPs, and BMPs.

There are USEPA approved Total Maximum Daily Load plans for various impaired water bodies within all nine counties in the Area of Analysis. These plans would be reviewed in detail during Tier 2 analysis to ensure that the water quality standards set forth in the plans are met as required.

The Tier 2 NEPA analysis would also address the need for mitigation of impacts on mapped or unmapped water wells, including proper abandonment of the wells (such as plugging and sealing) to prevent groundwater pollution from construction and from future operations and maintenance. Specific mitigation measures would be implemented prior to construction when practical and possible.

3.17 Wetlands

This section discusses the presence of wetlands in the Area of Analysis and the effects the Program may have on them.

3.17.1 Methodology and Regulatory Requirements

The regulatory framework pertaining to wetlands includes Section 404 of the Clean Water Act of 1972 (as amended) and Executive Order 11990, Protection of Wetlands (USDOT Order 5660.14), Preservation of the Nation's Wetlands; and the Interagency Wetland Policy Act of 1989 (20 ILCS/830/1-2, et seq.) and administrative rules promulgated thereunder (17 Illinois Administrative Code Part 1090).The regulatory definition of wetlands, as adopted by the U.S. Environmental Protection Agency (USEPA, May 11, 2012) and USACE to administer the Section 404 permit program is "[Wetlands are] 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. Wetlands generally include swamps, marshes, bogs and similar areas." Wetland resources include vegetated wetland areas as designated on the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps (USFWS 2013).

In conjunction with the Tier 2 NEPA analysis, a more detailed impact analysis of wetlands would be conducted, including field surveys, to determine what areas meet the USEPA and USACE regulatory criteria and definition of a wetland, and to determine the type and boundaries of those wetland areas. There is also the potential for additional wetlands to be found in the course of those surveys. During Tier 2 NEPA analysis, coordination would take place with the USACE to determine what wetland areas are jurisdictional or non-jurisdictional for Section 404 permitting purposes and mitigation requirements, in addition to coordination with state resource agencies, see Section 3.25.4.1.

The permitting approach for wetlands follows the Section 404 requirements identified in Section 3.25 (Permits). The USFWS NWI database was used to compile GIS data for locations of vegetated wetland areas within the Area of Analysis.

3.17.2 Affected Environment

The regulatory definition of wetlands emphasizes that wetlands must possess three essential characteristics before a positive determination of a wetland can be made: hydric soils, a prevalence of hydrophytic vegetation, and a persistent wetland hydrology. The NWI maps are based on a classification system known as the *Cowardin System*,[109] which classifies the types of "ecosystems" related to water resources. Typical vegetated wetlands in the Midwest include, but are not limited to, emergent (herbaceous), scrub-shrub, and forested wetlands. The maps in Appendix D show the NWI wetlands near or within the Alternative Analysis Area.

The NWI database was reviewed and it was determined that the vegetated wetland systems present within the Area of Analysis include Lacustrian (L) (lakes) Riverine (R) (rivers), Palustrine Freshwater Emergent (PEM), Aquatic (PAB), Unconsolidated Bottom(PUB) (ponds) and Forested/Shrub (PFO/PSS) wetlands. Table 3-31 lists the types of wetlands and their acreage within the 500-foot wide Area of Analysis.

[109] Cowardin et al., 1979

Table 3-31: Types and Acreage of Wetlands within the Area of Analysis

Alternative		Palustrine					Riverine	Lake	
		Aquatic Bed (PAB)	Emergent (PEM)	Scrub Shrub (PSS)	Forested (PFO)	Ponds (PUB)	Rivers (R)	Lake (L)	Total
Route 2									
Illinois	#	0	0	0	0	0	2	0	2
	Ac	0	0	0	0	0	7	0	7
Indiana	#	1	52	0	37	29	6	2	127
	Ac	1	139	0	61	15	6	2	224
Michigan	#	16	224	100	173	58	14	13	598
	Ac	15	538	207	410	29	75	161	1435
Total Number		**17**	**276**	**100**	**210**	**87**	**22**	**15**	**727**
Total Acreage		**16**	**677**	**207**	**471**	**44**	**88**	**163**	**1,666**
Route 4									
Illinois	#	0	0	0	0	0	2	0	2
	Ac	0	0	0	0	0	7	0	7
Indiana	#	1	57	0	47	26	7	1	139
	Ac	<1	114	0	68	10	7	<1	200
Michigan	#	16	224	100	173	58	14	13	598
	Ac	15	538	207	410	29	75	161	1,435
Total Number		**17**	**281**	**100**	**220**	**84**	**23**	**14**	**739**
Total Acreage		**15**	**652**	**207**	**478**	**39**	**89**	**161**	**1,642**
Route 5 Option 1 and 2									
Illinois	#	0	0	0	0	0	2	0	2
	Ac	0	0	0	0	0	7	0	7
Indiana	#	2	43	0	42	26	5	1	119
	Ac	1	65	0	72	18	7	1	164
Michigan	#	16	224	100	173	58	14	13	598
	Ac	15	538	207	410	29	75	161	1,435
Total Number		**18**	**267**	**100**	**215**	**84**	**21**	**14**	**719**
Total Acreage		**16**	**603**	**207**	**482**	**47**	**89**	**162**	**1,606**
Route 9 Option 1									
Illinois	#	0	7	0	8	2	2	0	19
	Ac	0	22	0	27	6	7	0	62
Indiana	#	3	41	1	46	14	3	1	109
	Ac	1	70	1	55	7	5	1	140
Michigan	#	16	224	100	173	58	14	13	598
	Ac	15	538	207	410	29	75	161	1,435
Total Number		**19**	**271**	**101**	**227**	**74**	**19**	**14**	**726**
Total Acreage		**16**	**630**	**208**	**492**	**42**	**87**	**162**	**1,637**

Alternative		Palustrine					Riverine	Lake	
		Aquatic Bed (PAB)	Emergent (PEM)	Scrub Shrub (PSS)	Forested (PFO)	Ponds (PUB)	Rivers (R)	Lake (L)	Total
Route 9 Option 2									
Illinois	#	0	7	0	8	2	2	0	19
	Ac	0	22	0	27	6	7	0	62
Indiana	#	3	40	1	46	15	3	1	109
	Ac	1	70	1	55	8	5	1	141
Michigan	#	16	224	100	173	58	14	13	598
	Ac	15	538	208	410	29	75	161	1,435
Total Number		**19**	**271**	**101**	**227**	**75**	**19**	**14**	**726**
Total Acreage		**16**	**630**	**208**	**492**	**43**	**87**	**162**	**1,637**

Although there are several wetlands scattered throughout the Area of Analysis, the larger concentrations are associated with floodplains adjacent to perennial rivers and streams. Table 3-32 lists the rivers and streams by state where wetlands are located.

Table 3-32: Major Perennial Rivers within the Area of Analysis

Stream Name	Route 2	Route 4	Route 5 Option 1 and Option 2	Route 9 Option 1 and Option 2
Illinois				
South Branch of the Chicago River	X	X	X	X
Calumet River	X	X		
Little Calumet River			X	X
Indiana				
Indiana Harbor Canal	X	X		
Grand Calumet River	X	X	X	
Burns Ditch			X	X
Portage Burns Waterway	X	X		
East Fork of the Little Calumet River	X	X	X	X
Michigan				
Galien River	X	X	X	X
St. Joe River	X	X	X	X
Kalamazoo River	X	X	X	X
Grand River	X	X	X	X
Huron River	X	X	X	X
River Rouge	X	X	X	X

3.17.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and related impacts to wetlands would not occur beyond those that may occur due to other projects and routine maintenance.

3.17.4 Impacts of the Build Alternatives

In general, wetlands can be impacted during construction as a result of soil disturbance and potential pollutant loading of stormwater runoff from construction sites. These impacts would be a result of placement of fill material for additional track and siding, culvert replacement or extensions, and bridge replacement or additions.

Impacts to wetlands would most likely occur only where additional right of way is acquired. A more detailed wetland impact assessment would be conducted during Tier 2 NEPA analyses, including field surveys, to determine the specific impacted areas that meet the regulatory criteria and definition of a wetland. Disturbance in the areas indicated in Table 3-31 would be avoided or minimized where practicable.

Specific impacts of the various route alternatives are discussed below.

3.17.4.1 Impacts Common to All Alternatives

Michigan

Common wetland impacts are relevant only to the portion of the Area of Analysis in Michigan. There are no existing wetlands in the urbanized sections of Michigan between Detroit and Pontiac. The Kalamazoo to Dearborn EA indicated that although the original rail bed construction included a number of culverts to allow streams to flow beneath the railroad embankment, wetlands would have been permanently destroyed except where they existed beneath bridges. Any proposed improvements in this segment do not include any alterations of existing bridges. Furthermore, all work is anticipated to be restricted to the existing railroad embankment. Therefore, no wetlands would be impacted by the Build Alternatives. From Kalamazoo to the Indiana border the only infrastructure improvements would be due to increased frequencies as this segment is already at speeds of 110 mph. Any proposed infrastructure improvements are anticipated to be within the existing right of way and not impact existing bridges and therefore no wetlands are anticipated to be impacted.

3.17.4.2 Route 2 Impacts

Illinois

Through Illinois, construction of Route 2 would directly impact approximately seven acres of two riverine wetlands associated with the South Branch of the Chicago River and the Calumet River.

Indiana

In Indiana, the Route 2 Area of Analysis contains more wetlands than in the other alternatives. There are approximately 224 acres of wetlands, mostly Palustrine Emergent and Forested. Route 2 travels through extensive wetland areas in the Indiana Dunes National Lakeshore where additional right of way is anticipated to be required.

3.17.4.3 Route 4 Impacts

Illinois

In Illinois, Route 4 is the same as Route 2. Therefore, impacts to wetlands would be the same as those for Route 2.

Indiana

In the Indiana Route 4 Area of Analysis there are a total of 200 acres of wetlands, mostly Palustrine Emergent and Forested. Route 4 also travels through the wetlands of Indiana Dunes National Lakeshore where additional right of way is anticipated to be required.

3.17.4.4 Route 5 Option 1 and Option 2 Impacts

Illinois

In Illinois, Build Alternatives 5 Option 1 and Option 2 are the same as Route 2. Therefore, impacts to wetlands would be similar to those for Route 2.

Indiana

In the Indiana Route 5 Area of Analysis there are a total of 164 acres of wetlands primarily between Porter and the Michigan border. It is not anticipated that right of way acquisition would occur in this segment. Areas where Route 5 would most likely impact wetlands is between Buffington Harbor and the Tolleston connection where there are a substantial number of wetlands located in the Clark & Pine Nature Preserve, Clark Junction West Site, the Clark and Pine General Refractories Site, and the Pine Station Nature Preserve.

3.17.4.5 Route 9 Option 1 and Option 2

Illinois

In the Illinois Route 9 Option 1 or Option 2 Area of Analysis there are 19 wetlands, totaling approximately 62 acres. The majority of these are associated with the Little Calumet River and the Beaubien Woods Forest Preserve, both located in the southern portion of the Area of Analysis.

Indiana

In the Indiana Area of Analysis there are a total of 140 acres of wetlands for both Route 9 options. A substantial portion of these wetlands are between Porter and the Michigan border where it is not anticipated that any right of way would be required. Areas where the Routes would most likely impact wetlands are adjacent to the Gibson Woods Nature Preserve and within the Tolleston Ridge Nature Preserves and/or the Ivanhoe South natural area between Gibson Junction and Ivanhoe.

3.17.5 Potential Mitigation Measures

During Tier 2 NEPA analysis, wetlands and impacts to them would be identified in greater detail. Where it is possible and practical, impacts to wetlands would be avoided or minimized.

Available mitigation options for unavoidable impacts to jurisdictional wetlands would be developed in more detail during the Tier 2 NEPA analysis and in conjunction with a Section 404 Permit, see Section 3.25.4.1. Typical mitigation measures include mitigation banking, in-lieu fees, and on-site or off-site permittee-responsible mitigation. Mitigation strategies identified and ultimately selected would take into account that not all mitigation options are available to all states and USACE Districts. During the design process, coordination would take place with the appropriate USACE Districts and appropriate resource agencies to develop appropriate mitigation strategies for the location of impacts. To the extent required, specific mitigation measures, would be identified and discussed during Tier 2 NEPA analysis after design details of the Selected Program Alternative are known. These will be recorded in the Tier 2 NEPA documents as appropriate and implemented as part of the Section 404 permit application and approval process when practical and possible. Permit requirements as a result of wetland impacts are discussed in Section 3.25 (Permits).

3.18 Coastal Zone Management Areas

This section describes the Coastal Zone Management Act (CZMA) and the Program's compatibility with CZMA. The coastal areas of concern in the Area of Analysis include the coastal areas of Lake Michigan.

3.18.1 Methodology and Regulatory Requirements

The Coastal Zone Management Act (CZMA) of 1972 as amended through Public Law No. 109-58, the Energy Policy Act of 2005, 16 U.S.C Sections 302 to 319 is administered by NOAA's Office of Ocean and Coastal Resource Management (OCRM). The CZMA provides for management of the nation's coastal resources, including the Great Lakes, and balances economic development with environmental conservation. Coastal zone management is intended to preserve, protect, develop, and, where possible, restore or enhance coastal zones. Coastal zone management areas were evaluated in accordance with FRA's Environmental Procedures Section 14(n)(9).

Each state in the Area of Analysis participates in the Coastal Zone Management Program. The Illinois DNR, the Indiana DNR and the Michigan DEQ are the agencies responsible for each state's participation

through their respective Lake Michigan Coastal Programs (LMCPs).The federal Coastal Zone Management Act requires that each state identify those coastal resources that require management or protection.

In January 2012, the Illinois Coastal Management Program (ICMP), enforced by the Illinois DNR, was approved. The ICMP's focus areas include invasive species; habitat, ecosystems, and natural area restoration; persistent bioaccumulative toxins; sustainable development; and non-point source pollution, among others.[110] The Indiana Lake Michigan Coastal Program was approved in 2001, relying on existing laws and programs as the basis for achieving its purpose and managed by the Indiana DNR. Michigan's coastal program is administered by the Office of Great Lakes (OGL), Michigan DEQ. The program includes local pass through grants and administration of coastal related sections of the Natural Resource and Environmental Protection Act, 1994 PA 451.

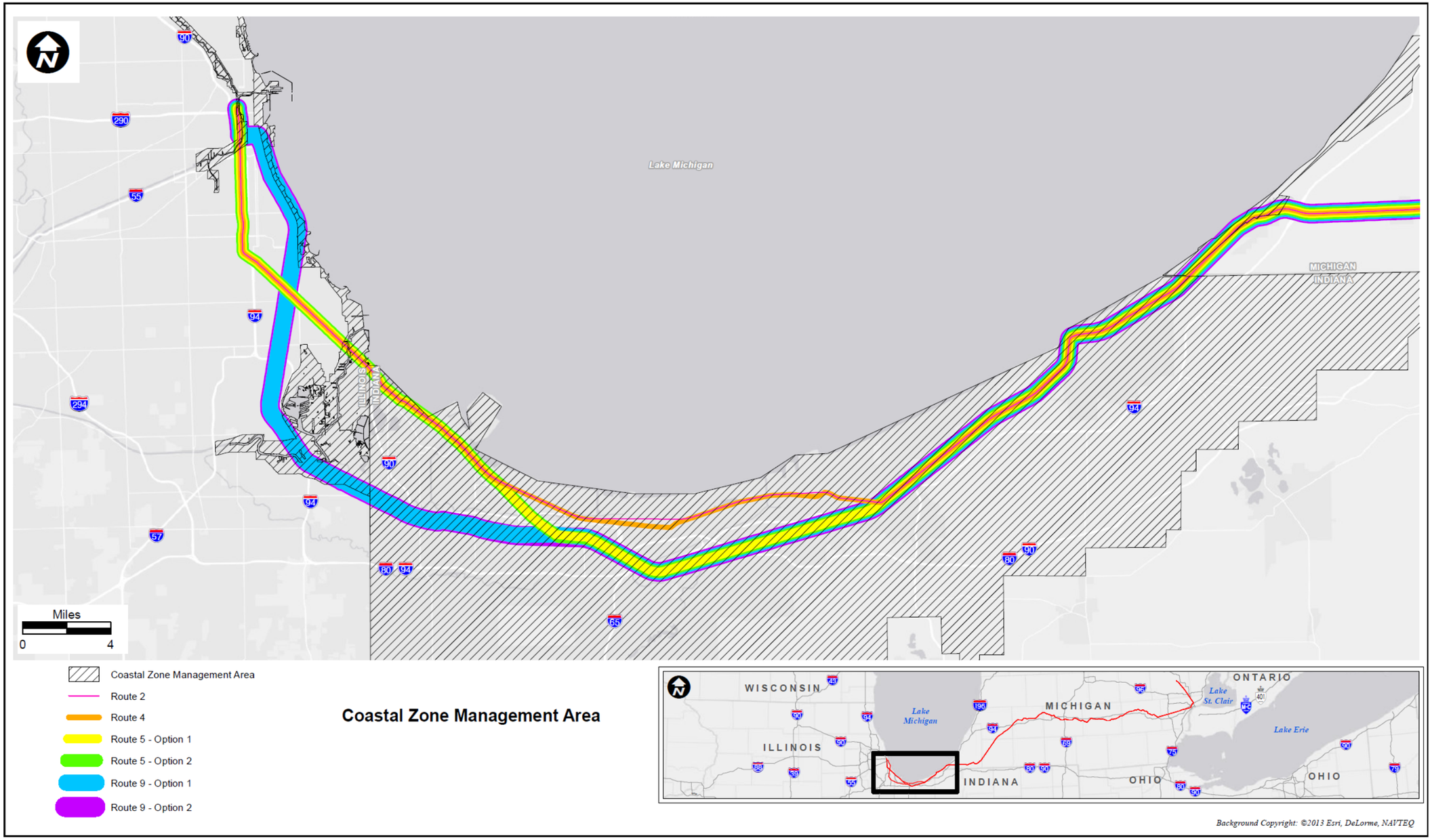
The Area of Analysis was reviewed using recent aerial and satellite high-resolution photographic imagery; maps of hydrography and other features; and the most recent geographic information system (GIS) data for a variety of environmental resources. Coastal zone mapping limits were identified on maps provided by the Michigan DEQ and Indiana DNR websites. Coastal Zones in Illinois were obtained from the Illinois DNR Illinois Coastal Management Program Geographic Information Systems (GIS).[111]

3.18.2 Affected Environment

A substantial portion of the Area of Analysis, especially through Illinois and Indiana is within the Illinois, Indiana and Michigan Coastal Zone boundary. Figure 3-9 shows the coastal zone boundary within the Area of Analysis.

[110] Illinois DNR, 2013a
[111] Illinois DNR, 2013b

Figure 3-9: Coastal Zone Boundaries within the Area of Analysis



Illinois

The Coastal Zone in Illinois encompasses both lakeshore and some inland waterways. The primary or "lakeshore" coastal zone boundary defines the land area within the present-day Lake Michigan watershed. This "present-day watershed" area is roughly 85 square miles. A secondary or "inland waterway" coastal zone boundary defines corridors along select segment of rivers that historically flowed to Lake Michigan but were engineered in the early 1900s to flow away from the lake. These inland waterways have a navigable link to Lake Michigan and are a critical interface between Lake Michigan and the regional river system. The inland waterways included in the coastal zone boundary add roughly another 25 square miles to the inland portion of Illinois' coastal zone. The Area of Analysis in the Coastal Zone in Illinois is located within the Lake Michigan watershed in addition to corridors along the Chicago River and the Calumet and Little Calumet Rivers within Cook County.

Indiana

The Indiana coastal zone, referred to as the Coastal Program Area, includes both inland and lakeside areas. The Coastal Program Area encompasses a total of approximately 604 square miles of land and approximately 241 square miles of Lake Michigan. It covers the northern portions of Lake, Porter, and LaPorte Counties. At its greatest extent, the inland boundary is approximately 17 miles from the Lake Michigan shoreline and at its narrowest extent; the inland boundary is less than 2 miles inland. The Coastal Zone boundary extents encompass all alternative routes in the Area of Analysis through Indiana.

Michigan

Michigan's coastal zone boundary generally extends a minimum of 1,000 feet inland from the Ordinary High Water Mark of the Great Lakes and connecting channels, or further to include coastal lakes, river mouths and bays, floodplains, coastal wetlands, designated sand dune areas, public parks, recreation and natural areas and urban areas. Within the Area of Analysis, the Michigan coastal zone includes a narrow strip of the Lake Michigan shoreline east of US Highway 12 approximately a mile wide from the Indiana border through New Buffalo. It includes the Galien River in Berrien County.

3.18.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and permanent Program-related impacts on coastal zones would not occur.

3.18.4 Impacts of Build Alternatives

3.18.4.1 Impacts Common to All Alternatives

Construction activities associated with implementation of the Build Alternatives would directly impact the coastal zones associated with Lake Michigan including potential impacts to the natural habitats and wildlife. The coastal zones could be impacted by construction activities including tree and brush clearing, placement of fill material for additional track and siding, culvert replacement or extensions, and bridge

replacement or additions. Such impacts may be expected in locations where right of way would be needed to perform the work and permits may be required.

The Build Alternatives could also increase the chances of impacts from erosion and sedimentation from railroad grades to adjacent aquatic habitat, and potential pollutant runoff and spills from operational and maintenance activities, which could affect natural habitats and the water quality of aquatic habitats that may be present adjacent to the rail corridor in the coastal zones. However, permanent best management practices (BMPs) that would hold the soil in place would provide measures to avoid or minimize those types of impacts. There is also the potential for temporary construction impacts from future culvert or bridge replacements as a part of ongoing maintenance.

The potential for impacts to coastal zone qualities would be further investigated in the Tier 2 NEPA analysis for the Selected Program Alternative. The avoidance, minimization, or mitigation of potential impacts on coastal zones would be accomplished, as appropriate, by the use of BMPs as discussed in Section 3.16.5 (Water Quality).

Michigan

The route through Michigan is the same for all alternatives. The route passes through the coastal zone management area along the Lake Michigan shoreline from the Indiana Border into New Buffalo, Michigan. However, this section of the route is already at the proposed 110 mph speed double track and no improvements are proposed with the Program. Therefore, there would be no impact to coastal resources in Michigan.

3.18.4.2 Route 2 Impacts

Illinois

Approximately 207 acres of coastal zones are within the Route 2 Area of Analysis through Illinois. Construction of Route 2 would directly impact the coastal zones associated with Lake Michigan, the South Branch of the Chicago River, and the Calumet River that are located within the Area of Analysis in Illinois.

Indiana

Through Indiana, the entire route area is within the Coastal Zone Management Area. Construction of Route 2 could potentially impact the coastal zones associated with the Grand Calumet River, Indiana Harbor Canal, Burns Waterway, East Fork of the Little Calumet River and natural areas such as the Indiana Dunes National Lakeshore, as well as associated floodplains, wetlands and threatened and endangered species. The East Fork of the Little Calumet River is rated as an Outstanding River by the Indiana Natural Resource Commission. All of these are potential impact areas and are discussed more thoroughly under the sections that deal with waterways and wetlands, see Sections 3.15, 3.16 and 3.17.

3.18.4.3 Route 4 Impacts

Illinois

In Illinois, Route 4 is the same as Route 2. Therefore, impacts to coastal zones would be the same as those for Route 2.

Indiana

In Indiana, Route 4 is very similar to Route 2 in that the entire route is within the Indiana Coastal Management Zone and similar features could be affected. Impacts would be similar to Route 2.

3.18.4.4 Route 5 Option 1 and Option 2Impacts

Illinois

In Illinois, Route 5 Option 1 and Option 2 are the same as Route 2. Therefore, impacts to coastal zones would be the same as those for Route 2.

Indiana

Through Indiana, construction of Route 5 Option 1 and Option 2 would directly impact the coastal zone qualities associated with the Grand Calumet River, Indiana Harbor Canal, and Burns Ditch as well as the natural areas including Pine Station Nature Preserve and the Clark and Pine Nature Preserve. Although Route 5 takes a different route through Lake and Porter Counties in Indiana, the potential construction impacts would be similar to Route 2 and would be as discussed above.

3.18.4.5 Route 9 Option 1 and Option 2

Illinois

Approximately 472 acres of coastal zone are within the Area of Analysis for Route 9 through Illinois. Construction of Route 9 would directly impact the coastal zones associated with Lake Michigan, the South Branch of the Chicago River, and the Little Calumet River that are located within the Area of Analysis.

Indiana

Through Indiana construction of Route 9 would directly impact the coastal zones associated with the Portage Burns Waterway, Willow Creek, Salt Creek and East Fork of the Little Calumet River as well as the natural areas including Gibson Woods and Tolleston Ridge Nature Preserves, and the Ivanhoe South Natural Area. Although Route 9 takes a different route through Lake and Porter Counties in Indiana, the potential construction impacts would be similar to Route 2 and would be as discussed above.

3.18.5 Potential Mitigation Measures

A Coastal Zone consistency determination would need to be made by each partnering state during implementation of the Selected Program Alternative as part of the Tier 2 NEPA analysis. If the Program is not consistent with the Coastal Management Programs in the states, mitigation measures would need to be implemented. The potential of the Program to adversely affect coastal zones during construction activities could be mitigated by the development and implementation of Stormwater Pollution Prevention Plans (SWPPPs) and the use of temporary and permanent BMPs. The avoidance, minimization, or mitigation of sediment pollution could be accomplished by the use of BMPs.

BMPs could be used during construction to control water pollution through the use of temporary measures, such as berms, slope drains, sediment basins, straw bales, silt fences, seeding, and mulching.

Specific mitigation measures, to the extent required, would be identified and discussed during Tier 2 NEPA analysis after design details of the Selected Program Alternative are known. The Tier 2 analyses would further address mitigation measures and control of pollutants and sediments and BMPs.

3.19 Natural Habitats and Wildlife

This resource includes various types of natural terrestrial (land) habitats and the wildlife that uses these habitats. Natural areas reported in this Tier 1 EIS include lands designated by Congress or federal or state agencies as wildlife refuges, waterfowl production areas, wildlife management areas, nature preserves, high quality natural communities, natural areas, and wildlife sanctuaries. On the state level, natural areas are public lands managed by the Illinois DNR, Indiana DNR, and Michigan DNR. Some private properties also contain natural habitat preserved for habitat conservation purposes; for example, Nature Conservancy lands or NRCS conservation easements. These lands are not afforded the same protections under Section 4(f), see Section 3.12; however many have conservation easements that restrict development or that are not subject to eminent domain. These lands have not been inventoried for this Tier 1 EIS, however may be considered during the Tier 2 NEPA analyses.

3.19.1 Methodology and Regulatory Requirements

Natural habitat and wildlife were evaluated in accordance with FRA's Environmental Procedures Section 14(n)(5). The regulatory framework pertaining to natural habitats and wildlife include the Fish and Wildlife Coordination Act of 1934 (as amended) (FWCA), the Migratory Bird Treaty Act of 1918 (as amended) (MBTA), the Pittman-Robertson Act of 1937, the Wilderness Act of 1964 (WA), and the Bald and Golden Eagle Protection Act of 1940 (as amended) (BGEPA). In addition, each state has regulations pertaining to wildlife and habitat, such as the Michigan Natural Resource and Environmental Protection Act, Act 451 of the Public Acts of 1994, Part 365 Illinois Wildlife Code (520 ILCS 5/), the Illinois Endangered Species Protection Act (520 ILCS 10/11(b)), Illinois Natural Areas Preservation Act (525 ILCS 30/17), and administrative rules promulgated thereunder (17 Illinois Administrative Code Part 1075). Natural habitats and wildlife are also protected under the Endangered Species Act (ESA) of 1973.

The Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) were implemented to offer protection to avian species. The MBTA makes it unlawful to pursue, hunt, take, capture, kill, or sell migratory birds; and the BGEPA prohibits anyone from taking bald or golden eagles, including their parts, nests, or eggs, without a permit issued by the Secretary of the Interior. In addition to protection from direct harm, the BGEPA also prohibits activities that disrupt eagles at nests, foraging areas, and important roosts because loss of these areas can disturb or kill eagles. Among other actions, "take" includes disturbance of eagles to the degree that it substantially interferes with breeding, feeding, or sheltering behavior, or results in injury, death, or nest abandonment.

The Indiana INMAP website was utilized to obtain the Managed Lands and Natural Communities in Indiana and both the Indiana and Michigan DNR websites were utilized to obtain additional information on various natural areas and habitats in Michigan and Indiana. The Illinois Department of Transportation Bureau of Design and Environment (IDOT BDE) reviewed the GIS Natural Heritage Database for information regarding Nature Preserves and Illinois Natural Areas Inventory (INAI) sites. Land enrolled in Illinois Nature Preserves Commission (INPC) land protection programs (Nature Preserves, Natural Heritage Landmarks, and Land and Water Reserves) and general wildlife information was also obtained on the website of Illinois DNR. The websites of the Illinois Forest Preserve Districts by county were used to obtain forest preserve locations. Information regarding the location of national wildlife refuges was obtained from the USFWS.

3.19.2 Affected Environment

Over the years, intensive agriculture and development have fragmented and reduced the amount of woodland and prairie habitat available for wildlife, and have decreased the quality of the wildlife habitat areas that remain. Each state has developed a proactive wildlife action plan (comprehensive wildlife action strategy) to assess the health of the states' wildlife and to determine strategies to conserve the numerous wildlife species of their states and their associated habitats (Illinois DNR, Indiana DNR, and Michigan DNR, 2005). These habitats provide food and shelter for over a thousand species including mammals, birds, fish, reptiles, amphibians, mussels, and snails, as well as several thousands of insect species. A list of protected natural areas or natural communities that provide habitat for the region's wildlife population are included in Table 3-33 and shown on the maps in Appendix D. The type of habitat that is characteristic within the Area of Analysis includes: woodlands (upland and riparian), savanna, prairies/grassland, shrubland, and aquatic habitat (wetlands, lakes and streams). The aquatic resources within the Area of Analysis that provide natural habitat for fish, invertebrates, and amphibian species include rivers, wetlands, lakes, ponds, and swamp/marshes that are discussed in Section 3.15 (Water Body Crossings and Floodplains) and Section 3.17 (Wetlands).

Table 3-33: Protected Natural Areas and their Habitat Types by County, State and Route

County and State	Site name	Habitat Types	Routes Impacted
Illinois			
Cook	Beaubien Woods Forest Preserve	aquatic, riparian, forest and woodland, wetland, and prairie/grassland	9
Cook	Burnham Prairie Nature Preserve*	dry-mesic, wet-mesic, wet prairies, and savanna communities	9
Cook	Burnham Park Nature Sanctuary, 47th Street Habitat Garden	woodland/forest, prairie/ grassland	9
Indiana			
Lake	Clark and Pine Nature Preserve	aquatic, wetland and prairie	4, 5
Lake	Pine Station Nature Preserve (DNR)	aquatic, wetland and prairie	5
Lake	Ivanhoe South (Dune and Swale) (Shirley Heinze Environmental Fund)	savanna	9
Lake	Grand Boulevard Lake Recreation Area (Gary Park Board)	aquatic	5
Porter	Woodland Park (Portage Parks and Recreation)	savanna	5, 9
Lake	Clarke Junction West Site	wetland and prairie	2, 4, 5
Lake	Tolleston Nature Preserve	savanna, wetland and prairie	9
Lake	Clarke and Pine General Refractories Addition Site	wetland and prairie	5
Lake	Brunswick Center Savanna Site	savanna	9
Lake/Porter	Indiana Dunes National Lakeshore	aquatic, savanna, wetland, forest, dunes and prairie	2, 4, 5, 9
Lake	Miller Woods Site	Savanna and Prairie	2,4
Porter	Inland Marsh Site	Savanna	2
LaPorte	Washington Park	Forest	2, 4, 5, 9

County and State	Site name	Habitat Types	Routes Impacted
Michigan			
Berrien	Grand Beach Preserve (Nature Conservancy)	wetland	2, 4, 5, 9
Berrien	Bakertown Fen Preserve (Nature Conservancy)	wetland	2, 4, 5, 9
Van Buren	None		
Cass	None		
Kalamazoo	Fort Custer State Recreation Area	aquatic, forest, and prairie	2, 4, 5, 9
Calhoun	None		
Jackson	Grass Lake Wildlife Area (DNR)	forest, wetlands and grasslands	2, 4, 5, 9
Washtenaw	Chelsea State Game Area (DNR)	forest, wetlands and grasslands	2, 4, 5, 9
Washtenaw	Albert J. Miller and Robert & Nancy Smith Preserve and Trail (Washtenaw County Parks)	forest and wetland	2, 4, 5, 9
Washtenaw	Burns-Stokes Preserve and Trail (Washtenaw County Parks)	forest, prairie and wetland	2, 4, 5, 9
Washtenaw	Osborne Mill Preserve and Trail	forest, prairie and wetland	2, 4, 5, 9
Washtenaw	Barton Nature Area (City of Ann Arbor)	forest, prairie and wetland	2, 4, 5, 9
Wayne	None		
Oakland	None		

Notes: SGA: State Game Area
**High-quality habitat*

The Area of Analysis is located in the north-south bird migration route through the Midwest known as the Mississippi Flyway[112], which is used annually by land birds, shore birds, and water fowl. Although suitable habitat for birds and waterfowl is anticipated to exist in the Area of Analysis, the potential for

[112] U.S. Fish and Wildlife Service. Flyways.us. 2008.

occurrences of migratory bird nesting, foraging, or roosting areas would be studied further in Tier 2 NEPA analysis.

General habitat characteristics in the Area of Analysis are described below for each state.

Illinois and Indiana

In the Area of Analysis within Illinois and Indiana, nearly all the vegetation has been replaced by urban development or agriculture, except in the scattered areas established and maintained as natural areas. Predevelopment vegetation included extensive prairie communities inter-mixed with oak-hickory forests. The region's streams and rivers are intermittent and perennial. Agriculture and urban development has affected stream habitat.[113]

Michigan

In the majority of Michigan's Area of Analysis, lands not dedicated to agriculture or urban uses within the Area of Analysis are comprised of oak-hickory forests, northern swamp forests, and beech forests. White oak, red oak, black oak, bitternut hickory, shagbark hickory, sugar maple, and beech are the dominant tree species. Streams in the area are perennial and intermittent and there are many small and medium-sized lakes. Agriculture and urban development has affected stream habitat. Land uses feature a mix of agricultural land, forest and woodland, pasture and urban, suburban and rural residential land uses. White-tailed deer, coyote, red fox, gray fox, beaver, river otter, mink, Canada warbler, upland sandpiper, northern pike, walleye, salmon, steelhead, trout are native to the region. [114]

3.19.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and impacts to natural habitats and wildlife would not occur beyond those that could occur due to other projects. The wildlife species that may be present in the existing corridors have been continually exposed to train traffic in varying degrees.

The current rail routes between Detroit/Pontiac and Chicago would continue to be used. Existing environmental impacts such as erosion and sedimentation from railroad grades to adjacent water resources, and potential pollutant runoff and spills from operational and maintenance activities would continue to affect any natural habitat and wildlife species that may be present adjacent to the rail corridor.

3.19.4 Impacts of Build Alternatives

The construction activities of the Build Alternatives, including tree and brush clearing, placement of fill material for additional track and sidings, culvert replacement or extensions, and bridge replacement or

[113] Commission for Environmental Cooperation. North American Terrestrial Ecoregions – Level III. April 2011.
[114] Commission for Environmental Cooperation. North American Terrestrial Ecoregions – Level III. April 2011.

additions could have the potential to impact terrestrial and aquatic natural habitats of wildlife species present in the Area of Analysis. Tree and brush clearing would be necessary to construct additional track and embankment, and to improve site distance at crossings for vehicle and train traffic. This clearing would impact natural habitats and may consequently impact the wildlife species that inhabit those areas.

Adjacent natural communities were historically fragmented by construction of the existing railroad alignment and development of surrounding lands. Since proposed areas where additional right of way would be acquired abut existing right of way, impacts would be relatively minimal and linear, and would not further fragment remaining large parcels of natural habitat areas.

Embankment placed in wetlands, lakes, and ponds; culvert replacement or extensions; and bridge replacement or additions would directly impact aquatic species habitats. In addition, temporary disruptions of aquatic species movement and hydrological flow could occur, thereby affecting in-stream habitats both upstream and downstream of construction operations.

The wildlife species that are present along the rail corridor have historically been continually exposed to train traffic in varying degrees. Some animal species may become accustomed to the noise and vibration generated by trains, while others may not. At this Tier 1 level of analysis, the location and density of wildlife is unknown, as are the individual species present along the Corridor.

It is anticipated that the increase in the frequency of trips and speed of train traffic may increase the potential for train collisions with mobile animal species and migratory birds.

The increase in train traffic could also increase operational and maintenance activities and potential spills increasing the chances of impacts from erosion and sedimentation from railroad grades to adjacent aquatic habitat, and potential pollutant runoff, which could affect natural habitats and the water quality of aquatic habitats that may be present adjacent to the rail corridor. There is also the potential for temporary construction impacts on water resources from future culvert or bridge replacements along the route, as a part of ongoing maintenance.

Land disturbance, wetland disturbance, tree and brush clearing, and culvert and bridge replacements (impacts to streams and rivers) could affect potential migratory bird nesting, foraging, or roosting areas that may be present in the Area of Analysis. Specific locations requiring clearing or structure removal would be identified during Tier 2 NEPA analysis for the Selected Program Alternative. At that time, coordination with the Illinois, Indiana and Michigan DNRs would take place to determine potential locations of migratory bird occupancy within the affected area, in addition to determining seasonal nesting, roosting, and foraging requirements of potentially affected species.

Table 3-34 summarizes the acreages for the sites listed in Table 3-33 for each Build Alternative.

Table 3-34: Summary of Natural Areas within the Area of Analysis by State and Alternative

County and State	Site name	Acreages within Area of Analysis				
		2	4	5 Opt. 1 & 2	9 Opt. 1	9 Opt. 2
Illinois[115]						
Cook	Beaubien Woods Forest Preserve				57	57
Cook	Burnham Prairie Nature Preserve*				2	2
Cook	Burnham Nature Sanctuary, 47th Street Habitat Garden				9	9
TOTAL ILLINOIS		**0**	**0**	**0**	**68**	**68**
Lake	Clark and Pine Nature Preserve*		<1	5		
Lake	Pine Station Nature Preserve			5		
Lake	Ivanhoe South (Dune and Swale) (Shirley Heinze Environmental Fund)				14	14
Lake	Grand Lake Recreation Area (East Gary Park Board)			3		
Lake	Clarke Junction West Site*	3	9	8		
Lake	Tolleston Nature Preserve (Gibson Woods)*				11	11
Lake	Clarke and Pine Gen. Refractories Addition Site*			16		
Lake	Brunswick Center Savanna Site*				9	1
Lake/Porter	Indiana Dunes National Lakeshore	414	316	17	17	17
Lake	- Miller Woods Site*	38	33			
Lake	- Gary Enterprise Zone Dune and Swale Site*		7			
Porter	- Inland Marsh Site*		7			
Porter	Portage (Woodland) Park (Portage Parks and Recreation)			<1	1	1
LaPorte	Washington Park*	2	2	2	2	2
TOTAL INDIANA		**457**	**374**	**56**	**54**	**46**

[115] Illinois DNR. Illinois Natural Areas Inventory (INAI) Sites. June 2013a.
Illinois DNR. Illinois Nature Preserves Commission (INPC) Protected Areas in Illinois by County. June 2013b.

County and State	Site name	Acreages within Area of Analysis				
		2	4	5 Opt. 1 & 2	9 Opt. 1	9 Opt. 2
Michigan						
Berrien	Grand Beach Preserve (Nature Conservancy)	3	3	3	3	3
Berrien	Bakertown Fen Preserve (Nature Conservancy)	6	6	6	6	6
Van Buren	State Open Space Land	3	3	3	3	3
Kalamazoo	Fort Custer State Recreation Area	26	26	26	26	26
Jackson	Grass Lake Wildlife Area	3	3	3	3	3
Jackson	State Open Space Land	23	23	23	23	23
Washtenaw	Chelsea State Game Area (DNR)	8	8	8	8	8
Washtenaw	Albert J. Miller and Robert & Nancy Smith Preserve and Trail*	9	9	9	9	9
Washtenaw	Burns-Stokes Preserve and Trail	11	11	11	11	11
Washtenaw	Osborne Mill Preserve and Trail	5	5	5	5	5
Washtenaw	Barton Nature Area	23	23	23	23	23
Washtenaw	State Open Space Land	7	7	7	7	7
TOTAL MICHIGAN		**127**	**127**	**127**	**127**	**127**

Notes:
SGA: Stage Game Area
**High-quality habitat*

The following sections describe the potential impacts specific to the various Build Alternative routes.

3.19.4.1 Impacts to Routes Common to All Alternatives

Michigan

The route through Michigan is constant for all alternatives. The Corridor passes through some ecologically sensitive areas. Any improvements within ecologically sensitive areas could potentially impact habitat during and after construction. Program improvements are expected to remain within the existing right of way through the Michigan corridor. Detailed improvement plans are not developed at this stage; however no improvements are currently proposed within ecologically sensitive areas. Potential stream, river and wetland impacts are also discussed under Section 3.15 (Water Body Crossings and Floodplains) and Section 3.17 (Wetlands).

Suitable upland habitat for terrestrial vertebrate species beyond the existing right of way would not be altered as no improvements are proposed in natural areas outside the existing right of way. As discussed above impacts could be as a result of increased train traffic and those as a result of increased maintenance activities. Table 3-34 summarizes the extent of natural areas adjacent to the exiting route. It also summarizes the acreage within the Area of Analysis for each site.

Once the specific improvements have been identified during Tier 2 NEPA analysis, those in ecologically sensitive areas would require a more detailed review and analysis to determine the impacts. If the proposed Program improvements would impact ecologically sensitive areas, avoidance, minimization or mitigation measures will be developed.

3.19.4.2 Route 2 Impacts

Illinois

There are no designated natural areas within the Illinois Area of Analysis of Route 2.

Indiana

In Indiana there are a number of natural areas within the Area of Analysis for Route 2 as indicated in Table 3-34. The total acreage in this Area of Analysis is 457 acres. A substantial portion of this route (414 acres) is through the Indiana Dunes National Lakeshore. However, the specific natural areas within the National Lakeshore are much less (38 acres). Some right of way may be required in the National Lakeshore, which may potentially impact the natural areas. Other natural areas include the Clarke Junction West Site and Washington Park in Michigan City. No work is anticipated in Michigan City and therefore this park should not be impacted.

3.19.4.3 Route 4 Impacts

Illinois

There are no designated natural areas within the Illinois Area of Analysis for Route 4.

Indiana

In Indiana the total natural area within the Area of Analysis for Route 4 encompasses approximately 374 acres. As with Route 2, a substantial portion of this area is within the Indiana Dunes National Lakeshore. However the specific natural areas of concern within the park are substantially less at about 47 acres. As with Route 2, there is anticipated right of way to be acquired within the National Lakeshore that could impact higher quality natural areas. Other areas of potential impact include the Clark and Pine Nature Preserve and the Clarke Junction West Site.

3.19.4.4 Route 5 Option 1 and Option 2 Impacts

Illinois

There are no designated natural areas within the Illinois Area of Analysis for Route 5.

Indiana

In Indiana the overall acreage of natural areas within the Area of Analysis for Route 5 Option 1 is less than Route 2 and Route 4 at a total of approximately 56 acres because much less of the route travels through the Indiana Dunes National Lakeshore. Also, none of the area in the National Lakeshore is through high quality natural areas. However, the route does travel through a few other high quality areas including the Clark and Pine Nature Preserve, the Clarke Junction West Site, like Route 4, and the Clarke and Pine General Refractories Addition Site for a total of approximately 29 acres that could potentially be impacted. As with the other alternatives, Washington Park in Michigan City is not expected to be impacted.

3.19.4.5 Route 9 Option 1 Impacts

Illinois

In Illinois, the Burnham Prairie Nature Preserve and the Beaubien Woods Forest Preserve are both located within the Area of Analysis for Route 9, Option 1. It is estimated that these two areas total an area of approximately 59 acres of natural habitats that could potentially be impacted, as shown in Table 3-34. In addition the Burnham Nature Sanctuary borders this route impacting approximately 9 acres within the Area of Analysis. Route 9 Option 1 also includes approximately 1,040 linear feet of stream habitat, 60 acres of wetland habitat, approximately one-half acre of lakes, and approximately 3 acres of swamps/marshes that could potentially be impacted.

Indiana

In Indiana the overall acreage of natural areas within the Area of Analysis for Route 9 Option 1 is less than both Route 2 and Route 4 at a total of approximately 50 acres. This is due to much less of the route travelling through the Indiana Dunes National Lakeshore. Also none of the area in the National Park is through high quality natural areas. Route 9 Option 1 travels through other high quality areas as well, including the Tolleston Nature Preserve and the Brunswick Center Savanna Site for a total area of approximately 20 acres, which could potentially be impacted by construction. As with the other route alternatives, Washington Park in Michigan City is not expected to be impacted.

3.19.4.6 Route 9 Option 2 Impacts

Illinois

In Illinois, Route 9 Option 2 is the same as Route 9 Option 1. Impacts to natural habitats and wildlife species would be the same as those reported for Route 9 Option 1.

Indiana

In Indiana the only difference between Route 9 Option 1 and Option 2 is the potential impact to the Brunswick Center Savanna Site. Route 9 Option 2 could potentially impact approximately 1 acre as compared to 20 acres with Option 1. All other potential impacts would be the same as Route 9 Option 1.

3.19.5 Potential Mitigation Measures

After design details are known, data specific to the Selected Program Alternative would be obtained through coordination with USFWS, Illinois DNR, Indiana DNR, and Michigan DNR during Tier 2 NEPA analysis. The existing information regarding migratory birds and natural terrestrial and aquatic habitat would be used as background data for conducting field surveys to determine the existence of high quality natural communities and migratory bird habitat.

During Tier 2 NEPA analysis, ways to avoid and minimize impacts to habitat would be assessed through coordination between the partner states and USFWS and the state resource agencies. If habitat cannot be avoided, compliance with regulatory requirements and potential mitigation measures to protect species and offset impacts would be applied. These measures typically include restrictions on construction activities in specific areas during the breeding/nesting seasons and application of best management practices to minimize run-off and erosion from construction sites. Mitigation measures may also include post-construction measures such as restoration activities or management of the existing special communities adjacent to the railway section.

3.20 Threatened and Endangered Species

This evaluation includes threatened and endangered species listed by the USFWS, consideration of state-listed threatened and endangered species as well as critical habitats in which these species may be found.

3.20.1 Methodology and Regulatory Requirements

The regulatory framework pertaining to threatened and endangered species includes the ESA of 1973, administered by USFWS, the Migratory Bird Treaty Act of 1918 (as amended) (MBTA), the Pittman-Robertson Act of 1937, the Wilderness Act of 1964 (WA), and the Bald and Golden Eagle Protection Act of 1940 (as amended) (BGEPA). In addition, state-listed species are regulated by the Illinois Endangered Species Protection Act (520 ILCS 10), administered by the Illinois DNR as advised by the Illinois Endangered Species Protection Board; by the Indiana Nongame and Endangered Species Conservation (IC 14-22-34) administered by the Indiana DNR and by the Natural Resource and Environmental

Protection Acts of 1994 (Act 451, Part 365 Endangered Species Protection) administered by the Michigan DNR. Also in 2009, the Michigan DNR began the process of identifying key wildlife, called *featured species*, that are highly valued, limited by habitat and have been selected for management. Threatened and endangered species were evaluated in accordance with FRA's Environmental Procedures Section 14(n)(7).

The ESA defines endangered species as those that are "in danger of extinction within the foreseeable future throughout all or a significant portion of [their] range," and defines threatened species as "those animals and plants likely to become endangered within the foreseeable future throughout all or a significant portion of their ranges" (16 USC 1531 et seq.).

The USFWS website provides information on federally listed threatened and endangered species and designated critical habitats. The Illinois DNR, Indiana DNR, and Michigan DNR websites also provide data relating to state-listed threatened and endangered species.

3.20.2 Affected Environment

The compiled data for federally and state-listed threatened and endangered species were reviewed to describe the affected environment. Although the presence or absence of these species along the Area of Analysis in Illinois, Indiana and portions of Michigan have been previously documented, field surveys and coordination with each state resource agency would take place during Tier 2 NEPA analysis to verify the presence of state listed species. Likewise, the presence or absence of federally listed threatened and endangered species is not known at this time and field surveys and coordination with the USFWS would take place during Tier 2 NEPA analysis, when more specific project limits would be identified, specific impact areas will be determined, and the potential for avoidance or minimization of impacts on any species that may be present.

3.20.2.1 Federally Listed Threatened and Endangered Species

USFWS lists 19 threatened or endangered species that occur, or have the potential of occurring, in the specific counties of the Area of Analysis, as shown in Table 3-35.

Table 3-35: Federal Threatened and Endangered Species List

Common Name	Scientific name	Habitat	Federal Status	County
Illinois				
Piping Plover	*Charadrius melodus*	Lakeshore beaches	E	Cook
Northern long-eared bat	*Myotis septentrionalis*	Hibernation occurs in caves and mines – swarms in surrounding wooded areas in autumn. Roosts and forages in upland forests during late spring and summer	E (proposed for listing)	Cook
Eastern massasauga	*Sistrurus catenatus*	fens, sedge meadows, peatlands, wet prairies, open woodlands, and shrublands	C	Cook
Hine's emerald dragonfly[a]	*Somatochlora hineana*	Spring fed wetlands, wet meadows and marshes	E	Cook
Eastern prairie fringed orchid	*Platanthera leucophaea*	Moderate to high quality wetlands, sedge meadow, marsh, and mesic to wet prairie	T	Cook
Leafy-prairie clover	*Dalea foliosa*	Prairie remnants on thin soil over limestone	E	Cook
Prairie bush clover	*Lespedeza leptostachya*	Dry to mesic prairies with gravelly soil	T	Cook
Mead's milkweed	*Asclepias meadii*	Late successional tallgrass prairie, tallgrass prairie converted to hay meadow, and glades or barrens with thin soil	T	Cook
Rufa Red Knot	*Calidris canutus rufa*	Lakeshore beaches, large wetlands	T	Cook
Indiana				
Indiana bat	*Myotis sodalis*	Hibernation occurs in caves and mines. Summer habitat occurs in wooded stream corridors and in bottomland & upland forests & woods.	E	LaPorte, Lake, Porter
Northern long-eared bat	*Myotis septentrionalis*	Hibernation occurs in caves and mines – swarms in surrounding wooded areas in autumn. Roosts and forages in upland forests during late spring and summer	E (proposed for listing)	LaPorte, Lake, Porter

Common Name	Scientific name	Habitat	Federal Status	County
Eastern massasauga	*Sistrurus catenatus*	fens, sedge meadows, peatlands, wet prairies, open woodlands, and shrublands	C	LaPorte & Porter
Mitchell's satyr butterfly	*Neonympha mitchellii mitchellii*	Fens	E	LaPorte
Mead's milkweed	*Asclepias meadii*	Late successional tallgrass prairie, tallgrass prairie converted to hay meadow, and glades or barrens with thin soil	T	Lake
Karner blue butterfly	*Lycaeides melissa samuelis*	Pine barrens and oak savannas on sandy soils and containing wild lupines	E	Lake & Porter
Pitcher's thistle	*Cirsium pitcheri*	Lakeshores; stabilized dunes and blowout areas	T	Lake & Porter
Piping Plover	*Charadrius melodus*	Lakeshore beaches	E	Porter
Rufa Red Knot	*Calidris canutus rufa*	Lakeshore beaches, large wetlands	T	LaPorte, Lake, Porter
Michigan				
Indiana bat	*Myotis sodalis*	Hibernation occurs in caves and mines. Summer habitat occurs in wooded stream corridors and in bottomland & upland forests & woods.	E	Berrien, Calhoun, Cass, Jackson, Kalamazoo, Oakland, Washtenaw, Wayne
Northern long-eared bat	*Myotis septentrionalis*	Hibernation occurs in caves and mines – swarms in surrounding wooded areas in autumn. Roosts and forages in upland forests during late spring and summer	E (proposed for listing)	Berrien, Calhoun, Cass, Jackson, Kalamazoo, Oakland, Washtenaw, Wayne
Eastern massasauga	*Sistrurus catenatus*	fens, sedge meadows, peatlands, wet prairies, open woodlands, and shrublands	C	Berrien, Kalamazoo, Calhoun, Cass, Jackson, Oakland, Washtenaw, Wayne
Mitchell's satyr butterfly	*Neonympha mitchellii mitchellii*	Fens	E	Berrien, Cass, Jackson, Kalamazoo, Washtenaw
Poweshiek skipperling	*Oarisma poweshiek*	Wet prairie and fens	C	Jackson, Oakland, Washtenaw

Common Name	Scientific name	Habitat	Federal Status	County
Eastern prairie fringed orchid	*Platanthera leucophaea*	Moderate to high quality wetlands, sedge meadow, marsh, and mesic to wet prairie	T	Wayne
Rufa Red Knot	*Calidris canutus rufa*	Lakeshore beaches, large wetlands	T	Berrien, Van Buren, Wayne
Northern riffleshell	*Epioblasma torulosa rangiana*	Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie	E	Wayne
Rayed Bean Mussel	*Villosa fabalis*	Smaller, headwater creeks, but they are sometimes found in large rivers	E	Jackson, Wayne
Piping Plover	*Charadrius melodus*	Lakeshore beaches	E	Berrien
Pitcher's thistle	*Cirsium pitcheri*	Lakeshores; stabilized dunes and blowout areas	T	Berrien
Small whorled pogonia	*Isotria medeoloides*	Dry woodland; upland sites in mixed forests (second or third growth stage)	T	Berrien
Copperbelly water snake	*Nerodia erythrogaster neglecta*	Wooded and permanently wet areas such as oxbows, sloughs, brushy ditches and floodplain woods	T	Calhoun, Cass
Snuffbox	*Epioblasma triquetra*	Small to medium-sized creeks in areas with a swift current and some larger rivers	E	Washtenaw

Source: USFWS 2013, Endangered Species, Illinois County Distribution, Federally Endangered, Threatened, and Candidate Species, http://www.fws.gov/midwest/endangered/lists/illinois-cty.html.

Notes:

E = Endangered, T = Threatened, C = Candidate

[a] *Designated Critical Habitat (Hine's emerald dragonfly) – Calcareous (high in calcium carbonate) spring-fed marshes and sedge meadows overlaying dolomite bedrock, along and near the Des Plaines River and the Calumet Sag Channel in Cook, DuPage, and Will Counties, Illinois.*

Although the species listed above have the potential to occur in various suitable habitats in the Area of Analysis, their actual presence or absence has not been determined in this Tier 1 study. However, the natural areas within the Area of Analysis as listed in Table 3-33 in Section 3.19 (Natural Habitat and Wildlife) provide the habitat types that are known to have the potential for suitable habitat for federally listed threatened or endangered species.

Coordination with the U.S. Fish and Wildlife Service, and state resource agencies would be initiated after design details of the Selected Program Alternative are known during Tier 2 NEPA analysis.

3.20.2.2 State-Listed Threatened and Endangered Species

There are also threatened and endangered species listed for each state that occur or have the potential of occurring in the specific areas of analysis as shown in Appendix J.

Illinois

There are 44 threatened and 69 endangered state species listed in Cook County, Illinois, as shown in the table included in Appendix J. However, based on the Illinois Department of Natural Resources' Natural Heritage Database information provided by IDOT BDE, there are only one endangered species and two threatened species within the Area of Analysis.

As with the federal list, the state species listed per county have the potential to occur in various suitable habitats in the Area of Analysis, however their presence or absence has not specifically been determined in this Tier 1 study. During Tier 2 NEPA analysis, field surveys at various locations in and around proposed rail ballast and track improvements would be conducted to better understand the potential impacts to the state endangered (E), threatened (T), or special concern (SC) species and their habitats. These field surveys would provide the location of the species, the general site ecology, population structure, and number of species impacted and the loss of suitable habitat.

Indiana

In Indiana, GIS data from the Indiana Natural Heritage Center, Indiana DNR was utilized to identify various recorded state threatened and endangered species observed within the Area of Analysis, as well as the areas in which they have been observed. Data was based on field observations conducted at various times. This data is included in the tables in Appendix J. The data indicates that there are 147 state-listed animal, plant and insect species within the Area of Analysis. Many of these are located in the natural areas listed in Section 3.19 (Natural Habitat and Wildlife).

Michigan

There are 360 state-listed species in the Michigan counties within the Area of Analysis based on the Michigan Natural Features Inventory (MNFI), a cooperative program between Michigan State University Extension and Michigan DNR. A detailed list is in Appendix J. The Kalamazoo to Dearborn EA indicated that there are potentially seven animal species and 22 plant species listed as threatened, endangered or species of concern that are known to be within the EA's area of analysis.

3.20.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not occur. Impacts on federally or state-listed threatened or endangered species would not occur beyond those that could occur due to other projects.

3.20.4 Impacts of the Build Alternatives

The construction activities of the Build Alternatives including tree and brush clearing, placement of fill material for additional track and sidings, culvert replacement or extensions, and bridge replacement or additions—could have the potential to impact terrestrial and aquatic natural habitats of state or federally listed threatened or endangered species, if present in the Area of Analysis. Tree and brush clearing would be necessary to construct additional track and embankment, and to improve site distance at crossings for vehicle and train traffic. This clearing would impact natural habitats and may consequently impact threatened or endangered species that inhabit those areas.

There are potential effects on state and federally listed species that may occur from the increase in noise and vibration. More detailed investigations would be performed in Tier 2 NEPA analysis when train speed, noise, and vibration can be more accurately calculated, and when field surveys identifying the presence or absence of listed species can be performed. The potential for impacts from erosion and sedimentation, pollutant runoff and spills, and temporary construction impacts would also be further analyzed in Tier 2 NEPA analysis.

The following sections describe the potential impacts specific to the various Build Alternative routes.

3.20.4.1 Impacts Common to All Alternatives

The Build Alternatives have the potential to impact state listed endangered, threatened or special concern plant species and/or result in the loss of plant habitat. The Corridor can be a conduit for the spread of invasive species because seeds can easily disperse along the open spaces of the corridor and be carried further as the air currents draft behind the train traffic. Such effects are already occurring in the existing corridors of the Build Alternatives so dispersal is not likely to increase substantially with added train traffic. This would be documented and addressed in cooperation with state natural resource agencies during Tier 2 NEPA analysis.

Species that may be present along the area of Analysis have already been exposed to train traffic in varying degrees. The potential for train collisions and the potential effects of noise and vibration on threatened and endangered species will be further analyzed during Tier 2 NEPA analysis in coordination with state resource agencies.

Michigan

The established route through Michigan is the same for all Build Alternatives. Therefore only the existing railroad right of way, including track, stations, and the maintenance facility in Michigan needs to be evaluated for potential impacts to state and federally listed threatened and endangered plant and animal species.

A review of the Michigan Natural Features Inventory (MNFI) Natural Heritage Database indicated that there are 360 state-listed plant and animal species within the nine Michigan counties within the Area of Analysis. A detailed list of these state listed species can be found in Appendix J. A phase one (office)

review of the project was completed which refined these records and the potential for them to exist within the project corridor. A total of 117 known records occur within 0.5 mile of the existing railroad tracks in Michigan. Based on a review of these individual records, there will probably be impacts to state listed species based on the proposed scope of work. However during the Tier 2 NEPA analysis, these locations will need phase two (field survey) reviews to evaluate the potential for impacts to both listed species and their habitats.

A review of the U.S. Fish and Wildlife Services threatened and endangered species county list indicates that there are 14 federally listed plant and animal species occurring in the nine Michigan Counties within the Area of Analysis. These species and their preferred habitats are shown in Table 3-35. A phase one review of the project was completed which refined these records and the potential for them to exist within the project corridor. Based on this review, the list of potential species in the corridor dropped to one. Due to the location of this species and the lack of suitable habitat within the project corridor in that area, it should not be impacted by the propose improvements. This may require that avoidance and mitigation strategies are implemented where species exist within or adjacent to the railway.

Analysis in the Tier 2 document will detail the phase one review including: species location, potential impacts, viability of the records and potential for suitable habitat at each location. Based on that information, phase two surveys will be required to determine the presence/absence of listed species adjacent to the railroad. If species are present, the level of impact and potential mitigation requirements to complete the proposed work will also be determined. If state or federally listed species would be impacted then, coordination with the MDNR and USFWS would be required. This coordination would determine the need for a MDNR Endangered Species Permit and/or the requirement for Informal/Formal Section 7 Consultation with the USFWS.

3.20.4.2 Route 2 Impacts

Illinois

Route 2 in Illinois would cross the South Branch of the Chicago River at the northern end of the Illinois portion of the Area of Analysis and the Calumet River at the southern end. In addition Route 2 would potentially impact wetlands associated with rivers (see Table 3-32 for a list of major rivers). However, all of these are in an urban area and none contain suitable habitat for the seven Cook County federally listed species. Therefore, no impacts on federally-listed species are anticipated to occur. An analysis of the state-listed species information indicates that habitat where the banded killifish and peregrine falcon have been found may be directly impacted by Route 2. Banded killifish habitat is located near the Calumet River crossing and near the South Branch of Chicago River. Peregrine falcon habitat is located immediately north of the Calumet River crossing.

Indiana

In Indiana there are a number of natural areas within the Area of Analysis for Route 2 that potentially provide suitable habitat for federal and state and threatened species as listed in the tables in Appendix J.

The habitat areas where species have been observed include the Clark and Pine Nature Preserve, Pine Station Nature Preserve, various sections of the Indiana Dunes National Lakeshore, and Furnessville Woods. Species have also been observed along the railroad right of way and other miscellaneous locations. It should be noted that a substantial portion of this route travels through the Indiana Dunes National Lakeshore where some right of way acquisition is expected that could impact federal or state listed species. The Build Alternative would also cross a number of rivers which are potentially suitable habitat for the listed species. However it is anticipated that no new bridge structures would be required over the suitable habitat river corridors and therefore no direct or adverse impacts on those species would occur in these river corridors.

3.20.4.3 Route 4 Impacts

Illinois

In Illinois, Route 4 is the same as Route 2 so impacts are the same as those discussed above for Route 2.

Indiana

In Indiana, Route 4 is almost identical to Route 2. Impacts would be similar as those for Route 2 with the difference being that there is less area impacted in the Indiana Dunes National Lakeshore and the portion of high quality natural area within the park is less, resulting in potentially fewer impacts to listed species.

3.20.4.4 Route 5 Option 1 and Option 2 Impacts

Illinois

In Illinois, Route 5 Option 1 and Option 2 are the same as Route 2 so impacts are the same as those discussed above for Route 2.

Indiana

In Indiana there are a number of natural areas within the Area of Analysis for Route 5 that provide potentially suitable habitat for federal and state threatened species as listed in the tables in Appendix J. The habitat areas where these species have been observed include the Clark and Pine Nature Preserve, Pine Station Nature Preserve, Clarke Junction West Site, Clarke and Pine General. Refractories Addition Site, various sections of the Indiana Dunes National Lakeshore, and Washington Park. Species have also been observed along the railroad right of way and other miscellaneous locations. There would be little to no anticipated disturbance along the portion of the route that travels through the Indiana Dunes National Lakeshore and Washington Park (Porter to Michigan City) and therefore any listed species are not expected to be impacted. Route 5 Option 1 and Option 2 would cross a number of rivers which are potentially suitable habitat for the listed species (see Table 3-32 for a list of major rivers in the Area of Analysis). Any work in the rivers or alterations to any bridge crossings may affect the listed potential species. Identification of affected species and potential impacts will be determined in in Tier 2 NEPA analysis.

3.20.4.5 Route 9 Option 1 and Option 2 Impacts

Illinois

In Illinois Route 9 Option 1 and Option 2 would cross the South Branch of the Chicago River and the Little Calumet River. However these rivers are not suitable habitat for any of the seven federally-listed species with the potential to occur in Cook County. However, there is potential for the remnant prairie containing native species in the Beaubien Woods Forest Preserve and the dry to mesic, wet to mesic, and wet prairies in the Burnham Prairie Nature Preserve may potentially provide suitable habitat for the Eastern Massasauga (*Sistrurus catenatus*), Eastern Prairie Fringed Orchid (*Platanthera leucophaea*), Leafy Prairie Clover (*Dalea foliosa*), and the Prairie Bush Clover (Lespedeza leptostachya). Impacts in these locations would be linear and minimal, rather than fragmenting large parcels.

The habitat where the state-listed banded killifish has been found in the Area of Analysis for Route 9 is located where Route 9 crosses the South Branch of the Chicago River and the Little Calumet River. The state-listed yellow-crowned night-heron is located in the Burnham Prairie Nature Preserve.

Indiana

In Indiana the habitat areas in which listed species have been observed include the Gibson Woods Nature Preserve, Tolleston Ridges Nature Preserve, Ivanhoe South, various sections of the Indiana Dunes National Lakeshore, and Washington Park. Species have also been observed along the railroad right of way. Detailed listing of species is included in the tables in Appendix J. There is little to no construction anticipated along the portion of the route that travels through the Indiana Dunes National Lakeshore and Washington Park (Porter to Michigan City) and therefore any listed species' habitats are not expected to be impacted. Route 9 Option 1 and Option 2 cross a number of rivers which are potentially suitable habitat for the listed species (see Table 3-32 for a list of major rivers in the Area of Analysis). Any work in the rivers or alterations to any bridge crossings may affect the listed potential species. Identification of affected species and potential impacts would be determined in in Tier 2 NEPA analysis. There is no substantial difference between the impacts of Route 9 Option 1 and Option 2.

3.20.5 Potential Mitigation Measures

Section 7 consultation (see Section 3.25.4.4) with USFWS would be conducted during Tier 2 NEPA analysis for the Selected Program Alternative to determine potential impacts to the federal listed species and their habitat. If it is determined that the Build Alternatives could have the potential to affect a federally listed species, a biological assessment would be prepared to determine the Build Alternative's potential effect on one or more species, pursuant to Section 7 of the ESA. If a potential impact to a federally listed species is identified, formal consultation is required with USFWS, and USFWS would prepare a biological opinion on whether the proposed activity would adversely affect (jeopardize the continued existence of) a listed species. Modifications to avoid or minimize impacts, or mitigation measures for unavoidable adverse impacts would be determined as part of the formal consultation.

Potential impacts on state-listed threatened and endangered species would be coordinated with the Illinois DNR, Indiana DNR, and Michigan DNR, as appropriate, during Tier 2 NEPA analysis. Database information regarding species locations and habitat requirements would be a basis for conducting field surveys to determine existence of state-listed species in the Area of Analysis. During Tier 2 NEPA analysis, avoidance or minimization of impacts would be identified and be assessed, and unavoidable impacts on state-listed species would be coordinated with the state agencies to determine potential mitigation measures.

Specific mitigation measures, to the extent required, would be identified and discussed during Tier 2 NEPA analysis after design details of the Selected Program Alternative are known.

During design, areas requiring protection would be shown on plans with instructions for the installation of protective fencing. This fencing would prohibit all work within these areas to avoid impacts to the species. If work restrictions cannot be used effectively during the design process to eliminate impacts to a species then, minimization strategies would be employed. These strategies would reduce impacts to the species and their habitats. Often this requires design changes or different construction techniques that minimize the overall impact to the species.

3.21 Energy Use and Climate Change

This resource includes the use of fuel and the relative energy use for various modes of transportation. Climate change refers to the climate's possible relationship to changes in greenhouse gas (GHG) emissions.

3.21.1 Methodology and Regulatory Requirements

This assessment evaluates potential commitments of energy resources likely to be involved in the Program and any potential energy conservation likely to reduce the use of petroleum or natural gas, consistent with the policy outlined in Executive Order 12185, Conservation of Petroleum and Natural Gas (44 FR 75093). The current regulatory framework affecting greenhouse gases includes the Clean Air Act of 1970 (as amended) and CEQ's NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions.

3.21.1.1 Data Collection and Government Agency Coordination

Transportation model data were collected from IDOT, INDOT, and MDOT, as well as from regional Metropolitan Planning Organizations and Councils of Governments, and are used in this analysis for passenger rail ridership forecast.

Relevant collected transportation data were reviewed, and a general discussion was prepared on the relative efficiencies of the various transportation modes used between Chicago and Detroit/Pontiac and intermediate points in relation to energy consumption and GHG emissions. A more detailed discussion of specific modes of transportation within the Corridor is provided in Section 3.2 (Transportation) and a more detailed discussion of emissions is provided in Section 3.9 (Air Quality).

3.21.1.2 Evaluation of Potential Impacts and Potential Mitigation

The potential effects of the Program on energy use were evaluated based on an assessment of increased energy use from operation of the train under each alternative, and reductions in energy use associated with the anticipated travel mode shift from planes, buses, and private automobiles to the rail system. Similar to the air quality impacts analysis, potential impacts on climate included the evaluation of the increases in CO_2 emissions from operation of the train under each Alternative, and CO_2 emission reductions associated with the anticipated travel mode shift from planes, buses, and private automobiles to the rail system.

3.21.2 Affected Environment

All transportation modes, including new passenger rail service, require various forms of energy resources and each of these resources have different implications on energy use and climate change. According to the U.S. Department of Energy, typical passenger trains are 31 percent more energy efficient than automobiles, and 14 percent more energy efficient than planes based on average British Thermal Units (BTUs) per passenger mile, see Section 3.2 (Transportation) for more information. Therefore, diverted passenger trips from automobiles, buses, and trains to passenger rail can reduce energy consumption and reduce GHG emissions.

GHG emissions, including naturally-occurring water vapor, released into the atmosphere absorb and emit radiation within the thermal infrared range. Because part of this radiation is radiated back towards the lower atmosphere, it results in an elevation of the average surface temperature. This naturally-occurring process (known as the greenhouse effect) is essential to maintaining life on earth; however, the concern is that human-caused emissions of GHG may be altering this process and resulting in excess heat being retained in the atmosphere, contributing to additional warming of the surface. Carbon dioxide (CO_2) emissions, like those produced by automobiles, are key contributors to GHG emissions.

3.21.3 Impacts of the No-Build Alternative

Under the No-Build Alternative, the Program improvements would not be built, and impacts on energy use and climate change would not occur beyond those that could occur due to other projects. Under the No Build Alternative, passenger train service would not be as readily available, resulting in the continued reliance on automobiles, buses, and planes for transportation between Chicago and Detroit. With the continued trend of increasing VMT within the Area of Analysis, energy consumption and GHG emissions related to transportation would likely continue to steadily increase under the No-Build Alternative.

3.21.4 Impacts of Build Alternatives

Energy use under each of the Build Alternatives would be essentially identical as there is only a two percent difference in length between the shortest route (Route 2 at 304.7 miles) and the longest route (Route 9 at 310.2 miles).

With expanded passenger rail service between Chicago and Detroit/Pontiac at speeds up to a maximum of 110 mph, at ten round-trips per day, with standard-stop service to major and minor destinations in the Corridor, the Build Alternatives would provide a competitive transportation alternative compared to automobiles, planes, and buses. For example, as noted in Section 3.2, a rail trip from Chicago to Detroit/Pontiac under the Build Alternatives would be approximately 4.5 hours, which is about the same duration as an automobile trip (assuming an average speed of 65 mph and no congestion).

Energy would be consumed during construction of the Build Alternatives, but reduced energy consumption for transportation would be realized over the long-term. Based on a preliminary passenger rail forecast and an analysis of energy efficiency by mode, the Build Alternatives would provide a net reduction in energy consumption through diverted trips from automobiles, buses, and planes to new passenger rail service. The anticipated energy savings in gallons of fuel saved per year is shown in Table 3-36.

Table 3-36: Build Alternatives – 2035 Estimated Annual Fuel Savings from Diversion of Passenger Vehicle, Bus, and Plan Trips (Gallons per Year)

State	Additional Train Fuel Consumption	Reduction in Fuel Consumption			Total Reduction in Fuel Consumption	*Net Change
		Vehicles	Buses	Planes		
Illinois	598,284	608,423	75,709	90,426	774,559	-176,275
Indiana	1,828,090	1,859,062	231,335	276,302	2,366,698	-538,608
Michigan	10,237,304	10,410,785	1,295,473	1,547,289	13,253,547	-3,016,243
TOTAL	**12,663,678**	**12,878,269**	**1,602,517**	**1,914,016**	**16,394,803**	**-3,731,125**

Note: Totals may not add due to rounding.

** A negative net change indicates that the implementation of the Build Alternative will result in an overall decrease in fuel consumption as the additional rail service is replacing passenger vehicle, bus, and plane trips along a similar route, and use less fuel per passenger then other modes of transportation.*

As shown in Table 3-37 implementation of the Build Alternatives has the potential to provide substantial energy savings on an annual basis. In spite of increased fuel consumption in locomotives (approximately 12.7 million gallons/year), the Build Alternatives are expected to result in reduced fuel consumption of approximately 16.4 million gallons for an annual reduction in fuel use within the Corridor of approximately 3.7 million gallons.

Based on the modal diversions in ridership forecasts, the Build Alternatives would decrease automobile traffic by approximately 466.7 million passenger-miles per year and would reduce bus travel by approximately 51.8 million passenger-miles per year.

As shown in Table 3-37, the Build Alternatives would result in a decrease in emissions of CO_2, the main GHG. The net decrease in CO_2 emissions is calculated to be approximately 10,284 tons/year.

Table 3-37: Build Alternatives – 2035 Estimated Changes in CO_2 Emissions from Diversion of Passenger Vehicle, Bus, and Plane Trips (Tons per Year)

Pollutant	Additional Train Emissions	Reduction in Emissions			Total Emission Reduction	*Net Change
		Vehicles	Buses	Planes		
CO_2	141,687.56	113,850.34	17,929.77	20,190.96	151,971.06	-10,283.51

Note: totals may not add due to rounding.

** A negative net change indicates that the implementation of the Build Alternative will result in an overall decrease in emissions as the additional rail service is replacing passenger vehicle, bus, and plane trips along a similar route, and produce fewer emissions per passenger then other modes of transportation.*

Detailed emission calculations and fuel consumption information can be found in Appendix G.

3.21.5 Potential Mitigation Measures

As shown in Table 3-36, the Program is anticipated to result in an annual reduction in fuel use within the Corridor of approximately 3.7 million gallons. In addition, based on calculated emissions of CO_2, the Program is anticipated to have beneficial effects on climate change due to a decrease in CO_2 emissions and an overall reduction of energy use. Therefore, mitigation is not expected to be required for energy use and climate change due to the expected reductions in fuel use resulting from diverted trips from other modes of transportation within the Corridor. A final assessment of any mitigation requirements would be completed in the Tier 2 NEPA analysis once the Selected Program Alternative is identified.

3.22 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments involve the use or destruction of a specific resource (for example, energy or natural resources such as water, minerals, or timber) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (for example, extinction of a threatened or endangered species or disturbance of a cultural site).

3.22.1 Methodology and Regulatory Requirements

Irreversible and irretrievable impacts were evaluated in accordance with NEPA (42 USC 4332(C)(v)); guidelines published by CEQ on implementing NEPA (40 CFR 1502.16); and FRA's Environmental Procedures Section 14(n)(10), (11) and (22).

Data gathered from the review of all applicable resources analyzed in the Tier 1 EIS were reviewed, notably the consumption of energy (as derived from the assessment of air pollutants generated from the

operation of the proposed passenger trains between Chicago and Detroit/Pontiac) and natural resources (as derived from the assessment of water resources, topography, geology, and soils, natural habitats and wildlife, wetlands, and threatened and endangered species). Additionally, land use anticipated to be converted to transportation improvements (rail and stations) was reviewed.

3.22.2 Affected Environment

The maps in Appendix D show various resources within the Area of Analysis, portions of which may be disturbed or eliminated, such as farmland, parkland, streams, wetlands, woodlands, wildlife habitat, and cultural resources.

Other resources that would not originate directly within the Area of Analysis and would most likely need to be acquired from outside the Area of Analysis may include materials such as steel, petroleum, natural gas, concrete materials, ballast rock, and wood. The locations of these resources is not ascertainable at this time, but would be considered during Tier 2 NEPA analysis.

3.22.3 Impacts of No Build Alternative

Under the No Build Alternative, the Program improvements would not be made, and new commitments of resources would not occur beyond those that could occur related to other projects in the Corridor. Also, energy resources would continue to be consumed by automobiles, busses, and airplanes traveling between Chicago and Detroit/Pontiac at a slightly higher rate than with the Build Alternatives.

3.22.4 Impacts of Build Alternatives

Construction of the Build Alternatives would result in the irreversible and irretrievable commitment of land where additional right of way is needed. The land would be converted from its current condition to a railroad grade and track. Construction materials would consist largely of steel, concrete, ballast rock, and wood. Whereas these materials would be largely irretrievable when used, these resources are not in short supply and many of the materials could be recycled for other projects when they no longer meet the design needs for passenger rail service.

Several energy resources would be committed to the Program, including petroleum, natural gas, electrical, and manpower expenditures for construction, operation, and maintenance. These resources are irretrievable.

In addition to the above resources commitments, federal and state financial resources would be irreversibly and irretrievably committed to the Program for planning and public review, development of Tier 2 NEPA analysis and documentation, design, construction, operation, and maintenance. These financial resources would no longer be available for other federal or state projects.

3.22.5 Potential Mitigation Measures

No mitigation measures are proposed at this time. Tier 2 NEPA analyses would assess the extent of irreversible and irretrievable commitments of resources and to determine if mitigation would be required.

3.23 Short-term Use vs. Long-term Productivity of the Environment

Balancing the relationship between short-term impacts and long-term productivity is an important consideration in determining the Program's feasibility. The following sections discuss short-term impacts to and use of resources, and long-term effects and benefits/losses that could be expected under the No Build and Build Alternatives.

3.23.1 Methodology and Regulatory Requirements

Short-term impacts to and use of resources in relation to long-term productivity were evaluated in accordance with NEPA (42 USC 4332(C)(iv)); guidelines published by CEQ on implementing NEPA (40 CFR 1502.16); and FRA's Environmental Procedures Section (14)(n)(22). Data were gathered from the review of construction impacts and all applicable resources analyzed in this Tier 1 EIS. This analysis qualitatively discusses the relationship between short-term impacts to and use of resources, and the long-term benefits and productivity of the environment.

3.23.2 Affected Environment

Various resources within the Area of Analysis are shown in the maps in Appendix D.

3.23.3 Impacts of No Build Alternative

Under the No Build Alternative, the Program would not be implemented and impacts would not occur beyond those that could occur due to other projects.

3.23.3.1 Short-Term Impacts

Construction of planned projects beyond the proposed Program improvements that would not be implemented could contribute to potential short-term construction impacts related to the following:

- Hazardous materials and waste disposal
- Water quality (erosion and sedimentation, and/or potential fuel and lubricant spills)
- Air quality (equipment emissions and fugitive dust)
- Noise and vibration (construction equipment)
- Property access
- Traffic and pedestrian delays and detours

In addition, short-term employment, use of materials to construct planned projects not in the Program, and purchases of goods and services generated by construction could create a short-term increase in the local economy that would end once the construction phase is completed.

3.23.3.2 Long-Term Benefits

The introduction of additional passenger rail service in the Chicago to Detroit/Pontiac Corridor would contribute to modest improvements in the transportation network, socioeconomic conditions, and at-grade crossing safety. Improved air quality and energy efficiency are also anticipated.

3.23.3.3 Long-Term Losses/Impacts

Long-term adverse impacts on the social and natural environment are expected to be minimal because most of the construction would be contained within existing right of way. Long-term productivity could be minimally affected with some reduction in farmland, slight increases in noise and vibration impacts on sensitive receptors, and increased collision impacts with wildlife.

However, traffic congestion could increase, and energy resources may continue to be consumed by other modes of transportation between Chicago and Detroit/Pontiac, at a slightly higher rate than with the Build Alternatives. This, in turn, could result in increased pollutant emissions and decreased air quality.

3.23.4 Impacts of Build Alternatives

Implementation of the Build Alternatives would result in the short-term impacts and use of resources as described below, while increasing the long-term benefits and productivity of passenger rail transportation, land use, and economic systems.

3.23.4.1 Short-Term Effects

The Build Alternatives would contribute to short-term construction impacts similar to those of the No Build Alternative, discussed above, but to a greater extent because of a longer corridor and additional right of way. In addition, short-term employment, use of materials to construct Program improvements, and purchases of goods and services generated by construction could create a short-term increase in the local economy that would end once the construction phase is completed.

3.23.4.2 Long-Term Benefits

The addition and enhancement of passenger rail service in the Corridor would contribute to improvements in the transportation network and access within the region by providing competitive passenger rail service that would meet the needs of increased future travel demand and more efficient travel between major urban centers.

A reduction in air pollution emissions would occur as a result of passenger rail service replacing automobile, bus, and plane trips, and decreased congestion on local streets and highways. Improved accessibility within the region would also result in economic benefits through employment opportunities

and the potential for development and increased economic activity around station areas. Other long-term benefits would include improvements in at-grade crossing safety and providing an accessible alternative mode of transportation for minority, low-income, elderly, and disabled populations.

3.23.4.3 Long-Term Losses/Effects

Although the Build Alternatives would result in some permanent impacts to waterways, water bodies, wetlands, floodplains, plant communities, natural habitat, and wildlife, coordination with resource agencies would be conducted to minimize impacts through appropriate mitigation measures. Other long-term losses/effects on the productivity of the environment would include the following:

- Removal of existing farmland from productivity
- Reduction of the local tax base as a result of acquiring farmland, commercial, and industrial property for additional railroad right of way
- Potential economic impacts on other modes of public transportation
- Potential acquisition of park land, recreation land, and natural areas
- Noise and vibration impacts on sensitive receptors
- Collision impacts on wildlife

These losses would be further defined during Tier 2 NEPA analysis.

With the initial implementation phase, there would also be less long-term benefits and productivity. As the Program improvements are extended, and speeds and the frequency of round-trips increase with subsequent implementation phases, more operational-related impacts would occur, and more energy and resources would be required. However, there would be more long-term benefits and productivity within or adjacent to the Area of Analysis.

3.23.5 Potential Mitigation Measures

The potential mitigation measures for short-term and long-term impacts are discussed in the previous sections for each respective resource in this chapter.

3.24 Indirect and Cumulative Effects

CEQ regulations implementing NEPA define indirect effects as those that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air, water, and other natural systems, including ecosystems (40 CFR 1508.8(b)).

CEQ regulations define cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future

actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). Thus, cumulative effects include the direct and indirect impacts of a project together with the impacts from reasonably foreseeable future actions of other projects.

Railroad corridors resulted in direct and indirect impacts on the environment in the Midwest commencing in the mid-1800s. However, for this analysis, the focus on past actions is limited to approximately the last 20 years. The time frame for future actions considered is commensurate with the time frame of full implementation, estimated to be the year 2040, or information available in current long-range transportation plans.

Direct and indirect impacts of the Program, as well as other past, current, or reasonably foreseeable regional and state-wide projects, are relevant for review of cumulative effects. Other local projects not related to the Corridor improvements could also contribute to cumulative effects on a resource.

3.24.1 Methodology and Regulatory Requirements

The methodology for conducting the review and evaluation of indirect and cumulative effects is in accordance with federal regulations and guidelines, including NEPA, and CEQ guidelines implementing NEPA.

Data from the following sources was used during review of the potential indirect and cumulative impacts on the human and natural environment as a result of the Program:

- Identification of other major transportation projects in the Area of Analysis through planning documents, including state transportation improvement plans, the Midwest Regional Rail Initiative, state long-range transportation plans, comprehensive plans developed by regional MPOs and COGs
- Land use information
- Internet sources, such as agency or news websites
- Input from government agencies as part of the scoping process

Indirect Impacts

Indirect impacts are evaluated in accordance with 40 CFR 1508.8(b). The potential for other development or other changes to the existing land use or environment potentially induced by the Program was assessed. The potential indirect impacts include further development of land in the vicinity of the Area of Analysis and at rail station locations. Changes in traffic circulation could also modify or require the construction of new transportation infrastructure that could cause indirect impacts on the human and natural environment. The direct impacts on each resource were considered, and the likelihood of the Program to induce additional indirect changes was considered.

Cumulative Effects

The cumulative effects with respect to the Program will be evaluated in accordance with 40 CFR 1508.7, CEQ guidance on assessing cumulative effects (CEQ, January 1997). Projects that could incrementally affect the existing environment along with the Program were characterized. The information acquired for Tier 1 NEPA analysis for cumulative effects included the major transportation projects. Coordination with planning agencies to acquire specific information about local projects for consideration would occur during Tier 2 NEPA analysis. The effects of past actions were included as part of the existing or baseline condition for each resource relevant to the analysis.

Resources on which the Program would have no direct or indirect impact are not considered in the cumulative effects analysis. Resources will be considered within a resource-appropriate Area of Analysis (for example, water resources were considered within a watershed), and the area that would be impacted directly and indirectly varies among different resources. Resources to be considered in the Tier 2 cumulative effects analyses would include all of the social, economic and environmental topics included in the NEPA analyses

3.24.2 Affected Environment

Rail projects associated with indirect or cumulative impacts relative to the Build Alternatives include other proposed improvements that are part of the Midwest Regional Rail System initiative. Of the MWRRS corridors with a terminus in Chicago, currently funded passenger rail projects that are under development at various stages of planning and implementation include Chicago to Omaha; Chicago to St. Louis; and Chicago to Iowa City.

Other railroad projects in the Area of Analysis include the implementation of other higher-speed intercity passenger rail projects. See Figure 1-2 in Chapter 1 (Purpose and Need) to see a map of the MWRRS routes. Final Design/Construction and Preliminary Engineering/NEPA projects in Illinois, Indiana, and Michigan, are presented in Table 3-38.

Table 3-38: Other Railroad Projects within the Area of Analysis

State	Project Name	Description
Illinois		
	Midwest Train Equipment Fleet	This project would provide new rolling stock for the Midwest states of Illinois, Michigan, and Missouri.
	Chicago Terminal Limits for the Midwest Regional Rail System	This project would provide final design and construction for the Quad Cities (the terminal station would be in Moline), Milwaukee, and Omaha corridors as well as preliminary design and NEPA work for the St. Louis, Omaha and Milwaukee corridors.
	Chicago to St. Louis High-Speed Rail Corridor	This project would complete the first phase of ground work for the high-speed rail corridor; it includes final design, rehabilitation and construction of existing sidings, new sidings, and development of a second main line to accommodate train meet points associated with the high-speed rail corridor as well as accompanying signal, bridge, and crossing work.
	Chicago Union Station Master Plan	The study includes short, medium, and long-term opportunities to assist Amtrak, Metra, and other station stakeholders in preparing for capacity and station building improvements. Capacity improvements that are suggested to accommodate increased intercity passenger rail frequencies are included in the medium-term station improvement ideas and are currently unfunded. [116]
	The Chicago Region Environmental and Transportation Efficiency (CREATE) Program's Englewood Flyover	The CREATE program is focused on investing in critically needed improvements to increase the efficiency of the region's passenger and freight rail infrastructure in the Chicago area.[117]
Indiana		
	Indiana Gateway Project	This project consists of new crossovers, additional track to reduce congestion for existing passenger and NS freight service.
	West Lake Corridor Study	NICTD published the West Lake Corridor Study in March of 2011, which identified and evaluated alternatives to serve the broader portions of Lake and Porter Counties with commuter service to downtown Chicago. The study concluded that two separate commuter rail lines from Valparaiso, Indiana in Porter County and Lowell, Indiana in Lake County to Chicago was the most desirable alternative. [118]

[116] Chicago Department of Transportation. *Chicago Union Station Master Plan Study: Final Report.* May 2012.
[117] http://www.createprogram.org. Accessed September 1, 2013.
[118] Indiana State Rail Plan. November 2011. http://www.in.gov/indot/files/Rail_JanFinal_Report_011712.pdf. Accessed September 2, 2013.

State	Project Name	Description
Michigan		
	Dearborn to Kalamazoo	This project includes track upgrades that would provide up to 110 mph speeds between Kalamazoo and Dearborn, Michigan thereby providing continual 110 mph service between Porter, Indiana and Dearborn, Michigan.
	New Passenger Stations	New passenger rail stations located at Troy-Birmingham, Dearborn, and Ann Arbor.
	Refurbished Passenger Stations	Battle Creek
	Woodward Avenue Rapid Transit	This is a study reviewing rapid transit options including commuter rail between Detroit and Pontiac, Michigan.
	Detroit Intermodal Freight Terminal (DIFT)	This project includes several improvements to intermodal operations in southwest Detroit at the Livernois-Junction Yard, and 15 nearby rail locations.
	Ann Arbor to Detroit Regional Rail	This project is a 38-mile route that proposes commuter rail service between Ann Arbor, Ypsilanti, Detroit Metropolitan Wayne County International Airport, Dearborn, and Detroit.
	Washtenaw and Livingston Line (WALLY)	The WALLY Line is a 26-mile service extension that would offer commuter rail service between Ann Arbor, Michigan and Howell, Michigan with several intermediate stops.

Other planning, design and construction transportation projects that were considered include a planning project in Illinois, which consists of studying the feasibility of 220 mph high-speed express passenger service between Chicago and St. Louis.

Chicago's Metra has planned improvements to help offset the demand from the increasing population in northeast Illinois. Metra's four primary projects are the following (Commuter Rail Division of the Regional Transportation Authority, 2012):

- STAR Line – Suburb-to-suburb commuter rail service between Joliet, Illinois, and O'Hare International Airport.
- SES – Commuter service in south Suburban Cook and Will counties.
- UP-NW Line – Expansion of service to eastern McHenry County and the addition of express and reverse-commute service to northwest Cook County.
- UP-W Line – Capacity, speed, and reliability improvements for Cook, DuPage, and Kane Counties

In addition to the aforementioned projects, Metra has initiated an Environmental Assessment and design of an extension of the BNSF line from Aurora to Oswego, Illinois.

Specific major roadway improvement projects within or crossing the Area of Analysis include the following in the addition to the aforementioned projects. These projects are in different phases of

planning and construction; consequently, the availability of information on specific impacts of the projects varies.

- The Illinois State Toll Highway Authority is advancing a new interchange connecting Interstates 294 and 57 on the Tri-State Tollway in the south suburbs near Harvey, Illinois
- The Illiana Corridor Project, a proposed project south of Joliet, Illinois, that would provide a direct connection between I-55 in Illinois and I-65 in Indiana. This project is jointly sponsored by IDOT and INDOT.

Additionally, the Southeast Michigan Council of Governments (SEMCOG) is currently conducting the Woodward Avenue Rapid Transit Alternatives Analysis. The study is evaluating Bus Rapid Transit (BRT) options along the 27-mile long Woodward Avenue Corridor, which would parallel the existing intercity passenger rail service between Detroit and Pontiac, Michigan[119]

Major air travel improvement projects in the Corridor include the Master Plan for the Gary/Chicago International Airport, located in Lake County, Indiana, anticipates many improvements including a runway extension, road acquisition, airspace expansion, improvements to the airport passenger terminal and parking facilities, railroad access improvements and the potential for an additional runway. These improvements are required for the airport to meet minimum FAA standards. The need for a new passenger terminal is not imminent at this time but would be needed if the airport's master planning forecasts are met. The Master Plan anticipates that these improvements will help them to tap into what they define as a constrained Chicago aviation market demand. One of the airport's top priorities is to attract passenger traffic.[120]

This Tier 1 level of NEPA analysis with a 300 mile Area of Analysis, the assessment of cumulative effects was a qualitative evaluation of the potential for cumulative effects rather than a detailed quantitative analysis of past, current, and reasonably foreseeable future projects. If necessary, a more detailed review of potential indirect and cumulative impacts of projects would be conducted during Tier 2 analyses for individual Program improvements.

3.24.3 Impacts of the No Build Alternative

Under the No Build Alternative, the Program improvements would not be built, and no new indirect impacts or cumulative effects are anticipated beyond those that could occur due to other projects. The No Build Alternative would not provide the total improved level and quality of passenger rail service between Chicago and Detroit/Pontiac. The No Build Alternative would have a slight negative contribution

[119] 2040 Regional Transportation Plan for Southeast Michigan. June 20, 2013. http://library.semcog.org/InmagicGenie/DocumentFolder/RTP.Adopted.6-20-13.pdf. Accessed September 11, 2013.
[120] http://www.garychicagoairport.com/masterPlan.asp

to cumulative effects on transportation by continuing the preference of personal automobiles on highways for travel between Detroit/Pontiac and Chicago.

3.24.4 Indirect Impacts of the Build Alternatives

Construction and operation associated with any phase of the Build Alternatives has the potential to cause indirect impacts. Currently there are no other development or infrastructure projects that cannot be advanced without the Build Alternatives. The following is a list of potential indirect impacts identified through evaluation of various environmental resources:

- Operation of passenger trains at speeds up to 110 mph would result in increased noise and ground vibration, as well as air emissions, and visual and aesthetic impacts. These direct impacts could potentially result in indirect impacts of reduced use of nearby parks, recreation areas, and natural areas. Additionally, there could be indirect impacts on wildlife.
- The improved passenger train service would reduce ridership on current transportation services, such as intercity bus and flight service, by offering a competitive alternative to these modes. Therefore, the project may indirectly impact the viability of these modes in the future.
- At-grade crossing improvements and closures could directly impact traffic patterns resulting in additional traffic being re-routed through nearby residential neighborhoods.
- Noise and vibration from passenger rail traffic could cause indirect impacts to cultural resources by affecting visitor experience for those sites that are open to the public.
- Land use and economic development could result indirectly from the construction and use of the suburban station in northwest Indiana as well as other potential improvements to existing stations.
- Proposed improvements to the existing stations and the new station in northwest Indiana will indirectly cause traffic increases in adjacent neighborhoods or business areas due to road closures or detours during construction.
- Passenger rail infrastructure improvements including crossing and signal improvements, track upgrades and construction of a dedicated double track railroad in the SOTL may indirectly benefit existing freight service.

At a Tier 1 NEPA level of evaluation, it is not anticipated that these impacts would be substantial; further evaluation of potential indirect impacts would be addressed during Tier 2 NEPA analysis when more details of the design and operation are known. Specific mitigation measures, to the extent required, would be identified and discussed during Tier 2 NEPA analysis after design details are known, recorded in NEPA documents as specific impacts are identified, and implemented prior to construction when practical and possible.

3.24.5 Cumulative Effects of the Build Alternatives

The majority of projects listed in Section 3.24.2 are linear transportation projects, often occurring either in existing right of way or adjacent to existing right of way, which in urban and suburban areas, is land that

has been previously disturbed. Because drainage is often constructed parallel to transportation improvements, it is likely that these projects would be affecting drainage and could involve impacts to wetlands and other waters of the U.S. In rural areas, it is likely that the other projects may be affecting farmland, natural areas, and wildlife habitat primarily through expansion of existing corridors.

Given that the majority of construction impacts of the Build Alternatives would be within existing right of way and that nearly the entire additional right of way required is adjacent to existing right of way, the physical impacts would be localized. Any new impacts outside of the existing track's footprint and right of way would be relatively narrow, linear, and distributed over a long distance (approximately 300 miles). As a result, the impacts to any given resource (e.g., natural, cultural, agricultural, or socioeconomic) within any given area (e.g., ecosystem, watershed, community) is expected to be relatively small and would have a negligible contribution to cumulative effect when considered with impacts from other projects in those areas.

When considered collectively with the projects listed in Table 3-38, the Build Alternatives would have a slight beneficial contribution to cumulative effects by improving overall air quality and reducing roadway congestion. Should construction of the Selected Program Alternative occur simultaneously with some of the projects in Table 3-38, existing passenger and freight rail services could see temporary increases in delays and congestion, but overall train and vehicular traffic would be maintained throughout the construction period.

Many of the transportation projects identified in Section 3.24.2 are for improvements along the existing alignments, with reconstruction or other modifications occurring either within or adjacent to existing right of way. New impacts of the identified transportation projects outside existing right of way would be relatively narrow and linear. The geographic distribution of the identified transportation projects further reduces the potential for cumulative effects. Consequently, cumulative effects on resources within a designated area, such as a watershed or ecosystem, would likely be minor.

The vast majority of the land use along the Corridor has been, currently is, and will continue to be farmland. The remainder of the Corridor is mostly comprised of highly developed urban areas that would not contribute to the Program's cumulative effects. The only areas that may be experiencing land use changes that could contribute to cumulative effects would be the suburban areas associated with the major metropolitan areas such as Chicago, Gary and Detroit. Land use throughout the Corridor is likely to remain unchanged with the implementation of the Build Alternatives and other proposed projects.

Section 3.24.4 discusses the various benefits resulting from more efficient and enhanced transportation systems. Given the numerous planned transportation projects, air quality, mobility, and safety would cumulatively benefit. Minimal negative cumulative effects associated with these projects would likely occur on farmland, habitat, wetlands, and streams.

As Tier 2 NEPA analyses are conducted, additional information on projects with the potential to have cumulative effects would be collected, and a more detailed analysis of cumulative effects would be conducted, as warranted.

3.24.6 Potential Mitigation Measures

After design details are prepared for the Selected Program Alternative, and required construction activities are known, specific indirect impacts and cumulative effects can be identified. Specific mitigation measures, to the extent required, would be identified and discussed in Tier 2 analysis documents.

3.25 Permits

The various construction activities associated with implementation of the Program would require permits to be issued by other agencies as described in this section. Permitting is important because it can help to avoid, minimize or mitigate environmental impacts.

3.25.1 Methodology and Regulatory Requirements

This section discusses anticipated federal, state, and local permits and/or approvals that are likely to be required to implement the Program. The list of permits was generated based on a review of federal and state government agency databases and the anticipated types of impacts to resources. The presence of wetlands, floodplains, navigable waters, and other resources discussed in previous sections were reviewed to identify what permits will likely be required prior to construction. There will be several types of permits to be obtained prior to construction related primarily to impacts on these types of resources. Specific regulatory requirements are discussed in the following sections. Federal agencies with permitting authority are also required to comply with NEPA, and may use this Tier 1 EIS and subsequent Tier 2 NEPA documents to meet their obligations.

3.25.2 Affected Environment

The Build Alternatives are within two USACE regulatory districts: the Chicago District covers the Area of Analysis in Illinois and most of the Area of Analysis in Indiana except south of Interstate 80/90 in Porter County. The Detroit District covers the entire Area of Analysis in Michigan as well as the aforementioned area south of I-80/90 in Porter County, Indiana.

3.25.3 Permits for the No Build Alternative

Under the No Build Alternative, the Program would not be implemented, and thus would require no permits or approvals. However, projects being completed under other programs within the Corridor would need to acquire any necessary permits and approvals prior to construction.

3.25.4 Permits for the Build Alternatives

The permits listed in this section would be required prior to construction of the Build Alternatives. These permits are associated primarily with the crossing and filling of water resources and wetlands and for construction activity in and around streams and floodways and bridge work.

The need for local permits will be investigated further and discussed in the Tier 2 analysis documents for the Selected Program Alternative when specific impacts are determined.

Permits discussed in this section will be obtained following Tier 2 NEPA analysis, during project design or before construction.

Construction of the Build Alternatives would likely require permits and approvals described in the following sections.

3.25.4.1 Section 404 Permits

Section 404 of the Clean Water Act regulates the discharge of dredged, excavated, or fill material in wetlands, streams, rivers, and other waters of the United States (jurisdictional waters). The U.S. Army Corps of Engineers (USACE) is the federal agency authorized to issue permits under Section 404 for certain activities conducted in wetlands or other waters of the United States. Section 404 permits would be needed from the USACE if the Program improvements cause the discharge of fill material below the ordinary high water mark (OHWM) of jurisdictional waters including wetlands. Generally, any project that includes construction activities in new right of way and/or impacts an aquatic resource will require a Section 404 Permit.

The USACE issues two types of Section 404 permits: general and individual. General permits include "Nationwide Permits" and "Regional General Permits" that are issued periodically for categories of activities that result in only minimal adverse impacts to the aquatic environment. "Individual Permits" are issued for projects with more substantial adverse impacts on a case-by-case basis. Individual Permit authorizations are based on a public interest review that includes a comment period for resource agencies and the public.

For a Tier 1 level of analysis, it is difficult to determine the number and type of permits that may be needed, not knowing the specific design of improvements. The number and type of permits required would depend on the nature of each Program improvement project's specific construction requirements, phasing, and location.

To obtain authorization to disturb regulated aquatic resources, the permit applicant must identify the waters present through wetland delineation and/or stream determination, avoid protected resources where possible, minimize unavoidable impacts, and if necessary, mitigate any remaining impacts. Wetland delineations and stream determinations will be completed for the Selected Program Alternative during Tier 2 analyses when design plans are available.

The following potential construction activities may be required to implement the Program and would need to be reviewed for possible Section 404 permit requirements:

- Culvert extensions
- Bridge/culvert replacements

- Riprap placement and/or flood emergency repairs
- Dredging, excavation, and fill in jurisdictional waters
- Any construction in or around streams or wetland areas

3.25.4.2 Section 401 Water Quality Certification

Section 401 of the Clean Water Act gives authority to each state to issue a water quality certification for any project that needs a 404 Permit. The 401 water quality certification includes verification by each state that the project will not violate water quality standards.

Section 401 water quality certifications for construction would be obtained from each state for Program improvement projects during the design phase of the Program and in conjunction with the Section404 permits.

Illinois Environmental Protection Agency and Department of Natural Resources

Illinois provides a joint permit application form, which is submitted to the Illinois EPA, Illinois DNR, and USACE for a floodplain permit, Section 404 permit, Section 401 Water Quality Certification, and public waters permits.

USACE provides the applicant's Section 404 application to Illinois EPA for Section 401 review and Water Quality Certification. Additional approvals are also required by the Illinois Department of Natural Resources/Office of Water Resources (DNR/OWR) for construction activities within a public body of water and within floodways in accordance with the Illinois Wetland Policy Act of 1989.

Indiana Department of Environmental Management

In Indiana, water permit applications are separate for the various permits; application to IDEM for Section 401 Water Quality permit, application to USACE, Chicago and/or Detroit District to obtain a Section 404 permit, application to the Indiana DNR, Department of Water for public water permits.

If USACE determines that a proposed project will require a Section 404 permit, then the applicant must also apply for and obtain a Section 401 Water Quality Certification from Indiana DEM. Indiana DEM reviews the proposed activities to determine if they will comply with Indiana law, including state water quality standards. In addition, isolated wetlands (those wetlands not regulated under the federal Clean Water Act) are regulated under Indiana's State Isolated Wetlands law. Impacts to isolated wetlands require a State Isolated Wetland Permit from IDEM. IDEM will determine if any state authorizations are needed before an applicant may legally discharge fill materials into wetland, streams, rivers, lakes, and other waters.

Michigan Department of Environmental Quality

The Michigan DEQ/USACE Joint Permit Application covers permit requirements pursuant to state and federal rules and regulations for construction activities in waterways and wetlands. The joint permit application process provides coverage for a Wetlands Protection Permit, required under Part 303 of Michigan's Natural Resources and Environmental Protection Act (Public Act 451 of 1994, as amended) and Section 401 Water Quality Certification.

Michigan provides a joint application permit, which is submitted to the USACE for Section 404 permit and Michigan DEQ for Section 401 Water Quality Certification and public waters permits.

3.25.4.3 Section 9 USCG Bridge Permit

The U.S. Coast Guard's Section 9 bridge permit would be required for any new bridge structures over rivers that are considered navigable by the Coast Guard.

To help enforce the General Bridge Act of 1946, the U.S. Coast Guard (USCG) Bridge Permit, also often referred to as a Section 9 Permit, is required to construct a new bridge or reconstruct or modify an existing bridge over navigable waters of the United States. The purpose of the General Bridge Act of 1946 is to preserve the public right of navigation and prevent interference with interstate and foreign commerce. USCG policy is to protect the freedom of navigation and the quality of the environment, meeting the reasonable needs both of navigation and land traffic.

Typical activities requiring a USCG Bridge Permit are:

- Constructing a new bridge over a canal, channel, stream, river, lake or other navigable body of water
- Modifying an existing bridge or causeway
- Making repairs that alter structural configuration or navigational clearances
- Significantly modifying any substructure or superstructure components

If new bridge crossings or modifications over waterways are required, coordination would commence with USCG under the Tier 2 analyses to determine and define permitting requirements.

3.25.4.4 Section 7 Endangered Species Permits

If endangered species are identified during program implementation, all activity in the immediate area would cease. Consultation with the U.S. Fish and Wildlife Service would be initiated as required by Section 7 of the Endangered Species Act of 1973, and appropriate state or federal permits would be sought. If an incidental take of listed species occurs, then Section 10 of ESA would be applicable.

3.25.4.5 Section 10 of the Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 requires that regulated activities conducted below the ordinary high water (OHW) elevation of navigable waters of the United States be approved by the

USACE. Until 1968, the Rivers and Harbors Act was administered to protect only navigation and the navigable capacity of the nation's waters. In 1968, in response to a growing national concern for environmental values, the policy for review of Section 10 permit applications was revised to include additional factors such as fish and wildlife, conservation, pollution, aesthetics, ecology and general welfare. Regulated activities include the placement/removal of structures, work involving dredging, disposal of dredged material, filling, excavation, or any other disturbance of soils and sediments, or modifications of a navigable waterway. One combined application can be submitted for both Section 404 and Section 10 permits. These permits may be required for any major river crossing improvements.

3.25.4.6 State Resource Agency Floodplain Encroachment Permits

Construction in the floodways and floodplains of the rivers, lakes and streams generally requires a permit from the state in which the water body is located. The floodway is the channel and the adjacent portion of the floodplain that is needed to safely convey and store flood waters. Permits are required to ensure that proposed development projects meet the requirements of the National Flood Insurance Program (NFIP) and each community's local floodplain management ordinance. Each community reviews proposed projects to verify that all required permits required by federal or state law have been received. Coordination would take place with each state and local jurisdictions, as appropriate, to determine specifics regarding permits for floodplain impacts.

The following state agencies issue construction in a floodway permits for activities within the Area of Analysis:

Illinois

Illinois DNR/OWR permits are either regulated under Part 3700 - Construction in Floodways of Rivers, Lakes and Streams or Part 3708 if it is in northeast Illinois. For Illinois, this will come under the joint permit with application with the USACE, and the Illinois Environmental Protection Agency as discussed above. It is designed to simplify the approval process for the applicant seeking project authorizations from the three agencies.

Indiana

Applicants must submit a Construction in a Floodway Permit State Form 42946 to Indiana DNR/DOW.

Michigan

The Michigan DEQ/USACE Joint Permit Application package would be submitted by MDOT to cover permit requirements pursuant to state and federal rules and regulations for construction activities where the land meets the water and including wetlands, often referred to as the land/water interface. It is intended to prevent duplication of state and federal regulations. The Joint Permit Application process provides coverage for the Floodplain Permit. Any work within the channel of streams or rivers is regulated by the Michigan Department of Natural Resources (MDNR) and would require a permit under Part 301 of P.A. 451 (1994, as amended).

3.25.4.7 Section 402 National Pollution Discharge Elimination System Permit

Discharge of stormwater during construction will be addressed under the NPDES permitting and with best management practices (BMPs).

The disturbance of one or more acres of total land area is subject to the requirements of a NPDES permit for stormwater discharges from the construction sites.

USEPA regulates non-point source discharges through its stormwater program pursuant to the Clean Water Act. The USEPA has given Illinois, Indiana, and Michigan the responsibility to administer the NPDES permit to govern stormwater runoff from construction activities that disturb one acre of land or greater.

Illinois EPA administers and enforces NPDES permits in Illinois. Illinois EPA uses General Permit No. ILR10 for construction activities that will result in the disturbance of 1 or more acres of land subject to the Clean Water Act, the Illinois Environmental Protection Act and the Illinois Pollution Board Rules and Regulations. In order for stormwater discharges from construction sites to be authorized to discharge under this general permit, the applicant must submit a NPDES Notice of Intent (NOI) in accordance with state requirements. Unless notified to the contrary, 30 days after the date the NOI is received by Illinois EPA, applicants who submit a NOI in accordance with the requirements of this permit are authorized to discharge stormwater from construction sites under the terms and conditions of this permit.

Indiana DEM administers and enforces NPDES permits in Indiana in accordance with Construction/Land Disturbance Storm Water Permitting (327 IAC 15-5, Rule 5). It is designed to reduce pollutants, principally sediment that are a result of soil erosion and other activities associated with land-disturbing activities.

Michigan DEQ administers and enforces NPDES permits in Michigan. A Notice of Coverage must be filed with DEQ, including a copy of the Soil Erosion and Sedimentation Control (SESC) permit, a location map, a copy of the SESC plan for the project, the name and certification of the responsible stormwater operator, and the filing fee.

3.25.4.8 Air Pollution Control Permits

It is expected that much of the concrete needed for construction of the Build Alternatives would be sourced from existing batch plants across the region; however, the potential need for project-specific concrete batch plants would be discussed in the Tier 2 NEPA analyses. Should project-specific batch plants be required for construction, those batch plants would need to obtain air pollution control permits from the respective state air pollution control agencies prior to construction or relocation of the batch plant.

3.25.4.9 Coastal Zone Permits

Each state has developed a Coastal Zone Management Program for coastal zone in their respective state, see Section 3.18 (Coastal Zone Management Areas). These programs outline the framework in which to protect natural resources within the designated Coastal Zones. However none of the states require separate permits for work within the coastal zones as permits are required under current authorities for protection of natural resources such as air quality, wetlands, and floodplains.

3.25.4.10 National Park Service Permits

If Route 2, Route 4 or Route 5 is selected as the Preferred Alternative, and right of way is required from the Indiana Dunes National Lakeshore National Park, coordination with the National Park Service would be required to comply with Section 4(f), see also Section 3.12 (Section 4(f)). Additional permits or approvals may be necessary if they have park-specific legislation or policies. If necessary, this review would be conducted during the Tier 2 NEPA analysis of the Selected Program Alternative.

3.25.5 Potential Mitigation Measures

Specific mitigation measures would be implemented as appropriate per each individual permit and approval. For example, Section 404 Permits may require mitigation measures for both temporary and permanent impacts to wetlands, streams, rivers, and other waters of the United States. Specific mitigation measures, to the extent required, would be identified and discussed for the Selected Program Alternative during Tier 2 analyses after design details are known, recorded in NEPA documents as specific impacts are identified, and implemented.

3.26 Construction Impacts

This section includes a discussion of potential impacts from construction equipment and personnel, impacts on the public during construction, as well as impacts to existing rail operations.

3.26.1 Methodology and Regulatory Requirements

The *FRA Procedures for Considering Environmental Impacts*[121] Section 10 (b) (23) requires impacts during the construction period to be considered in the environmental assessment process. The various ways in which construction activities can physically affect properties near the construction sites were reviewed. The following types of impacts are most often associated with construction activities:

- Waste Disposal – solid and hazardous
- Water Quality – erosion and sediment; fuel and lubricant spills

[121] Federal Railroad Administration. FRA Procedures for Considering Environmental Impacts. Federal Register Vol. 64, No. 101. May 26, 1999.

- Air Quality – equipment emissions and fugitive dust
- Noise – heavy construction equipment
- Vibration – pounding, drilling and blasting activities
- Access – pedestrian and rail access to facilities, services, businesses, and parking
- Traffic – traffic management, detours
- Safety – public safety around construction sites, emergency vehicle access

3.26.2 Affected Environment

Sensitive resources that are often most affected by construction activities include sensitive land uses such as residential neighborhoods, schools, places of worship, parks and recreational areas, and sites that have equipment that may be sensitive to vibration. The locations of these resources are described in detail in the specific sections dealing with these resources. The specific resources are shown on the maps in Appendix D.

Utilities within the Corridor may also be affected by construction activities. Rural areas typically include fiber optic and other communication lines sharing right of way along the railroad while utility crossings of communication, gas, oil and power utilities typically occur at roadway crossings. Within urban areas, many more utility crossings occur including sanitary sewer, water, storm sewer, communication, gas, electric, and major oil and gas pipelines. Other utilities include petroleum products pipelines. In Indiana these include Amoco, Wolverine, Shell, Wabash, Explorer, Buckeye, Phillips, Marathon, ARCO, US Steel, and Northern Indiana Public Service Company. Other utility companies include at a minimum ComEd, DTE Energy, Consumers Energy, SEMCO, NIPSCO, Peoples Gas, American Water Company, AT&T, Sprint, Verizon, and Comcast. During Tier 2 NEPA analyses, utility companies would be coordinated with to determine what utilities would be potentially impacted.

3.26.3 Impacts of the No Build Alternative

Under the No Build Alternative, construction would be limited to regular maintenance activities, and improvements related to other existing and programmed projects. Construction impacts from these projects would be addressed separately and follow environmental requirements for construction such as stormwater permitting to minimize construction impacts. Impacts to railroad operations from existing regular maintenance activities are expected to be the same or similar as currently experienced.

3.26.4 Impacts of Build Alternatives

Typical main line improvements for the Build Alternatives include construction of an additional track through much of the Area of Analysis to increase rail capacity and limit conflicts with existing rail operations. The areas where additional track is needed are located primarily from Chicago to Porter, Indiana. Other construction activities along the mainline include an upgrade of the rails, cross ties, signalization, and grade crossing protection throughout the Area of Analysis. Tree and brush clearing

would be necessary to construct additional track and embankment, and to improve site distance at crossings for vehicle and train traffic. In addition to these main line improvements, other potential construction activities include a new passenger station in northwest Indiana and new maintenance facility in Pontiac, Michigan.

Tree and brush clearing could affect natural habitats and may consequently impact the wildlife species that inhabit those areas. Construction may also result in temporary impacts, including increases in waste disposal, potential impacts to water quality, air quality, increased noise levels, vibration, dust, traffic congestion, visual changes, and disrupted access to properties and neighborhoods. Specific construction activities would be described in Tier 2 NEPA analysis documents as the Program improvements and future operations are more defined. Specific construction impacts would also be evaluated in more detail in Tier 2 NEPA analysis. Typical impacts that can be expected on any of the Build Alternatives are discussed in the following sections.

3.26.4.1 Rail Traffic

Rail traffic can be affected as operating speeds are reduced through the construction zones. This may add to rail travel time and in turn increase cost to rail operators. There may be temporary cessation of rail operations on affected track sections for limited times.

3.26.4.2 Noise and Vibration

Construction activities often involve heavy equipment that generates noise. Some construction activities, including pile driving and rock excavation with explosives, would generate noise, and in some cases, would cause vibrations that may temporarily affect properties off-site. Areas that could be impacted by construction noise and vibration would be identified in Tier 2 NEPA analyses. See Section 3.8 (Noise and Vibration Impacts) for more information about potential impacts from noise and vibration.

3.26.4.3 Air Quality

Construction activities would include short-term air emissions from on-site heavy equipment as well as fugitive dust and particle debris from demolition and excavation activities. See Section 3.9 (Air Quality) for more information about potential air quality impacts.

3.26.4.4 Waste Disposal

The construction of any of the Build Alternatives has the potential to generate waste material from clearing plant material, excavation, and removal of existing track and railroad ties where replacement is warranted. Other examples of site waste may include construction material packaging, broken equipment/parts, and other excess material. It is anticipated that some of the soil material would be reused for fill material in other construction areas associated with the Build Alternatives or other nearby construction projects. During typical construction activities, small amounts of soil may be contaminated through on-site motor or hydraulic oil spills and previously contaminated soils. Groundwater from past disposal could also be encountered and need to be properly handled.

Within areas of additional right of way acquisition, there may be instances where demolition of existing structures or buildings would be required within the areas of additional right of way acquisition. However, some of these buildings or structures may include small amounts of hazardous waste; especially in older industrial areas that are prevalent in the developed portions of the Area of Analysis fronting existing rail lines.

During Tier 2 analyses, affected areas of the Selected Program Alternative would be reviewed for potential contamination concerns. Sampling and analysis would be performed as needed to better characterize and determine the extent of contamination and to determine ways to mitigate it.

3.26.4.5 Water Quality

It is expected that in some locations, construction activities will occur within, adjacent to, or near streams, wetlands, and bodies of open water. As described above, construction debris and potential spills may occur that would have the potential to impact water quality from stormwater runoff from the construction site. See Section 3.16 (Water Quality Resources) for more information about potential water quality impacts.

3.26.4.6 Access

During construction, access to adjacent properties may be impacted on a temporary basis. Within urban areas and small communities, existing businesses could experience inconvenience and potential short-term economic hardship during construction because of access disruptions and traffic delays.

3.26.4.7 Traffic and Safety

Slow-moving heavy equipment would be entering and exiting the construction sites in the Area of Analysis throughout the construction period. In addition, vehicular traffic would be temporarily affected at locations where grade crossing will be separated, modified, or improved. While the exact construction zones are not known at this time, temporary lane closures or roadway closures will be required to construct some of the proposed improvements. If not properly planned and coordinated with local jurisdictions, this can cause conflicts with existing traffic and can impact motorized and non-motorized safety.

Where impacts to vehicular traffic exists, emergency services, schools, businesses, and other activities requiring vehicular access would be affected by potential delays or detours. However, construction related impacts on vehicular traffic would be temporary. Traffic maintenance planning would be coordinated with schools and emergency service providers.

In general, construction activities for corridor improvements would affect rail traffic by reducing operating train speeds through the construction zones, adding to rail travel time and, in turn, cost. This would occur when adding new siding tracks, double-tracks, and connection tracks, upgrading signals, and modifying grade crossings. The other impact would be schedule adjustments for existing operations to create windows of opportunity for temporary shutdown of rail operations on selected track sections, such

as when the new turnouts are being placed for the passing sections and new sidings, or when there is a potentials safety risk, such as during the construction of a flyover. During construction, there may be track outages that would interrupt intercity passenger rail service. As necessary bus service would be provided along the Corridor to replace intercity passenger rail service lost during construction. Permission and participation from the railroad owners would be required for all alternative construction that would take place within the railroad right of way.

3.26.4.8 Utilities

All Build Alternatives would require the relocation of utilities in areas affected by construction of Program improvements. Most utility impacts are likely to occur at grade crossings, flyovers and stations as well as where new construction occurs outside of the existing right of way. Many utilities that cross under the railroad may not meet current standards and could be upgraded at the time of construction, such as the need for encasement of the utility within the right of way.

All of the Build Alternative routes cross pipelines and all require the acquisition of some right of way along the Corridor and at the new station location in northwest Indiana. These would likely result in some utility relocations. Potential indirect impacts could result as relocations are made within or outside of the right of way including temporary shutdown and/or protection of the utilities during construction.

Routes 2, 4 and 5 (Option 1 and 2) could connect to the Commonwealth Edison (ComEd) utility right of way just east of the Englewood Flyover, and travel within the right of way to Indiana. The 100-foot wide ComEd corridor is currently used as an overhead utility corridor. This corridor has the ability to accommodate rail operations but impacts are expected to the ComEd overhead utilities. Impacts could include temporary shutdown and/or protection of the utilities during construction.

Once design features are identified, additional information would be gathered in Tier 2 NEPA analyses to locate and identify utilities and to develop ways to avoid or minimize impacts to utilities.

3.26.5 Potential Mitigation Measures

Impacts from construction activities would be reviewed and mitigation would be developed during the Tier 2 analyses. Information available at this stage is not sufficient to define specific construction noise and vibration mitigation measures. It would be appropriate to develop and implement a mitigation plan for the final design and construction phases. The objective of such a plan is to minimize damaging construction noise and vibration using all reasonable and feasible means available and to outline the procedure for establishing threshold and limiting noise and vibration values. The plan should also include the development of noise and vibration plans to monitor compliance during construction.

Potential construction impacts are typically mitigated through the following measures:

3.26.5.1 Existing Rail Operations

- Coordinating with railroad owners in order to minimize impacts within the railroad right of way

- Adjusting schedules for operations and limited temporary shutdowns
- Staging construction in a way that limits conflicts

3.26.5.2 Noise and Vibration

- Equipping and maintaining muffling equipment for trucks and other construction machinery to minimize noise emissions
- Limiting times and duration of construction activities adjacent to sensitive land uses
- Employing limits and controls on drilling and blasting activities

3.26.5.3 Air Quality

- Adhering to construction permit conditions and all state and local regulations in regard to emissions and exhaust, fugitive dust, and burning of debris

3.26.5.4 Waste Disposal

- Recycling construction debris, if possible, at facilities that are in compliance with federal, state, and local regulations
- Testing hazardous waste if encountered
- Handling, collecting, and disposing of waste materials in accordance with federal, state, and local regulations

3.26.5.5 Water Quality

- Managing stormwater runoff through NPDES and all other federal, state, and local permitting processes
- Implementing BMPs for control of soil erosion and other pollutants
- Properly storing hazardous materials away from water bodies and wetlands in a self-contained upland location

3.26.5.6 Access

- Developing a traffic mitigation plan for construction sequencing to maintain reasonable access to adjacent properties, including special provisions to accommodate emergency vehicle access to the site and adjacent properties, as well as adjacent populations of elderly and disabled persons.

3.26.5.7 Traffic and Safety

- Coordinating with Illinois DOT, Indiana DOT, and Michigan DOT as well as local jurisdictions to develop and implement a traffic control and safety plan

Specific mitigation measures, to the extent required, would be identified and discussed during Tier 2 NEPA analyses after design details are known. Specific impacts would be identified, recorded in NEPA documents, and implemented during the Program's construction period(s).